ISSN 1927-0526 (Print)
ISSN 1927-0534 (Online)

Journal of Educational and Developmental Psychology

Vol. 7, No. 1 May 2017

CANADIAN CENTER OF SCIENCE AND EDUCATION

Editorial Board

Contents

Contents

Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Sleep Problems in Children with Autism Spectrum Disorders

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Received: September 29, 2016 Accepted: November 25, 2016 Online Published: November 28, 2016

doi:10.5539/jedp.v7n1p1 URL: http://dx.doi.org/10.5539/jedp.v7n1p1

Abstract

This study examines sleep problems of children with Autism Spectrum Disorder (ASD), as reported by their parents. To investigate this issue a total of 35 children with ASD and 35 children of Typical Development (TD) were selected from northern Greece. A structured questionnaire (Williams et al., 2004) was used, a modified version of the questionnaire study conducted by the Kosair Children's Hospital Sleep Center (Gozal, 1998). Results show that children with ASD often experience sleep problems compared to TD individuals and also exhibit frequent awakenings during the night, difficulty in falling asleep, breathing concerns during sleep, morning headaches, sleepwalking, nightmares and fall asleep at school.

Keywords: autism spectrum disorder, sleep problems, children

1. Introduction

According to the DSM-5 (2013) of the American Psychiatric Association, individuals with Autism Spectrum Disorder (ASD) are characterized by restricted interests and repetitive behaviors and a severe delay in social interaction and communication difficulties. Studies demonstrate between 44% and 83% of children with ASD experience sleeping problems (Ferber, 1996; Richdale, 1999). Over the last two decades, a multitude of studies have been conducted concerning the characteristics of the sleep of individuals with ASD, in order to clarify their nature and the possible causes.

Sleep is a normal function, which ensures that a given individual receives the necessary amount of rest to enable him/her to maintain a stable level of alertness and effectiveness during the day. The process of sleep interacts with the process of waking and determines when the person is in a state of alertness and when in a state of sleep (Atkinson et al., 2000). As Glickman (2010) reports, the model of sleep implies the coexistence of two mechanisms that shape the arrangement between sleep and waking: the sleep homeostasis and the circadian pulse (Borbély, 1982; Borbély et al., 1989). This process is reflected in a sequence of five stages, four of which are referred to as periods of Non-Rapid Eye Movement (NREM), while the fifth is referred to as Rapid Eye Movement (REM). Measurement of the eye movements begins at the stage when the individual is still awake, lying down with his/her eyes closed, shortly before he/she enters the state of sleep.

During REM sleep, also known as the dream period, the eyes make very fast movements, the brain is overstimulated and the limbs are loose (Society of Neuroscience, 1996). During sleep, the human brain may present 4-6 periods of REM, usually every half an hour, following a gradual increase in duration as sleep deepens (Society of Neuroscience, 1996). NREM sleep is characterized by muscle relaxation, together with a significant reduction in heart and respiratory rates (Atkinson et al., 2000).

The criteria for the classification and diagnosis of sleep disorders are included in the ICSD-2 (AASM, 2005) and the DSM-5 (APA, 2013). Sleep problems are common in childhood, both in typical developing children and children with developmental disabilities (Polimeni et al., 2005). Studies have demonstrated significant levels of correlation between developmental disorders and sleep problems, ranging from 44% to 83%, regardless of mental level (Krakowiak et al., 2008; Polimeni et al., 2005; Richdale, 1999). Furthermore, the percentages of insomnia (40-80%) in this population are significant (Johnson et al., 2009). Also, the prevalence of sleep disorders in children with ASD is higher than in children with other delays (Goodlin-Jones et al., 2008; Krakowiak et al., 2008) and is not associated with age (Goldman et al., 2012; Maski & Kothare, 2013).

Sleep disturbance often causes discomfort to both children and their parents and can affect the child's functioning during the day (Stores, 1999). In fact, the less nocturnal sleep children with ASD get, the more serious the symptoms of ASD become. To be more precise, their stereotyped behaviors and social skills deteriorate (Schreck et al., 2004). Moreover, repeated awakenings during the night, difficulties in morning awakening, as well as an increase in the duration of the latent period of sleep are the most commonly reported sleep problems (Patzold et al., 1998; Richdale & Prior, 1995; Williams et al., 2004), which result in a shorter total duration of sleep.

Such anomalies suggest that sleep problems may reflect a circadian rhythm in the everyday neurobehavioral and endocrine functions of the individual (Glickman, 2010). The causes, however, of sleep disorders in people with ASD still remain unclear. According to parental testimonies, night waking is a common characteristic of children with ASD, although its frequency is similar to that of TD children (Richdale & Schreck, 2009). However, long-lasting periods of night waking are extremely unusual, as they generally last two or three hours. During this time the child may simply laugh or utter words, wake up screaming or play with items in the room (Malow et al., 2006; Schreck et al., 2004).

The majority of individuals with ASD will experience sleep disorders at some point in their childhood, particularly under the age of eight (Richdale & Prior, 1995). Usually, the interventions that are applied to the sleep problems of children with ASD are behavior-based approaches. Behavioral interventions help both Typical Developing (TD) children (Mindell et al., 2006) and children with ASD (Hall, 1997) to address particular problems related to the initiation and maintenance of sleep. Studies (Didden et al., 1998; Durand, 2002; Durand & Christodulu, 2004; Weiskop et al., 2001; Weiskop et al., 2005) support the application of behavioral methods in controlling the behavior of an individual who is stressed from sleep deprivation. The role of the family is also important in such programs (Weiskop et al., 2001). However, various other studies suggest medication as a means of reducing disturbed behaviors during sleep, particularly the administration of melatonin (Dogde & Wilson, 2001), which is the hormone that helps regulate the circadian sleep-wake cycle.

2. Methods

2.1 Objectives and Hypotheses Tested

The hypotheses tested were the following: a) Do sleep disorders vary with the presence or absence of autism spectrum disorder? b) Is the age of the individual considered to be an important factor in sleep problems (It was hypothesized that the younger a child was, the higher the rates in individual categories of sleep problem would be. In this light, the sample of the two groups was divided into three age groups.)? c) The survey also aimed to examine the medications taken by different individuals and determine whether they affect sleep or the appearance of disorders in the sample. However, the size of the sample to which medication, to overcome sleep problems, was given was limited (n = 3 in 70 individuals), d) Finally, are there gender differences in sleep disorders?

2.2 Sample

This study included 70 parents, 35 children with ASD and 35 of TD children. Of the total number of children, 72.9% (n = 51 children) were boys and 27.1% (n = 19) were girls. To be precise, the sample of the group with ASD consisted of 27 boys (77.1%) and 8 girls (22.9%), whereas the typical population group consisted of 24 boys (68.6%) and 11 girls (31.4 %). The first part of the questionnaire consisted of seven questions concerning the demographics and other personal information of the groups. The survey involved the parents of children aged 4-14 years. The sample was classified into three age categories. Of the total sample, 18.6% (n = 13 children) were aged 0-5 years, 40% (n = 28) were aged 6-11 years, while 41.4% (n = 29) were 12 years or older. Concerning people on the autism spectrum, the percentages were 17.1% (n = 6) aged 0-5 years, 37.1% (n = 13) aged 6-11 years and 45.7% (n = 16) aged 12 years and over, while the percentages for the typical population group were 20% (n = 7) aged 0-5 years, 42.9% (n = 15) aged 6-11 years and finally 37.1% (n = 13) aged 12 years and above (Table 1).

Table 1. Demographic and other characteristics of the sample

	ASD		TD		Total	
	n	%	n	%	n	%
Sex						
Boys	27	77.1	24	68.6	51	72.9
Girls	8	22.9	11	31.4	19	27.1
Age						
0 to 5	6	17.1	7	20.0	13	18.6
6 to 11	13	37.1	15	42.9	28	40.0
12 and above	16	45.7	13	37.1	29	41.4
Other Conditions						
Yes	1	2.9	3	8.6	4	5.7
No	34	97.1	32	91.4	66	94.3
Taking Medicine						
Yes	5	14.3	3	8.6	8	11.4
No	30	85.7	32	91.4	62	88.6
Taking Medicine about Sleep						
Yes	3	8.6	0	0.0	3	4.3
No	32	91.4	35	100.0	67	95.7

2.3 Measures and Procedures

An anonymous questionnaire was completed by the parents with Likert responses. The questionnaire consisted of three parts: a) demographics, b) the quantity of sleep, and c) behavioral problems in sleeping. The largest part of the questionnaire had been used in previous research (Williams et al., 2004), which was a modified version of the questionnaire study conducted by the Kosair Children's Hospital Sleep Center (Gozal, 1998). Parental participation was voluntary. The children who participated in the survey have been diagnosed with ASD and mild or severe mental disability by State-Approved Evaluation Centers in Greece. The sample of TD did not exhibit any mental disorder or disability and served as the control group.

The questionnaire was distributed to parents with children from both groups, with the aid of the headmasters and teachers of children's school units.

2.4 Statistical Analysis

In order to check the consistency of the means of data collection, a reliability analysis was conducted using Cronbach's a. In order to describe the quantitative variables which were involved in the statistical analysis, use was made of average values (mean), standard deviations (standard deviation = SD), minimum-maximum (min-max), and also the tendencies of the third and fourth moments of distribution (skewness and kurtosis). In the case of qualitative data, the description was made by recording the absolute (f) and the relative frequencies (%). To compare quantitative variables with the extraction of the key findings, Student's hypothesis test was used (independent samples t-test). The influence of categorical data on the formation of continuous variables was examined by means of a two-way ANOVA test at a significance level of $\alpha = 5\%$,, while the hypothesis of equality of variances was tested by means of the Levene's test. For the processing and statistical analysis of the data, the software package IBM SPSS Statistics 20 was used.

3. Results

3.1 Characteristics of Quantity of Sleep

Table 2 shows the frequencies and relative frequencies of responses, both for the whole sample and for each of the studied groups separately.

Table 2. Descriptive measures of quantitative characteristics of sleep

	ASD		TD		Total	
	n	**%**	**n**	**%**	**n**	**%**
Time that nighttime sleep starts						
7-8	1	2.9	0	0.0	1	1.4
8-9	3	8.6	2	5.7	5	7.1
9-10	14	40.0	14	40.0	28	40.0
10-11	12	34.3	16	45.7	28	40.0
11 or more	5	14.3	3	8.6	8	11.4
Number of hours of nighttime sleep						
6-7	11	31.4	2	5.7	13	18.6
8-9	20	57.1	25	71.4	45	64.3
10-11	4	11.4	8	22.9	12	17.1
Number of hours of daytime sleep						
0	21	60.0	16	45.7	37	52.9
1	5	14.3	7	20.0	12	17.1
2-3	4	11.4	11	31.4	15	21.4
5 or more	5	14.3	1	2.9	6	8.6

The above table shows the results of the parental reports concerning the quantitative characteristics of their children's sleep. More precisely, regarding the question about the time of sleep onset, the largest values are for the periods 9-10 p.m. (40%: n = 14) and 10-11 p.m. (40%: n = 14). For the children in the typical population group, 40% were reported to experience onset of sleep from 9-10 p.m. (n = 14) and 45.7% from 10-11 p.m. (n = 16). For the question concerning the evening hours of sleep, 64.3% of children were reported to get 8-9 hours of sleep (n = 45 children). The parents of children with ASD responded that 31.4% of the children (n = 11) slept around 6-7 hours at night, 57.1% (n = 20) 8-9 hours, while only 11.4% (n = 4) slept 10-11 hours. In response to the same question, 71.4% (n = 25) of the parents of TD children replied that their children slept around 8-9 hours at night, while 5.7% (n = 2) reported that their children slept for 6-7 hours and 22.9% (n = 8) gave a response of 10-11 hours. The third question in Table 2 concerns sleeping time during the day: 52.9% (n = 37) of all respondents reported that their child did not sleep at all during the day, while 21.4% (n = 15) responded that their child slept for 2-3 hours. Regarding the subgroups, the values that concern children with ASD are 14.3% (n = 5), which represents one hour of sleep during the day, while 60% (n = 21) of the children do not sleep at all during the day, 11.4% (n = 4) sleep for 2-3 hours and 14.3% (n = 5) for over 5 hours. Of the TD children, 20% (n = 7) sleep one hour during the day, 31.4% (n = 11) about 2-3 hours, 45.7% (n = 16) do not sleep at all, and only 2.9% (n = 1) sleep for over 5 hours.

3.2 Reliability of the Data Collection Instrument

At the beginning of the study, a reliability analysis was carried out for the part of the questionnaire which outlines the children's sleep disorders that are under examination. In Table 3, Cronbach's a scale records the sleep disturbances both for the total number of children in the sample and for each group separately. Values greater than 0.500 may be considered to ensure the cohesion of the individual components and their behavior as constituent members of a group.

Cronbach's a index was $a = 0.866$ for the whole of the sample, $a = 0.870$ for the children with ASD and $a = 0.820$ for the TD group. The conclusion drawn is that the scale that was used has a high internal validity for the study sample.

3.3 Scale Measuring Sleep Disorders

The table below (Table 3) show the distribution of frequencies and relative frequencies for all the responses that were given for each question separately. These form the scale of sleep disorders in the children that were examined. The answers are presented for children with ASD and TD in Table 3, thus providing a first indication of random variation in their sleep disturbances. In this section we take into account the results based on parents' reports of sleep disturbance occurring "often" or "almost always". This section of the questionnaire included 23 categories of sleep disorder (Williams et al., 2004).

More specifically, 10% (n = 7 individuals) of parents feel that their TD and children with ASD is often or almost always restless in its sleep, while 11.4% (n = 8) feel that their children has difficulty in falling asleep. 11.4% of the children (n = 8) are reluctant to sleep in their own bed, 12.9% (n = 9) exhibit numerous awakenings during sleep, while 20% (n = 14) often or almost always experience difficulty in awakening in the morning. Cases of enuresis at bedtime amount to 8.6% (n = 6). 7.1% (n = 5) of parents state that their children seem disoriented for a short time after the morning awakening and as many as 7.1% (n = 5) observe that their children often or almost always breathes through the mouth during the day. According to the following categories of disorder mentioned in the questionnaire, 8.6% (n = 6) of the children grind their teeth (bruxism) during sleep, 7.1% (n = 5) snore, 15.7% (n = 11) exhibit fear and anxiety, making it impossible to sleep in the dark, 10% (n = 7 individuals) seem to be easily disturbed by noise and wake up, while talking in one's sleep also occurs in 8.6% (n = 6). Furthermore, 11.4% (n = 8) exhibit difficulty in breathing during sleep, 7.1% (n = 5) exhibit self-mutilating behavior (head banging) and 11.4% (n = 8) frequently or almost always interrupt their sleep to visit the toilet. Indeed, 10% (n = 7) of the children have been observed to fall asleep at school, while a further 10% (n = 7) of the children have been reported to wake up suddenly from sleep screaming and shouting. Another 10% (n = 7) of the parents' responses indicate that their children often or almost always has nightmares, while 8.5% (n = 6) report cries during the night, and 11.4% (n = 8) morning headaches. Finally, 10% (n = 7) of the children have been observed to sleepwalk.

Table 3. Frequencies and relative frequencies of responses of parents in each question for the TD & ASD group

TD frequencies (%)	Sleep disorders	ASD frequencies (%)
2.9%	Restless sleep	17.2%
2.9%	Difficulty falling asleep	20%
8.6%	Unwillingness to fall asleep in own bed	14.3%
0%	Frequent awakenings	25.7%
25.7%	Difficulty arousing	14.3%
2.9%	Enuresis	14.3%
0%	Disoriented waking	14.3%
5.8%	Daytime mouth breathing	8.6%
8.6%	Bruxism	8.6%
5.8%	Snoring	8.6%
20%	Fear of sleeping in dark	11.5%
5.8%	Awakens to noise	14.3%
0%	Vocalizes in sleep	17.2%
0%	Breathing concerns	20%
0%	Head banging	14.3%
8.6%	Gets up to go to bathroom during night	14.3%
2.9%	Wakes up screaming	17.2%
0%	Falls asleep at school	20%

0%	Nightmares	20%
2.9%	Cries during night	14.3%
2.9%	Morning headaches	20%
0%	Sleepwalking	20%
0%	Apnea	0%

17.2% of the parents with ASD children reported (n = 6) that their children exhibited restless sleep, 20% (n = 7) that they had difficulty in falling asleep, and 14.3% that they were unwilling to sleep in their own bed. 25.7% of parents (n = 9) recorded multiple awakenings during the night, 14.3% reported difficulty in awakening in the morning and 14.3% (n = 5) reported cases of enuresis during sleep. Another 14.3% (n = 5) reported disorientation after morning awakening, 8.6% (n = 3) breathing through the mouth during the day, and 8.6% (n = 3) reported that their child ground its teeth while asleep (bruxism). The same percentage (8.6%) reported that their child snored in its sleep. Furthermore, 11.5% of children with ASD (n = 4) were reported to be afraid to sleep in the dark, 14.3% (n = 5) to wake easily due to noise, while 17.1% (n = 6) had been observed to vocalize in sleep while sleeping and 20% (n = 7) were reported to experience breathing difficulties while sleeping. Finally, 14.3% (n = 5) were reported to exhibit self-mutilating behavior (head banging), 14.3% (n = 5) to often or almost always interrupt their sleep to visit the toilet, and 17.1% (n = 6) to wake up screaming. 20% (n = 7) of the parents stated that their child often or almost always had nightmares. 14.3% (n = 5) of the children with ASD were reported to cry at night, 20% (n = 7) to experience morning headaches and 20% (n = 7) to sleepwalk (Table 3).

Table 3, also, presents, as a separate set of data, the responses of parents with TD children regarding the behaviors of their offspring in their sleep. First of all, it may be observed that the values given by parents with TD children are much lower than those given in the responses of parents of children with ASD. The highest values given in the responses of parents of TD children to questions regarding their children's sleep disorders were as follows: 20% (n = 7) of the children were afraid to sleep in the dark and 25.7% (n = 9) experienced difficulties in morning awakening, a rate that exceeds the 14.3% (n = 5) reported for the group of individuals with ASD.

Table 4 provides a strong indication of a variation between the mean sleep disorder of children with ASD and that of children in the typical development group. The mean value of sleep disorders for children with ASD is $M = 1.978$ with a standard deviation of $S.D. = 0.647$, while the mean value for the TD children is $M = 1.595$ (clearly lower than that for the group of children with ASD), with a standard deviation of $S.D. = 0.396$. Compared with the picture that was obtained by comparing the results of Table 3, relating to each question separately, Table 4 provides a clearer indication of the problems that most children with ASD face compared with those in the TD group.

Table 4. Characteristic values of the scale of Sleep Disorder

Sleep Disorder Scale	M*	SD	Minimum Value/Max Value	Skewness	Kurtosis
Total Sample	1.786	0.567	1.00/4.36	1.577	4.974
ASD	1.978	0.647	1.05/4.36	1.401	4.039
TD	1.595	0.396	1.00/2.91	0.961	2.330

Note. * 1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = almost always.

The average score on the measurement scale for sleep disturbance for the whole sample is equal to $M = 1.786$, which corresponds to statements between "never" and "rarely". The minimum value on the measured scale for the sample under study is 1.00 for the statement "never", while the maximum is 4.36, corresponding to the statements between "often" and "almost always". Table 4 shows the third and fourth moments of the scale that is formed, both for the whole sample and for each group separately. To check if the indication of variation in sleep disturbance between TD and with ASD children is confirmed statistically, $\alpha = 5\%$ was used as a significance

level in the Student's statistical hypothesis tests (independent sample t-tests) that were carried out on independent samples, the results of which are presented in Table 5 below.

Table 5. Checking the case of Student's Hypothesis Test for Sleep Disorders (independent samples T-test)

Factors	Levels	Mean*	SD	df	t	p-value
Group	TD	1.59	0.40	56.325	-2.987	0.004
	ASD	1.98	0.65			

Note. * 1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = almost always.

Note. ** = p < .05.

As may be observed, the variation in the sleep disturbance scale between the two groups of TD and with ASD children is shown to be statistically significant at a significance level of $\alpha = 5\%$ with $\mathrm{t}\,(56.325) = -2.987$ and $\mathrm{p} - \mathrm{value} = 0.004$.

3.4 Effects of Demographic Data

Next, the relationship between the rate of sleep disturbance for TD and with ASD children and demographics (gender, age) were examined. To verify the existence or not of a statistically significant dependence between the factors under study, two models of ANOVA (two-way ANOVA) were used with the global sleep disorders scale as the response and the gender and age of the children in the study group as independent variables. Table 6 shows the results of the ANOVA tests for each factor.

Table 6. Analysis of variation in factors (two-way ANOVA) gender and class studies

Factors	Df	F	p-value
Sleep Disorder			
Constant	1	571.366	0.000*
Group	1	4.597	0.036*
Gender	1	2.183	0.144
Group x gender	1	0.664	0.418
Error	66		
Sleep Disorder			
Constant	1	677.209	0.000*
Group	1	7.729	0.007*
Age	1	0.494	0.613
Group x age	1	1.801	0.173
Error	64		

Note. * = p < .05.

The first model that was applied included the following factors: the group to which each child belonged, its gender and its interaction. As is shown in the first part of the table above, at a significance level of $\alpha = 5\%$, only the effect of the group (TD or ASD) to which the child belonged ($\mathrm{p} - \mathrm{value} = 0{,}036$) is statistically significant,

something which is to be expected from the analysis so far, while there is no variation in sleep disorders between boys and girls ($p-value=0.144$). The interaction of gender and group does not prove to be statistically significant at the same significance level ($p-value=0.418$), which suggests that the degree of sleep disturbance does not vary in each group separately, according to the gender of the child. Similar conclusions can be drawn from the second half of Table 6, for the model with the sleep disorder scale as a dependent variable and the group to which each child belonged, its age and the interaction between the two as factors. The response, at the level of significance $\alpha=5\%$, is statistically and significantly affected by whether the child has ASD or not ($p-value=0.007$) but not by its age ($p-value=0.613$). Also, at the same level of significance, the interaction of the two variables does not prove to be statistically significant ($p-value=0.173$), which suggests that the degree of sleep disturbance does not vary in any group individually, neither in accordance with the age of the child.

4. Discussion

According to the analysis that was performed, a statistically significant difference ($p < 0.05$) emerges between the reports of parents with children with ASD and those with TD children, based on the measurement of sleep disturbance. Similar studies have highlighted the existence of sleep disorders in children with ASD, as well as differences in the incidence rates of sleep problems among typical development children and children with ASD or other developmental delays (Goodlin-Jones et al., 2008; Krakowiak et al., 2008; Patzold et al., 1998; Richdale & Prior, 1995).

In the present study, the gender and age of the children did not seem to affect the existence of behaviors related to sleep disorders. Regarding age, other surveys have concluded that at some stage in childhood, especially under the age of 8, the majority of children with ASD will experience sleep problems (Richdale & Prior, 1995), while other studies did not find a correlation between sleep problems and age (Goldman et al., 2012). Thus, the results of the surveys conducted so far are contradictory. In this study, although the two samples (ASD and TD) were divided into three distinct age groups (up to 5 years, 6-11 years and 12 years and over), the analysis was restricted to drawing a comparison between the two samples overall. Therefore, it should be stressed that no analysis for each age group was conducted separately.

Some of the most common sleep disorders in this research (multiple night awakenings, difficulty in falling asleep and difficulty in breathing during sleep) are acknowledged by international research (Krakowiak et al., 2008; Williams et al., 2004). At this point, it is worth noting that the results of the present survey indicate a statistically significant difference between the two samples; however, on the basis of the results, it may be concluded that there is no significant difference between the categories of sleep disorder, which occur at varying rates, ranging from 8 6% to 25.7%. Therefore, the rates shown in the sample of individuals with ASD are statistically significant when compared to the sample of TD individuals; however, when compared individually, some of the rates are shown to be on a smaller scale, showing a relative divergence from those in the literature base, although this does not affect the percentage of the overall result, which is produced by the responses to all of the questions together.

The greatest variation between TD and with ASD children was recorded in the multiple night awakenings category, in which 1/4 of the children with ASD observed by parents woke up more than once during the night. In a survey by Williams et al. (2004) the rate was close to 33%. The rates recorded in the other categories amounted to percentages of 20% or less. To be more precise, significant percentages consisted of parasomnic behaviors, with sleepwalking and nightmares reaching rates of 20% in the sample of children with ASD. These percentages, though higher than those for other disorders, are in line with the findings of Schreck and Mulick (2000) and contrast with the low percentages yielded by the studies of Patzold et al. (1998) and Williams et al. (2004).

As for the percentages of disorders in TD children, these ranged from 0% to 25.7%. Among TD children, a percentage was formed by those children experiencing difficulty in morning awakenings, while another percentage consisted of children who were afraid to sleep in a dark room. Also, the percentages formed by the numbers of TD children experiencing difficulty in starting and maintaining sleep—2.9% and 0%, respectively—were regarded as negligible in contrast to the figures suggested by the bibliography, where it is estimated that about 1/3 of children, mainly of preschool age, exhibit night-time awakenings (Ferber, 1995). To conclude, with regard to the findings for the TD children, attention may be drawn to the figure of 8.6% for the percentage of children exhibiting unwillingness to sleep in their own bed (co-sleeping), a behavior that found to be more frequent in previous research than the percentage obtained in this study indicates. The corresponding

percentage for children with ASD (14.3%) was also lower in the present study than the percentages produced by other studies. Intervention programs (Howlin, 1984; Moore, 2004; Reed et al., 2009; Weiskop et al., 2005) are intended to eliminate such behaviors in individuals with ASD. To draw an overall conclusion for the test sample, it may be stated that the parents of TD children believe that their offspring do not experience any disorders that might impair their sleep.

Continuing with the percentages of disorders in individuals with ASD, it may observed that a percentage of 17.2% (n = 6), according to the parents' reports, exhibit restless sleep. The presence of restless sleep is emphasized in sleep evaluation surveys as being a common symptom among the population with ASD (Williams et al., 2004). More specifically, the percentage is 40% and restless sleep is recognized as being the second most common disruptive behavior in children with ASD with respect to sleep. Furthermore, according to the present study, the disorder most frequently reported by the parents of children with ASD occurred in 1 of 4 children with ASD, while according to Krakowiak et al. (2008), the proportion is as high as 1 in 2. Also, 1 in 3 TD children (32%) have at least one problematic sleeping behavior (Krakowiak et al., 2008), while in the present study the sleep problem most frequently reported by the parents of TD children occurs in only 1 in 4 TD children. In the sample of the 35 individuals with ASD, there was no statistically significant number of children receiving medication for sleep problems that might provide a clearer understanding of sleep behaviors during periods of medication.

Considering the age of the children who took part in the survey, larger percentages (11.4% of children with ASD and 20% of TD children) were expected in categories such as those in which children experience fear and refuse to sleep without the existence of a light in their room. Equally small proportions of children with ASD, compared with those in the bibliography, emerge in other categories, such as snoring, the grinding of teeth and systematic inhaling and exhaling through the mouth, where no proportion exceeds 10%. However, a significant proportion of children with ASD 1 in 5 were found to fall asleep at school, either in the "often" or "almost always" category, a proportion that is substantially greater than the approx. 5% found in a similar survey (Williams et al., 2004). As for the percentages obtained for the 23 categories in the sample with ASD tested in this study, conclusions were also drawn in the other categories, with approx. 1 in 5 children—7 individuals with ASD having been observed to mumble in their sleep, either often or almost always, and a similarly high percentage of children—approx. 15% displaying self-mutilating behavior in their sleep. Equally percentages—20% and 14.3% respectively—are formed by the numbers of children with daytime headaches and disoriented morning awakenings, in which children with ASD may appear to be disoriented for a short while after waking.

Concerning the quantitative characteristics of sleep, children with ASD, despite the fact that they displayed a statistically significant difference in the types of sleeping behaviors that were analyzed above, appear to show no differences in the quantity of their sleep. 3 out of 4 children with ASD begin their evening sleep between 9 and 11 p.m., the time at which 80% of TD children retire to bed, while only 14.3% of the population with ASD sleep after 11 p.m. Furthermore, the hours of evening and daily sleep are considered normal and similar to those of TD children. More specifically, 57.1% of the sample with ASD sleep between 8 and 9 hours at night, which corresponds to the percentage arrived at by Williams et al. (2004), while 60% of the ASD sample do not sleep at all during the day. However, a significant proportion of the ASD population—14.3% is shown to sleep unusually long hours—5 or more during the day, when for TD children the same percentage is only 2.9%.

Regarding the limitations, the survey based on parents reports without taking into consideration references from major faces of the children's environment such as doctors, teachers, psychologists who involved with the care and education of children. Furthermore, it is important to stress the fact that the survey was based on the objectivity of parents that take part in and their ability to observe and evaluate the quantity and quality characteristics of sleep behaviours of their children without being, previously, educated in the identification and assessment of distractive sleep behaviors. Significant restriction was also the limited sample which consisted of 70 children aged 4-14 years old.

The above restrictions could be the occasion for further research in order to study thoroughly the childhood sleep disorders in children with ASD and draw safer conclusions. Finally, educating parents on observation, evaluation and treatment of any sleep disorders of their children could contribute to a more objective measurement of sleep problems in children with ASD.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Efficacy Trial of Contrasting Approaches to the Response-Contingent Learning of Young Children with Significant Developmental Delays and Multiple Disabilities

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Received: September 20, 2016 Accepted: October 30, 2016 Online Published: November 29, 2016

doi:10.5539/jedp.v7n1p12 URL: http://dx.doi.org/10.5539/jedp.v7n1p12

Abstract

Findings from a randomized control design efficacy trial of an asset-based vs. needs-based approach to the response-contingent learning of infants and toddlers with significant developmental delays and disabilities who did not use instrumental behavior to produce or elicit reinforcing consequences are reported. The investigation included 71 children randomly assigned to the two contrasting types of interventions. The asset-based intervention and needs-based intervention differed in terms of how child behavior were identified and used to elicit reinforcing consequences as part of response-contingent learning games implemented by the children's parents or other primary caregivers. Children in the asset-based group were provided more learning opportunities, acquired more response-contingent behavior, and demonstrated more efficient learning compared to children in the needs-based group. Implications for improving practices for very young children with significant developmental delays and multiple disabilities are described.

Keywords: asset-based, strengths, needs-based, deficits, child operant learning, learning games, response-contingent behavior

1. Introduction

Four decades ago, Maier (1978) defined intervention as "A series of socially engineered … activities in which a practitioner deliberately introduces specifically structured events into the experience of an individual or group of individuals … in order to facilitate ordinary developmental processes" (p. 195). A year later, Garwood (1979) defined early childhood intervention as the "provision of meaningful and appropriate educational experiences to preschool children to maximize educational benefits" (p. 3). Whether stated explicitly or implicitly, all interventions are developed from different paradigms where different worldviews include different beliefs and presuppositions about the experiences hypothesized to be related to outcomes of interest (Reese & Overton, 1980). These beliefs and presuppositions in turn influence decisions about both research and practice (Hartung, 2015; Turner & Reese, 1980). Woodhead (2006) noted that historically different early childhood intervention paradigms have influenced policy and practice in discernibly different ways.

1.1 Intervention Paradigms

Two contrasting paradigms have most often been used to conceptualize and operationalize early intervention practices with infants and toddlers with developmental delays and disabilities. One approach focuses on identifying delayed or missing skills and then intervening to teach or facilitate children's acquisition of those skills (Allen & Cowdery, 2015; New & Cochran, 2007). The other approach uses existing child behavior as the building blocks for promoting acquisition of instrumental and functional behavior (Leffert, Benson, & Roehlkepartain, 1997; Wilson, Mott, & Batman, 2004). Eloff and Ebersohn (2001) described these contrasting approaches to early intervention as needs-based and asset-based approaches respectively.

The two approaches differ in terms of their assumptions about the purpose of intervention. Asset-based intervention is premised on the belief that human growth and development is best facilitated when existing behavioral competencies are changed or modified as a result of new or challenging learning opportunities. In contrast, needs-based intervention is premised on the belief that foundational behavior not in a person's

repertoire need to be targeted and taught using practices intended to promote acquisition of those behavior. Asset-based approaches to intervention focus on building on child strengths, interests, preferences, and other skills to enhance learning (e.g., Dunst, Herter, & Shields, 2000; Eloff & de Wet, 2009; Lancioni, Singh, O'Reilly, Oliva, & Groeneweg, 2005), whereas needs-based approaches to intervention focus on the identification of child weaknesses, deficits, or missing skills and the amelioration of these deficiencies (see Dunst & Trivette, 2009; and Panitch, 1993; for descriptions of the features of this approach to early intervention).

1.2 Purpose of the Study

The purpose of the study described in this paper was to compare an asset-based versus needs-based approach to response-contingent learning of infants and toddlers with significant developmental delays and multiple disabilities to determine if the two approaches differed in terms of their consequences operationally defined in terms of a number of different child learning measures. Response-contingent learning refers to a child's ability to use a behavior to produce or elicit reinforcing environmental consequences (Gunnar, 1980; Williams, 2001). This type of instrumental learning was described by Watson and Ramey (1972) as response-contingent stimulation because an environmental effect (stimulation) is contingent upon a child's behavioral response, whereas Piaget (1952) described this type of learning as secondary circular reactions where a child's repeated actions on the social and nonsocial environment result in interesting consequences. According to both Gunnar (1980) and Tarabulsy et al. (1996), this type of learning is important because contingency experiences provide infants opportunities to learn to control environmental events and to recognize that they are the agents of environmental effects (i.e., contingency awareness).

1.3 Previous Research

More than 60 years of research indicates that infants without delays or disabilities as young as 2 to 4 months of age acquire the ability to use vocalizations, smiling, visual attention, arm and leg movements, head turns, sucking movements, and other behavior to produce or elicit environmental consequences (see Dunst, Gorman, & Hamby, 2010; Dunst, Storck, Hutto, & Snyder, 2007; Hulsebus, 1973; Lipsitt, 1969; Rovee-Collier & Gekoski, 1979; for reviews). Infants and toddlers with disabilities or delays often take longer to learn these same types of response-contingent behavior and as a result often demonstrate a latency to learn (Hutto, 2007). The extent to which a latency to learn response-contingent behavior among infants and toddlers with delays or disabilities is related to different types of experiences or interventions has not been directly examined nor have the differences in rates of learning been explicitly determined (see e.g., Dunst, Gorman et al., 2010; Dunst, Storck et al., 2007).

Close inspection of response-contingent learning studies with infants and toddlers with significant delays and multiple disabilities suggest that the characteristics of different interventions have differential consequences in terms of child learning. For example, Dunst, Cushing, and Vance (1985) used a needs-based approach to contingency learning where behavior that children did not yet exhibit were targeted to be learned and found a latency to learn for half of the children in their study. In contrast, Lancioni et al. (2005) used an existing child behavior and favorite stimuli to facilitate a young girl's use of vocalizations to produce a preferred environmental consequence. Dunst et al. (2007) reported similar results using an asset-based approach to response-contingent child learning with young children with delays and disabilities. The differences between the two approaches to child learning were the basis for hypothesizing that an asset-based intervention would be more effective than a needs-based intervention for promoting the response-contingent learning of young children with significant delays and multiple disabilities.

1.4 Study Hypotheses

The study described in this paper was a randomized controlled efficacy trial that included different measures of child learning opportunities, child response-contingent learning, and child learning efficiency. The four hypotheses of the study were:

H_1: Children in the asset-based group will be afforded more learning opportunities (number of learning trials per game) compared to the children in the needs-based group.

H_2: Children in the asset-based group will demonstrate acquisition of more response-contingent behavior (total number of contingency responses and average number of contingency responses per learning game) compared to the children in the needs-based group.

H_3: The response-contingent learning opportunities afforded the children in the asset-based group will result in more efficient learning (percent of trials associated with response-contingent behavior and average number of response-contingent behavior per minute) compared to the children in the needs-based group.

H_4: The rates of change on the different child learning measures will increase more rapidly among the children in the asset-based group compared to those for the children in the needs-based group.

The study is part of a line of research and practice investigating the use of response-contingent learning opportunities with children with significant developmental delays or multiple disabilities to enhance their abilities to interact with their social and nonsocial environments in ways having reinforcing consequences (e.g., Dunst et al., 1985; Dunst, Raab, Trivette, Parkey et al., 2007; Dunst, Raab et al., 2010; Dunst, Raab, Wilson et al., 2007; Raab, Dunst, Wilson, & Parkey, 2009). Preliminary analyses of data from the study yielded encouraging findings about the differences in the two approaches to response-contingent learning (Raab, Dunst, & Hamby, 2016). The study described in this paper included a larger sample of children and different types of data analysis procedures to evaluate whether the two approaches to response-contingent learning had differential effects. Hierarchical linear growth curve modeling was used to examine intraindividual changes in the children's learning and the extent to which those changes were differentially related to the contrasting types of interventions. The study results were also examined in terms of the relative effectiveness of the asset-based intervention beyond that associated with the needs-based intervention. Findings were expected to either support or refute the contention that the two approaches to response-contingent learning had different characteristics and consequences.

2. Method

2.1 Institutional Review and Approval

The study described in this paper was reviewed and approved by the investigators' Research Institute Institutional Review Board. This included, but was not limited to, the approval of the intervention procedures, the procedures for obtaining participant informed consent, and the procedural safeguards for protecting the study participants.

2.2 Recruitment

The children were recruited from early intervention programs, preschool special education programs, hospitals, specialty clinics, physician practices, and parent and disability organizations in three states in the southeastern United States. Children were eligible for participation in the study if they had multiple disabilities (e.g., cerebral palsy and sensory impairments), identified disabilities associated with significant developmental delays (e.g., congenital anomalies or genetic disorders), significant developmental delays without known causes, neurologic diseases or central nervous system disorders (e.g., lissencephaly, Ohtahara syndrome), or birth-related conditions associated with poor developmental outcomes (e.g., extreme low birth weight and grade 3 or 4 intraventricular hemorrhaging); were functioning at or below a 4 to 5 month age level of development; and not yet demonstrating intentional use of behavior to produce or elicit reinforcing social or nonsocial environmental consequences.

One hundred and twenty children were referred to the study and screened for eligibility. Eighty-one children were determined to be eligible for participation. Children who met the eligibility criteria were randomly assigned to either the asset-based (N = 42) or needs-based (N = 39) intervention groups. Four children were lost to attrition in the asset-based group (10%) and six children were lost to attrition in the needs-based group (15%). Two parents in each group never gave oral or written consent to participate, and the investigators lost contact with the other six families. Both overall attrition (10%) and differential attrition (5%) were small enough to establish a low level of bias (What Works Clearinghouse, 2014, n.d.-a). The final sample sizes were 38 and 33 respectively in the asset-based and needs-based intervention groups.

2.3 Participants

The participants were 71 children (37 boys and 34 girls) birth to six years of age and their parents (65 mothers, 2 fathers) and other primary caregivers (2 foster parents, 2 parent guardians). There were no differences in the proportion of males and females in the two intervention groups, $\chi^2 = 0.74$, $df = 1$, $p = .390$, $d = .21$, nor was there a difference in the proportion of mothers in the two intervention groups, $\chi^2 = 1.39$, $df = 1$, $p = .239$, $d = .28$. These findings indicate that the two samples were more similar than different on those participant characteristics.

The Mullen (1995) *Scales of Early Learning* were administered to each child at entry into the study. The children were, on average, 17 months of age (SD = 10) but functioning developmentally, on average, at only 4 months of age (SD = 3). Fifty-six percent of the children had Mullen Composite Standard Scores of 49 which is the lowest score attainable. A score of 49 or less is three or more standard deviations below a mean of 100 where 90 percent of the children had standard scores that indicated very low functioning levels (Mullen, 1995).

Because the majority of the children had Mullen Composite Standard Scores at or below 49, the children's Developmental Quotients (DQ) were estimated by dividing each child's composite developmental age on the Mullen scales by his or her chronological age and multiplying the result by 100. The children's average DQ was 34 (SD = 25). Seventy-five percent of the children had DQs three or more standard deviations below a mean of 100, 60% had DQs four or more standard deviations below the mean, and 50% of the children had DQs five or more standard deviations below the mean.

Table 1 shows the developmental characteristics of the children and the background characteristics of the parents in the two intervention groups at entry into the study. The children's chronological ages, developmental ages, and DQs were very much alike in both groups as evidenced by no statistically significant between group differences. There were also no statistically significant between group differences in the parents' ages, years of formal education, or family socioeconomic status (Hollingshead, 1975). The results are an indication that randomization resulted in the children and parents in the two intervention groups being more similar than different. There was, however, nonbaseline equivalence for child DQs and parent education as evidenced by mean difference effect sizes of d = .31 and d = .36, respectively (What Works Clearinghouse, 2014, n.d.-b). Both variables were used as covariates in all of the analyses described below.

Table 1. Characteristics of the children and parents at entry into the study

	Asset Group		Needs Group				
Background Characteristics	Mean	SD	Mean	SD	*t*-test	*p*-value	Cohen's *d* Effect Size
Child Characteristics							
Chronological Age (months)	17.61	12.57	17.36	8.70	0.95	.924	.02
Developmental Age (months)	4.56	2.99	4.41	2.46	0.23	.817	.06
Developmental Quotient[a]	36.33	26.23	30.48	18.69	1.09	.282	.31
Parent Characteristics							
Age (years)	32.18	7.57	31.78	8.40	0.21	.835	.05
Years of School Completed	14.05	1.71	13.48	1.46	1.49	.140	.36
Family SES[b]	36.16	15.01	33.85	9.13	0.79	.436	.19

Computed as child developmental age divided by child chronological age x 100.[b] Hollingshead (1975) four factor index of socioeconomic status.

Inasmuch as the study participants were also receiving special instruction/special education, and therapy services from other programs, agencies, and providers, we ascertained the similarity of the two groups of children on early childhood intervention services. The percent of children receiving the four services that "make up" the bulk of early childhood intervention in the U.S. (Hebbeler et al., 2007) are shown in Table 2. There were no between group differences for any of the four comparisons. There were also no differences in the total number of the four kinds of services for the children in the asset-based (M = 2.55, SD = 1.41) vs. needs-based (M = 2.39, SD = 1.09) intervention groups, t = 0.54, df = 69, p = .593, d = .13.

Table 2. Percent of children receiving early childhood intervention services

Child Services	Asset Group	Needs Group	χ^2	*p*-value	Cohen's *d* Effect Size
Special Instruction/Education	50.0	46.7	0.08	.785	.07
Speech and Language Therapy	60.5	54.8	0.23	.634	.12
Occupational Therapy	65.8	54.8	0.86	.354	.23
Physical Therapy	78.9	83.9	0.27	.603	.13

2.4 Procedure

Three early childhood practitioners were assigned to implement the asset-based intervention and three early childhood practitioners were assigned to implement the needs-based intervention. The asset-based approach used existing behavior in the children's repertoire as target behavior as part of response-contingent learning opportunities, whereas the needs-based approach used adult-selected behavior for the children to learn as target behavior. The practitioners in the two groups were kept unaware of the fact that there was a contrasting intervention group, and the staff assigned to the two different intervention groups never interacted with one another throughout the course of the study.

The children in both groups were first assessed to identify behavior that the children would use to produce or elicit environmental consequences as part of response-contingent learning opportunities (described to the parents as learning games). The two interventions differed only in the procedures used to identify and select target behavior. Lancioni et al. (2001) described the differences between the contrasting interventions in terms of asset-based practices "not requiring excessive effort" (p. 271) to control environmental consequences and needs-based practices as requiring "excessively high levels of effort" (p. 271) to control environmental consequences.

The children in the asset-based group were observed in everyday activities in their homes and their parents queried to identify behavior in the children's repertoires but not used intentionally to produce or elicit reinforcing environmental effects. An investigator-developed checklist was used to record the occurrence and frequency of different child behavior, including, but not limited to, head, body, arm, leg, fist, and hand movements; vocalizations; and directed gaze and visual fixation. Behavior that a child produced frequently or for considerable durations of time were selected as target behavior to be used as part of providing the children response-contingent learning opportunities.

The children in the needs-based group were administered the birth to three-year-old *Assessment, Evaluation, and Programming Systems* (AEPS) (Bricker, Capt, & Pretti-Frontczak, 2002) scales to identify missing skills operationalized as behavior at or just above the ceiling level in six scale domains (fine motor, gross motor, adaptive, cognitive, social-communication, and social). Results were used to select child behavior as the intervention targets where response-contingent learning games were used to facilitate acquisition of those behavior targets. The AEPS was not used as intended by assessment system developers but rather to simply identify intervention targets for response-contingent learning opportunities.

As part of the assessments administered to both groups of children, child-specific reinforcers were identified through observations and parent interviews to determine the people, materials, activities, events, and so forth that elicited or maintained the children's attention. This was done in a manner similar to how Dunst, Raab, Trivette, Wilson et al. (2007) identified reinforcing consequences in their research with children with significant developmental delays and multiple disabilities. Fisher, Piazza, Bowman, and Amari (1996) noted that this is a more effective approach to identify reinforcers compared to using a predetermined list of potential reinforcers.

The same types of response-contingent learning games for children in both intervention groups were used to promote the children's use of targeted behavior to produce or elicit reinforcing consequences. Learning games included targeted operant behavior that either resulted in reinforcing consequences (e.g., swiping at a mobile producing movement or sound) or were reinforced by a caregiver (e.g., an adult talking to a child each time he or she looked at the adult's face). All of the learning games were characterized by behavior-based contingencies where the availability of a reinforcement or the production of an interesting consequence was dependent on the children's production of the targeted behavior (Tarabulsy et al., 1996).

2.5 Implementation

Early childhood staff were taught the intervention practices in the contrasting approaches over a two-month period of time prior to their work with children and their families using an evidence-based adult learning procedure (Dunst, Trivette, & Hamby, 2010). These early childhood staff, in turn, taught parents to use the practices in the families' homes using a modified version of the adult learning procedures (Raab, Dunst, & Trivette, 2013).

The adult learning procedure involved staff's active participation in four phases for learning either of the two interventions: (1) acquiring information about and examples of the intervention practices; (2) authentic use of the interventions and evaluating the characteristics and outcomes of the practices; (3) reflecting on their overall understanding and mastery of the practices; and (4) identifying and participating in additional opportunities to

learn to use their particular approach to intervention. Staff were trained using procedural manuals that were identical for the two intervention groups except for the methods used to identify target behaviors. Video examples of response-contingent learning opportunities were used both to illustrate the practices to the practitioners and to provide staff opportunities to use and understand how the interventions were implemented. Role-playing, in-vivo training, and investigator feedback were employed to provide staff opportunities to use the interventions in a manner consistent with the study procedures.

The practitioners and the children's parents developed four to six learning games so that targeted behavior were associated with child-specific reinforcers to facilitate the children's acquisition of contingency responses. Both social and nonsocial games were developed for each child. Social learning games involved a child's use of a target behavior to elicit a social response from the parent (e.g., a parent kissing the child on the neck each time she turned her head from side to midline while in a supine position). Nonsocial learning games involved a child's use of a target behavior to elicit a nonsocial environmental consequence (e.g., a child producing movement of a mobile by leg or hand movements).

Parents were taught to implement the learning games by the practitioners using the same adult learning procedure used to train the staff (Dunst et al., 2010). For each game that was developed, staff engaged a parent in completing an investigator-developed *Learning Games Intervention Form* that included the target behavior and reinforcing consequence used in a game, procedures to prepare and set up a game (e.g., materials needed, positioning of the child, etc.), strategies for implementing the game to ensure delivery of the reinforcing consequence when the child produced a target behavior, and any special child-specific considerations (e.g., wait time, adaptations, etc.). Staff described the key characteristics of a game, demonstrated the use of the game, and then had the parent practice each game with her child. Supportive feedback and guidance were provided as necessary to ensure the parents understood how to implement the learning games in the ways intended.

The practitioners visited the children and parents weekly or every other week and observed and recorded the types of games played with the children, the length of time each game was played, the child behavior that was targeted to elicit or produce reinforcing consequences for each game, and the number of child behavior that had and did not have reinforcing consequences. The home visits were also used to change or modify the learning games, develop new learning games, and to coach the parents in how to engage their children in the learning games.

2.6 Procedural Fidelity

The parents maintained weekly logs, which were used to determine procedural fidelity in terms of the number of games developed for a child compared to the number of games implemented by a parent with the child, and the frequency of child participation in the games per week. There were, on average, 2.92 (SD = .79) different games planned and 2.72 (SD = .87) games implemented for each child per week, t = .61, df = 69, p = .545, d = .15. The games were played, on average, 4.30 days per week (SD = 1.38). There was no statistically significant difference in the number of days per week that the children participated in the games in the two intervention groups, t = .08, df = 69, p = .933, d = .02. These results indicated that the groups did not differ in terms of the number of planned compared to the number of implemented games or how often the parents implemented the games with the children in the two intervention groups.

2.7 Dependent Measures

Investigator-developed recording forms were used to code different information about the learning games during the home visits by the staff with the children and their parents. Each recording form included space for recording the number of trials per game. A trial was defined as the availability of a child-specific reinforcement where a targeted behavior for a game (either prompted or non-prompted) did or did not result in the reinforcing consequence. The recording form included codes for non-prompted targeted behavior that produced or elicited a reinforcing consequence, physically and verbally prompted child contingency behavior, and child behavior that had no environmental effects per learning opportunity trial. A trial lasted up to six seconds at which time the child's responses were coded. A learning game was defined as a series of learning trials that involved use of a targeted behavior to produce or elicit a child-specific reinforcing consequence where a game lasted until a child ceased attempts to elicit a reinforcing consequence, or lost interest in a game. Each child had an average of five data collection sessions during the eight weeks of intervention. Three games on average were played with each child per session where each game lasted an average of six minutes.

The information on the recording forms was used to compute two child learning opportunity measures, two child response-contingent behavior measures, and two child learning efficiency measures. The child learning opportunity measures included the number of learning games used with a child and the number of learning opportunities (trials) per game. The child response-contingent behavior measures included the total number of non-prompted response-contingent behavior that resulted in a reinforcing consequence and the average number of non-prompted child response-contingent behavior per learning game. A non-prompted response-contingent behavior was defined as a child's use of a targeted behavior to produce or elicit a reinforcing consequence that was not prompted by either a parents' or a practitioners' verbal or nonverbal behavior. The child learning efficiency measures included the percent of learning opportunities (trials) associated with non-prompted child behavior having reinforcing consequences and the average number of non-prompted child behavior having reinforcing consequences per game minute. The six learning measures were first computed for each game and then averaged across games per session.

2.8 Interrater Agreement

The early childhood practitioners made a total of 355 home visits during the course of the study where 1,010 learning games were played during the home visits. Research assistants (one for each intervention group) made joint visits with the practitioners in their respective intervention groups on 95 occasions (27% of the total number of home visits) where 272 learning games (27% of the total number of learning games) were played during the home visits. The research assistants used the same recording form as the practitioners where the two sets of codes were used to compute interrater agreement for (1) the number of games played during the home visits, (2) the length of the games in minutes, (3) the number of learning trials per game, and (4) the number of non-prompted response-contingent child behavior. Interrater agreement was computed as the number of agreements divided by the number of agreements plus non-agreements multiplied by 100. There was 100% agreement on both the number of games played during the home visits and the number of minutes each game was played. There was 92% agreement on the number of trials for the learning games (range = 89 to 93), and 91% agreement on the number of non-prompted child response-contingent behavior (range = 85 to 95).

2.9 Data Analysis

Hierarchical linear growth curve modeling (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011) was used to evaluate the effects of the two contrasting approaches to interventions on the six child learning measures. Each analysis included tests for linear increases in the slopes of the learning measures (Level-1) and between intervention group differences in the slopes controlling for the non-time varying covariates (Level-2). The between group comparisons are analogous to between group x measurement occasion tests for interactions between the independent and dependent measures. The growth curves were modeled with each child's baseline learning measure equal to zero inasmuch as none of the children demonstrated instrumental response-contingent behavior at the beginning of the study. The main analyses were supplemented by additional analyses as indicated to clarify the nature of the relationships between the two contrasting interventions and the child learning measures.

In addition to statistical significance testing, we also computed Cohen's *d* effect sizes for the differences in the slopes for the two intervention groups. The effect sizes were computed using the formula $d = b/\sqrt{tau}$, where b is the regression coefficient for the between slope differences and tau is the random effects variance component for the measurement occasion slopes (Feingold, 2009). We also computed the improvement indices for the between group slope differences for evaluating the practical importance of the intervention effects (What Works Clearinghouse, 2014). This is a measure of the relative effectiveness of the asset-based intervention beyond that associated with the needs-based intervention (Lipsey et al., 2012). An improvement index can take on values between -50 and +50, where positive indices show favorable results for the particular intervention hypothesized to be more effective. It is interpreted as the percentage of slope indices in the asset-based group that exceeded those in the needs-based group. *ZCalc* was used to compute the improvement indices (Neill, 2006).

3. Results

Table 3 shows the results for the linear growth curve analyses for each of the six dependent measures with the effects of the non-time varying covariates (parent education and child DQ) partialled from the between group differences. Parent education was not related to any of the between group slope differences, and child DQ was related to only the between group slope differences for the total number of nonprompted response-contingent behavior, $t = 2.04$, $df = 67$, $p = .045$, $d = .50$, and average number of response-contingent behavior per game, $t = 2.22$, $df = 67$, $p = .030$, $d = .54$.

Results indicated that there were statistically significant between group slope differences in the rates of change for 4 of the 6 learning measures, but large to very large effect sizes for the between group slope differences for all six learning measures. All of the sizes of effect favored the asset-based group except for the number of learning games played with the children. The findings showed that the progressive increases in the slopes on the dependent measures (except the number of learning games) were greater for the asset-based intervention compared to the needs-based intervention.

Table 3. Fixed effects estimates for the differences in the linear growth curves (slopes) for the asset-based vs. needs-based intervention groups

Child Learning Measures	Between Group Coefficient	Standard Error	*t*-ratio	*p*-value	*d*
Child Learning Opportunities					
Number of Learning Games	-0.06	0.03	-1.85	.069	0.81
Number of Learning Trials Per Game	0.90	0.24	3.68	.000	1.13
Child Response-Contingent (RC) Behavior					
Number of RC Behavior	3.67	0.72	5.14	.000	1.45
Number of RC Behavior Per Game	1.08	0.21	5.26	.000	1.48
Child Learning Efficiency					
Percent of Trials with RC Behavior	1.34	0.73	1.83	.072	0.86
Average RC Behavior Per Minute	0.16	0.03	4.79	.000	4.87

*Note*s. Results are adjusted for baseline differences in child DQs and parent education. *d* = Cohen's *d* effect size.

3.1 Child Learning Opportunities

There were linear increases in the number of learning games played with the children across measurement occasions for all the children taken together, b = .39, $t = 20.46$, $p = .000$, $d = 4.76$, where the linear growth curve slopes were greater for the needs-based intervention compared to the asset-based intervention (Table 3). There were also linear increases in the number of learning opportunities (trials) afforded the children, b = 1.54, $t = 9.101$, $p = .000$, $d = 1.56$, where the linear increases were much more pronounced for the asset-based compared to the needs-based intervention.

The average slopes for both child learning opportunity measures are shown in Table 4. The average slope for the number of learning games was b = .46 for the needs-based group compared to b = .33 for the asset-based group. This finding, however, is somewhat misleading because of the small standard error associated with the between slope differences. This is the case as shown in Figure 1 where the slopes for the two contrasting interventions are very much alike. The average number of games played at Week 1 was 1.67 (SD = .15) for the asset-based group and 1.46 (SD = .11) for the needs-based group, and at Week 8 was 3.78 (SD = .32) for the asset-based group and 3.91 (SD = .26) for the needs-based group.

Although the number of learning games played per week with the children in both intervention groups were more similar than different, the rates of increase in the number of learning opportunities (trials) afforded the children per game in the asset-based group (b = 1.94) was nearly twice as large as that for the needs-based group ($b = 1.09$). The between slope difference shown in Table 4 was associated with a very large effect size ($d = 1.13$). The difference in the slopes is shown in Figure 2 where the average number of trials per game at the end of the study was 20.96 (SD = 2.41) for the asset-based group compared to 10.63 (SD = 1.75) for the needs-based group, $t = 20.37$, $df = 69$, $p = .000$, $d = 4.90$. The between group difference in the slopes for number of child learning opportunities had an improvement index of 37. This indicates that if the children in the needs-based group had received the asset-based intervention they would have experienced 37% more learning opportunities (trials) per game.

Table 4. Linear growth curve average rates of change for the contrasting types of interventions

Child Learning Measures	Asset Group		Needs Group		*d*	Improvement Index
	Average Slope	SE	Average Slope	SE		
Child Learning Opportunities						
Number of Learning Games	0.33	0.04	0.46	0.05	0.81	29
Number of Learning Trials Per Game	1.94	0.23	1.09	0.25	1.13	37
Child Response-Contingent (RC) Behavior						
Number of RC Behavior	5.60	0.53	1.67	0.57	1.45	43
Number of RC Behavior Per Game	1.73	0.20	0.49	0.21	1.48	43
Child Learning Efficiency						
Percent of Trials with RC Behavior	8.70	0.93	4.99	1.00	0.86	31
Average RC Behavior Per Minute	0.34	0.08	0.06	0.08	4.87	50

Notes. The average slopes are adjusted for the two non-time varying covariates (child DQ and parent education). The Cohen's *d* effect sizes for the Table 3 contrasts were used to compute the improvement indices (Neill, 2006).

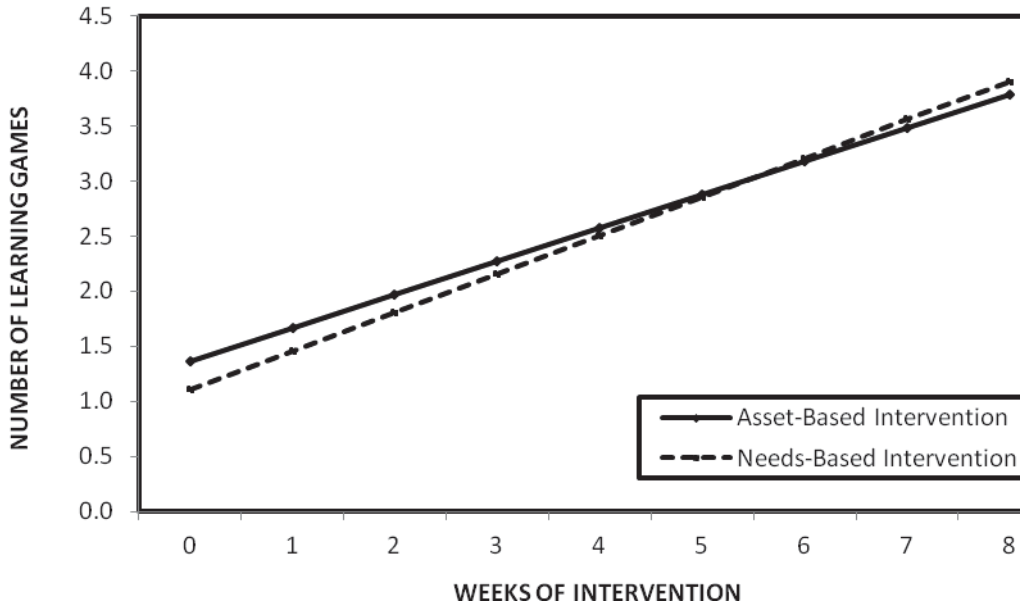

Figure 1. Average number of learning games implemented during each week of intervention

3.2 Child Response-Contingent Behavior

The between intervention group linear trend comparisons for the total number of non-prompted response-contingent behavior and average number of non-prompted response-contingent behavior per game were both associated with statistically significant differences and very large effect sizes (Table 3). In both analyses, the asset-based group demonstrated faster rates of learning compared to the needs-based group (Table 4). The rates of change for both the total number of response-contingent behavior and the average number of response-contingent behavior per game were more than three times greater for the asset-based intervention compared to the needs-based intervention. Both differences were associated with very large between slope differences effect sizes.

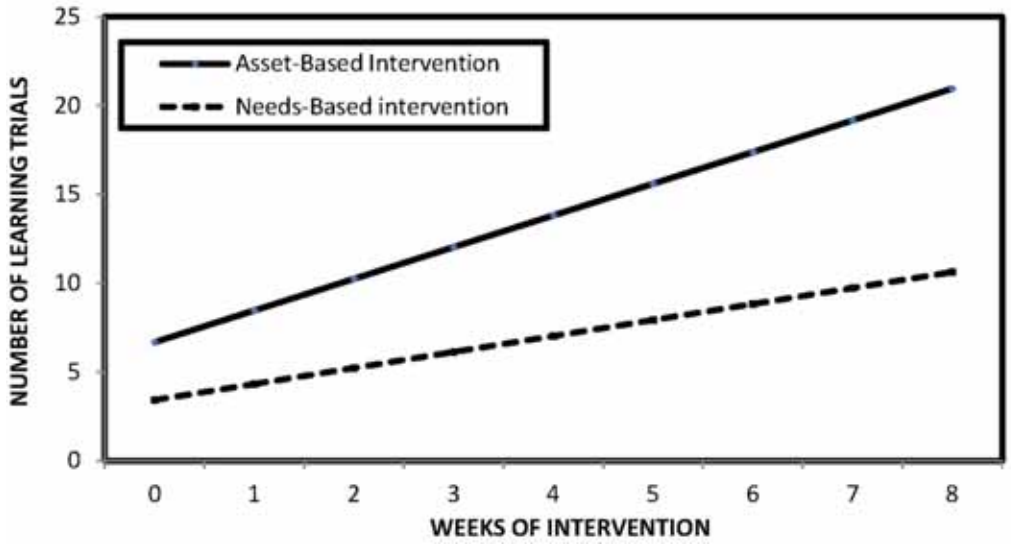

Figure 2. Average number of trials (learning opportunities) afforded the children per game across the eight weeks of intervention

Figure 3 shows the rates of learning for the average number of response-contingent behavior per game for the contrasting intervention approaches. The results show that the asset-based intervention was associated with considerably more rapid child learning compared to the needs-based intervention. Whereas the average number of response contingent behavior per game was 18.31 (SD = 3.33) for the ability-based intervention at the end of the study, the average number of response-contingent behavior was only 4.76 (SD = 2.44) for the needs-based intervention, $t = 19.30$, $df = 69$, $p = .000$, $d = 4.64$.

The between group differences for both learning measures were associated with improvement indices of 43 (Table 4). These indices show the relative effectiveness of the asset-based intervention beyond that associated with the needs-based intervention. The results indicate that the children in the needs-based group would have shown 43% improvement in their rates of learning had they experienced the assed-based rather than the needs-based intervention.

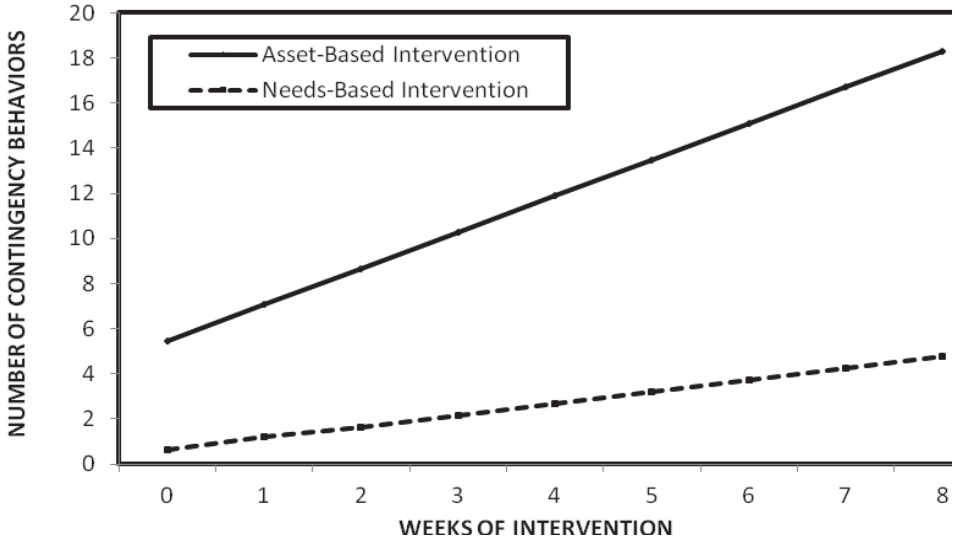

Figure 3. Average number of child response-contingent behavior per game across the eight weeks of intervention

3.3 Child Learning Efficiency

Results showed that the between group differences in the slopes for the percent of response-contingent behavior per number of trials was associated with a large effect size (d = .86) and the differences in the average number of response-contingent behavior per minute was also associated with a very large effect size (d = 4.87). Both sets of analyses showed that learning efficiency improved more rapidly for the asset-based intervention group compared to the needs-based intervention group (Table 4). At the end of the eight weeks of the intervention, the average percent of trials associated with nonprompted response-contingent behavior was 99.99 (SD = 6.42) for the asset-based intervention compared to 52.36 (SD = 4.78) for the needs-based intervention, t = 35.03, df = 69, p = .000, d = 8.42.

Closer inspection of the findings showed a curvilinear rather than a linear relationship for the changes in the percent of trials associated with nonprompted response-contingent behavior and a between slope difference in the rates of change between the contrasting interventions, b = 2.02, t = 6.85, p = .000, d = 4.12. Figure 4 shows the differences in the curvilinear rates of change for the two contrasting interventions. As hypothesized, child response-contingent learning was considerably more efficient for the asset-based intervention compared to the needs-based intervention as evidenced by a more rapid increase in the percent of trials associated with response-contingent behavior during the first three weeks of intervention and a larger and more stable ratio of response-contingent behavior to learning trials during the last three weeks of intervention.

Both learning efficiency measures had improvement indices favoring the asset-based intervention (Table 4). These indices show the relative efficiency of asset-based contingency learning practices beyond those associated with needs-based contingency learning practices. The results, and especially those for the percent of response-contingent behavior per number of learning trials (Figure 4), illustrate the value-added effects of an asset-based approach to early intervention.

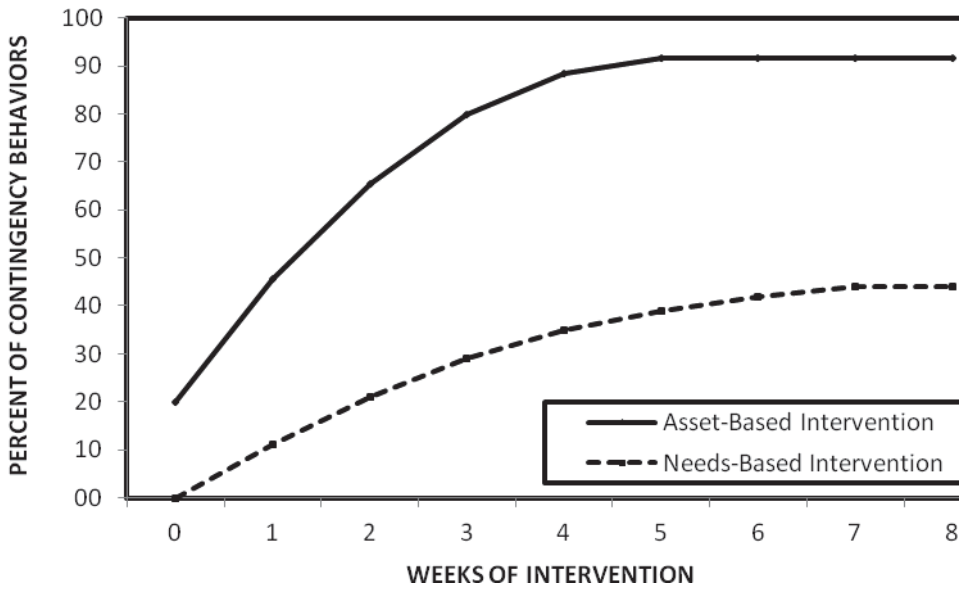

Figure 4. Average percentage of child response-contingent behavior per number of learning trials across the eight weeks of intervention

4. Discussion

Findings showed that the children in the asset-based group were afforded more learning opportunities and demonstrated more response-contingent learning, and the learning games resulted in more efficient child learning, compared to the children in the needs-based group. The results provide support for the four study hypotheses, and highlight the fact that the ways in which child behavior are identified, selected, and used as part of learning games to facilitate acquisition of response-contingent behavior matter a great deal in terms of child learning capacity and efficiency. The results are consistent with Eloff and Ebersohn's (2001) contention that

asset-based and needs-based early childhood interventions differ both conceptually and procedurally and in turn differ in their characteristics and consequences.

It is important to note that the effects of the asset-based intervention were considerably more robust than found in earlier studies with children with significant developmental delays or disabilities (e.g., Bailey & Meyerson, 1969; Haskett & Hollar, 1978; O'Brien, Glenn, & Cunningham, 1994; Utley, Duncan, Strain, & Scanlon, 1983) including earlier studies conducted as part of the line of research and practice by the study investigators (e.g., Dunst et al., 1985; Dunst, Raab, Trivette, Parkey et al., 2007; Dunst, Raab et al., 2010; Dunst, Raab, Trivette, Wilson et al., 2007; Raab et al., 2009). We also note that the acquisition and use of response-contingent behavior in the asset-based group was almost immediate and there was no latency to learn as has been the case in other studies of young children with severe developmental delays and multiple disabilities (Hutto, 2007). These findings are most likely the case because the asset-based intervention was conceptualized and implemented from a strengths-based perspective where the children were seen as having existing capabilities as well as the capacity to become more competent. This included the use of existing child behavior as the building blocks for developing their response-contingent capabilities and child-specific reinforcers which was not necessarily the case in previous research where targeted behavior and reinforcers were predominantly investigator or practitioner selected rather than based on existing behavior in a child's repertoire (e.g., Hanson & Hanline, 1985; Sullivan, Laverick, & Lewis, 1995; Watson, Hayes, & Vietze, 1982) including our own research (e.g., Dunst et al., 1985; Laub & Dunst, 1974).

The fact that the children in the needs-based group made some progress deserves comment because the intervention practice used with this group of children was intended to mirror a particular type of early childhood intervention where the results from developmental assessment scales are used to identify behavior for children to learn. This approach to intervention is part of a long standing tradition of using assessment scale results as the source of information for identifying behavior that early childhood intervention is designed to promote or facilitate but which children do not yet use in an intentional or functional manner (see especially Dunst, Snyder, & Mankinen, 1988). As stated by Eloff and Ebersöhn (2001), "Even though many proponents of the needs-based approach ... [include assessment] of strengths and weaknesses, practice serves to emphasize weaknesses" (p. 149).

The learning demonstrated by the children in the needs-based group is typical for the type of intervention that was used with the children in the study described in this paper (Hutto, 2007). In fact, infants and toddlers with significant developmental delays and young children with multiple disabilities often demonstrate at least some learning as a result of any number of early childhood intervention practices (see e.g., Dunst, 1986). In the absence of the findings from the children in the asset-based group, one might conclude that the needs-based intervention was about as effective as would be expected with children with significant delays and disabilities. The results show that the needs-based intervention was not nearly as effective as the asset-based intervention as evidenced by the results reported in the paper.

The practical significance of the asset-based approach to response-contingent learning was demonstrated by the magnitudes of the improvement indices for 5 of the 6 learning measures (Table 4). The magnitudes of the improvement indices are larger than those reported for other types of early childhood interventions (e.g., Feil, Frey, Walker, & Forness, 2015; What Works Clearinghouse, 2006), and illustrate the value-added effects of asset-based compared to needs-based approaches to response-contingent intervention.

The differences between asset-based and needs-based practices perhaps is best illustrated by noting that an asset-based approach is part of a family of early childhood intervention practices that emphasize child and family strengths as the behavior used to promote participation in everyday activities to provide opportunities to interact with people and material in ways that not only strengthen existing capabilities but also provide contexts for acquiring new skills (e.g., Campbell, Milbourne, & Silverman, 2001; Granlund, Wilder, & Almqvist, 2013; Green, McAllister, & Tarte, 2004; Swanson, Raab, & Dunst, 2011). Accordingly, the learning games for the asset-based group were the sources of child learning opportunities, and existing non-instrumental child behavior were the strengths (abilities) used to elicit reinforcing environmental consequences and promote child acquisition of instrumental and functional behavioral capabilities as was found in the study described in this paper.

4.1 Implications for Practice

We conclude by noting the implications for changing and improving early childhood intervention practices. Young children with significant delays and disabilities more often than not are seen as lacking foundational skills that lead to identification of child behavior, which the children do not or cannot easily produce (i.e.,

missing skills). Results reported in this paper and elsewhere (e.g., Dunst, Raab, Wilson et al., 2007; O'Brien et al., 1994) indicate that intervention practices for young children with significant developmental delays or multiple disabilities could be improved considerably by (1) changing the ways in which target behavior are selected, (2) using assessment procedures for identifying child-specific reinforcers, and (3) arranging learning opportunities (e.g., learning games) to facilitate child use of behavior to produce or elicit reinforcing environmental consequences (see e.g., Dunst, 1981; Lancioni, 1980; Sullivan & Lewis, 1990; Watson et al., 1982; for descriptions of response-contingent learning interventions).

An asset-based approach to child response-contingent learning starts by identifying behavior that children already demonstrate (intentionally or non-intentionally) and using these behavior as the building blocks to promote acquisition of contingency behavior (Eloff & Ebersöhn, 2001; Wilson et al., 2004). Response-contingent learning is more likely to occur if child-specific rather than *a priori* selected reinforcers are used as the consequence of child behavioral responses (Crawford & Schuster, 1993; Piazza, Fisher, Hagopian, Bowman, & Toole, 1996). The experiences (e.g., learning games) afforded children to use behavior to produce or elicit reinforcing consequences need to be ones that have a high probability of occurring as frequently and as often as possible to provide lots of opportunities to be associated with positive effects (Dunst, Raab, Trivette, Wilson et al., 2007; Dunst, Trivette, Raab, & Masiello, 2008). This is the case, in part, because young children with delays or disabilities often take longer to learn contingency detection (Tarabulsy et al., 1996) and awareness (Watson, 1966), and the more children are afforded learning opportunities with developmentally enhancing characteristics, the more likely they will learn that they are the agents of environmental effects.

Acknowledgment

The research described in this paper was supported, in part, by the U.S. Department of Education, Institute of Education Sciences (Grant # R324A110183). The opinions expressed, however, are those of the authors and do not necessarily represent the opinions or official position of the Department or Institute.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Young Children's Inductive Generalizations about Similarities between Siblings or Classmates

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Received: October 4, 2016 Accepted: November 10, 2016 Online Published: December 4, 2016

doi:10.5539/jedp.v7n1p29 URL: http://dx.doi.org/10.5539/jedp.v7n1p29

Abstract

This study investigated 3- to 5-year-olds' inductive generalizations about similarities between siblings. Children were presented with contrasts in appearance and either sibling or classmate status and asked to generalize either biological properties or behaviors. Performance did not differ from chance for judgments about siblings, but children generalized on the basis of appearance more than classmate status. Thus, young children do not necessarily expect siblings to share biological and behavioral characteristics, but do regard sibling status as different from an arbitrary social relationship such as classmate status.

Keywords: biological knowledge, induction, kinship

1. Introduction

The concepts of family resemblance and inheritance are central to debate about the development of children's intuitive biological knowledge (Solomon & Zaitchik, 2012). Carey and colleagues (Carey, 1985, 1988; Solomon, Johnson, Zaitchik, & Carey, 1996) have argued that young children (a) do not recognize biology as a distinct and coherent conceptual domain, and (b) do not understand inheritance as the biological transmission of characteristics from parents to offspring. According to this view, young children recognize family resemblance (i.e., children expect offspring to resemble their parents), but do not understand resemblance as resulting from a biological causes, rather than social or environmental conditions. In contrast, others (e.g., Gelman & Wellman, 1991; Springer, 1992; Springer & Keil, 1989) have argued that preschool children do understand the biological inheritance of traits. Studies of children's understanding of resemblance and inheritance have examined reasoning about resemblance between parents and offspring. In the present study, we extended this work by examining young children's reasoning about similarities between siblings.

Previous studies have asked children about either the inheritance of species-general characteristics or the inheritance of individual differences within a species. For example, Gelman and Wellman (1991) told children ages 3- to 6-years of age about an animal that had been separated from its parents and other members of its species and raised with another species. Children were asked if the animal would have the characteristics of its own species or the characteristics of the species among which it was raised, e.g., would a cow raised among pigs moo or oink? By 4-years of age children attributed to the animal the characteristics of the animal's own native species more than the characteristics of the species with which the animal had been raised. Springer (1992) investigated children's beliefs about individual differences within a species. Springer (1992) presented children ages 4- to 8-years with a picture of an animal and described it as having a particular characteristic, e.g., a horse that had hair inside its ears. Then children were shown a picture of second animal that looked similar to the first animal, but was described as an unrelated friend, and a picture of third animal that looked different from the first animal, but was described as its baby. When asked if the second and third animals shared the first animal's characteristic, children attributed the characteristic to the baby more frequently than to the friend. However, Solomon et al. (1996) argued that such evidence indicates that young children understand that offspring resemble their parents, but does not necessarily demonstrate that children understand biological inheritance.

According to Solomon et al. (1996), having a concept of inheritance requires that children recognize (a) that offspring resemble their parents, and (b) that family resemblance results from biological causation. A biological concept of inheritance would include recognition that inherited traits are related to birth rather than to social

experience. Therefore, Solomon et al. (1996) assessed children's understanding of inheritance by presenting them with an adoption scenario in which a king/queen's child was adopted by a shepherd/shepherdess (or vice versa). Children were asked if the child shared the physical traits and beliefs of the biological parent or the adoptive parent. Solomon et al. (1996) reasoned that if children understand inheritance as a biological process related to birth, children should attribute the biological parent's physical traits to the child, but attribute the adoptive parent's beliefs to the child. However, young children did not recognize that an adopted child is likely to resemble a biological parent for physical traits, such as eye color, and likely to resemble an adoptive parent for learned characteristics, such as beliefs about skunk's ability to see in the dark. Because children did not consistently differentiate physical traits and beliefs in their judgments until 7-years of age, Solomon et al. (1996) concluded that younger children do not recognize family resemblance as inherited through a biological process that is distinct from teaching and learning. Solomon (2002) reported that 4- and 5-year-olds judged an adoptive child as equally likely to share a biological parent's shirt color and race. Nevertheless, Solomon and Johnson (2000) found that following a twenty-minute training session that emphasized the role of genes in inheritance, many 5- and 6-year-olds improved in performance on an adoption task, though the majority of children still did not differentiate between physical traits and beliefs.

In the present study we investigated young children's reasoning about family resemblance between siblings. Understanding resemblance between siblings presents children with a different challenge, compared to understanding resemblance between parents and offspring. Because siblings often are similar in age, the physical resemblance between siblings, especially during childhood, might be more readily evident to children than is the resemblance between a parent and a young child. However, the nature of the kinship relation between siblings might be less apparent than the relationship between parent and child. Whereas parents and children are related directly through biological inheritance, siblings are related indirectly, via shared parentage. Thus, the notion that siblings are biologically related, as well as socially related, might be less apparent to children. We asked 3-, 4-, and 5-year-olds to reason about biological and behavioral characteristics of siblings and non-siblings.

Our procedure was based on a triad task that Gelman and Markman (1986) used to study young children's patterns of inductive generalization. Gelman and Markman (1986) presented 4-year-olds with sets of three pictures. Each triad included two test items and a target. The target belonged to the same category as one test item differed in appearance, and the resembled the other test item, but belonged to a different category (e.g., the test items were a flamingo (labeled as a bird) standing on one foot and a bat with wings outstretched, and the target was a blackbird with wings outstretched). Children were taught an unfamiliar property for each test item (e.g., the bird (flamingo) feeds its babies mashed up food; the bat feeds its babies milk). Then children were asked which property was characteristic of the target. Children based the majority of their inferences on category membership (e.g., responding that the blackbird behaves like the flamingo rather than the bat). Likewise, subsequent research indicates that when given a choice of basing inductive generalizations on shared category membership or similarity in perceptual appearance, young children typically generalize on the basis of category membership (Gelman, 2003; Gelman & Davidson, 2013). In the present study, we examined children's use of sibling status as a basis for inductive generalizations. In the Sibling condition, we presented children with triads with pictures of three children. The first two pictures portrayed children were unrelated and differed in appearance. Participants taught about either a biological or behavioral property of these two children (e.g., "This boy has fibros in his blood. This boy has neutros in his blood."). The participants were shown a picture of third child who looked similar to one of the first two children, but was the sibling of the other child. Participants were asked if the third child shared the same property as his or her dissimilar sibling or shared the property of the unrelated child who he or she resembled in outward appearance. As a comparison, in the Classmate condition, the third child in each triad was a classmate of one of the first two children, but did not resemble the classmate, and resembled the other child, but was not a classmate of that child. Because being classmates is a temporary, and more or less serendipitous, relationship, classmate status should not support inductive inferences to the same degree as kinship.

The design of the study allowed us to distinguish among patterns of attribution based on outward appearance, biological kinship, or social relations. If young children generalize unseen biological or behavioral characteristics on the basis of similarity in outward appearance, then in both the Sibling and Classmate conditions, participants should judge that the third child in each triad shares the property of the child who similar in appearance, but unrelated. If children regard family resemblance as biologically-based and also recognize siblings as biologically related, then in the Sibling condition participants should generalize from sibling to sibling within each triad, but should generalize on the basis of similarity in appearance in the Classmate

condition. If children lack a biological understanding of kinship and regard being siblings or classmates as equivalent social relationships, they should generalize on the basis of sibling or classmate status equally often and more often than they generalize on the basis of appearance.

2. Method

2.1 Participants

Thirty two 3 year olds (mean age 3 years, 8 months; age range 3 years, one month to 3 years, 11 months; 17 girls and 15 boys), 32 4 year olds (mean age 4 years, 5 months; age range 4 years to 4 years, 10 months; 16 girls and 16 boys), and 32 5 year olds (mean age 5 years, 5 months; age range 5 years, 1 month to 5 years, 9 month; 18 girls and 14 boys) participated. The children were students at preschools in either suburban or rural towns in the northern Illinois region of the United States. Children in the Classmate condition participated in a related study reported by Pillow, Pearson, and Allen (2015). In addition, 10 adults (mean age 21 years; range 19-23 years; 7 women and 3 men) participated in a manipulation check prior to the main experiment. The adults were students enrolled in an upper level undergraduate psychology course at a public university.

2.2 Materials

Eight sets of computer generated pictures of children were used for the main test procedure. Each set was a triad, with pictures of two children (the test pictures) on the same page placed above a picture of a third child on a separate page (the target pictures). On the top page, the two test children stood side by side. The two children differed in hair color, hair length, eye color, facial features, and shirt color, but had identical bodies, posture, pants, and shoes. On the second page, the target child had the same hair color, eye color, and facial features as one of the two test children, but had hair of an intermediate length and a different color shirt than either of the test children. This target child matched the two test children in body, posture, pants, and shoes. Across the eight sets of pictures, hair color, hair style, eye color, facial features, and shirt color were varied so that the individuals in each triad were distinct from the individuals in the other triads. Because race and ethnicity of the depicted children were not variables under investigation, these variables were held constant by making all children in the pictures Caucasian in appearance. Additional sets of pictures were used in the familiarization procedure.

2.3 Procedure

Each child participated in one of two conditions: Sibling or Classmate. In each condition, children began with a brief familiarization procedure. The familiarization procedure introduced children to information about either sibling or classmate status, and similarities and differences in appearance. This procedure also accustomed children to pointing to pictures. In the Sibling condition, there were two familiarization trials. For the first trial, half of the children were shown two pairs of pictures of boys, and the other half were shown two pairs of pictures of girls. One of pair of pictures differed in appearance but were labeled as siblings (e.g., “Here are two boys. This boy and this boy are brothers.”). The pictures in the other pair were similar in appearance, but were labeled as unacquainted with each other (e.g., “Here are two boys. This boy and this boy don’t know each other.”). Children were asked, “Can you point to the boys that are brothers?” and “Can you point to the boys that don’t know each other?” For the second familiarization trial, children were shown the two pairs of pictures from the first two trials. The experimenter pointed to the first pair and said, “I think these two look kind of the same”, and then pointed to the second pair and said “I think these two look different”. Then the experimenter asked, “What do you think? Can you point to the ones that look kind of the same? And can you point to the ones that look different?”. In the Classmate condition, there were two familiarization trials. The procedure in the Classmate condition was the same as in the Sibling condition, except that for the first trial one pair of pictures was labeled as classmates rather than siblings.

Following the familiarization, there were eight test trials. On each trial children were shown a set of pictures, taught either a biological or behavioral characteristic for each of the two test children (test child A and test child B) and then asked if the target child had the same characteristic as test child A or test child B. In Sibling condition all three children (target and test) were described as being the same gender. The target child was described as being a brother or sister of either test child A or test child B, but visually resembled the test child that he or she was not related to. For example, children were told, “This girl has telos in her body. This girl has brevies in her body. Now here’s someone else. She looks kind of like this girl. And she’s this girl’s sister”. Likewise, in the Classmate condition, the target child resembled one of the test children, but was a classmate of the other, dissimilar test child. For example, children were told, “This boy likes to share a lot. This boy likes to laugh a lot. Now here’s someone else. He looks kind of like this boy here. And he’s in this boy’s class at school”.

All of the behaviors mentioned on behavioral trials were positive and socially desirable. The items were based on those used by Gelman, Collman, and Maccoby (1986) and Pillow et al. (2015). Biological and behavioral items are shown in the appendix. For all trials, both the target child's similarity in appearance with one of the test children, and the target child's sibling or classmate status with other test child, were explicitly mentioned.

In each condition, there were four biological trials and four behavioral trials. Biological and behavioral trials were presented in alternating blocks of two trials of each type, with half of the children in each condition beginning with two biological trials, and half beginning with two behavioral trial. The order of mention of the sibling and non-sibling, or classmate and non-classmate, was alternated across trials. For half of the trials in the Sibling and Classmate conditions, all three children were boys, and for the other half the children were girls.

A manipulation check was included to ensure that the pictures intended to be similar in appearance were perceived as more similar than were the pictures intended to be different in appearance. For the manipulation check, adults were shown pairs of pictures and asked to rate their similarity. The eight triads from the main procedures were used. In each triad, there are three possible pairings of pictures. Adults were shown each of the three pairings for each triad, resulting in 24 pairs of pictures. In addition, 12 pictures were paired with an identical copy of themselves to create matching pairs. Altogether there were 36 pairs of pictures, which were presented in random order. First, adults were told, "You will be seeing pictures of people, presented two at a time. For each pair of pictures, please rate how similar the two people are to each other". Then they were shown a five point rating scale, with one labeled as "different", 3 labeled as "somewhat similar", and 5 labeled as "highly similar". Next participants were told, "Use this five point scale to rate the similarity of the two people in each pair of pictures". Participants viewed and rated the pairs of pictures at their own pace.

3. Results

For the manipulation check, adults rated Matching pictures (M=5.00) as significantly more similar than the Similar pictures (M=3.52), t (9)=10.15, p<.001, and rated the Similar pictures as significantly more similar than the Dissimilar pictures (M=1.95), t(9)=8.44, p<.001. Thus, adults perceived the Similar pictures as being more alike visually than the Dissimilar pictures.

Each child was a given a score from 0-4 for biological trials and a score from 0-4 for behavioral trials. Scores corresponded to the number of trials on which the child responded that the target would have the same trait as the test child who was a sibling (Sibling condition), or was a classmate (Classmate condition). Results are shown in Table 1. The data were analyzed in two steps. First, to examine possible effects of age, condition (Sibling versus Classmate), and the type of trait children were asked about (Biological versus Behavioral) a 3 x 2 x 2 (Age x Condition x Trait) ANOVA with Trait as a repeated measures factor was conducted. Second, children's scores were compared to chance expectancies. The ANOVA yielded a significant effect of Condition, F(1, 90)=4.13, p<.05, partial η^2=0.044, MSE=1.92, with higher scores in the Sibling Condition than in the Classmate condition. For each condition, performance was compared to chance responding (2 out of 4 trials) for both biological and behavioral traits. Because the Age x Condition x Trait ANOVA did not yield any significant effects of Age, the three age groups were combined for these comparisons. In the Sibling condition, performance did not differ from chance for either biological, t(47)=0.69, p>.05 or behavioral traits, t(47)=0.91, p>.05. In the Classmate condition, children attributed both biological, t(47)=3.93, p<.001, and behavioral traits, t(47)=2.45, p<.05, on the basis of shared classmate status significantly less often than would be expected by chance.

Table 1. Mean number of category match responses by age, condition, and property

	Sibling				Classmate			
	Biology		Behavior		Biology		Behavior	
Age	Mean	SD	Mean	SD	Mean	SD	Mean	SD
3-years	1.75	1.18	1.63	1.31	1.75	1.00	2.06	1.12
4-years	2.25	1.25	2.06	0.93	1.00	1.15	1.44	1.21
5-years	1.63	1.31	1.88	1.09	1.31	1.20	1.19	1.28

Note. Scores range from 0-4.

4. Discussion

We examined 3- to 5-year-old children's use of information about sibling status, classmate status, and similarity in physical appearance when making inductive generalizations about biological and behavioral characteristics. Although children in the Sibling condition generalized characteristics from one sibling to another more often than children in classmate condition from one classmate to another, children's performance in the Sibling condition did not differ from chance for either biological or behavioral characteristics. Thus, in the Sibling condition children did not treat kinship as more important than similarity in appearance when making inductive generalizations. Therefore, in the Sibling condition children did not demonstrate a biologically-based understanding of family resemblance. In the Classmate condition, most of the time children generalized both biological behavioral characteristics on the basis of similarity in appearance rather than on the basis of classmate status. Across the two conditions children did not demonstrate consistent use of either appearance or kinship as the sole basis for induction, nor did children generalize equally on the basis of sibling and classmate relationships. Instead, children seemed to consider both appearance and social relationships, weighting a sibling relationship as roughly equal in inductive strength to similarity in appearance, but regarding a classmate relationship as a much weaker basis for induction than similarity in appearance.

The present results are consistent with Solomon et al.'s (1996) conclusion that young children do not understand family resemblance as resulting a biological process of inheritance that is related to birth. Solomon et al. (1996) found that prior to 7-years of age children did not consistently attribute a biological parent's physical traits, but an adoptive parent's beliefs, to a child who had been adopted at birth. In the present study, we examined children's expectations concerning family resemblance between siblings, but we did not investigate children's beliefs about biological inheritance. We found that 3- to 5-year-old children did not expect siblings to share either unseen internal biological properties or behavioral characteristics. Thus, in contrast to previous findings that young children expect offspring to resemble their parents, we did not find evidence that young children expect siblings to resemble each other. However, in studies of parent-offspring family resemblance, the biological traits presented have included a mix of observable external features and hidden internal features. Young children often may base generalizations on visual or global similarity rather than more abstract relationships (Deng & Sloutsky, 2012; Jones & Smith, 1993; Sloutsky & Fisher, 2004). Thus, the notion that family members resemble each other in outward appearance may be more familiar and accessible to young children compared to the idea that family members might possess similar internal features. Children in our study may have failed to evidence a belief in family resemblance either because (a) children recognize family resemblance between parents and offspring before they recognize resemblance between siblings, or (b) children recognize resemblance in external features before they expect resemblance in internal features.

Young children also might be more aware of individual differences in external features than internal features. Research on category-based induction indicates that children expect members of the same species or general biological category to share both internal features and typical behavioral characteristics (Gelman, 2003; Gelman & Davidson, 2013). Furthermore, when asked about cases of cross-species adoption, children ages 4 years and older expected an adopted animal to share the characteristics typical of its species more than the characteristics of the species with which it had been raised (Gelman & Wellman, 1991). Learning about individual differences within a species may present children with a different challenge than reasoning about the typical shared characteristics of a species. Individual differences in external features should be more accessible to both perception and thought than differences in internal features, and to the extent that children expect members of species to share non-obvious features, the possibility of individual differences in such features may not come to mind readily. Therefore, the use of internal biological features in the present study may have contributed to children's failure to base inductions on kinship more than on similarity in appearance.

The present study was an initial effort to extend research on children's beliefs about family resemblance to include reasoning about siblings. The results indicate that young children do not necessarily expect siblings to share biological and behavioral characteristics, but do regard sibling status as different from an arbitrary social relationship such as classmate status. These results suggest directions for additional research. Future studies could (a) directly compare children's reasoning about sibling relationships with reasoning about parent-offspring relationships, (b) examine children's reasoning about sibling adoption scenarios to assess beliefs about inheritance, (c) compare children's reasoning about siblings with reasoning about other close social relationships, such as friends or neighbors, (d) examine children's generalization of a variety of characteristics, including external and internal characteristics, behaviors, preferences, and beliefs, and (e) trace developmental progress in

understanding family resemblance and inheritance by comparing young children's reasoning about siblings with older children's reasoning.

Acknowledgments

We thank the children, parents, and schools who participated in this study.

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Appendix

Biological items:

Has fibro/neutros in his/her blood.

Has telos/brevies in his/her body.

Has a sarto/lattis in his/her body.

Has transfa/protho in his/her blood.

Behavioral items:

Always works hard on puzzles/Always cleans up toys at school.

Likes to share a lot/laugh a lot.

Always says please and thank you/Always holds puppies and kittens carefully.

Likes to follow rules/Likes to meet new people.

Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Validity and Reliability of the Brief Scale of Alcohol Dependence (BEDA) on Teenagers

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Received: October 14, 2016 Accepted: November 20, 2016 Online Published: December 5, 2016

doi:10.5539/jedp.v7n1p36 URL: http://dx.doi.org/10.5539/jedp.v7n1p36

Abstract

The Brief Scale of Alcohol Dependence (BEDA) has shown validity and reliability on previous studies. Despite the frequent use in treatment programs for addictions, there are gaps on its psychometric properties and diagnostic efficiency on the teenage population. This study conducted analysis of construct validity of the Brief Scale of Alcohol Dependence and its relation to attitudes towards an accident prevention program for young people in Sonora. 838 high school students (Cecytes) from Hermosillo participated, including students from second, fourth and sixth semesters. 54% are male, while the rest (46%) are female, with an average age of 16 and a SD of 1, with a minimum age of 15 and a maximum of 19. Results show that the scale meets the statistical criteria that proves its validity and supports its use on the teenage population. Results support the hypothesis of the scale having evidence of validity and reliability, which justifies its use in research and in the creation of indicators of alcohol consumption in young people.

Keywords: validity and reliability, brief scale, alcohol dependence

1. Introduction

The importance of monitoring substance use among students offers the possibility of assessing risk behaviors of today's youth (European Monitoring Centre for Drugs and Drug Addiction, 2012). This practice can be carried out in Mexico by means of the National Survey of Addictions (ENA), which allows analyzing data on different age ranges. It has been recorded in the adolescent population that alcohol consumption has significantly increased according to different parameters: *consumed alcohol once* increased from 35.6% to 42.9%; *consumed in the last year* increased from 25.7% to 30.0%, and *consumed in the last month* from 7.1% to 14.5%. This trend was observed in men and women, especially in *consumed in the last month*, going from 11.5% to 17.4% for men and from 2.7% to 11.6% for women Villatoro-Velázquez et al. (2012).

A comparison of the 2008 and the 2011 ENAs reveals that the user rate registered a significant increase among young people from 2.1% to 4.1%, while high consumption (daily) stayed the same and the regular drinker decreased from 2.2% to 1%. Gender-wise, daily consumption held low percentages for both genders, regular use decreased and dependence doubled in males (from 3.5% to 6.2%) and tripled in females from .2 to .6%.

The data obtained from the ENA and the Encode show the magnitude of the problem of alcoholism, which threatens an important part of Mexico's young population; as physical, social, and psychological consequences associated to the use, abuse, and dependence on alcohol is a public health problem (Guzmán, Pedrao, Rodríguez, López, & Esparza, 2007; Mora & Natera, 2001).

Studies related to addictions in young people are based on the fact that it is precisely at this stage of life in which consumption of alcohol, tobacco, and other drugs most often starts. The average age of onset of alcohol consumption is 16, however, in recent years consumption occurs at a younger age (Martínez, Salazar, Pedroza,

Ruiz, & Ayala, 2008). This implies a greater likelihood of developing dependence, and so here lies the need to understand the factors associated to the onset and form of alcohol use in this age group (Cadaveira, 2009; Maradiegue, 2010).

Likewise, excessive use of alcohol is considered as one of the five main risk factors for illness, impairment, and death worldwide. For instance, in 2012, 5.9% of all deaths worldwide (3.3 million) were due to the consequences of using this substance (Villatoro-Velázquez et al., 2014).

One of the main causes of death are those that link alcoholism and car accidents. This bond has brought about the implementation of the Designated Driver Program (PCD) since August 7th 1992, as a preventive measure against alcohol related car accidents and to promote awareness in the community about the importance of driving sober, thus encouraging a culture of responsible consumption. However, encouraging a culture of responsible consumption would be on a par with a change in the beliefs and reasoning system that allow the young person to realize the risk involved in alcohol consumption, in order for them to reduce drinking and avoid building alcohol dependence and a disorder.

This raises a methodological need related to the presence of an instrument that facilitates the detention of teenage students at risk with alcohol. This effort has been made in some States in the country with different scales. For example, the scale of Alcohol Use Disorders Identification Test (Audit) was validated for high school students in Mexico City (Gómez, Gómez, Pérez, & Morales, 2009).

Another study carried out in Mexico (Pérez-López, Villalobos-Gallegos, Viveros, Graue-Moreno, & Marín-Navarrete, 2015). Validated three different versions of the BEDA (15, 14, and 12 items), by means of a confirmatory factor analysis, but with people who were receiving care in residential treatment centers for addictions, concluding that the three versions presented an internal consistency >.90, adequate goodness of fit, and significant correlations with the Mini International Neuropsychiatric Interview, v. 5.0, of diagnostic criteria of Alcohol Dependence (DA).

1.1 Objetive

This study carried out validity and reliability analysis of the Brief Scale of Alcohol Dependence and its relation with attitudes toward an accident prevention program for young people.

2. Method

2.1 Participants

838 high school students (Cecytes) from Hermosillo participated, including students from second, fourth and sixth semesters. 54% are male, while the rest (46%) are female, with an average age of 16 and a SD of 1, with a minimum age of 15 and a maximum of 19.

2.2 Instruments

2.2.1 Brief Scale of Alcohol Dependence (BEDA)

The Echeverría, Ruiz, Tiburcio y Ayala (2007) version was used. It consists of 15 items that are answered in a continuum of Never-Almost always. The scale's aim is to measure dependence in the adult population and it was adapted to be applied to youths.

2.2.2 Attitude and Knowledge of the Designated Driver Program

Developed especially for this study, by means of the elements and criteria in which the designated driver program is based on, consists of 10 items made with Likert response options that retrieve the agreement-disagreement attitudes, and it is based in the knowledge one may have about the program.

3. Procedure

The data was gathered by the implementation of a group questionnaire, requesting prior authorization of the relevant directors and the informed consent of the participants.

Data analysis consisted of an exploratory factor analysis with half of the participants, employing the maximum likelihood extraction method and Oblimin rotation in SPSS 20, and then a confirmatory factor analysis with the structural equations method using AMOS.

4. Results

4.1 Factor Analysis

An exploratory factor analysis was performed to the BEDA, achieving one-dimensionality with values of .922 in the Kaiser-Meyer-Olkin measure of sample adequacy; and a significant Bartlett test of sphericity (X^2=4491.29, p=.000), which held data adequacy for this type of analysis (Hair, Black, Babin, & Anderson, 2006).

The criterion for including the dimension in the factorial solution was that at least 10% of the variance was explained, and as for items, that they present factor loadings equal or greater than .30 (Martínez, Hernández, & Hernández, 2009). The final solution consisted of 11 items, excluding four, which characterize the young respondents, since those that were not significant are basically related to the possibility to continue drinking and to the freedom to do so without accounting to anyone, for instance: do you drink your desired amount regardless of what you have to do the following day? Moreover, the values of explained variance and internal consistency rate alike turned out to be adequate, which indicates strong evidence of construct validity.

Likewise, an exploratory factor analysis was carried out for the *attitudes towards the designated driver program* resulting two factors as theoretically designed, with values of *KMO=.859*; and a significant *Bartlett test of sphericity* (X^2*=1181.98*, *p=.000*), which showed data adequacy for this type of analysis.

The final solution consisted of seven items: four items distributed in factor one, which has been denominated *congruous attitude* towards the program and explains 47.39% of the variance, and three items in factor two, which has been denominated *incongruous attitude* towards the program and explains 9.83% of the variance, as well as the internal consistency rate (*Cronbach's Alpha=.89*), which shows strong evidence of construct validity.

Table 1. Brief Scale of Alcohol Dependence (BEDA)

Items/Brief Scale of Alcohol Dependence (BEDA).	h^2	Factor Loading
R1. Do you have difficulty to stop thinking about drinking?	.53	.73
R2. Is drinking in excess more important than your next meal?	.53	.73
R3. Do you organize your day according to where and when you may drink?	.42	.65
R4. Do you drink in the morning, afternoon, and night?	.53	.73
R5. Do you drink for the effect of alcohol regardless of what beverage you are drinking?	.48	.69
R10. The next morning after drinking too much, do you feel the need to drink in order to function?	.54	.73
R11. The next morning after drinking too much, do you wake up with shaky hands?	.58	.76
R12. After drinking a large amount, do you wake up and vomit?	.58	.76
R13. The next morning after drinking too much, do you avoid people?	.50	.70
R14. After drinking too much, do you see things that scare you even when you realize its your imagination?	.59	.77
R15. Do you go out for a drink and the next day forget what happened the previous night?	.44	.67
% of the variance	*52.52*	
Cronbach's Alpha	*.90*	

Note. h^2=communality.

Table 2. Attitude and knowledge of the designated driver program

		Factor Loading	
	h^2	F1	F2
R5. The main goal of the designated driver is: to drive all of his friends back home safe and sound.	.73	**.85**	-.52
R3. The Designated Driver Program raises awareness about the importance of not mixing alcohol and driving, promoting a responsible consumption culture in the community.	.63	**.79**	-.44
R7. The largest commitment of a designated driver is to not drink alcoholic beverages.	.63	**.79**	-.52

R1. Designated Driver is a program at a national level that contributes to the reduction of car accidents involving alcohol abuse.	.55	**.74**	-.42
R8. Another major commitment of the designated driver is to notify other drivers about police checkpoints.	.60	-.48	**.77**
R10. Being a designated driver allows you to be a police officer, in the near future, without taking any tests.	.55	-.39	**.73**
R4. The extended hours of alcohol sales favors the caring of people in the community and makes it less likely for people to mix alcohol and driving.	.28	-.42	**.51**

Note. h^2=communality.

4.2 Confirmatory Factor Analysis

From the results of the exploratory factor analysis, a model for measuring the *Alcohol Dependence* construct was proposed, in which the presence of a one-dimensional factor was established and related to a congruous or incongruous attitude toward the designated driver program as evidence of divergent validity.

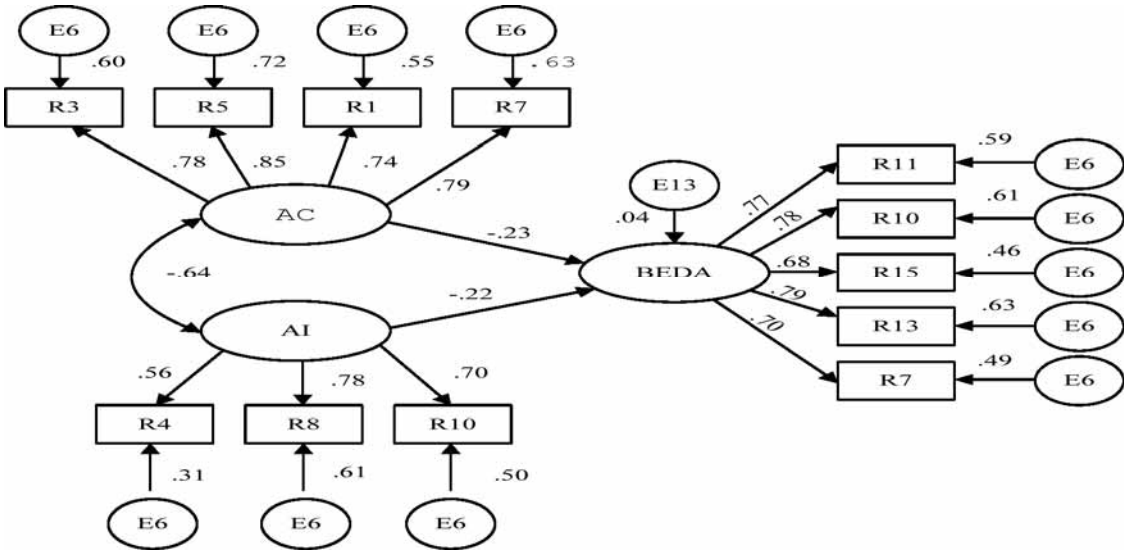

Figure 1. Theoretical model for measuring alcohol dependence and knowledge and attitudes toward an intervention intention of alcohol consumption

The estimation procedure of the model used was that of maximum likelihood based on the X^2 test. Absolute fit, incremental, and parsimony rates were taken into account to evaluate the model's goodness of fit to the data (Cea, 2004; Hair, Black, Babin, & Anderson, 2006). The absolute fit value is given by the statistical X^2, that in this case the hypothesis [$X^2(51)=96.674$, $p<.001$] is rejected, however the rate *CMIN*(X^2/gl)*=1.89*, *the value of RMSEA=.04*, the incremental fit rate NFI=.955 and the CFI=.*978* and the parsimony rate, PNFI=.738, suggest that the model gained a satisfactory general fit (see Figure 1).

5. Discussion

The need to value health or conditions of well being in the population, regardless of age or social distinction, is a priority for governments, with population surveys being one of the most efficient strategies. Surveys, on the other hand, must have some very important features, such as: validity, reliability, and prompt resolution (Villatoro-Velázquez et al., 2015).

The results support the hypothesis that the scale shows evidence of validity and reliability, which justify its use in research and creating indicators of alcohol consumption in young people. The value of the scale is reinforced by the solidity of the studies that report the existence of indicators in the adult population (Gómez, Gómez, Pérez,

& Morales, 2009). On the other hand, small correlations between the dimensions of attitude, which manifest knowledge about the designated driver program, assert that it is of little importance how much is known about the program and that its relation with consumption is scant and in a directly proportional sense. This suggests that the more is known about the program, the greater the alcohol consumption is. While this is beneficial, because car accidents are reduced, addictions can be brought up among young people.

Although the findings suggest that the scale is a valuable tool for measuring the construct, it must be stated that it has limitations, being that only the usual items were worked with. In this sense it is recommended to write new items that are related to the socialization of young people nowadays.

Acknowledgments

This study is part of the project "Design and Evaluation of Preventive and Corrective Programs Related to the use of Alcohol in Teenagers and Young People" (Diseño y Evaluación de Programas Preventivos y Correctivos Relacionados con el uso del Alcohol en Adolescentes y Jóvenes), financed by the Hermosillo municipal government, March-July 2012. The authors wish to thank the Hermosillo Municipal Government 2009-2012.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Development of Attentional Functions in School-Age: Evidence from both Traditional and Computerized Tasks

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Received: September 20, 2016 Accepted: October 31, 2016 Online Published: December 7, 2016

doi:10.5539/jedp.v7n1p42 URL: http://dx.doi.org/10.5539/jedp.v7n1p42

Abstract

The present study examines the development of basic attentional functions (sustained attention, selective attention, flexibility and divided attention) in 172 elementary school children (6-12 years) by using representative subtests from both a computerized (KITAP) and a traditional battery (TEA-Ch). The results indicate significant age-related improvements between 8 and 10 years in all the attentional functions irrespective of the assessment tool. Specifically, the results from both instruments converge regarding the developmental rates for divided attention, sustained attention and flexibility. However, performance scores in KITAP suggest a developmental plateau after the age of 10 years, whereas TEA-Ch subtests seem to be more sensitive to uncovering attention performance differences beyond the age of 10.

Keywords: attention development, school-age, computerized assessment, traditional assessment

1. Introduction

The development of attention in typically developing school age population has recently attracted growing research interest, given the strong associations between attention, academic achievement and self-regulation of emotion and behavior (Posner & Rothbart, 2005). Child literature is still limited compared to the relevant adult regarding the assessment of distinct attention functions or processes. According to most contemporary neuropsychological models, attention is a multidimensional system consisting of various functions, processes or components (Cohen, 1993; Mirsky, Anthony, Duncan, Ahearn, & Kellam, 1991). Furthermore, developmental studies have provided convincing evidence that the development of attention is a multistage process, in which several components follow different timelines (Anderson, 2008). These timelines start from infancy and continue until adolescence, with most remarkable and rapid changes occurring during childhood (see Klenberg, Korkman, & Lahti-Nuuttila, 2001).

Early developmental studies have tried to confirm the adult subdivision of the attention system in children and to provide developmental rates for each component with the use of tasks primarily designed for adults (Kelly, 2000; Rebok, Smith, Pascualvaca, Mirksy, Anthony, & Kellam, 1997). Recently, more child-friendly tasks have been developed and implemented in an attempt to overcome the lack of motivation evidenced in testing children with adult material (e.g., CogState by Betts, McKay, Maruff, & Anderson, 2006; TEA-Ch by Manly, Robertson, & Nimmo-Smith, 1999; KI-TAP by Zimmermann, Gondan, & Fimm, 2002). Only recently there have been empirical attempts to examine the development of children's attention as a multidimensional construct with the use of test batteries that assess various attention functions. Assessment issues have been raised regarding the ecological validity of the attention batteries as well as their sensitivity in taping the developmental trends in school age population. Specifically, traditional paper-and-pencil assessment tools have the advantage to mimic real world situations (Chevignard, Soo, Galvin, & Catroppa, 2012), but administration and performance recording heavily depend on the examiner's experience. Computerized evaluation, instead, offers time accuracy, reliable, randomized presentation (Schatz & Browndyke, 2002) and can override the immature verbal abilities of younger children through its button pressing requirements. Convenient though these may be, they render computer-administered batteries artificial. Thus, although these laboratory-based measurements of attention have been proved useful, considering young children's limited verbal abilities (Betts et al., 2006; Sobeh & Spijkers, 2013), they have been criticized regarding their ecological validity (Huges & Graham, 2002).

The present study aimed at providing developmental data for various attention functions (sustained, selective, divided, and shift of attention) from school age population by using two different types of assessment: traditional and computerized. To our knowledge, no empirical study has provided developmental data for different attention functions that are simultaneously assessed by paper-pencil and computerized tasks. The question raised is whether there is a systematic pattern in the development of different attention functions in typically developing school children, irrespective of the assessment tool, or one assessment tool is more sensitive to capturing differences in attention performance compared to the other. Such evidence would, first, broaden our understanding regarding the consistency of developmental timelines of various attention functions in a period of rapid changes in the development of attention system (see Vakil, Blachstein, Sheinman, & Greenstein, 2009) and, second, inform us about the sensitivity of different assessment tools in capturing age-related differences in attention.

1.1 Developmental Evidence from Typically Developing School Children

As mentioned above, attention represents a complex system that can be separated into several specific functions. Even though various terms have been used in the literature to describe attention functions, well-known theoretical models generally support similar representations. Namely, the two widely endorsed neuropsychological models of attention (*networks of attention*, Posner & Peterson, 1990; *aspects of attention*, van Zomeren & Brouwer, 1994) support the subdivision of the attention system into three basic functions or components: (a) the intensity of attention component, which refers to the ability to maintain a general level of arousal and include functions like *alertness*, *vigilance and sustained attention*, (b) the visual-spatial orientation component, which is assumed to be responsible for *selective function* as presented in visual scanning tasks, and (c) the executive component comprising of more complex and effort-demanding functions, such as the *inhibitory control* (withholding task-inappropriate responses), the ability to *shift* the attentional focus between two tasks (flexibility), and the ability to attend both of them at once (*divided attention*).

Early developmental studies using adult testing material, have reported a rapid improvement in three functions (selection, maintenance and shift) mostly at ages 8 to 10, rather than 10 to 13 (Rebok et al., 1997). A few years later, Kelly (2000) based on a sample of 100 British children aged from 7 to 13 years old found a gradual progress in processing speed emerging from 7 to 13 years. The ability to sustain attention showed a less significant improvement between 9 to 13 years, and shift of attention had a similar developmental pattern for ages 7-8 years and 9-11 years, while a reduction in the progressing rate was observed at ages 12-13. These findings provide further support to previous evidence (Rebok et al., 1997) that rapid changes in attention functions occur at school-age, specifically between years 8 and 10. Concurrent developmental studies with child-friendly material are based mainly on computer-assisted assessment, which seems to be promising in tapping the early emergence of attention functions in school-age and even pre-school children. In Betts and colleagues' (2006) study regarding the development of sustained attention in a sample of 57 typically developing children aged between 5 to 12 years, participants completed a game-like computer-administered battery (CogState) with varying memory load. Results indicated a significant progress in children's ability to sustain attention over extended periods of time until the age of 10 years. After that age performance remained rather stable with only minor improvement. Provided with appropriately designed test material, even children below the age of 6 years can demonstrate the ability to switch attention between two or more task sets with different rules (Dibbets & Jolles, 2006). Different cognitive aspects of visual selective attention (visual perception, visual scanning, speed of reaction time) continue to develop until the last years of elementary school (Wassenberg, Hendriksen, Hurks, Feron, Keulers, Vles, & Jolles, 2008). Finally, flexibility and divided attention, despite their progress throughout school-age, do not seem to stabilize before the age of 12 to 16 years (Zimmermann & Fimm, 2002).

Recently, in an attempt to evaluate the development of attention as a multidimensional system, attention batteries have been used, paper-pencil or computerized, which assess the basic functions of attention, according to the theoretical models mentioned above. Such batteries are the *Test of Attentional Performance for Children*—KITAP (Zimmermann et al., 2002), a computerized battery, and the *Test of Everyday Attention for Children*—TEA-Ch (Manly et al., 1999), a more traditional paper-pencil neuropsychological tool. Both, KITAP and TEA-Ch, have been used primarily in neuropsychological research as comprehensive attention batteries for the identification of ADHD (i.e., Heaton et al., 2001; Kaufmann et al., 2010).

Research with KITAP in typically developing school populations is limited to only two developmental cross-cultural studies (Sobeh & Spijkers, 2012, 2013) and one study relating attentional performance to scholastic achievement (Trautmann & Zepf, 2012). In both developmental studies KITAP has been proved to be an age sensitive instrument in primary school children (6-12 years). The findings suggest that less complex functions like

alertness, sustained and selective attention show early emergence in the course of development and stabilize around the age of 10. Components of executive functions (flexibility, divided attention, inhibitory control) show improvement beyond childhood, and continue until early adolescence.

In the case of TEA-Ch, typically developing population has been used only in psychometric (Chang et al., 2008; Malegiannaki, Metallidou, & Kiosseoglou, 2014) and normative studies (Manly et al., 2001). TEA-Ch was found to be an age sensitive assessment tool for attention in different school age populations, i.e., Australian, Chinese and Greek). More specifically, Manly et al. (2001) administered TEA-Ch to an Australian sample of 293 healthy children between the ages of 6 and 16, which were divided into 6 age bands. Age significantly affected performance on each TEA-Ch subtest as predicted, although the difference in performance decreased as children matured in age. No significant impact of gender was found (see also Malegiannaki et al., 2014). Similar performance patterns were detected more recently with 158 younger Chinese participants (starting from the age of 3 years until 16 years) (Chan et al., 2008). In all three studies, most attention functions were found to improve from childhood to adolescence. Even though there are distinct developmental timetables for each attention function, it seems that the most outlined and important changes occur between 8-11 years, followed by a developmental plateau after the age of 12 (see Vakil et al., 2009).

Given that between 8-11 years there seems to be a period where significant changes in attention skills occur, the aim of the present study was to provide evidence for the development of several functions of attention during primary school. Sustained, selective, divided, and shift of attention tasks (both traditional and computerized) were used, in order to include the three basic functions of attention indicated by the theoretical models (i.e., the intensity of attention, the selectivity and the flexibility/shift of attention). The computerized tasks were selected from the KITAP battery and the traditional paper-pencil tasks from the battery of TEA-Ch. Based on previous evidence, our hypothesis was that rapid changes in attention functions would occur between 8 and 10 years.

2. Method

2.1 Participants

The sample consisted of 172 children aged from 6 to 12 years, which formed three age groups (6-8; 8-10; 10-12 years). Both genders were represented equally in the sample (see Table 1). Children were recruited from 10 different public primary schools from the Prefecture of Thessaloniki, in North Greece, in order to collect data from different educational environments and socioeconomic regions (West, East and Center areas of Municipality of Thessaloniki, provinces, and villages). The participants come from different educational backgrounds, based on their parents' mean years of education. The present study was approved by the Greek Ministry of Education and Lifelong Learning and all parents signed informed consent. Only children with written consent of their parents were included in the study. Participants whose parents' reported neurological abnormalities or head injury, developmental disabilities, psychiatric disorders, sensory deficiency, referrals for attention, learning difficulties or needs for special education were excluded from the present study.

Table 1. Sample description

Gender		Boys	Girls	Total
(*N*)		84	88	172
Age Groups	6-8 years *N* = 47	8-10 years *N* = 60	10-12 years *N* = 65	
mean age in years *(SD)*	7.14 (0.46)	8.93 (0.57)	10.97 (0.48)	9.21 (1.62)
parents' mean years of education	13.55 (3.74)	13.53 (2.77)	12.85 (3.14)	13.28 (3.19)
mean Vocabulary scores (scaled)	11.43 (3.76)	10.77 (2.84)	10.60 (3.44)	10.88 (3.34)

2.2 Measurements

Four tasks from KI-TAP and four tasks from TEA-Ch were used to assess children's attentional ability respectively. Additionally, the WISC-III Vocabulary test served as a measurement of Verbal Intelligence.

2.2.1 Test of Attentional Performance for Children-KITAP

KITAP is a non-verbal computerized battery for the assessment of school-age children regarding the following attentional domains: Alertness, Distractibility, Divided Attention, Flexibility, GoNogo, Sustained attention, Vigilance and Visual Scanning. Performances on these tasks can be interpreted by the following parameters: (a) reaction time in medians, (b) standard deviation of reaction times, (c) errors (incorrect responses to critical stimuli), and (d) omissions (missed responses to critical stimuli). Administration, scoring and interpretation guidelines for KITAP are available elsewhere (see Zimmermann, Gondan, & Fimm, 2002). For the purposes of the present study four tasks corresponding to major attentional domains were chosen:

1) *Sustained Attention (The Ghosts' Ball)*: Maintenance of attention for an extended period of time in which ghosts of different colors appeared consecutively at different windows of a castle ruin. Children were asked to press the key as quickly as possible as soon as they detected two ghosts with the same color appearing consecutively (10min, 300 trials, with 50 critical trials).
2) *Selective Attention/Distractibility (The Sad and the Happy Ghost)*: Selective visual attention task with distracting stimuli. Children are required to ignore the distractor stimuli (other cartoons) presented in the periphery of the visual field, while trying to distinguish the critical stimuli (sad ghost) from the non-critical ones (cheerful ghost) by pressing the key-button as quickly as possible (4 min, 80 trials).
3) *Flexibility (The Dragon's House)*: Alternating successive attention between two dragons of different color (green and blue) that appeared on the left and right side of a center gate. In cases of false response, an acoustic feedback was provided to the child and in the subsequent trial the correct stimulus was shown (1.5min, 50 trials).
4) *Divided Attention (Owls)*: A visual-acoustic dual-task in which the child was required to simultaneously respond to critical visual stimuli (every time the visually presented owl closed its eyes) or acoustic stimuli (every time two successive high or low presented hoots appeared) by pressing the key (4.5min, 297 trials).

2.2.2 Test of Everyday Attention for Children—TEA-Ch

TEA-Ch was developed for the functional assessment of attentional components in children aged from 6 to 16 years. A detailed description of the nine subtests and their test items is available elsewhere (Manly et al., 1999; 2001). Its construct validity and appropriateness for the use with Greek-speaking school population has been established (Malegiannaki et al., 2014). In the present study the following four tasks were selected as representative measurements of the attentional functions:

1) *Sustained Attention (Code Transmission)*: Children were listening to long (10 min), monotonous series of digits from 1 to 9 randomly played on an audio tape. Every time they noticed two "5s" in a row, they had to announce the digit that was presented before. The score was the number of targets correctly announced.
2) *Selective Attention (Sky Search)*: Children are required to identify the presence of randomly distributed target stimuli (pairs of spaceships) among distractor pairs of spaceships on a colorful A3 sheet and circle them as quickly and accurate as possible. The second part is a non-distractor motor control condition. Total score on this task is calculated by subtracting the motor control time-per-target from the sky search time-per-target.
3) *Flexibility (Creature Counting)*: This subtest required children to repeatedly alternate between counting upward and downward (i.e., from 1 to 12 and vice versa) in response to visual stimuli. Score was calculated from the sum of correct trials divided by total time taken to complete the trials.
4) *Divided Attention (Sky Search DT)*: A dual attention task in which the visual selective attention subtest Sky Search is combined to an acoustical task of silently counting tones (the Score! subtest) and announcing them at the end of each trial. Final score on this subtest reflects the double task decrement on performance.

2.2.3 Verbal Intelligence

The vocabulary subtest of the standardized WISC-III Greek Version (Georgas, Paraskevopoulos, Bezevengis, & Giannitsas, 1997) was administered as the most representative measure of verbal intelligence. The Vocabulary subtest was chosen as an alternative not time consuming option, due to its high correlation with the general IQ score (Jensen, 2001).

2.3 Procedure

The present study was approved by the Greek Ministry of Education and Lifelong Learning. Authors also obtained permission from Psytest© and Pearson Psychological Assessments© for both the translation into Greek and administration for research purposes of KITAP and TEA-Ch, respectively. The current study was part of a larger research in which all participants were assessed with full administration of the two batteries, in two different sessions each of one hour duration.

3. Results

To explore developmental differences on attentional performance on KITAP and TEA-Ch subtests, two different one-way analyses of covariance (ANCOVAs) were used with the three age groups (6-8 years, 8-10 years, 10-12 years) serving as independent variables. Scaled Vocabulary score (WISC-III), and mean years of education of both parents were used as covariates. Dependent variables were the test scores of the subtests of TEA-Ch (accuracy or time measures) and KITAP parameters (median of reaction time, RT; standard deviation of reaction time, SD; errors of omission, OM; false alarm errors, ER) in each analysis, respectively. The strength between age and attentional performance was estimated by using partial eta squares (η^2) effect sizes. The score of errors in the Sustained attention subtest of KITAP indicated non-normal distribution (skewness = 2.05 and kurtosis = 5.16) which was corrected by using the *log10-transformation*, in order to meet normality requirements according to relevant literature criteria (corrected values of skewness = .03 and kurtosis = -.41) (De Carlo, 1997; West, Finch, & Curran, 1995). Bonferroni significant difference test was used in the post hoc multiple comparisons of mean performance between age groups.

3.1 Age Differences

After controlling for Verbal Intelligence (Vocabulary WISC-III) and mean parents' educational level, results of ANCOVAs showed a main effect of age on children's attentional performance in KITAP and TEA-Ch subtests. As children mature in age, attentional performance improves significantly.

3.1.1 KITAP

More specifically, in KITAP age had a significant effect in all subtests' parameters of performance, except for the omission errors in the distractibility task (see Table 2). Flexibility and sustained attention subtests showed a stronger age effect with higher effect sizes as compared to the other two subtests. Divided Attention was also affected by age in most parameters. In general, the above results suggest that selective attention emerges early at the developmental course and shows a gradual but minor improvement as compared to the more complex executive (i.e., divided and flexibility) and intense demanding (i.e., sustained) attentional aspects. Moreover, effect sizes differed regarding subtest parameters. Generally, speed of processing (RTs and SDs) indices were more age-sensitive than indices of accuracy (omissions and errors).

Considering post hoc comparisons of the three age groups (Table 2), most significant differences were found between the younger and the older age group (1-3) in all parameters except for the stability of performance in the Divided attention task (SD). Differences between Group 1 and 2 were significant in all subtests, except for errors and RT in the less age-affected Distractibility subtest and omissions in the Sustained attention task, which showed no difference. Age differences between the older age bands (2-3) were found in most of the cases non significant or very small at best, indicating a potential developmental plateau after the age of 10 years for all functions, apart from the sustained attention. Group 2 differed from Group 3 regarding ER Distractibility and RT in Flexibility as well.

Table 2. Performance of the three age groups on KITAP subtests, results of ANCOVA and post hoc comparisons

		Age groups			Age effect			Post hoc comparisons		
		Group 1: 6-8 [b]	Group 2: 8-10	Group 3: 10-12						
		(*N = 47*)	(*N = 60*)	(*N = 65*)						
KITAP Subtests	Par [a]	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	*F*	*p*	η^2	6-8 < 8-10	6-8 < 10-12	8-10 < 10-12
Sustained Attention	RT	782.96 (145.62)	690.18 (122.73)	616.12 (124.38)	22.49	.000	.212	.001	< .001	.007
	SD	247.21 (70.14)	191.71 (52.22)	169.03 (48.44)	31.30	.000	.273	< .001	< .001	.047

	OM	11.28 (7.55)	9.10 (5.66)	6.29 (5.98)	11.38	.000	.120	*ns*	< .001	.022
	ER	15.11 (14.66)	10.35 (9.93)	7.03 (8.61)	9.20	.000	.099	.039	< .001	*ns*
Selective Attention/	RT	504.62 (158.07)	459.25 (131.99)	440.16 (125.05)	3.11	.047	.036	*ns*	.047	*ns*
Distractibility	SD	359.02 (242.81)	231.75 (164.56)	249.20 (233.79)	5.98	.003	.067	.005	.013	*ns*
	OM	4.09 (3.61)	3.08 (2.84)	3.02 (3.02)	1.86	*ns*	-	-	-	-
	ER	20.26 (7.93)	16.80 (8.36)	13.12 (8.26)	11.57	.000	.122	*ns*	< .001	.029
Flexibility	RT	1310.02 (405.02)	1035.57 (279.23)	855.97 (210.60)	31.43	.000	.273	< .001	< .001	.004
	SD	525.06 (238.34)	348.65 (137.53)	281.89 (129.22)	31.51	.000	.274	< .001	< .001	*ns*
	ER	5.47 (3.64)	2.97 (2.73)	2.23 (1.91)	23.18	.000	.217	< .001	< .001	*ns*
Divided Attention	RT	793.31 (93.24)	699.88 (113.56)	674.85 (79.31)	21.63	.000	.206	< .001	< .001	*ns*
	SD	281.97 (85.40)	234.80 (64.09)	253.50 (78.27)	5.26	.006	.059	.004	*ns*	*ns*
	OM	5.91 (5.33)	3.80 (3.66)	3.31 (4.00)	5.83	.004	.065	.030	.004	*ns*
	ER	15.70 (17.05)	8.58 (10.48)	8.08 (10.67)	7.31	.001	.081	.005	.001	*ns*

Notes. [a] Par. = Parameter; RT = median of the reaction time; SD = standard deviation of reaction times; OM = omissions; ER = false alarm errors.

[b] Represents the upper cutoff of each band (e.g., only children under 8 years would appear in group "6-8"); *ns* = not significant.

3.1.2 TEA-Ch

Performance on TEA-Ch subtests was significantly affected by age. Similarly to KITAP, older children tended to score higher when compared to younger age groups as expected. Unlike the case with KITAP, post hoc comparisons of TEA-Ch showed an ongoing development of attentional performance until 12 years (see Table 3). The only non significant differences were observed between Group 2 and Group 3 performance on Sky Search DT subtest.

Table 3. Performance of the three age groups on TEA-Ch Subtests, Results of ANCOVA and post hoc comparisons

	Age groups			Age			Post hoc comparisons		
	Group 1: 6-8 [*]	Group 2: 8-10	Group 3: 10-12						
	(*N = 47*)	(*N = 60*)	(*N = 65*)						
TEA-Ch Subtests	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	*F*	*p*	η^2	6-8 < 8-10	6-8 < 10-12	8-10 < 10-12
Sustained Attention (accuracy)	30.28 (6.35)	34.58 (3.59)	36.72 (3.23)	31.38	.000	.273	*p* < .001	*p* < .001	*p* < .05
Selective Attention (time-per-target)	6.87 (2.17)	5.21 (1.59)	4.21 (1.05)	40.73	.000	.328	*p* < .001	*p* < .001	*p* < .005
Flexibility (time-per-shift)	6.74 (2.87)	5.18 (1.73)	3.90 (0.93)	35.63	.000	.299	*p* < .001	*p* < .001	*p* < .001
Divided Attention (decrement)	10.91 (11.29)	4.71 (8.82)	2.36 (3.13)	16.95	.000	.169	*p* < .001	*p* < .001	*ns*

Notes. [*] Represents the upper cutoff of each band (e.g., only children under 8 years would appear in group "6-8"); *ns* = not significant.

4. Discussion

The present study aimed at exploring the development of attention functions in school age children by using both computerized and paper-pencil assessment tools. One of the strengths of the study is that it utilized child-friendly behavioral tasks in a sample of typically developing children. The present results indicated that both assessment tools are age-sensitive in assessing the basic attention functions in school age years.

Regarding *selective attention*, the results from the KITAP subtests indicated a slow but gradual development occurring primarily between 6-10 years, where the plateau is formed. Only omissions of the target stimulus showed no significant age improvement (see also Wassenberg et al., 2008). Contrary to that, the time-based measurement of TEA-Ch selective attention task, suggested an improvement beyond that age point. More light on this controversy could be shed by Wassenberg's et al. (2008) study in which the d2 test of selective attention was administered to 451 Dutch elementary school children. Their outcomes support a differential developmental pattern of certain aspects of selective attention as obtained by the d2 task parameters. More specifically, the level of inattention as indicated by number of omissions remained stable across all grades. The impulsivity aspect, as measured by false alarm errors, had an age-related improvement until the fourth grade. Processing speed of the d2 test continued developing until the sixth school grade. To sum up, in the present study stability of inattention performance was evidenced using the KITAP selective attention subtest, whereas the continuing progress of the speed parameter of selective attention was revealed by the respective TEA-Ch subtest. According to Wassenberg et al. (2008) this is explained by the early presence of basic and non-complex elements of executive functions, which will eventually develop into a systematical goal-directed behavior during childhood and until adolescence. Discrepancies between locating the plateau on 4th or 6th school grade are assumed to possibly reflect differences regarding assessment methodology, paper-pencil as the d2 test, or computerized (e.g., Klimkeit, Mattingley, Sheppard, Farrow, & Bradshaw, 2004). At this point, the current study extends knowledge regarding the comparison of these two types of assessment. Thus, in our study the RT score of KITAP distractibility subtest stabilized around the age of 10, while with TEA-Ch time score in selective attention task suggested the improvement of reaction time beyond that age point.

No discrepancy was observed between the two assessment tools regarding the *sustained attention*. Detecting age-related changes of sustained attention beyond the stabilization point of 10 years is a step forward in the assessment with computerized test material. For example, Betts et al. (2006) using a novel program (CogState) found that sustained attention improved until 10 years followed by a plateau. Researchers claimed that the output of computer-administered batteries offer the opportunity of calculating more complex parameters, such as the variability (for example *SD*), which along with RT, are assumed to be more indicative of the assessment of sustained attention. In the TEA-Ch battery, the two available pure sustained attention tasks (Score! and Code Transmission, which were included in the present study) provide only accuracy scores. Such indices (errors of omission or false alarm and correct answers) may be less representative of young children's sustained attention performance since variability in response is a commonly observed phenomenon. In this framework, ceiling or floor effects (Manly et al., 2001) can easily occur in the assessment, and should be carefully interpreted when examining developmental changes (Betts et al., 2006).

In the case of *divided attention* the developmental plateau after the age of 10 was evidenced by both assessment tools. The results converge with Sobeh and Spijker's (2013) findings with a Syrian and German sample of 562 children from 5 to 12 years. Given that divided attention represents an effortful executive control aspect, it would be a mistake to conclude that divided attention does not develop at all after the age of 10. As already stated by Klenberg et al. (2001) "*Some developmental changes could occur before and some after the developmental peak*".

Finally, as regards the *flexibility* or *shifting attention* component, the present results from both measures showed that the reaction time continues to decrease until the age of 12 years, which suggests a gradual development of this aspect of attention. Similar developmental trends for the switching ability have been reported in previous research (see Zimmermann & Fimm, 2002) using the time-based estimates (RTs) of the Flexibility subtest. In fact, this subtest has been indicated as the most age-sensitive attention task of the overall KITAP battery (correlating $r = -.66$ to age) and, despite early emergence its development was found to stabilize after the age of 14 or 15 years.

Given the limitation of the cross-sectional design of the present study, the results indicate that, irrespective of the assessment tool, there is a significant development in basic attention functions through the primary school years, especially between 8 and 10 years. Performance scores in KITAP suggest a developmental plateau in most of the parameters after the age of 10 years, except for the sustained attention. TEA-Ch subtests seem to be more sensitive in uncovering attention performance differences beyond the age of 10 years, with the exception of the divided

attention task. This is not unexpected, though, since TEA-Ch was initially developed to assess children's attention up to the age of 16 years, while KITAP up to the age of 10 years (even though it has also been administered to adolescents). Task-specific characteristics in traditional assessment, such as the verbal modality may raise task complexity and confound attention assessment with other cognitive factors, i.e., language and working memory. Thus, some TEA-Ch subtests characteristics (e.g., the divided attention subtest) might be suggested as an examination tool suitable for older children. Taking into consideration that academic underachievement has been consistently associated with attention problems and that the attention network is considered very important for self-regulation of emotion and behavior (Rothbart & Rueda, 2005), the present results indicate that is crucial to provide researchers and educators with child-friendly, age-sensitive behavioral assessment tools. Further, they indicate the importance of finding ways to foster attention skills, especially in periods where significant changes in attention skills occur.

Acknowledgements

This study was supported by the Alexander S. Onassis Public Benefit Foundation for the doctoral research of Amaryllis-Chryssi Malegiannaki.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

An Examination of the Expected Timing of Transitions into Adulthood among Rural Men and Women

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Received: September 30, 2016 Accepted: October 31, 2016 Online Published: December 8, 2016

doi:10.5539/jedp.v7n1p52 URL: http://dx.doi.org/10.5539/jedp.v7n1p52

Abstract

The timing of transitions into adulthood has critical implications for early adulthood development, yet few research studies on this topic exist, particularly involving rural youth. We utilized a nationwide sample of geographically diverse rural youth from 34 rural locations in the United States to investigate adolescents' expected transitions into adulthood. The vast majority of rural men and women planned to get married and become parents, however, women expected earlier transition times into adulthood. Results also indicated a number of individual, family, and community variables related to the expectation of marriage and parenthood and the expected timing of marriage and parenthood. Notably, we found that whereas women were generally more likely than men to plan to get married and become a parent, this observed gender gap decreased as educational aspirations increased.

Keywords: rural youth, expected transition times, gender, aspirations, adulthood

1. Introduction

In many societies, getting married and becoming a parent represent the key markers of entering adulthood (Carr & Kefalas, 2011; Shanahan, 2000). Yet the ages at which adolescents enter into these new roles widely vary and have changed significantly over time. Compared to adolescents in previous decades, individuals today get married and have children at later ages (Furstenberg, 2010; Settersten & Ray, 2010), in part due to changes in gender norms, rising home prices, and the pursuit of increased schooling (McLanahan, 2004; Waters, Carr, & Kefalas, 2011). Researchers have also found demographic characteristics, socioeconomic status, family structure, expectations, and school experiences play a role in the timing of transitions into adulthood (Carr & Kefalas, 2011; Oesterle, Hawkins, Hill, & Bailey, 2010).

Despite a significant body of work on transition times into adulthood, few studies include rural samples and existing work is quite dated, using cohorts that transitioned into adulthood during or before the 1980s (Marini, 1985; Oesterle et al., 2010; Rindfuss, Swicegood, & Rosenfeld, 1987). Because previous work is dated and limited in scope, these explorations do not take into account the drastic socioeconomic changes that many rural communities in the United States experienced over the past three decades (Brown & Schafft, 2011; Carr & Kefalas, 2009; Farmer et al., 2006). These social and economic changes (e.g., the elimination of many low skilled employment opportunities) have likely differentially affected the expectations and transition times into adulthood of rural men and women (Fussell & Furstenberg, 2005; United States Department of Agriculture [USDA], 2013).

In this paper, we addressed gaps in the literature by examining the ages and predictors of expected transitions into adulthood among contemporary rural adolescents. We used a recent national survey of rural high school students, and paid particular focus to (a) gender differences in expected transition times, and (b) how the educational aspirations of rural men and women shape their transition times into adulthood. We focused on gender because it plays a key role in understanding the future expectancies of adulthood among young adults in rural areas (Blackwell & McLaughlin, 1999; Crockett & Beal, 2012; Crockett, Shanahan, & Jackson-Newsom, 2000; Meece, Askew, Agger, Hutchins, & Byun, 2014). Women today hold increasingly significant roles in the

workforce, illustrating significant changes in cultural and social norms. These changes have likely contributed to the increases in rural youth, especially rural young women, who have significantly higher aspirations to attend postsecondary institutions compared to rural men (Meece et al., 2013, 2014). Given the high educational aspirations of rural women, we hypothesized that educational aspirations would differently shape the expected transition times for rural women and men.

It is important to note that the current study examines the *expected* transition times for adulthood among rural adolescents, rather than the *actual* transition times. We acknowledge a potential difference between the expected versus actual timing of transitions into adulthood, however literature suggests that aspirations (Beal & Crockett, 2010) and expectations for timing of transitions into adulthood (Crockett & Beal, 2012) are key factors in predicting the developmental trajectories of adolescents (Greene, 1990). Further, research suggests that aspirations and expectations affect long-term achievement and adaptation into adult roles (Mortimer & Johnson, 1998; Schoon, 2010; Shanahan, 2000).

2. Theoretical Framework

Adolescence is a key developmental period when individuals are able to think about their educational and occupational aspirations in increasingly complex ways and consider how their identities relate to these future plans (Eccles et al., 2003). The current study conceptualized adolescents' aspirations and expectations by drawing on two lines of developmental research. First, this study drew on work rooted in social cognitive theory centered on *aspirations*. According to Bandura (1986) aspirations are cognitive representations of a goal that help direct and organize behaviors and can include educational or occupational hopes or ambitions (Meece et al., 2013, 2014). Second, the current study was supported by literature focused on future-oriented beliefs. Nurmi (1991) describes future-oriented beliefs in terms of three psychological processes; motivation, planning, and evaluation. Adolescents' set goals based on their motives, plan and prepare for those goals, and finally, evaluate the likelihood of attaining those goals (Nurmi, 1991). A synthesis of research has found that the goals that adolescents set are tied to major developmental tasks and that changes in contextual opportunities are the foundation for future-oriented beliefs (Nurmi, 1991).

Collectively, aspirations and future-oriented beliefs are important to study because they shape outcomes in early adulthood and beyond, predicting educational (Ou & Reynolds, 2008) and occupational attainment (Armstrong & Crombie, 2000) and successful transitions into early adulthood (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001; Beal & Crockett, 2010; Eccles, Brown, & Templeton, 2008; Elder & Conger, 2000; Schneider & Stevenson, 1999). In turn, transitions into adult roles shape one's life trajectory and can even preclude other goals, for instance, entry into parenthood can delay pursuing higher education or professional goals (Schoon, Martin, & Ross, 2007; Upchurch, 1993). Using principles from two developmental lines of research, the current study investigated how individual, family, and community characteristics relate to transition times among rural youth. In the section that follows, we review the extant literature on the timing of adulthood transitions and their predictors, focusing on rural youth.

3. Background Literature

Both demographic characteristics (e.g., gender) and contextual factors (e.g., socioeconomic status and family structure) shape the developmental transitions of rural youth (Carr & Kefalas, 2011; Oesterle et al., 2010; Schoon, 2010).

3.1 Individual Characteristics

Rural young women tend to marry at a younger age compared to nonrural women (McLaughlin, Lichter, & Johnston, 1993) and tend to anticipate younger ages of school completion, marriage, and parenthood compared to young men (Crockett & Bingham, 2000). Work by Crockett and Bingham (2000) found that girls expected to get married at 22.75 and enter parenthood at 24.44. Another study from a nationwide sample of youth from the 1980s reported that the expected median ages for marriage were 23.3 for women and 26.5 for men; and for parenthood it was 23.6 for women only (Greene, 1990). Although research on rural youth has found that rural young women have significantly higher educational aspirations than rural young men (Chenoweth & Galliher, 2004; Elder & Conger, 2000; Meece et al., 2014), rural women continue to marry at younger ages than their male peers.

Another important individual-level influence is ethnicity. Currently, almost a third of rural students are children of color (Johnson, Showalter, Klein, & Lester, 2014) and the percentage of rural minority youth, particularly Latino youth, continues to increase (Donato, Tolbert, Nucci, & Kawano, 2007; Johnson, 2006; Johnson &

Strange, 2009; Lichter & Brown, 2011). Previous work has found that specific timing (Bynner, 2005) and expectations for future educational plans (Turcios-Cotto & Milan, 2013) can significantly vary across cultural, racial, and social groups (Settersten & Ray, 2010). Latino and black youth are more likely to make earlier transitions into parenthood and black youth are more likely to get married at earlier ages compared to their white and Asian Americans peers (Macmillan & Copher, 2005; Pew Latino Center Study, 2009; Schoen, Landale, Daniels, & Cheng, 2009). These findings may also apply to ethnic minority youth living in rural contexts; more systematic investigations are needed to confirm these relations.

3.2 Family Characteristics

Family characteristics are key in shaping the aspirations and expectations of rural youth. Rural youth are more likely than their urban peers to live in two-parent families and these youth report higher educational aspirations and attainment than youth from single parent or other types of non-traditional families (Byun, Irvin, & Meece, 2012a; Byun, Meece, & Irvin, 2012b). In addition, belonging to families in which many immediate and extended family members have attended college increases the likelihood that students will report plans to attend college themselves (Chenoweth & Galliher, 2004). One potential inhibiting factor related to rural families is their tendency to move locations often. Johnson et al. (2014) reported that one in eight rural students have changed residence in the previous 12 months. This issue of mobility can interfere with consistency in schooling and it is also associated with lower academic achievement (Johnson et al., 2014).

3.3 Community Characteristics

Existing research on transition times of rural youth has used geographically confined samples, which do not take into account geographic diversity within rural communities. However, geographic considerations, such as rural isolation, have important implications for the long-term aspirations of rural adolescents. Spohn, Crowther, and Lykins (1992) found that rural isolation affected the educational attainment of Appalachian youth largely through institutional barriers (e.g., lack of information about financial details). Other research has found that geographic proximity to college increases the likelihood that students will apply to college (Turley, 2009), highlighting the importance of geography in college pursuit.

4. Recent Socioeconomic Transformations in Rural Communities

Changes in economic conditions have created the need for more research on the contemporary transition times of rural youth (Brown & Schafft, 2011; Carr & Kefalas, 2009; Farmer et al., 2006). Manufacturing and agriculture in rural areas has steadily declined and a more service-oriented industry has arisen, offering fewer stable employment opportunities to rural residents (McLaughlin & Coleman-Jensen, 2008). These changes in the labor market have led to widespread poverty and challenges in gaining and sustaining employment in some rural communities. In fact, more than two in five young people in rural areas live in poverty (Johnson et al., 2014). Conditions of poverty directly and indirectly influence adolescent development and family planning and also disproportionately affect minority residents, often having intergenerational consequences (Lichter & Johnson, 2007; Provasnik et al., 2007).

For decades, rural economies were based on agricultural jobs that involved manual and service labor, and were primarily filled by men. Even recently, research has found that rural areas offered fewer employment opportunities for women compared to men (Johnson, Elder, & Stern, 2005). Today, temporary service industry jobs, often with unstandardized hours, comprise a large majority of employment options available to young adults in rural areas (Gibbs, Kusmin, & Cromartie, 2005; McLaughlin & Coleman-Jensen, 2008). These occupational opportunities may have contributed to the significant rise in rural youth, especially women, who aspire to attend postsecondary institutions outside of their home community (Meece et al., 2013; Snyder & Dillow, 2010).

Social conditions in the community also have the potential to either hinder or promote rural youths' aspirations for adulthood and expectations for transition times. Social conditions hinder aspirations and subsequent transition times when social and cultural attitudes and community investments do not promote the attainment of higher education (Elder & Conger, 2000; Roscigno & Crowley, 2001). When many community members do not hold advanced education, as is the case with many rural areas, there is high unemployment (Johnson et al., 2014) and lack of occupational role models for younger generations. On the other hand, strong connections between schools and parents can also promote rural adolescents' aspirations for educational or occupational attainment. Rural youth live in areas high in social capital with strong shared values and connections between families, schools, and religious institutions (Byun, Meece, Irvin, & Hutchins, 2012c; Crockett et al., 2000; Elder &

Conger, 2000). These connections are critical in shaping educational and residential aspirations for adulthood (Byun et al., 2012c; Crockett et al., 2000; Elder & Conger, 2000; Johnson et al., 2005; Meece et al., 2014; Petrin, Farmer, Meece, & Byun, 2011).

The preceding discussion highlights recent changes in the economic landscape, social attitudes, and educational aspirations of rural youth. We hypothesized that these shifts will play a prominent role in determining the timing of adulthood transitions among contemporary rural youth. Further, we hypothesized that educational aspirations will moderate the relation between gender and expected transition times. In other words, whereas women tended to marry earlier according to research conducted several decades ago (McLaughlin et al., 1993), this may not hold true today given the rising postsecondary aspirations of and the limited employment opportunities for women in rural locales.

5. Aims of the Current Study

The current study was guided by several goals. The first goal was to generate descriptive summaries of the expected timing of transition into adulthood among contemporary rural youth. The second goal was to explore how various individual, family, and community variables related to the expected timing of transition, with a particular focus on gender. The final goal was to examine how educational aspirations shape gender differences in the expected timing of transition into adulthood.

6. Data and Methods

6.1 Data and Sample

The current study is part of a broader national investigation to examine students' school adjustment and postsecondary aspirations in rural high schools in the United States. The original sampling frame was limited to public rural high schools in all 50 states that were currently in operation. Rural schools were identified using the metro-centric locale codes developed by the U.S. Census Bureau for the National Center for Education Statistics (NCES) with a basis on schools' geographic location or proximity to an urbanized area as well as on population size and density (NCES, 2011). The rural schools in the original sample were further classified into four subtypes based on locale code designations (i.e., small town, rural fringe, rural distant, and rural remote), Rural Education Achievement Program, Small Rural School Achievement (SRSL) Program, and Rural and Low-Income Schools (RLIS) Program with a special emphasis on SRSL and RLIS. The schools in this sample were also classified into four geographic regions (i.e., the Midwest, Northeast, South, and West) as established by the U.S. Census Bureau.

Using this stratified sampling, 114 schools were randomly selected and contacted. Of these, 73 schools (11% from small town and 89% from rural locales) across 34 states agreed to participate in this study. At the time of data collection, 16,295 adolescents in grades 9-12 were enrolled at these 73 study schools, and 8,754 adolescents took part in the study by completing a survey. The overall participation rate was 53.8%. However, one school in the study had an extremely low participation rate (167/1,883). Removing this school from the calculation produces an overall participation rate of 59.6%. In addition, the study included 667 teachers (59.5% female and 40.5% male) who completed surveys about themselves and students in the study.

For the present investigation, we restricted our analyses to those adolescents who provided valid answers to the survey questions (see below) regarding expectations for marriage and parenthood and who attended schools where the Common Core of Data were available. In addition, we excluded Asian American adolescents due to small sample sizes (less than 1% of the total sample). The final sample consisted of 7,298 adolescents, including 53% female, 67% white, 7% black, 10% Latino/a, 4% Native American, and 12% multiracial (Note 1).

6.2 Measures

6.2.1 Dependent Variables

The dependent variables in the current study were expected timing of first marriage and parenthood. Data for these two gateway variables were gathered via questionnaire items. For example, respondents were prompted: "Do you plan to get married? If yes, at what age do you plan to do this?" Response options provided were: by age 16-18; by age 19-21; by age 22-24; by age 25-27; by age 28-30; after age 30. Based on this question, we created two indicators in terms of (a) whether adolescents planned to get married or not (no=0 versus yes=1) and (b) the expected age of first marriage only among those who planned to get married. Likewise, we created two indicators in terms of (a) whether a respondent planned to become a parent (no=0 versus yes=1) and (b) the expected age of parenthood only among those who planned to become a parent.

6.2.2 Independent Variables

Based on the literature reviewed above, we included a variety of individual, family, and community variables in the analysis of the predictors of the timing of transitions into adulthood of rural youth. For individual characteristic variables the following were included (a) gender, (b) race/ethnicity, (c) grade level, (d) educational aspirations (years of education), (e) academic achievement (a self-reported measure), (f) residential aspirations, and (g) residential stability (years in the current community). Gender and race/ethnicity were measured by asking respondents to indicate their gender (female=1, male=0) and racial/ethnic background (e.g., white, black, Latino, or Native American). Grade level was measured through asking respondents to report their grade level (1=9th, 2=10th, 3=11th, and 4=12th). Educational aspirations were measured through asking participants how far in school they would most like to go. Original response options included the following: 1=less than high school graduation; 2=high school graduation or GED only; 3=attend or complete a two-year school course in a community college, vocational, or trade school; 4=attend college but not complete a four-year degree; 5=graduate from college; 6=obtain a master's degree or equivalent; 7=obtain a Ph.D., M.D., or other advanced degree; and 8=don't know. This variable was transformed into years of schooling (e.g., 1=11, 7=22), with the exclusion of the "don't know" category. We treated the "don't know" category as missing data and replaced it using multiple imputations. Academic achievement was measured through asking adolescents to report their grades. Response options ranged from 1=below D's to 8=Mostly A's. Residential aspirations were measured through asking adolescents to report where they would like to live at age 30. Response options included: 1=home state, 2=another state, 3=have not thought about it or decided. Residential stability was measured through asking participants to report how long they had lived in their current community. Response options included: 1=less than 5 years, 2=5-10 years, 3=more than 10 years.

For family background variables the following were included (a) parental education, (b) family economic hardship, and (c) intact family. Parent education was measured through adolescents' reporting on the highest level of their parents' education. Original response options included the following: 1=less than high school graduation; 2=high school graduation or GED only; 3=attend or complete a two-year school course in a community college, vocational, or trade school; 4=attend college but not complete a four-year degree; 5=graduate from college; 6=obtain a master's degree or equivalent; 7=obtain a Ph.D., M.D., or other advanced degree; and 8=don't know. We examined both parents' education levels and included whichever parent had the highest level of education. We transformed this variable into years of schooling, with the exclusion of the "don't know" category. We treated the "don't know" category as missing data and replaced it using multiple imputations. Family economic hardship was measured through three items that asked adolescents about constraints that they felt related to family economic challenges. Questions included, "There is not enough money in my family to pay bills"; "We don't have enough money in my family for things that are important"; and "We don't have enough money to buy things my family needs or wants". The response options included five-point scales (never to all of the time). The reliability statistic was .879. Intact family was measured by participants' indication of whom they currently lived with (1=both mother and father, 0=other). Number of siblings was measured through participants' reporting the number of their brothers and sisters.

For variables that pertained to economic and geographic conditions in the rural community, the following were included (a) isolation of rural community (i.e., town/fringe or distant [reference category], town/remote, rural/fringe or distance, rural/remote), (b) percent of the population aged 25 or older with college degrees, and (c) poverty rate. Isolation was measured through locale codes. Original codes were 31=rural, fringe, 32=rural, distant, 33=rural remote, 41=town, fringe, 42=town, distant, and 43=town, remote. Categories were collapsed into 1=town, fringe or distant, 2=town, remote, 3=rural, fringe or distant, and 4=rural, remote. Both percent of the population aged 25 or older with a college degree and poverty rate were measured using information from 2004-2005 NCES Common Core of Data. Appendix Table A presents descriptive statistics for our independent variables.

6.3 Analytic Strategies

First, we performed descriptive statistics for the expectations for first marriage and parenthood as well as expected ages of first marriage and parenthood by the pooled sample and gender. Second, to examine the expectations for first marriage and parenthood, we conducted logistic regression analyses as these items were measured by dichotomous variables (Long & Freese, 2006). In analyzing the expected ages of first marriage and parenthood, we conducted interval regression analyses because the outcome variables contained both interval censoring and right-censoring (Long & Freese, 2006). When we ran these multivariate analyses, we estimated two models. The first model included all individual, family, and community variables to examine how these

variables related to the expectations for and expected times of first marriage and parenthood. The second model included the interaction term between gender and educational aspirations to examine whether gender differences in the expectations and expected times for first marriage and parenthood differed by educational aspirations.

We replaced missing data only for the independent variables using multiple imputations (Schafer & Graham, 2002) (see Appendix Table A). Following recommendations set forth by von Hippel (2007), all of the dependent and independent variables were included so that missing values for the independent variables were predicted using existing values from the other variables. Given literature suggesting that accurate results typically can be obtained from two to ten imputations (Rubin, 1987; von Hippel, 2005), we generated ten imputed datasets. In each imputed dataset, each missing value was replaced with a plausible random value drawn on the observed values of all of the variables (von Hippel, 2005). We used the Stata ICE module for multiple imputations and pooled estimates from the ten datasets with the MIM prefix in Stata. To address the nested nature of data (i.e., students nested within schools), we employed cluster robust standard errors, which downwardly adjust inflated standard errors resulting from violations of the independent errors assumption due to clustering thereby reducing the likelihood of making a Type I error (Rogers, 1993).

7. Results

7.1 Expectations for and Expected Timing of Transitions

Table 1. Distribution of expectation of first marriage and parenthood by gender and race/ethnicity

	Total	Gender	
		Female	Male
Marriage			
Whether a student planned to get married or not (N=7,298)	0.94	0.95	0.93
If planned, at what age? (N=6,707)			
By age 16-18	0.02	0.03	0.01
By age 19-21	0.12	0.14	0.09
By age 22-24	0.38	0.42	0.34
By age 25-27	0.34	0.31	0.37
By age 28-30	0.11	0.08	0.14
After age 30	0.03	0.02	0.05
Parenthood			
Whether a student planned to become a parent (N=7,298)	0.91	0.91	0.90
If planned, at what age? (N=6,445)			
By age 16-18	0.03	0.03	0.02
By age 19-21	0.05	0.05	0.05
By age 22-24	0.21	0.25	0.18
By age 25-27	0.42	0.44	0.40
By age 28-30	0.21	0.19	0.24
After age 30	0.08	0.04	0.11

Note. Numbers are proportions.

Table 1 presents the distribution of expectations for and expected timing of transitions into adulthood in terms of first marriage and parenthood by gender. Given the interval scale of the variables for expected timing of transitions into adulthood, we also present both lower and upper bounds for expected ages of first marriage and parenthood by gender in Table 2. Ninety-four percent of adolescents indicated that they planned to get married. Ninety-five percent of female participants and 93% of male participants indicated that they planned to get married. Among participants who indicated that they planned to get married, 38% indicated that they planned to

get married by age 22-24. Among female participants, 42% indicated that they planned to get married by age 22-24. Thirty-seven percent of male participants, on the other hand, indicated that they planned to get married by age 25-27. With respect to parenthood, 91% of the participants indicated that they planned to become a parent. Ninety-one percent of female participants and 90% of male participants indicated that they planned to become a parent. Among those participants who indicated that they planned to become a parent, 42% indicated that they planned to become a parent by age 25-27. Among women, 44% indicated that they planned to become a parent by age 25-27. The corresponding percentage among men was 40%.

When it came to expected ages of first marriage, the lower bound for expected age was 23.96 for men and 22.97 for women, while the upper bound for expected age was 25.65 for men and 24.85 for women. For expected ages of parenthood, the lower bound for expected age was 25.31 for men and 24.45 for women, while the upper bound for expected age was 26.70 for men and 26.20 for women. In sum, generally speaking, while the majority of rural youth planned to get married and become a parent, expected timing of transitions tended to be earlier among women compared to their male counterparts. In the section that follows, we examine predictors of the expectations of transition into adulthood before examining predictors of expected transition times into adulthood.

Table 2. Expected ages of first marriage and parenthood by gender

	Expected Age			
	Lower interval age		Upper interval age	
	M	SD	M	SD
Marriage (N=6,707)				
Male	23.96	2.98	25.65	2.71
Female	22.97	2.84	24.85	2.70
Total	23.44	2.94	25.22	2.74
Parenthood (N=6,445)				
Male	25.31	3.13	26.70	2.81
Female	24.45	3.01	26.20	2.83
Total	24.85	3.10	26.43	2.83

Note. Only those students who indicated that they had planned to get married or to become a parent are included.

7.2 Predictors of the Expectation of Transition into Adulthood

7.2.1 Expectation of Marriage

Table 3 presents results from the logistic regression model predicting the likelihood of a student planning to get married. Recall that Model 1 included all individual, family, and community variables and Model 2 additionally included the interaction term between gender and educational aspirations.

Model 1 showed that there were no significant gender differences in the likelihood of the expectation for marriage, yet there were significant ethnic differences, as black participants were less likely than white participants to expect to get married. Grade level was also a significant predictor: 10^{th}, 11^{th}, 12^{th} graders were less likely than 9^{th} graders to expect to get married. Higher educational aspirations, higher academic achievement, and growing up in an intact family were associated with the increased likelihood of planning to get married. On the other hand, participants who hoped to live in another state when they were 30 years old were less likely to plan to get married compared to participants who wanted to live in their home state. Also, a higher level of family economic hardship and living in a community with a relatively higher poverty rate was associated with the decreased likelihood of planning to get married. In Model 2, the interaction term between gender and educational aspirations was negative and significant, suggesting that while overall female participants were more likely than male participants to plan to get married, this gender gap reduced as educational aspirations increased.

Table 3. Logistic regression model predicating the likelihood of planning to get married

	1			2		
Variable	Coef.	SE	OR	Coef.	SE	OR
Individual characteristics						
Female (vs. male)	0.149	0.113	1.160	2.814 **	0.859	16.677
Race/ethnicity (White omitted)						
Black	-0.564 *	0.262	0.569	-0.598 *	0.267	0.550
Hispanic	-0.168	0.160	0.846	-0.195	0.162	0.823
Native	-0.138	0.357	0.871	-0.135	0.361	0.874
Multiracial	-0.073	0.130	0.929	-0.068	0.130	0.934
Grade (9th grade omitted)						
10th	-0.388 **	0.138	0.679	-0.379 **	0.140	0.684
11th	-0.422 **	0.131	0.656	-0.416 **	0.131	0.660
12th	-0.447 **	0.150	0.640	-0.446 **	0.152	0.640
Educational aspirations	0.096 **	0.031	1.100	0.180 ***	0.046	1.197
Academic achievement	0.126 **	0.041	1.134	0.119 **	0.041	1.126
Residential aspirations (home state omitted)						
Another state	-0.525 ***	0.147	0.591	-0.547 ***	0.148	0.579
Have not thought or decided	-0.189	0.144	0.828	-0.208	0.145	0.812
Residential stability (Less than 5 years omitted)						
5-10 years	0.173	0.152	1.188	0.176	0.151	1.192
More than 10 years	0.321 *	0.143	1.379	0.340 *	0.142	1.405
Family characteristics						
Parental education	0.020	0.027	1.020	0.019	0.027	1.019
Family economic hardship	-0.100 *	0.049	0.905	-0.101 *	0.049	0.904
Intact family	0.608 ***	0.117	1.837	0.597 ***	0.118	1.817
Community characteristics						
Isolation (Town, fringe or distant omitted)						
Town, remote	-0.355	0.332	0.701	-0.364	0.319	0.695
Rural, fringe or distant	-0.185	0.338	0.831	-0.201	0.324	0.818
Rural, remote	-0.219	0.321	0.803	-0.226	0.308	0.797
% of population aged 25 or older with college degrees	-0.014	0.012	0.987	-0.013	0.012	0.987
Poverty rate	-0.033 ***	0.010	0.968	-0.032 **	0.010	0.969
Female X Educational aspirations				-0.165 **	0.053	0.848
Constant	1.384 *	0.656	—	0.134	0.832	—
Pseudo (McFadden's) R-squared[a]	0.022			0.072		
N	7,298			7,298		

Note. Standard errors are corrected for clustering within schools.

a. Pseudo R-squared is based on one complete and imputed data set.

***p<.001, **p<.01, *p<.05 (two-tailed tests).

7.2.2 Expectation of Parenthood

Table 4 presents results from the logistic regression model predicting the likelihood of a student planning to become a parent. Model 1 showed, unlike for the expectation of marriage, only a few variables were significant predictors of the expectation of parenthood. Rural youth who wanted to live in another state or had not thought

about it/decided were significantly less likely to plan to become a parent, compared to their counterparts who wanted to live in home state. Adolescents from intact families were significantly more likely to plan to become a parent than adolescents from non-intact families. Of interest, when we included the interaction term between gender and educational aspirations in Model 2, both gender and educational aspirations became positive and significant, while the interaction term was negative and significant. This suggests that although female participants were generally more likely than male participants to plan to become a parent, this observed gender gap reduced as educational aspirations increased. This result was consistent with results for the expectation of marriage.

Table 4. Logistic regression model predicating the likelihood of planning to become a parent

	1			2		
Variable	Coef.	SE	OR	Coef.	SE	OR
Individual characteristics						
Female (vs. male)	0.161	0.084	1.175	2.726 ***	0.684	15.272
Race/ethnicity (White omitted)						
Black	0.048	0.226	1.049	0.025	0.229	1.026
Hispanic	0.149	0.223	1.161	0.127	0.225	1.136
Native	-0.067	0.138	0.936	-0.061	0.139	0.941
Multiracial	-0.086	0.141	0.918	-0.080	0.140	0.923
Grade (9th grade omitted)						
10th	-0.116	0.119	0.891	-0.107	0.121	0.899
11th	-0.103	0.103	0.902	-0.099	0.103	0.905
12th	-0.103	0.157	0.902	-0.102	0.158	0.903
Educational aspirations	0.034	0.022	1.035	0.114 ***	0.032	1.120
Academic achievement	0.069	0.036	1.071	0.061	0.036	1.063
Residential aspirations (home state omitted)						
Another state	-0.494 ***	0.094	0.610	-0.513 ***	0.096	0.599
Have not thought or decided	-0.295 **	0.107	0.745	-0.312 **	0.108	0.732
Residential stability (Less than 5 years omitted)						
5-10 years	-0.095	0.133	0.909	-0.097	0.131	0.907
More than 10 years	0.196	0.122	1.216	0.210	0.121	1.233
Family characteristics						
Parental education	0.028	0.019	1.029	0.028	0.019	1.028
Family economic hardship	-0.051	0.041	0.951	-0.052	0.041	0.950
Intact family	0.242 **	0.082	1.274	0.230 **	0.080	1.258
Community characteristics						
Isolation (Town, fringe or distant omitted)						
Town, remote	0.126	0.115	1.134	0.119	0.115	1.127
Rural, fringe or distant	0.201	0.139	1.223	0.185	0.140	1.203
Rural, remote	0.236	0.130	1.266	0.228	0.132	1.256
% of population aged 25 or older with college degrees	-0.009	0.009	0.991	-0.009	0.009	0.991
Poverty rate	-0.018	0.009	0.982	-0.018	0.009	0.982
Female X Educational aspirations				-0.155 ***	0.041	0.856

Constant	1.300 *	0.523	—	0.107	0.567	—
Pseudo (McFadden's) R-squared[a]	0.022			0.027		
N	7,298			7,298		

Note. Standard errors are corrected for clustering within schools.

a. Pseudo R-squared is based on one complete and imputed data set.

***p<.001, **p<.01, *p<.05 (two-tailed tests).

7.3 Predictors of Expected Times of Transition into Adulthood

Analyses that focused on the expected transition times into adulthood were restricted to those adolescents who planned to get married and to become a parent. Model 1 included all individual, family, and community variables and Model 2 additionally included the interaction term between gender and educational aspirations.

7.3.1 Expected Times of Marriage

Table 5 presents results from the interval regression model predicting expected ages of first marriage. Model 1 showed that there were significant gender differences in expected ages of first marriage, even after controlling for other variables.

Table 5. Interval regression model predicating the expected timing of marriage

	1		2	
Variable	Coef.	SE	Coef.	SE
Individual characteristics				
Female (vs. male)	-1.193 ***	0.086	-2.382 ***	0.572
Race/ethnicity (White omitted)				
Black	1.530 ***	0.192	1.535 ***	0.191
Hispanic	-0.175	0.218	-0.165	0.218
Native	-0.320	0.183	-0.323	0.183
Multiracial	0.327 *	0.153	0.325 *	0.154
Grade (9th grade omitted)				
10th	0.172	0.097	0.169	0.097
11th	-0.029	0.090	-0.030	0.089
12th	0.090	0.123	0.091	0.122
Educational aspirations	0.181 ***	0.017	0.143 ***	0.025
Academic achievement	0.086 **	0.030	0.090 **	0.030
Residential aspirations (home state omitted)				
Another state	0.333 **	0.102	0.341 **	0.102
Have not thought or decided	0.298 **	0.090	0.305 **	0.091
Residential stability (Less than 5 years omitted)				
5-10 years	0.040	0.137	0.044	0.136
More than 10 years	0.012	0.128	0.008	0.129
Family characteristics				
Parental education	0.015	0.015	0.016	0.015
Family economic hardship	-0.135 ***	0.038	-0.134 ***	0.038
Intact family	-0.222 *	0.098	-0.217 *	0.098

Community characteristics				
Isolation (Town, fringe or distant omitted)				
Town, remote	-0.417	0.268	-0.415	0.264
Rural, fringe or distant	-0.353	0.277	-0.345	0.272
Rural, remote	-0.306	0.234	-0.302	0.229
% of population aged 25 or older with college degrees	0.025	0.014	0.025	0.014
Poverty rate	0.005	0.015	0.004	0.015
Female X Educational aspirations			0.071 *	0.034
Constant	21.048 ***	0.619	21.635 ***	0.674
Pseudo (McFadden's) R-squared[a]	0.025		0.025	
N	6,707		6,707	

Note. Standard errors are corrected for clustering within schools.

a. Pseudo R-squared is based on one complete and imputed data set.

***p<.001, **p<.01, *p<.05 (two-tailed tests).

On average, female participants planned to get married at earlier ages than male participants by 1.2 years. There were also significant racial/ethnic differences with black and multiracial adolescents reporting much later ages for first marriage than their white peers. Higher educational aspirations were significantly related to later ages for first marriage; a one year increase in the year of education that participants wanted to pursue was associated with .181 years of delay for first marriage. Higher academic achievement was also significantly related to later ages for first marriage. Adolescents who wanted to live in another state or had not thought about it/decided reported significantly later ages for first marriage than those who wanted to live in their home state. A higher level of family economic hardship was associated with earlier ages for first marriage. Adolescents from intact families reported significantly earlier ages for first marriage than those from non-intact families. No community variables were significant predictors. In Model 2, the interaction term between gender and educational aspirations was positive and significant. This result suggests that while overall female participants tended to report significantly earlier ages for first marriage than male participants, this gender gap was significantly smaller among those adolescents who had higher educational aspirations than those who had lower educational aspirations. Figure 1 depicts this varying relationship between gender and expected ages of first marriage, depending on the level of educational aspirations. For this figure, we calculated expected ages of first marriage as predicted by Model 2, and set all other variables to zero. As shown in Figure 1, the gender gap in expected age of first marriage was much smaller among participants who reported higher educational aspirations, compared participants who reported lower educational aspirations.

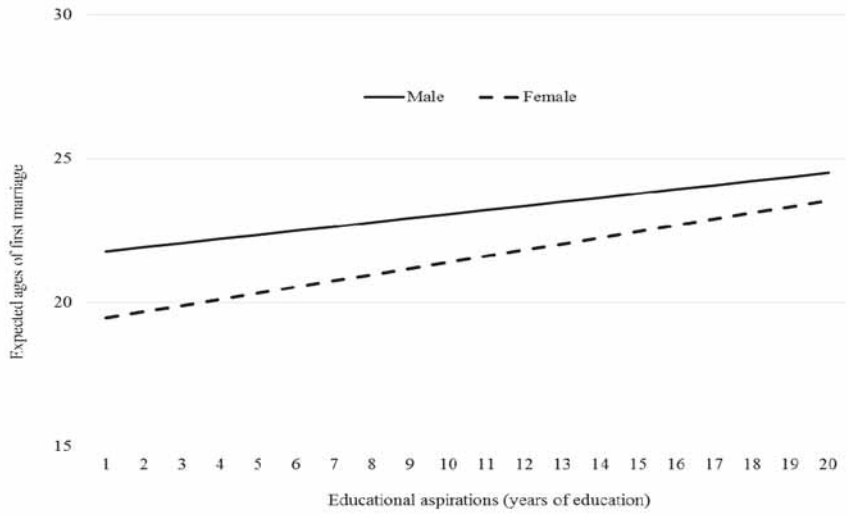

Figure 1. The Varying relationship between gender and expected ages of first marriage

Note. Predicted expected ages of first married were based on Model 2 in Table 4. We set zero for all other variables.

7.3.2 Expectation of Parenthood

Table 6 presents results from the interval regression model predicting expected ages of parenthood. Model 1 showed that there were significant gender differences in expected ages of parenthood, even after controlling for other variables. Specifically, female participants planned to become a parent at earlier ages than their male peers by approximately 1.2 years. There were significant ethnic differences with Hispanic participants reporting much earlier ages for parenthood than white participants. Similar to results for first marriage, higher educational aspirations were significantly related to later ages for parenthood. That is, a one-year increase in the year of education that participants wanted to pursue was associated with 2.35 years of delay for parenthood. Higher academic achievement was also significantly related to later ages for parenthood and higher level of family economic hardship was associated with earlier ages for parenthood. Again, no community variables were significant predictors. Unlike for first marriage, in Model 2, the interaction term between gender and educational aspirations was not statistically significant.

Table 6. Interval regression model predicating the expected timing of parenthood

	1		2	
Variable	Coef.	SE	Coef.	SE
Individual characteristics				
Female (vs. male)	-1.180 ***	0.103	-2.323 **	0.693
Race/ethnicity (White omitted)				
Black	-0.473	0.365	-0.466	0.365
Hispanic	-1.058 ***	0.179	-1.049 ***	0.180
Native	-0.322	0.229	-0.326	0.227
Multiracial	0.149	0.126	0.148	0.127
Grade (9th grade omitted)				
10th	-0.003	0.113	-0.006	0.114
11th	-0.023	0.105	-0.023	0.105
12th	-0.028	0.134	-0.027	0.133
Educational aspirations	0.235 ***	0.022	0.198 ***	0.031

Academic achievement	0.161 ***	0.034	0.165 ***	0.034
Residential aspirations (home state omitted)				
Another state	0.320 **	0.099	0.328 **	0.099
Have not thought or decided	0.378 **	0.110	0.385 ***	0.109
Residential stability (Less than 5 years omitted)				
5-10 years	0.163	0.135	0.168	0.135
More than 10 years	-0.015	0.125	-0.017	0.125
Family characteristics				
Parental education	0.001	0.017	0.001	0.017
Family economic hardship	-0.106 *	0.046	-0.104 *	0.046
Intact family	0.070	0.099	0.074	0.099
Community characteristics				
Isolation (Town, fringe or distant omitted)				
Town, remote	-0.456	0.261	-0.455	0.258
Rural, fringe or distant	-0.222	0.220	-0.215	0.214
Rural, remote	-0.006	0.179	-0.003	0.173
% of population aged 25 or older with college degrees	0.017	0.010	0.017	0.010
Poverty rate	-0.015	0.010	-0.016	0.010
Female X Educational aspirations			0.068	0.042
Constant	21.705 ***	0.578	22.273 ***	0.710
Pseudo (McFadden's) R-squared[a]	0.027		0.027	
N	6,445		6,445	

Note. Standard errors are corrected for clustering within schools.

a. Pseudo R-squared is based on one complete and imputed data set.

***p<.001, **p<.01, *p<.05 (two-tailed tests).

8. Discussion

The timing of major adulthood transitions has critical developmental implications, yet few research studies on this topic specifically focus on rural youth. The current study addressed this gap in the literature and contributes to the growing research on transition times of rural adolescents in several ways. First, the sample of this study included a large, diverse, and contemporary pool of rural men and women. Second, this paper examined both gender- and ethnicity-related differences in the expected timing of transitions into adulthood. Third, the study included community predictors unique to rural areas, which are largely absent from previous studies on transition times of rural youth. Below we highlight several key findings.

8.1 Individual Characteristics and Adulthood Transitions

8.1.1 Gender

Study results are consistent with previous research on gender and timing of transitions into adulthood (Crockett & Beal, 2012; Crockett & Bingham, 2000; Greene, 1990; Marini, 1985; Schoon, 2010), which has found that women expect earlier ages of transition into marriage and parenthood roles. Compared to extant work that used both rural and national samples (Greene, 1990; Crockett & Bingham, 2000), results of the current paper find relatively similar expected ages of marriage and parenthood. However, compared to previous studies, women in our sample expected slightly older ages of entering parenthood, which aligns with current trends concerning the postponement of marriage and parenthood (Furstenberg, 2010; Settersten & Ray, 2010).

8.1.2 Educational Aspirations

In line with research on educational aspirations (e.g., Byun et al., 2012a), and as exemplified by the results of the current paper, educational aspirations were key in guiding the pathways into adulthood of rural youth. Despite the fact that most rural men and women expected to get married and enter parenthood, their expectations were also heavily shaped by educational aspirations. We found that while women were generally more likely than men to plan to get married and become a parent, this observed gender gap reduced as educational aspirations increased. This interaction was consistent throughout all analyses except in predicting expected timing of parenthood. The strong influence of educational aspirations especially among rural women demonstrates the powerful role of human agency in shaping developmental outcomes (Eccles, 2008; Elder, 1998). In addition, the moderating influence of educational aspirations may reflect how rural women perceive relatively few occupational options in their home communities (Johnson et al., 2005), prompting them to make decisions about pursuing educational and professional goals in relation to marriage and parenthood goals. The perception of few career options, along with increases in the postsecondary aspirations of rural women in recent years (Meece et al., 2013), align with our findings and suggest that educational aspirations play an important role in adulthood transitions such as the expectations for and timing of marriage and parenthood. These findings may also reflect broader changes in the social attitudes and norms surrounding gender and employment among rural community members.

8.1.3 Ethnicity

Results of this study align with previous work that shows how specific timing and expectations for future educational plans fluctuate depending on culture, gender, and ethnicity (Bynner, 2005; Settersten & Ray, 2010; Turcios-Cotto & Milan, 2013). The current study extends this existing work by exploring the predictors of expected transition times into adulthood of a diverse subsample of rural youth. Key findings showed that black participants were less likely than white participants to expect to get married and black youth reported much later ages for first marriage than white youth. These findings suggest nuanced differences in the expectation of adulthood transitions across adolescents of different ethnicities; however, more research is needed to confirm ethnicity-related differences in the expected transition times of rural youth.

8.1.4 Residential Aspirations

Our results also showed that the aspiration to live away from home was closely linked to expected adulthood transitions. Adolescents who wanted to live in another state when they were 30 years old were less likely to plan to get married and expected later ages for their first marriage. Additionally, rural youth who wanted to live in another state or had not thought about it/decided were significantly less likely to plan to become a parent and expected later ages for becoming a parent. These findings might reflect the desire to delay marriage and family in pursuit of higher education outside of one's home communality (Furstenberg, 2010; Hektner, 1995; Settersten & Ray, 2010). These results could also be tied to feelings of rural residential attachment, which would align with work by Johnson et al. (2005), who found that rural youth who are less residentially attached tend to hold higher educational expectations. Our findings extend work by Johnson et al. (2005) in exploring how residential aspirations are linked to other development markers (i.e., expectations of marriage and parenthood).

8.2 Family Characteristics and Adulthood Transitions

Our study also highlights how family contributions, in addition to individual influences, relate to the developmental outcomes of rural youth. Rural youth who perceived higher levels of family economic hardship reported significantly earlier ages for marriage and parenthood (thus obfuscating educational pursuits), compared to their counterparts who perceived lower levels of family economic hardship. These findings may reflect how conditions of poverty can have long-term negative consequences on development (McLoyd, 1998) and can result in lower earnings and less educational attainment into adulthood (Corcoran, 1995; Heflin & Pattillo, 2006). Our study highlights the important role of family background in the transition times of rural youth, and underscore how family background can serve as a barrier and facilitator for transitions into adulthood in rural settings.

8.3 Community Characteristics and Adulthood Transitions

Our study found limited evidence suggesting that community characteristics are associated with the transition times of rural youth. Only the poverty level of the community was significantly associated with the likelihood of planning to marry, as youth living in communities with a higher poverty rate were less likely to plan to get married. However, the role of community characteristics in shaping the transition times of rural youth should not be underestimated for several reasons. First, the current study considered only a limited number of community

variables. Second, although we conceptualized residential aspirations as individual influences in the current study, these beliefs may be reflective of community influences as well, such as the availability of employment opportunities. More research is needed to determine how these residential aspirations are tied to community influences.

9. Study Limitations, Future Research, and Implications

Despite using a nationwide and diverse sample of rural sample, the current study could not include an exhaustive list of ethnicity, family, or economic variables. Many of the variables in the current study were previously linked to transition times among white rural youth, but not enough information exists about some of the important within-group predictors of transition times among ethnic-minority rural youth. Future studies should examine group differences across rural youth of various ethnic backgrounds and include culturally appropriate, school-, and community-oriented variables.

Another study limitation was the cross-sectional nature of the study and the absence of follow-up data on actual transition times. Although the current paper did not include follow-up data, research has shown the expectations for the timing of transitions predict the actual timing of transitions (Beal & Crockett, 2010; Crockett & Beal, 2012; Mello, 2008). However, without longitudinal data, causality and directionality cannot be determined. Future research using rural samples should use longitudinal data and more sophisticated analysis techniques, (e.g., Oesterle et al., 2010) in studying developmental pathways of rural youth. Another possible limitation was the usage of timing of marriage and parenthood of markers as the transition into adulthood. Extant research has suggested that adolescents' current conceptions of adulthood involve more psychological, individualistic, and relational processes, and do not necessarily include markers such as entry into parenthood, marriage, first job, or the finishing of education (Horowitz & Bromnick, 2007). Future work on the transition times into adulthood among rural youth should include these contemporary conceptions of adulthood that emphasize responsibility, autonomy, and decision-making (Arnett, 2003).

Finally, although we highlighted recent socioeconomic transformations that have taken place in rural communities and their potential impact on the developmental trajectories of rural youth, our analyses did not directly test this issue. To better address this issue, future research should investigate whether and how socioeconomic transformations in rural communities shape rural youth's transitions to adulthood by using data for different age cohorts. Future research also should use comparative data that include urban and suburban youth to examine the role of rurality in shaping transitions to adulthood.

Despite these limitations, the results of this study hold two major implications for the developmental trajectories of rural youth. First, the powerful impact of educational aspirations on shaping the critical life transitions of rural men and women shows how malleable aspirations and cognitive beliefs have the ability to shape development pathways. Even when rural youth face changing and sometimes limiting economic and social environments, holding high educational aspirations can help steer adolescents toward their goals. The malleable aspirations of rural youth could be a target for future school-based intervention work that could potentially help guide rural youth through the often-difficult transition from high school into adulthood. Second, this study illustrates how family and community forces unique to rural areas shape the developmental transitions and trajectories of rural men and women. Future intervention efforts should harness the promotive, or buffering, roles that families and communities play in helping rural youth navigate their transitions to adulthood.

Acknowledgements

This research was supported by the Spencer Foundation (Reference Number 201300107) and the Institute of Education Sciences, U.S. Department of Education (Grant Number #R305A04056). The views expressed in this article are ours and do not represent those of the granting agency.

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Note

Note 1. Respondents were given the option of selecting one or more race categories to indicate racial identities, which led to a higher proportion of a multiracial group. Because of the nature of the questions asked, our data on race/ethnicity are not directly comparable with data collected by the U.S. Census Bureau or NCES.

Appendix

Table A. Descriptive statistics for the independent variables included in analyses

Variable	M or %	SD	% imputed
Individual characteristics			
Female	52.38	—	0.00
Race/ethnicity			0.00
White	67.25	—	
Black	6.77	—	
Hispanic	10.48	—	
Native	3.60	—	
Multiracial	11.89	—	
Grade			0.03

9th	27.75	—	
10th	27.36	—	
11th	24.91	—	
12th	19.98	—	
Educational aspirations	16.75	2.46	7.77
Academic achievement	6.21	1.61	3.49
Residential aspirations			1.55
Home state	35.76	—	
Another state	30.12	—	
Have not thought or decided	34.12	—	
Residential stability			0.88
Less than 5 years	17.10	—	
5-10 years	18.61	—	
More than 10 years	64.29	—	
Family characteristics			
Parental education	13.87	2.59	11.59
Family economic hardship	1.80	0.94	6.28
Intact family	56.78	—	0.00
Community characteristics			
Isolation			0.00
Town, fringe or distant	7.60	—	
Town, remote	11.66	—	
Rural, fringe or distant	36.67	—	
Rural, remote	44.07	—	
% of population aged 25 or older with college degrees	18.25	5.77	0.00
Poverty rate	16.30	5.00	0.00
N		7,298	

Note. We performed descriptive analyses for each of ten imputed datasets and then averaged the mean and standard deviations by using Rubin's rule.

Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Parenting Stress as a Mediator between Mental Health Consultation and Children's Behavior

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Received: November 22, 2016 Accepted: December 6, 2016 Online Published: December 8, 2016

doi:10.5539/jedp.v7n1p72 URL: http://dx.doi.org/10.5539/jedp.v7n1p72

Abstract

Early Childhood Mental Health Consultation (ECMC) focuses on enhancing adults' (e.g., parents) skills and abilities in order to improve children's behavior. Limited research has examined parenting factors as mechanisms of change, which is important given the bidirectional nature of parent-child interactions. Parenting stress and its influence on children's behavioral outcomes (behavior problems and protective factors) were investigated following the implementation of an Early Childhood Mental Health Consultation (ECMHC) program. Participants included parents that participated in the ECMHC program (n = 247) and a comparison group (n = 72) in the Midwest. Overall, parents in the ECMHC group experienced fewer dysfunctional parent-child interactions and less distress. Results indicated that parent-child dysfunctional interactions mediated the relationship between ECMHC and children's behavior problems (CI = .001, .038) and protective factors (CI = -.061, -.001). Parental distress did not mediate the relationship between ECMHC and children's behavior problems (CI = -.001, .016) or protective factors (CI = -.020, .001). Understanding the influence of stress and parent-child interactions is beneficial as these may be malleable and responsive to change if targeted in intervention. Examining mechanisms of change related to parents will allow for refinement of services and improved behavioral outcomes for children.

Keywords: behavior concerns, early childhood mental health consultation, parenting stress, protective factors

1. Introduction

Behavior problems exhibited by young children often lead to difficulties and dysfunction in adolescence and adulthood (Fergusson, Horwood, & Ridder, 2005). To avoid the negative long-term consequences of behavior problems, the implementation of prevention and early intervention services such as Early Childhood Mental Health Consultation (ECMHC) have been on the rise (Green, Everhart, Gordon, & Gettman, 2006). ECMHC is an indirect problem-solving approach to intervening with young children (ages birth to 6 years), their families, and other adult care providers (Cohen & Kaufman, 2000). This problem-solving approach is developed and implemented collaboratively by a consultant, individuals with other areas of expertise, such as a childcare provider or preschool teacher, and the caregivers of the target child. ECMHC targets adults by enhancing their skills and abilities to better prevent, identify, and treat mental health problems as a way to change children's behavior. ECMHC directly focuses on adults' behavior, which is proposed to lead to indirect effects on children's behavior. The most common type of consultation, child- or family-centered consultation, focuses on impacting childcare factors and family factors that may be contributing to or maintaining the child's challenging behavior. This is advantageous in that it considers multiple ecologies affecting a child by incorporating important adults in a collaborative problem-solving approach.

Research on the effectiveness of ECMHC provides evidence for improving young children's social, emotional, and behavioral functioning. ECMHC has been linked to less challenging behavior (e.g., disruptive behavior; Raver et al., 2009), more positive behaviors (e.g., social skills; Perry, Dunne, McFadden, & Campbell, 2008), and lower rates of expulsion in at-risk preschool populations (e.g., Upshur, Wenz-Gross, & Reed, 2009). Given

the emphasis of changing adult-child interactions in this intervention, it is not only important to investigate outcomes of this approach and *if* children improve, but also *how* the intervention helps children improve. Research has hypothesized how changes in childcare providers and teachers help children, such as an improved provider-child relationship and increased teacher efficacy (e.g., Brennan, Bradley, Allen, & Perry, 2008; Johnston & Brinamen, 2012), but even this literature base is lacking empirical support and authors have argued for a better understanding of how change occurs in ECMHC. Even more limited is research devoted to understanding how parent changes resulting from ECMHC lead to improved child behavior outcomes. Given that parents spend the most time with their young children and the significant influence parental behavior has on child behavior, examining mechanisms of change related to parents is an essential next step in further establishing ECMHC as an evidence-based practice.

Parents' behavior significantly influences child behavior through parent-child interactions (Patterson & Reid, 1970). Parenting stress, or the aversive psychological reaction to the demands of being a parent (Abidin, 1992), is one factor that may influence parenting behavior. Parents with elevated parenting stress may be more likely to engage in aversive parenting behaviors. Frequent negative parent-child interactions may result in elevated parenting stress over time. Parents who are highly stressed may be more likely to give in to their child's demands to avoid putting in the effort necessary to effectively manage challenging behavior. Elevated levels of parenting stress are associated with behavior problems and conversely, more behavior problems have been linked to elevated parenting stress (e.g., Barry, Dunlap, Cotton, Lochman, & Wells, 2005). The intervention literature also suggests relations between parenting stress and child behavior. For example, in studies targeting children's behavior problems, parenting stress is reduced, and when parenting stress is targeted in treatment, children exhibit fewer behavior problems (e.g., Feinfield & Baker, 2004; Kazdin & Whitley, 2003).

Given this, it could be the case that if stress is reduced for parents following ECMHC, child behavior problems may also decrease. One component of ECMHC that may affect parents' stress levels is parenting education and skills. Lack of parenting competence, fewer emotional resources, and fewer instrumental resources contribute to parenting stress (Deater-Deckard, 1998). Improving parenting stress levels through ECMHC may enhance parents' perception of available resources, change attitudes toward parenting, and build more effective parenting skills. Reducing parenting stress through ECMHC may lead to positive parent-child interactions and ultimately help to improve children's behavior.

The current study was part of a larger study of ECMHC and extends the findings of the report from that evaluation (Van Egeren et al., 2011). While the large-scale, mixed-method evaluation furthered the research on ECMHC and examined many variables, rationale for why improvements and potential mediators between ECMHC and child outcomes were not investigated. The purpose of the current study was to evaluate parenting stress and its influence on children's behavioral outcomes (i.e., behavior problems and protective factors) following the implementation of an ECMHC program. Research has suggested that higher levels of parenting stress is related to more behavior problems exhibited by children, and that behavior problems and parenting stress often predict the presence and level of the other (e.g., Barry et al., 2005). Additionally, the mediating role of parenting stress in improving children's behavioral outcomes following intervention is an important area of investigation (Feinfield & Baker, 2004). In this study, the first hypothesis was that parenting stress would mediate the relation between ECMHC and child behavior problems. More specifically, we purported that if parenting stress was high after ECMHC, more behavior problems would be reported, and if parenting stress was rated as being low after ECMHC, less behavior problems would be found after the intervention.

A paucity of research has been dedicated to examining whether less parenting stress may be related to children displaying more protective factors. This includes behaviors such as self-control, initiative, attachment, and the ability to communicate effectively (LeBuffe & Naglieri, 1999). Protective factors promote resiliency and moderate or buffer the negative effects of stress (Rutter, 1987). Previous studies indicate that higher levels of parenting stress are related to lower levels of children's social competence (e.g., Anthony et al., 2005; Bender & Carlson, 2013). Given this previous finding, the second hypothesis was that parenting stress would mediate the relation between the ECMHC and children's protective factors. Specifically, we predicted that less parenting stress would be associated with more protective factors and more parenting stress would be associated with fewer protective factors following ECMHC.

2. Method

2.1 Participant Characteristics

Three hundred nineteen parents of children between the ages of 6 and 72 months participated. Two groups of participants were included in the study: the ECMHC group (N = 247) and a comparison group (N = 72). The ECMHC group included parents who participated in the Child Care Expulsion Prevention (CCEP) Program, a state-funded initiative in the Midwest between the years of 2007 to 2010. The comparison group included parents that did not participate in the CCEP program and resided in counties in the state that did not have access to ECMHC (i.e., CCEP) services. Both groups involved children who were demonstrating behavioral challenges impacting their functioning in the childcare center and/or at home.

2.1.1 CCEP Group

Children attending childcare programs in the counties that offered ECMHC services were referred to the CCEP program by their childcare provider or parent because of the child's behavioral difficulties exhibited in the childcare or home setting. Children were referred for several reasons, including problems related to aggression, developmental delays, behavioral regulation, physical difficulties, sensory integration, or other types of externalizing behavior. After consultants made initial contact with the provider and family, consultants obtained consent for CCEP services as well as consent for the data to be sent to independent evaluators at the university. When university consent was given, the parents completed several questionnaires related to their child's behavior. Following the conclusion of services parents completed the same questionnaires, along with a survey assessing their satisfaction with the consultation process and effectiveness. After the pre and post questionnaires were completed, CCEP consultants sent the data to the researchers evaluating the CCEP program.

CCEP was flexible in its approach given the diverse needs and challenges of the child and complexity and severity of the problem. Number of visits and duration of services were not uniform given that they were tailored to each particular child, parent, and provider. However, on average, consultants spent one to three hours per week with an individual child/family and provider. CCEP services typically lasted three to six months for most children.

Consultants served children and families from 31 counties throughout the state. The age of children in the ECMHC group ranged from 12 to 72 months (M = 44 months; SD = 12.5 months), with 76% being male. Approximately 81% of children were identified as Caucasian. The majority of children (92%) exhibited multiple behavior problems. Children were most frequently referred to ECMHC for problems related to aggression, developmental delays, and self-regulation, as reported by their parents. Of the children included in the sample, 28% exhibited difficulties related to developmental delays (e.g., exhibiting high activity levels), 22% presented with some type of aggression problem (e.g., hitting, verbal aggression), and 21% had regulatory problems (e.g., inability to self-regulate, demanding behavior). The majority of parents in the ECMHC group were female (N = 237; 96%) with an age range of 20 to 59 years (M = 33 years; SD = 6.9 years). The majority of parents identified as Caucasian (84%). Parents reported their income in the past 12 months. Sixteen percent reported less than $14,999, 49% fell between $15,000 and $54,999, 25% fell between $55,000 and $99,999, and 10% reported more than $100,000.

2.1.2 Comparison Group

The evaluators recruited families for the comparison group by sending advertisements to licensed family daycare centers and childcare centers in counties that did not offer ECMHC services. Recruitment flyers were also posted in the community (e.g., grocery stores, doctor's offices), in early childhood newsletters, and websites. Interested parents who inquired about participation were asked a series of questions over the phone to assess child behavior and determine eligibility. Questions assessed child behavior to determine whether behavior problems were comparable to the behavior problems exhibited by children referred to the CCEP program. Exclusions from participation were made when ratings of child behavior problems fell below a pre-defined cutoff score, if the child attended a publically funded preschool, or if their child attended Head Start. Eligible parents were provided information about the study and interested parents provided verbal consent over the phone. Phone interviews were scheduled within one week and took 30 to 45 minutes. Questionnaires assessed the child's behavior and parent characteristics such as parenting stress and empowerment. In rare cases, parents were sent a copy of the questionnaires in the mail to complete and mail back to the evaluators. Six months later, parents were contacted again to complete the second phone interview. The same questionnaires were administered as the initial interview.

The age of children ranged from 6 to 64 months (M = 37 months; SD = 13.8 months), with 64% being male. Approximately 86% of children were identified as Caucasian. Similar to the CCEP group, the majority of children exhibited multiple behavior problems (84%). Parents most frequently reported behavior problems related to developmental delays (40%), aggression (33%) and self-regulation (21%). The majority of parents in the comparison group were female (N = 68; 94%) with an age range of 19 to 46 years (M = 31 years; SD = 5.9 years). Parents reported their income in the past 12 months. Twenty-one percent reported less than $14,999, 42% fell between $15,000 and $54,999, 27% fell between $55,000 and $99,999, and 10% reported more than $100,000.

2.2 Procedure

2.2.1 Description of the Child Care Expulsion Prevention (CCEP) Program

CCEP was an ECMHC program funded by the Department of Community Health (MDCH) in the Midwest where consultants worked collaboratively with child care providers, parents, and administrators to promote healthy social-emotional development for young children and prevent expulsion (Carlson et al., 2012). The CCEP program served children age birth to five years in 31 of 83 counties. The fundamental approach to serving young children is relationship-based practice, where consultants facilitate, and nurture adult-child interactions. Consultants also equipped these adults with knowledge and skills that improved their interactions with the child.

The CCEP program provided family/child-centered consultation and programmatic consultation. However the main focus was child/family-centered consultation. Overall, CCEP had all of the components that are considered to be essential in ECMHC including emphasis on a collaborative relationship between the consultant, parent, and provider, utilization of problem-solving and creation of skill-building goals, identification of specific issues to be targeted and addressing issues within a reasonable time frame, and consultants who possess a set of professional skills and interpersonal skills. In addition to meeting this criteria of ECMHC, CCEP had specific steps that were integral to CCEP implementation. These steps include: a) referral, intake, and consent; (b) observation and assessment; (c) meeting with parents and providers to develop a Positive Child Guidance Plan; (d) support to implement the Positive Child Guidance Plan; (e) referrals to outside services as needed; and (f) conclusion of services.

Consultants engaged in several types of services to enhance the attitudes and skills of providers and parents, as well as improve the classroom and home environment. Consultants provided direct and indirect services (Perry et al., 2010) to assess the child's problems. After the child's problem was identified, a plan was constructed to reduce the problem. Consultants often provide leadership to construction of the plan and ensured that the plan was carried out. Indirect services may have included educating providers and parents about a particular topic (e.g., child development and behavior), coaching and modeling of positive adult behavior and discipline strategies, conducting in-service or trainings, and consultation regarding adjustments to the classroom or home environment (e.g., routines, structure, environment layout). Consultants made referrals for the child and/or family to other professionals or agencies if their needs exceeded the resources or expertise of the consultant and ECMHC program. Resources were also provided to families and childcare centers, such as books and toys.

According to a review of ECMHC and its impact on children's behavioral outcomes, Perry and colleagues (2010) highlight three different approaches to ECMHC service delivery within the literature. One of the approaches, individualized consultation services, which is defined as consultation that is tailored to the needs of the child, family, provider, or program, is the type of consultation delivery model used in CCEP. Several evidence-based practices are promoted within the model. This includes the use of valid and reliable assessment tools, as well as the use of effective teaching and scaffolding strategies, such as coaching, modeling, and immediate feedback. Implementation of this approach has been suggested to be a promising way to reduce young children's behavior problems.

Qualified consultants working within community agencies provided CCEP services. Qualifications of CCEP consultants included possessing a) a master's degree in social work, psychology, or related field; b) a license or being license-eligible; and c) a Level II-Infant Mental Health Endorsement for culturally sensitive, relationship-based practice promoting infant mental health, or a graduate certification in infant mental health studies. Consultants were supervised by agency personnel and were required to participate in ongoing reflective supervision. MDCH Technical Assistance (TA) staff also provided support to consultants in various ways such as specialized training, individualized supervision, quarterly meetings, resources, and an email support group.

2.2.2 Integrity and Fidelity of CCEP Implementation

Several variables were evaluated to determine whether CCEP services were implemented as intended for the participants in the current study. The variables were selected based on the larger study of ECMHC Evaluation Report (Van Egeren et al., 2011) and suggestions from the literature (e.g., Sheridan et al., 2009). Completed intake forms and evidence of a Positive Guidance Plan were indicators of high implementation fidelity. These permanent products are also supported in the literature as evidence of implementation fidelity (Sheridan, Swanger-Gagne, Welch, Kwon, & Garbacz, 2009).

The percentage of participants that completed the intake form in the current study's sample was 100%. Additionally, a Positive Guidance Plan was constructed for 93% of the children in the current study's sample. Observation and assessment was completed for 100% of children and 100% of consultants supported the implementation of the Positive Child Guidance Plan by providing a wide range of services that varied in duration and intensity. As mentioned above, consultants spent an average of one to three hours per week with an individual child/family and provider, with program services typically lasted three to six months for most children.

Self-reported perceptions of consultation services were considered another way of evaluating the fidelity of service implementation (Sheridan et al., 2009). Parents rated their satisfaction with the consultant they worked with and CCEP services. This self-reported information is a form of adherence, as perceived by those participating in CCEP, and yields an estimate of consultees' adherence to or compliance with intervention implementation. The parent satisfaction survey measured how helpful parents found their consultant to be and how willing they would be to request services from their consultant in the future, even if other consultants were available. This survey consisted of the Consultant Evaluation Form (CEF), as well as additional items that assessed parents' perceptions of consultation. In addition to this measure evaluating parents' perception of satisfaction, it was also an indirect way of determining how successful the consultant was at building a relationship with the parent. As indicated by ECMHC literature as well as CCEP cornerstones, relationship building was an important component of services. The parent satisfaction survey was an optional questionnaire that parents completed after CCEP services and mailed to the evaluators in a paid postage, addressed envelope. Given that this measure was optional, not all parents completed the measure. For the current study sample, two-thirds of parents completed and mailed the questionnaire back to the evaluators.

In regards to overall parent satisfaction, scores were generally high, indicating high levels of satisfaction. All questions were rated on a scale of 1 (low, or strong disagreement) to 7 (high, or strong agreement). The CEF consisted of 12 questions with a possible overall score range of 12 to 84. The mean CEF score for the current sample was 76.2 (item mean: 6.4). The mean for individual items that assessed overall perception of consultation (mean = 6.4), overall perception of change in competence (mean = 6.0), perception of behavior improvement in child (mean = 6.0), and time of effectiveness (mean = 5.9), were also rated high. Two additional subscales were incorporated into the satisfaction survey. One subscale assessed parents' acceptability of CCEP services. The possible overall score range was 9 to 63. The mean score for the current sample was 55.5 (item mean = 6.2). The second subscale assessed parents' perception of effectiveness of CCEP services. The possible overall score range for this subscale was 4 to 28. The mean score for the current sample was 22.5 (item mean: 5.6).

2.3 Measures

2.3.1 Demographic Information Questionnaire

The CCEP Intake Form was a questionnaire used to collect descriptive information from parents about their child and family. Child age, gender, race, behavior problems exhibited, and number of previous expulsions was gathered. Family information such as household income, primary language spoken in home, and services received (e.g., food assistance, medical assistance) was also gathered. During the second year of data collection, the intake form was revised to include additional demographic information. Significant missing demographic data resulted from this change.

2.3.2 Parenting Stress Index-Short Form (Adapted)

The Parenting Stress Index-Short Form (PSI-SF 3rd Ed.; Abidin, 1995) is a derivative of the Parenting Stress Index (PSI 3rd Ed.; Abidin, 1995). The 36-item PSI-SF is an early identification assessment of parenting and family characteristics that fail to promote normal development and functioning in children, children with behavioral and emotional problems, and parents who are considered at-risk for dysfunctional parenting. This study used the Parent-Child Dysfunctional Interaction and Parental Distress subscales. The Parent-Child

Dysfunctional Interaction subscale evaluates the parent and child's interactions and measures parents' perceptions that the child does not meet expectations and interactions with the child are not reinforcing. The Parental Distress subscale measures parents' perceptions of child-rearing competence, social support, and stresses associated with the restrictions placed on other life roles. Psychometric research with low-income population supports the use of the PSI-SF (Reitman, Currier, & Stickle, 2002). The PSI-SF predicts observed parenting behavior as well as children's current and future behavioral and emotional adjustment (Abidin, 1995). Abidin (1995) reported reliability alpha coefficients of 0.80 for Parent-Child Dysfunctional Interaction and 0.87 for Parental Distress subscales.

2.3.3 Devereux Early Childhood Assessment (DECA)

The DECA is a nationally, norm-referenced, strength-based assessment tool that evaluates protective and risk factors in preschool children (LeBuffe & Naglieri, 1999). Three versions of the DECA were available and completed by parents based on the age of the child. The DECA-Infant (1 to 18 months) consists of 33 items that assess for Initiative and Attachment. The DECA-Toddler (18 to 36 months) includes 36 items that assess for Initiative, Attachment, and Self-Regulation. The subscales are combined to create a Total Protective Factor (TPF) score. The DECA-Preschool (2 to 5 years) consists of 37 items; 10 items assess for Behavior Concerns (BC) and 27 items assess TPF. This score is compromised of 3 subscales including Initiative, Self-Control, and Attachment. Each scale has an average *t*-score of 50, with a standard deviation of 10. On all DECA forms, children can receive ratings of Strength ($t \geq 60$), Typical ($40 \leq t \leq 60$), or Concern ($t \leq 40$) on the TPF scale and TPF subscales. On the BC scale, children can also receive ratings of Strength ($t < 40$), Typical ($40 \leq t \leq 60$), or Concern ($t \geq 60$). Internal reliability alpha coefficients for the scales based on parent-ratings are: .84 (Initiative), .86 (Self-control), .76 (Attachment), .91 (Total Protective Factors), and .71 (Behavior Concerns) (Lebuffe & Naglieri, 1999). The standardization sample for the DECA-Infant and DECA-Toddler consisted of 2,183 children and the standardization sample for the DECA-Preschool consisted of 2,000 preschool children, who accurately reflected the diversity of preschool children in the United States. Supportive evidence also exists for use of the DECA with low-income early childhood populations exhibiting behavior problems (Brinkman et al., 2007).

2.4 Data Analysis

To investigate the mediating relationships, multiple regression analysis was used to determine whether the ECMHC condition (ECMHC vs. comparison group) and parenting stress significantly contributed to lower ratings of behavior problems. The bootstrap method, a type of mediation analysis that has growing support for testing indirect effects (Hayes, 2009; Preacher, Rucker, & Hayes, 2007; Shrout & Bolger, 2002), was performed. This assessed whether parenting stress mediated the relation between the ECMHC condition and behavioral outcomes. The Statistical Package for the Social Sciences (SPSS) was used to conduct all of the analyses. A macro for the bootstrap analysis was downloaded from http://www.afhayes.com/spss-sas-and-mplus-macros-and-code.html and was also conducted in SPSS.

3. Results

3.1 Correlation Analyses and Analyses of Variance

Pearson correlations were conducted for variables included in the study. Correlation matrices for the ECMHC group (pre and post) and the comparison group (time 1 and time 2) can be found in Table 1. For the ECMHC group, at both time 1 and time 2, the Parental Distress and Parent-Child Dysfunctional Interaction subscales had a medium positive correlation with Behavior Concerns and a medium negative correlation with Total Protective Factors. When parents rated more Parental Distress and Parent-Child Dysfunctional Interactions, they also rated their children as exhibiting more behavior problems and fewer protective factors. For the comparison group at time 1, similar significant correlations were found between variables; however, one difference emerged. Parental Distress and Behavior Concerns were not significantly correlated, whereas Parental Distress and Total Protective Factors were negatively correlated. This suggests that higher ratings of Parental Distress were not necessarily related to more behavior problems but were related to fewer protective factors for children within the comparison group.

Table 1. Pearson correlations among study variables for CCEP and comparison group

ECMHC Group Variable (Pre)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Parental Distress	---	.59**	.35**	-.32**												
2. Parent-Child Dysfunctional Interaction		---	.38**	-.44**												
3. Child Behavior Concerns			---	-.51**												
4. Child Total Protective Factors				---												
ECMHC Group Variable (Post)																
5. Parental Distress					---	.59**	.30**	-.33**								
6. Parent-Child Dysfunctional Interaction						---	.31**	-.45**								
7. Child Behavior Concerns							---	-.48**								
8. Child Total Protective Factors								---								
Comparison Group Variable (Pre)																
9. Parental Distress									---	.62**	.09	-.31**				
10. Parent-Child Dysfunctional Interaction										---	.25**	-.49**				
11.Child Behavior Concerns											---	-.57**				
12. Child Total Protective Factors												---				
Comparison Group Variable (Post)																
13. Parental Distress													---	.52**	.43**	-.33**
14. Parent-Child Dysfunctional Interaction														---	.37**	-.43**
15. Child Behavior Concerns															---	-.10**
16. Child Protective Factors																---

**$p \leq .01$

Additionally, point biserial correlations including the ECMHC and comparison group variables were conducted (Table 2). At pre and post, the ECMHC group had a small negative correlation with the Parental Distress and Parent-Child Dysfunctional Interaction subscales. Parent participation in the treatment group was related to lower ratings of Parental Distress and Parent-Child Dysfunctional Interactions. Interestingly, the ECMHC Group variable was not significantly correlated with child Behavior Concerns or Protective Factors. Unlike parents in the treatment group, children's participation in the treatment group was not related to fewer behavior problems and more protective factors. Parental Distress had a medium positive correlation with Behavior Concerns and medium negative correlation with Protective Factors. Parent-Child Dysfunctional Interaction also had a medium positive correlation with Behavior Problems and medium negative correlation with Protective Factors. Similar to the significant correlations discussed above, this suggests that more elevated ratings of Parental Distress and Parent-Child Dysfunctional Interactions were related to more behavior problems and fewer protective factors.

Table 2. Point Biserial correlations between treatment and comparison study variables

Variable (Pre)	1	2	3	4	5	6	7	8	9	10
1. Treatment Group (ECMHC vs. Comparison)	---	-.13*	-.16*	-.06	-.00					
2. Parental Distress		---	.61**	.30**	-.31**					
3. Parent-Child Dysfunctional Interaction			---	.35**	-.44**					
4. Behavior Concerns				---	-.52**					
5. Total Protective Factors					---					
Variable (Post)										
6. Treatment Group (ECMHC vs. Comparison)						---	-.11*	-.18**	-.04	.10
7. Parental Distress							---	.58**	.33**	-.34**
8. Parent-Child Dysfunctional Interaction								---	.32**	-.45**
9. Behavior Concerns									---	-.41**
10. Total Protective Factors										---

Independent samples *t*-test analyses were conducted to determine whether differences at time 1 between the two groups existed in terms of children's behavior and parents' stress. Behavior Concerns scores were not found to be significantly different between ECMHC (M = 65.09, SD = 7.81) and comparison (M = 66.16, SD = 7.92) groups (t = 1.02, df = 317, p > .05). Total Protective Factor scores were not found to be significantly different between ECMHC (M = 41.04, SD = 9.89) and comparison (M = 41.06, SD = 9.76) groups (t = .014, df = 317, p > .05). Furthermore, scores for Parent-Child Dysfunctional Interaction were not significantly different between ECMHC (M = 21.05, SD = 6.44) and comparison (M = 23.49, SD = 5.84) groups (t = 2.88, df = 317, p > .05). The Parental Distress scores were not significantly different between ECMHC (M = 25.80, SD = 8.57) and comparison (M = 28.39, SD = 8.21) groups (t = 2.27, df = 317, p > .05).

A mixed between-within subjects ANOVA was conducted to determine whether changes in scores were the same over time for the two different groups. Children's Behavior Concerns (F(1, 317) = 53.36, p < .01) and Total Protective Factors (F(1, 317) = 44.90, p < .01) were significantly different over time for both groups. No significant differences emerged between groups on post scores, suggesting that scores for Behavior Concerns (F(1, 317) = .35, p > .05) and Total Protective Factors (F(1, 317) = .99, p > .05) were similar. However, differences emerged for the interaction effects. No significant interaction between group and time were apparent for Behavior Concerns (F(1, 317) = .06, p > .05), whereas a significant interaction was found for Total Protective Factors (F(1, 317) = 3.89, p < .05).

A mixed between-within subjects ANOVA was conducted for the Parental Distress and Parent-Child Dysfunctional Interaction subscales. Parental Distress (F(1, 317) = 31.81, p < .01) and Parent-Child Dysfunctional Interactions (F(1, 317) = .02, p < .01) were significantly different over time for both groups. The ECMHC group experienced less distress (F(1, 317) = 5.46, p < .05) and fewer dysfunctional interactions (F(1, 317) = 11.33, p < .01) with their children at time 2. No significant interaction between group and time were apparent for either subscale, suggesting that that change in scores over time for the two different groups were similar.

3.2 Regression and Mediation Analyses

Although the preliminary point biserial correlations between the ECMHC Group condition and children's behavioral outcomes (Behavior Concerns, Total Protective Factors) were not significantly correlated, the mediation analysis was still conducted. This was justified by the mediation guidelines set forth by Shrout and Bolger (2002). They recommend moving forward with mediation analyses even if the X (ECMHC Group) → Y (children's behavioral outcomes) relation is not significant. They argue that as causal processes become more distal, the effect size may become smaller because it is more likely to be transmitted through additional links in a causal chain, affected by competing causes, or affected by random factors. It may be the case that the more proximal X → M and M → Y associations are larger than the distal X → Y association therefore the test of X → Y may be more powerful when mediation is taken into account. It is also suggested that the analyses proceed on the basis on the strength of the theoretical argument between X → Y, rather than the statistical test of X on Y.

To test mediating relationships, the SPSS macros for mediation (Hayes, 2011; Hayes, 2012; Preacher & Hayes, 2008) were utilized. The macro gave estimates of the specific indirect effects as well as of the total indirect effect. The current analysis utilized 1,000 bootstrap samples that were created from the original dataset (N = 319) by random sampling with replacement. Ninety-five percent confidence intervals (95% CI) were used to evaluate the significance and magnitude of indirect effects estimated through the bootstrap method. Based on Shrout and Bolger's (2002) suggestion, if the 95% CI for the estimates of the indirect effects based on these 1,000 indirect effect estimates does not include zero, then it can be concluded that the indirect effect is statistically significant at the .05 level.

The results of the analysis showed that the ECMHC group was associated with a negative direct effect on parental distress (β = -.11, p < .05) and parent-child dysfunctional interaction (β = -.18, p < .01). Parental Distress (β = .33, p < .001) and Parent-Child Dysfunctional Interaction (β = .32, p < .001) also had a positive direct effect on children's behavior problems. This suggests that parents in the ECMHC group experienced less parental distress and dysfunctional interactions following ECMHC. Additionally, parents with more stress had children with more behavior problems. No direct effect was found between the Treatment Group and children's behavior problems even after controlling for both Parental Distress (β = -.001, p > .05) and Parent-Child Dysfunctional Interaction (β = .02, p > .05). Participation in the treatment group did not predict fewer behavior problems for children. These effects were lower after controlling for the parenting stress subscales, compared to without controlling for them.

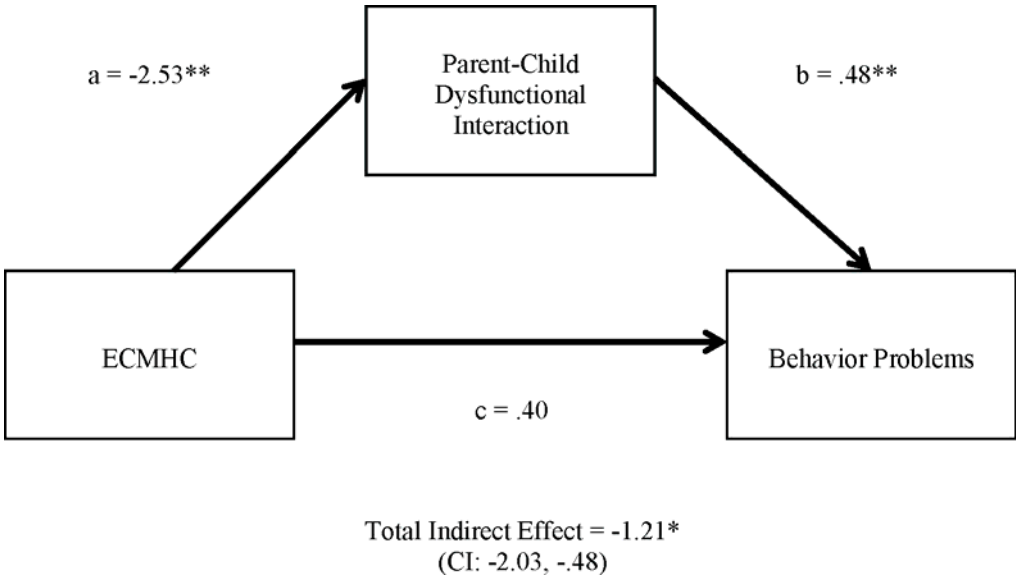

Figure 1. Significant mediation results for parent-child dysfunctional interaction and children's behavior (*p < .05, **p < .001)

For the parental distress model, the total indirect effect was not significant (CI = -.001, 0.16). In the Parent-Child Dysfunctional Interaction model, the total indirect effect was significant with the 95% bootstrap confidence interval excluding zero (CI = .001, .038) (Table 6). This model suggests that the relationship between the ECMHC group and children's behavior problems was mediated by Parent-Child Dysfunctional Interaction, but not Parental Distress (Figure 1).

In examining the indirect effects on children's total protective factors, the results showed that the ECMHC group had a negative direct effect on Parental Distress (β = -.11, p < .05) and Parent-Child Dysfunctional Interaction (β = -.18, p < .01). Parental Distress (β = -.34, p < .001) and Parent-Child Dysfunctional Interaction (β = -.45, p < .001) had a negative direct effect on children's total protective factors. Similar to the previous mediation model, the results suggest that parents in the ECMHC group experienced less parental distress and dysfunctional interactions. Additionally, parents with more stress had children with fewer protective factors. No direct effect was found between the ECMHC Group and children's total protective factors, even after controlling for both Parental Distress (β = .06, p > .05) and Parent-Child Dysfunctional Interaction (β = .02, p > .05). Participation in

the ECMHC group did not predict more protective factors for children. These effects were lower after controlling for the parenting stress subscales.

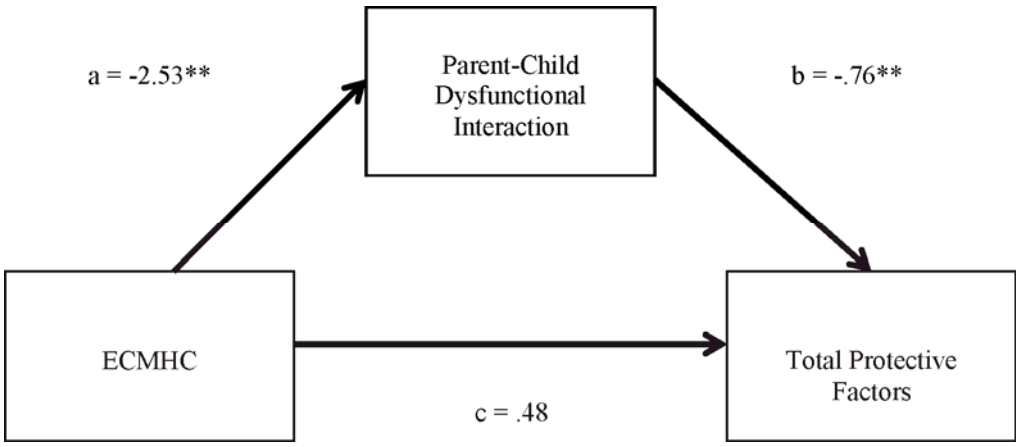

Figure 2. Significant mediation results for parent-child dysfunctional interaction and children's protective factors (*p < .05, **p < .001)

For the parental distress model, the total indirect effect was not significant. In the Parent-Child Dysfunctional Interaction model, the total indirect effect was significant with the 95% bootstrap confidence interval excluding zero (CI = -.061, -.001) (Table 4). The relationship between the ECMHC group and children's total protective factors was mediated by Parent-Child Dysfunctional Interaction (Figure 2).

4. Discussion

This is the first study to appear within the literature examining mediators of ECMHC on child behavior outcomes. Results suggested that parent ratings of dysfunctional interactions with their child played a mediating role in the relationship between ECMHC and children's behavior problems and protective factors. Parent ratings of parental distress were not found to be a mediator between ECMHC and children's behavioral outcomes. Results also suggested that parents in the ECMHC group experienced less distress and fewer dysfunctional parent-child interactions.

In the current study, parents in the ECMHC group who experienced more stress had children with more behavior problems and parents with less stress had children with more protective factors. This is consistent with Feinfield and Baker's (2004) study, which demonstrated that when parents received an intervention component focusing on parent problem solving, greater therapeutic change was evident for the child. Their results indicated that parent factors, such as attitude, stress, and parenting practices played a role in the relationship between the treatment (which consisted of child- and parent-focused components) and children's behavioral outcomes. Their study demonstrated that parents' attitude, measured by negative perceptions of the parent-child relationship and parenting efficacy, and stress, as measured by the Child Stress subscale of the PSI, mediated the effects of intervention on children's behavior problems. When parents experienced fewer negative perceptions about their children and reported less stress caused by their children, children's behavior was likely to improve.

Research has suggested that a contributing factor to parenting stress is parents' perception of access to resources (Deater-Deckard, 1998). Parenting resources include knowledge and competence of parenting tasks. Thus, parents who have less knowledge about child development and child-rearing, lower feelings of parenting competence, fewer emotional resources, and fewer instrumental resources are likely to experience more stress. Given that ECMHC in the current study provided parents with various resources, including knowledge, skills, and support by a consultant, it could be that parents in the ECMHC group experienced a reduction in stress as a result of improved access to practical support, greater understanding of their children's behaviors, and guidance on effective parenting techniques. In turn, reductions in stress may have led to an increased use of positive techniques and helped to improve their child's behavior following ECMHC. Additionally, emotional support provided by the consultant to the parent may also have contributed to stress reduction since research has shown positive links between these factors (Kirk, 2003).

Parenting stress influences children's behavior problems as well as protective factors. Literature has suggested that parenting stress affects parenting behavior and parents' feelings toward their child (Deater-Deckard, 1998). Therefore, parents with less stress may have more positive feelings toward their children and more positive interactions with their children. Opposite to the coercive parenting cycle (Patterson, 1982), positive interactions toward the child may elicit more positive behaviors from the child, thus resulting in parents' perception of improved behavior. Children may also observe these positive parental behaviors and imitate this type of behavior as well as learn how to solve problems using positive, rather than negative strategies. Parents using consistent, positive parenting techniques may be more likely to nurture the development of protective factors, such as attachment. Parents with less stress may also interact with their child more frequently, thus allowing the child more opportunities to exercise initiative and self-control behaviors. These positive behaviors elicit more positive responses from parents and others with whom they interact, thus reinforcing children's use of positive behaviors.

It is interesting that the results of the current study found that parent-child dysfunctional interactions were a significant mediator, but not parental distress. The Parent-Child Dysfunctional Interaction subscale evaluated the parents' perception of their interactions with their child and measured negative perceptions that a parent has about their child, such as (a) the child does not meet their expectations or (b) the interactions with the child are not reinforcing. Given that this subscale assessed the parents' perceptions of interactions with their child, it may be a more direct measure of their actual behavior with their child compared to the parental distress subscale. For example, if parents rated their perceptions of interactions with their child as negative or endorsed items that suggest negative parental behaviors toward their child, this may be a better predictor of their actual behavior. Negative interactions may have a greater impact on their child's behavior than parents' perceptions of child-rearing competence, social support, and stresses associated with the restrictions placed on other life roles.

It may also be the case that the Parental Distress subscale is more closely related to parental emotional health (Haskett, Ahern, Ward, & Allaire, 2006). In Haskett and colleagues' (2006) analysis of the psychometric properties of the PSF-SF and its subscales, they found that the Parental Distress subscale (which they referred to as Personal Distress in their article), was strongly related to parents' emotional health. Emotional health was measured by the Symptom Checklist-90-Revised, which measures a broad range of psychological problems. The analysis also revealed that the Parent-Child Dysfunctional Interaction subscale, combined with some items from the Difficult Child subscale, created a subscale they referred to as Child Rearing Stress. This was strongly related to children's behavior problems and parental behavior. The results of Haskett and colleagues' (2006) study suggest that these subscales measure two different types of stress. Considering this in regards to the current study, the Parent-Child Dysfunctional Interaction subscale may be measuring actual parent behavior more closely. Parental Distress may not play a mediating role if it is experienced in isolation and without negative parenting behaviors.

Furthermore, the Parental Distress subscale has been found to be more strongly associated with negative life events than the Parent-Child Dysfunctional Interaction (Whiteside-Mansell et al., 2007). This suggests that this subscale may be less related to only stress as it relates to parenting and may be more encompassing of other life stressors. Additionally, the study found support for the decomposition of the Parent-Child Dysfunctional Interaction subscale into two additional subscales, Dyadic Interaction and Perception of Child. The Dyadic Interaction score was found to be associated with aggressive child behavior, therefore providing support that the Parent-Child Dysfunctional Interaction subscale as a whole may be more strongly associated with child behavior.

4.1 Limitations and Future Directions

While a comparison group was included in the current study, an important limitation of the current study was the absence of a control group and lack of random assignment. As with other studies that examine children across time, it is not possible to rule out maturational effects when examining changes in children's behavior. As children grow during the preschool period, research has suggested that core executive function components develop (Garon, Bryson, & Smith, 2008). Children improving in these areas would likely demonstrate improvements in behaviors that parents or providers rated as problematic. It would be important to investigate why and how children and parents improved, even if they are not participating in an intervention. It is important to ensure that treatment improves children's behavior beyond the natural maturational effects they are experiencing in order to best serve children and utilize resources effectively.

It is unknown whether parents and children who chose to participate in the ECMHC program were different from parents and children that had similar behavior difficulties who did not access services, and whether families in the comparison group were different from families who chose not to. Although this is the case, the CCEP

program had the potential to impact participants in the ECMHC group through the services that it provided (e.g., education, skill building, consultant support) therefore differentiating them from the comparison group, despite its limitations and lack of control for maturational effects.

One of the advantages of the type of consultation approach used in the current study is its flexibility in service delivery to meet the needs of each individual family. Given that this type of ECMHC program was not a manualized consultation approach it is difficult to know which services were implemented and which were effective. These limitations are consistent with other ECMHC studies in the literature (Gilliam, 2007; Perry et al., 2010).

5. Conclusions

High parenting stress levels have been associated with more behavior problems and fewer protective factors in children (e.g., Anthony et al., 2005; Bender & Carlson, 2013) and the current study further supports this link. Given this, it is important to target parent behavior in treatment by helping parents improve their own parenting behavior and interactions with their child. While many other factors have also been found to be associated with behavior problems (e.g., violent communities, low SES), parent-child interactions may be one factor that is more malleable and responsive to change in intervention services, when compared to other factors such as a the type of community one resides in or the amount of financial resources a family has available (Kazdin & Whitley, 2003).

The findings of the current study, as well as previous studies, have suggested parents' negative perceptions of the child and the child's behavior also mediate children's outcomes following treatment. Therefore, in addition to targeting parent-child interactions in intervention, it would be important to help parents alter their negative perceptions of the child through cognitive techniques such as reframing. Evaluating negative perceptions of the child may also serve as a preventative measure, given that this may be a precursor to negative interactions with the child. Additionally, parenting stress literature has suggested that an educational component in treatment for children's behavior problems helps reduce stress experienced by parents. Education about child development, the nature of behavior problems, reasonable expectations for a young child, and becoming more sensitive to a child's needs, may also help reduce negative perceptions of the child and the child's behavior.

It is important to continue investigating the differences between parent-child dysfunctional interactions and parental distress. While both of these constructs have been found to be predictors of children's behavioral problems, only parent-child dysfunctional interactions were found in this study to mediate children's behavioral outcomes. In addition to the current study's findings, previous research has also suggested that these domains of parenting stress may be different, which may affect children differently and require different types of interventions. Improved understanding of these conceptualizations of parenting stress may help to effectively target the difficulties parents face when parenting. Interventions utilized in ECMHC that accurately target and provide parents with skills and strategies that directly relate to the difficulties they are experiencing are essential to a refinement of services and improved behavioral outcomes.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Relation of Metacognitive Monitoring and Control Processes across the Life-Span

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Received: September 26, 2016 Accepted: October 20, 2016 Online Published: December 14, 2016

doi:10.5539/jedp.v7n1p86 URL: http://dx.doi.org/10.5539/jedp.v7n1p86

Abstract

The two studies presented here were conducted to explore the relationship between metacognitive monitoring and control processes across the life-span. Monitoring processes often guide control processes (goal-oriented learning), yet more recent work also documents that control processes can also be based on feedback from monitoring processes (data-oriented learning). Study 1 provided first evidence for data-oriented learning in older adults and in a life-span perspective. Participants of four age groups (third-grade children, adolescents, younger and older adults) were able to adapt their Judgments-Of-Learning (JOLs) based on their Study Time (ST). Effects were most pronounced for younger and older adults. Study 2 investigated the flexible interplay between goal- and data-oriented learning within one learning task for the first time in older adults and from a life-span perspective. Adolescents and younger adults were able to switch between models while elementary children and older adults hat greater difficulties to do so. Possible causes for developmental trends are discussed. In sum, the integration of both goal- and data-oriented learning within one task seems to be a complex process.

Keywords: judgements-of-learning, life-span, metacognition, metacognitive control, metacognitive monitoring, study time

1. Introduction

Metacognitive processes that occur during learning have been studied extensively in children and adults (Schneider & Löffler, 2016; Son & Metcalfe, 2000). Efficient monitoring and control processes are assumed to increase memory performance and the use of information concerning the on-going learning process can (implicitly) help to structure one's learning behavior. Metacognitive processes are therefore relevant during everyday life, e.g., when one has to decide about whether one has memorized the departure time of one's train, but even more so in formal learning situations. Considering the increasing importance of life-long learning in recent years, a life-span perspective is important yet still rare in the metacognitive monitoring and control literature.

According to Nelson and Narens' (1990) seminal model of procedural metamemory, monitoring encompasses subjective prospective and retrospective judgments at different stages of the learning process. Of special interest for the following two studies are Judgments-Of-Learning (JOLs) which represent subjective ratings about the degree to which encoded information can be potentially recalled during a future memory test (Nelson & Narens, 1990). Control processes on the other hand concern the initiation, continuation or termination of actions during the learning process. In the following studies control was operationalized in terms of duration of Study Time (ST).

1.1 Monitoring Affects Control-Hypotheses

Maybe the most common assumption in metacognitive research is that monitoring processes influence learning behaviors, especially the selection of to-be-studied items and the allocation of study time (see, Son & Metcalfe, 2000, for a review). Effective item selection and allocation of study time should in turn lead to better memory performance. The idea that monitoring influences control processes can be derived from Nelson and Narens' model of metacognitive monitoring and control (Nelson & Narens, 1994). A number of studies were able to establish this *monitoring affects control-hypotheses* (MC-model; Nelson & Leonesio, 1988) for children, younger and older adults. For example, in the classic paradigm "allocation of study time" it was reported how much attention and time learners give to learning material. For younger adults there is ample evidence that participants

study easy material longer than material they judged as difficult (Son & Metcalfe, 2000; Thiede & Dunlosky, 1999). From a developmental perspective studies indicate that this competence develops over the elementary school years. Dufresne and Kobasigawa (1989) were able to show age-related differences in the spontaneous allocation of ST. In a paired-associate learning task 10- and 12-year-old children spent more time on unrelated than related item-pairs. 6- and 8-year olds spent an equal amount of time on related and unrelated word-pairs although they were able to distinguish easy and hard pairs. Kobasigawa and Metcalf-Haggert (1993) demonstrated that even younger children in first and third grade are able to use monitoring information to regulate their ST if differences in item-difficulty are especially salient.

In sum, empirical evidence suggests that the relation between monitoring and control gets stronger over the elementary school years. Although even first grade children are able to use monitoring information to deploy their ST, regulation processes are more in accordance with JOLs for older children (Lockl & Schneider, 2002, 2003).

Older adults, like young children, seem to have accurate monitoring but show a weaker relationship between monitoring and control processes (e.g., ST) than younger adults (Dunlosky & Connor, 1997; Froger, Sacher, Gaudouen, Isingrini, & Taconnat, 2011). A possible explanation for this fact is that older adults fail to spontaneously use effective strategies as often as younger adults (Dunlosky & Connor, 1997). This idea is supported by the fact that environmental support at encoding, like an intensive strategy instruction, helps older adults to allocate their ST more efficiently (Froger, Bouazzaoui, Isingrini, & Taconnat, 2012). Also under other favorable conditions, e.g., the possibility of prelearning all word-pairs prior to the actual learning experiment, older adults seem to be able to regulate their ST on the basis of monitoring processes as effectively as younger adults (Hines, Touron, & Hertzog, 2012).

In sum, a number of studies support the idea that self-regulated learning processes are based on monitoring processes. That is learners monitor item difficulty and accordingly allocate their ST. Empirical evidence suggests that this relation grows stronger over the elementary school years, has its peak in young adulthood and declines again in older adulthood. Yet, learners across the life-span seem to act according to the monitoring affects control-hypothesis (MC-model).

1.2 Control Affects Monitoring-Model

More recent studies also detected the reverse relation: monitoring processes may also follow control processes and can be modulated consequently (Control affects monitoring-(CM) model). Koriat, Ma'ayan and Nussinson (2006) showed that in self-paced learning processes young adults used ST as a cue to infer the height of the subsequent JOLs. In these settings, ST provides information of the item difficulty or of the necessary effort to memorize an item. Accordingly, Koriat et al. (2006) referred to ST in these cases as having a "data-oriented function". That is, whereas in learning processes evocating the MC-model, ST is allocated in order to reach a specific goal ("goal-oriented learning"), in CM-processes it provides data for the monitoring procedure. This is in line with the cue-utilization view (Koriat, 1997), which postulates that JOLs are based on intrinsic, extrinsic, and mnemonic cues predictive for recall. The data-oriented function of ST is considered as an unconsciously applied mnemonic cue indicating the extent to which an item has been mastered. In other words, participants adopt an "easily learned easily remembered"-heuristic (ELER-heuristic) according to which recall performance depends on the effort spent to memorize an item: easily learned items are more likely to be remembered than items that are memorized with more effort (Koriat, Ackerman, Lockl, & Schneider, 2009a, 2009b). Thus, contrary to the predominant MC-model, in CM-processes JOLs and recall performance decrease with increasing ST. This pattern has been repeatedly found in young adults (Koriat et al., 2006; Koriat & Nussinson, 2009; Koriat, Nussinson, & Ackerman, 2014).

So far, data about the developmental course of the CM-model are rather scarce. For children from older elementary school age on, Koriat and collegues (2009a) found evidence that JOLs decreased with the amount of ST spent on an item when given no time limit. However, this relationship could not be confirmed in first and second graders. In terms of recall performance, though, in all age groups, recall increased with decreasing ST, indicating that the invested amount of effort represents a valid cue. A follow-up study by the same authors (Koriat et al., 2009b) contrasting second and forth graders' performance in a setting which provided an unlimited number of trials to acquisition found evidence that even the younger participants were able to adopt the ELER-heuristic when items varied sufficiently in intrinsic difficulty. Hoffmann-Biencourt et al. (2010) also confirmed this memorizing effort-heuristic with a similar self-paced learning task but different learning materials (picture pairs instead of word pairs) in a sample of children from grades 1 to 8. Yet, for first time, this study also documented a developmental trend in that it found a weaker relationship between ST and JOLs for younger children. A consistent use of the memorizing effort heuristic was detected for fifth- to eighth-graders, whereas for first- to fourth-graders

a weaker association between ST and JOLs was found. To our knowledge no study has explored the CM-model in older adults so far.

1.3 Interplay of MC- and CM-Model

The MC- and CM-models are not considered mutually exclusive but seem to occur according to situational specifications and sometimes even within the same learning task (Koriat, Ackerman, Adiv, Lockl, & Schneider, 2014). According to Koriat and colleagues, the MC-model should apply for goal-oriented learning, that is, when learners have a particular motivation to reach a specific goal. This goal may be emphasized by incentives or rewards. The CM-model should apply if learning is self-regulated and data-oriented: learning experiences with difficult items lead to the conclusion that even with additional learning effort low recall rates are to be expected. Therefore, JOLs decrease with increasing ST assuming that ease of encoding is a diagnostic cue of recall performance. A recent study by Koriat et al. (2014) documented that adolescents and young adults are able to apply data-oriented and goal-oriented regulation differentially within the same paired-associate learning task. Fifth- and sixth-graders have difficulty to do so although they are sensitive to goal-oriented and data-oriented regulation when they occur in different tasks. In older adults, the question of application of data-oriented and goal-oriented self-regulation within the same task has not been addressed yet.

In sum, these findings indicate that important developmental changes in the interplay between metacognitive monitoring and control processes occur during middle-school years. So far, it seems that under favorable circumstances children as young as seven years old are able to infer the size of JOLs from the corresponding ST. A flexible alternation between both MC- and CM-processes does not seem to develop before early adolescence. For older adults the CM-model has not yet been explored at all. Yet, considering the importance of effective life-long learning, a better understanding of learning processes in this age group is necessary.

1.4 The Present Studies

At present, more research is needed to clarify the relationship of metacognitive monitoring and control processes. Especially the CM-model has not been investigated for older adults and empirical studies involving children are scarce. Moreover, the ability to employ both the MC- and the CM-model within the same learning task has yet to be explored more thoroughly and for a broader age range including elementary children and older adults. Given the importance of metacognitive monitoring and control processes throughout life, the following studies were designed to fill these gaps in the literature. A first aim was to explore developmental trends in the CM-model for the first time in a life-span design (Study 1) and a second goal was to investigate the interplay of the MC- and CM-models within a life-span sample (Study 2).

In study 1, participants of four age groups (early school age to later adulthood) were asked to study word pairs in a version of Koriat and colleagues (2009a) which documented a CM-model. Specifically, participants studied word-pairs in a self-regulated pace, then gave JOLs and had to recall the items at a later memory test. The task was chosen because of its suitability for a wide range of ages and because it allows a very close comparison with existing data. JOLs, ST and recall were recorded.

Previous research suggests that from the middle of the elementary school years on, children begin to successfully use the heuristic, the longer they study an item, the less likely they are to recall it, that is a CM-model (Koriat et al., 2009a; Hoffmann-Biencourt et al., 2010). Therefore, third-grade children were chosen as the youngest age group. Additionally, third-grade children possess sufficient reading skills to master the word-pair stimuli used in most previous studies on data-oriented learning. The second age group consisted of adolescents as evidence for the CM-model gets stronger from the beginning of the elementary school years to adulthood (Hoffmann-Biencourt et al., 2010) and in this period of life important changes in the flexible interplay between monitoring and control seem to occur (Koriat et al., 2014). Young adults served as a comparison group as metacognitive abilities should reach their peak at this age. Older adults were included because the literature so far lacks any empirical data on the CM-model in this age group. Additionally, our sample for the first time allows a developmental overview of metacognitive monitoring and control abilities over a very broad age range. Thus, it enables a direct contrast of metacognitive performance in the developmental course.

Concerning age effects, we expected that third-grade children are able to use information on ST for their JOLs, yet there should still be room for improvement. Adolescents should show clear use of data-oriented learning. Young adults are expected to easily use the CM-model and show the strongest association of ST and JOLs. Concerning older adults, we expected a weaker relationship between control and monitoring processes than for young adults as studies on metacognitive control predominantly show weaker performance of older adults compared to younger

adults due to difficulties in executive functions (Pansky, Goldsmith, Koriat, & Perlmann-Avnion, 2009; Souchay & Isingrini, 2004). This fact is also reflected in the MC-model which shows slight deficits in older adults. The flexible use of valid cues seems to be more difficult for older than for younger adults.

2. Study 1

2.1 Method

2.1.1 Participants

A total of 112 (55 male, 57 female) participants of four age groups (28 children in 3rd grade, 28 adolescents in 7th and 8th grade, 28 younger and 28 older adults) took part in our study. Participants came predominantly from a middle class socioeconomic background. They were recruited via contacting their schools directly and via newspaper and internet advertisements. Children and adolescents received small gifts, the other participants got 10-Euro vouchers or were paid in cash. Participants' mean ages were 9.00 (*SD* = 0.38) for the children, 13.25 (*SD* = 1.04) for the adolescents, 22.00 (*SD* = 2.29) for the younger adults and 68.39 (*SD* = 5.63) for the older adults.

2.1.2 Materials

The learning items consisted of disyllabic pairs of concrete German nouns. To vary the difficulty, one half of the pairs were semantically associated (e.g., "beetle-spider"), half of the pairs were not related (e.g., "sock-digger"). The item list for children and older adults consisted of 24 word pairs; adolescents were asked to study 36 pairs, younger adults had 48 pairs. Four practice pairs not included in the analysis preceded the experiment. The different length of item lists were chosen in order to adjust the basic recall rates between the age groups. The order of presentation was randomized among the participants.

2.1.3 Procedure

The consent of the parents and of the school was obtained before beginning the study with underage participants. Participants were tested individually in quiet rooms in the school or in the laboratory. Participants first were asked to memorize the item pairs presented on a computer screen at their own pace. They were instructed to study each item pair as long as they needed to recall it in about 20 minutes.

In the JOL phase, each left noun of the item pair was presented on the screen in the same order as in the learning phase. Participants were asked to indicate the likelihood of remembering the target in about 30 minutes. JOLs were rated on a thermometer scale from 0 (very cold = very unsure) to 100 (very hot = very sure) successfully used in previous studies (Koriat et al., 2009b; Koriat & Shitzer-Reichert, 2002). The scale was introduced by underlining the similarity to the well-known "hit-the-pot-game". Thus, the closer one is to the "pot", that is, the required word pair, the "hotter" the "temperature", that is, the more confident the participant is the higher he/she positions the slider on the JOL-scale. After a short interval, the stimulus of each pair was presented and participants were asked to indicate the missing word. They were requested to guess an answer if they could not think of the appropriate response.

2.2 Results

We start by presenting memory performance in terms of the percentage of correctly recalled items, mean JOLs and ST as a function of age group and item difficulty (related vs unrelated items). Then we will analyse the effects of ST on JOLs as evidence for the CM-process.

Preliminary analyses did not reveal any systematic effects of gender. The data was therefore collapsed across this variable. As a post hoc follow-up on main effects, Scheffé tests were used. The level of significance was set to $p < 0.05$.

Recall. The first column of Table 1 shows the percentage of correct responses. An ANOVA with recall as dependent variable revealed a significant main effect of age group ($F(3,108) = 13.94$; $p < .001$; $\eta^2 = .28$). Post hoc tests clarified that younger adults (79.54%) outperformed children (45.83%), older adults (52.42%; both *p*'s < .001) and adolescents (61.11%; $p < .05$). Furthermore, a main effect of item difficulty was found ($F(1,108) = 278.82$; $p < .001$; $\eta^2 = .72$) which was modified by the interaction between item difficulty and age group ($F(3,108) = 13.67$; $p < .001$; $\eta^2 = .28$). Separate t-tests for each age group revealed that in all age groups, recall was greater for easy items than for difficult ones (all *p*'s < .001). Still, the effect sizes indicated that children (Cohen's $d = 1.93$), adolescents ($d = 1.00$), and older ($d = 1.44$) adults showed a greater difference in recall between related and unrelated items than the younger adults ($d = 0.67$; cf., Table 1).

Table 1. Recall in %, ST (s) and mean JOLs as a function of age group and item difficulty in Study 1

Age group		Recall (%)	Study time (s)	JOLs
Children				
	Related	65.8 (21.0)	8.1 (5.2)	71.8 (14.9)
	Unrelated	25.9 (20.3)	9.9 (7.5)	48.9 (19.4)
	Overall	45.8 (18.5)	9.0 (6.3)	60.3 (15.5)
Adolescents				
	Related	72.4 (15.6)	8.7 (7.7)	73.7 (13.3)
	Unrelated	49.8 (28.0)	10.5 (8.8)	61.0 (18.3)
	Overall	61.1 (20.7)	9.6 (8.1)	67.3 (14.7)
Younger Adults				
	Related	86.3 (15.9)	9.9 (9.0)	81.6 (12.1)
	Unrelated	72.8 (23.6)	13.9 (9.8)	69.4 (13.7)
	Overall	79.5 (18.9)	11.9 (9.3)	75.5 (11.6)
Older Adults				
	Related	71.4 (24.3)	7.4 (4.7)	75.6 (16.6)
	Unrelated	33.4 (28.5)	10.5 (6.1)	48.6 (25.7)
	Overall	52.5 (24.2)	8.9 (5.2)	62.1 (18.3)

Note. Standard deviations are in parentheses.

Study time. An ANOVA with mean ST as a dependent variable yielded a significant main effect of item difficulty ($F(1,108) = 90.48$; $p < .001$; $\eta^2 = .46$), with hard items (11.20 s) being studied more extensively than easy ones (8.54 s). This effect was modified by the interaction between item difficulty and age group ($F(3,108) = 3.67$; $p < .05$; $\eta^2 = .09$). T-tests revealed that the difference in mean ST between related and unrelated items was highest for younger and older adults (both p's < .001), followed by the children and the adolescents (both p's < .01; see Table 1).

Judgments of Learning. In an ANOVA with mean JOLs as a dependent variable a significant main effect of age group was found ($F(3,108) = 5.63$; $p < .001$; $\eta^2 = .14$) with post hoc tests indicating that younger adults (75.50) gave higher mean JOLs than children (60.34; $p < .01$) and older adults (62.07; $p < .05$). Furthermore, a significant main effect of item difficulty ($F(1,108) = 137.42$; $p < .001$; $\eta^2 = .56$) and a significant interaction ($F(3,108) = 5.37$; $p < .01$; $\eta^2 = .13$) were found. The interaction reflects the fact that the difference in mean JOLs between related and unrelated items was highest in children ($d = 1.34$) and older adults ($d = 1.23$) as compared to adolescents ($d = 0.80$) and younger adults ($d = 0.94$; all p's < .001 in t-tests; see Table 1).

Table 2. Mean within-person JOL-ST pearson and ST-recall Gamma correlation as a function of age group in Study 1

Age group	Pearson-correlation JOL-ST	Gamma-correlation ST-recall
Children	-.05 (.29)	-.13 (.29)*
Adolescents	-.04 (.18)	-.11 (.27)*
Younger Adults	-.15 (.22)**	-.21 (.27)**
Older Adults	-.11 (.24)*	-.34 (.32)***

Note. Standard deviations are in parentheses. * p < .05; ** p < .01; *** p < .001.

Cue utilization: Memorizing effort as a cue for JOLs. Most importantly we aimed to examine the relationship between ST and JOLs. For that purpose, we proceeded in analogy with previous work (Hoffmann-Biencourt et al., 2010; Koriat et al., 2009a, 2009b) and calculated Pearson-correlations between ST and JOL for each participant. A negative correlation indicates that shorter studied items received higher JOLs and thus supports the CM-model. The averaged correlations for each age group are depicted in Table 2. For the younger ($p < .01$) and older adults ($p < .05$) correlations were different from zero. An ANOVA with age group as independent variable revealed no significant main effect. In order to substantiate these results, a second procedure adopted from Koriat et al. (2006, 2009a, 2009b) was used. Hence, for each participant JOLs were divided in those above and below the individual median of ST (cf., Figure 1). Mean JOLs above and below this median were calculated and entered in an ANOVA with age group and ST (below and above median) as a dependent variable. A significant main effect of age group ($F(3,108) = 5.54$; $p < .01$; $\eta^2 = .13$) and a significant main effect of ST ($F(3,108) = 21.24$; $p < .001$; $\eta^2 = .16$) occurred. The post-hoc test revealed that younger adults gave higher mean JOLs than children and older adults (s. above). Besides, participants gave higher JOLs for items below the median (69.41) than for items above the median (63.11).

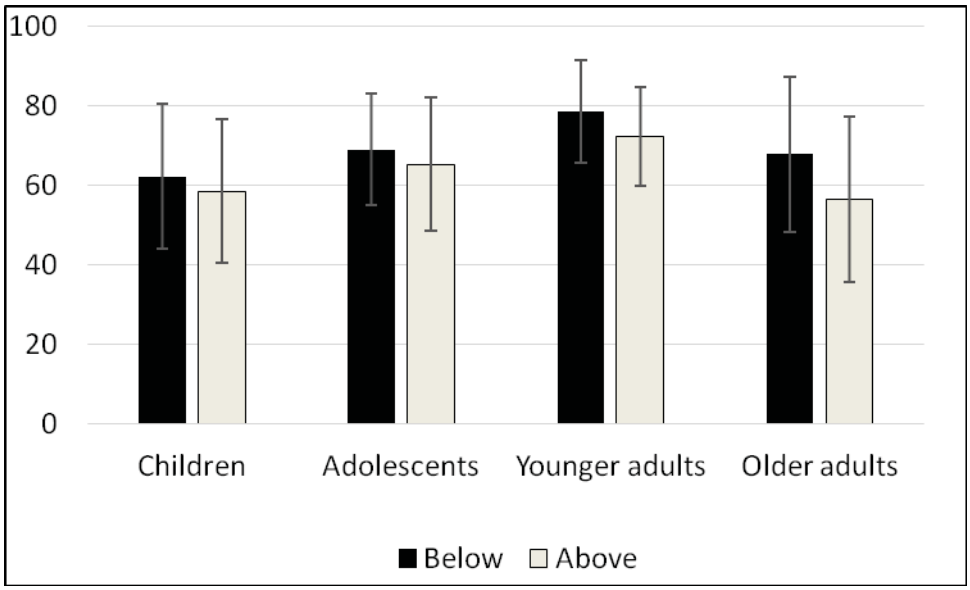

Figure 1. Mean JOLs for below-median and above-median ST as a function of age group in Study 1

Cue validity: *The validity of ST as a predictor of recall*. In order to analyse whether ST predicted later recall, we again drew on existing work by Hoffmann et al. (2010; cf., also Koriat et al., 2009a, 2009b) and calculated Goodman-Kruskal gamma-correlations between ST and recall for each participant. Mean correlations for each age group are depicted in Table 2. All correlations were different from zero ($p < .05$ for children and adolescents; $p < .01$ for younger adults; $p < .001$ for older adults). Shorter ST came along with greater recall. An ANOVA with age group as independent variable revealed a significant main effect of age group ($F(3,108) = 3.50$; $p < .05$; $\eta^2 = .09$). Post hoc tests showed a significant difference between older adults' (-.34) and adolescents (-.11) mean correlations. As a second step, for each participant items were split into those with below and those with above median ST. An ANOVA with age group and ST (below vs. above median ST) as independent and recall as dependent variable was conducted and revealed a significant main effect of a age group ($F(3,108) = 13.77$; $p < .001$; $\eta^2 = .28$), a significant main effect of ST ($F(1,108) = 36.93$; $p < .001$; $\eta^2 = .25$) and a significant interaction between both ($F(3,108) = 4.19$; $p < .01$; $\eta^2 = .10$). The main effect of age group on recall has been analysed with post hoc tests above. The main effect of ST indicates that overall, recall was higher for items below (.65) than above (.54) median ST. T-tests indicated significantly higher recall for items with shorter ST in contrast to items with longer ST for the older age groups (adolescents: $p < .05$; younger and older adults: p's $< .001$), but not for children (cf., Figure 2).

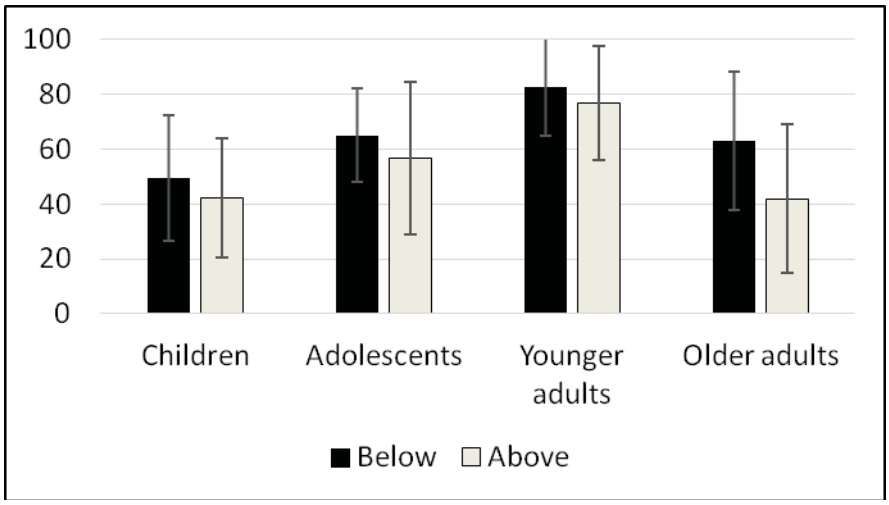

Figure 2. Mean recall in % for below-median and above-median ST as a function of age group in Study 1

2.3 Discussion

The present study aimed at exploring the relationship between metacognitive monitoring and control skills in a broad age range. In particular, we focused on finding evidence for the data-oriented CM-model in a life-span sample. This was achieved by investigating the relationship between ST and size of JOLs. We postulated that the CM-model should be detectable in all age groups but be especially salient in younger adults. An important innovative aspect of our study was its life-span perspective in that four age groups (children in third-grade, adolescents, younger and older adults) were included in the sample. To our knowledge, this study tested data-oriented learning in older adults for the first time.

First, the results show that the experimental conditions operated as expected. We largely managed to balance out baseline difficulty across age groups and experimental conditions with the exception of young adults outperforming the other age groups. Recall rates for related items ranged from .66 to .86. For unrelated items children, adolescents and older adults showed greater difficulty than younger adults, yet in all age groups recall was greater for easy than for difficult items. Additionally, in accordance with the literature adequate metacognitive monitoring performance could be depicted from third grade to older adulthood (Dunlosky & Metcalfe, 2009; Schneider & Löffler, 2016).

In accord with our hypothesis, we found evidence for data-oriented learning in all age groups but also developmental trends. Accordingly, items with higher ST received lower JOLs than items with lower ST in all age groups. This conclusion was substantiated by the results for Pearson correlations between ST and JOLs that took into account the full range of STs for each participant. This analysis revealed evidence in favor of the CM-model for younger and older adults, while results for children and adolescents only showed a tendency towards this direction. Our findings are in accordance with existing data which documents use of the CM-model from third grade on and an increasing association between JOLs and ST until young adulthood (Hoffmann-Biencourt et al., 2010). Yet, the expected differences between third-graders and adolescents could not be detected in Study 1. One possible reason might be that in contrast to existing experiments (cf., Hoffmann-Biencourt et al., 2010; Koriat et al., 2009a) in Study 1 the learning task for adolescents was more challenging than that for third-graders. Possibly, the higher task demands resulted in lower self-regulation performance that were closer to elementary school children's abilities (cf., Schunk & Zimmermann, 1998). As expected the association between ST and JOLs was weaker for older than for younger adults. This might reflect difficulties of older adults in executive functions which makes it more difficult for them to use control processes as a cue for monitoring processes (Pansky et al., 2009).

Additionally, it was analyzed how valid memorizing effort was as a predictor for recall, that is if ST has diagnostic value for JOLs. Gamma-correlations between ST and recall revealed that this is the case for all age groups and shorter ST was associated with greater recall. This effect was most pronounced for older adults. The validity of the memorizing effort heuristic was also reflected when comparing recall for above and below median STs. For adolescents, younger and older adults recall performance increased with shorter ST indicating that the invested effort serves as a valid cue for recall performance. Accordingly, ST seems to gain importance for recall

performance with increasing age. Generally, correlations between ST and recall were stronger than those between ST and JOLs, indicating that the validity of ST as a diagnostic cue can be found earlier in life than its use as a cue for the size of monitoring judgements.

In sum, this study for the first time provided evidence for data-oriented processing according to the CM-model in older adults and in a life-span sample. Younger and older adults responded most to the monitoring function of ST. Yet, there is still room for improvement in self-regulation and subsequent monitoring, especially in the two youngest age groups.

Overall, Study 1 added to the literature by showing within one experimental design that participants from middle elementary school age to older adulthood are able to make use of the CM-model. In everyday learning, both the MC- and the CM-model often are probably at play within the same learning task (Koriat et al., 2006). Yet, the literature so far shows only few studies investigating this phenomenon. In order to study the flexible alteration between the MC- and the CM-model within one task goal-oriented learning can be experimentally emphasized by varying the incentive value of different items while data-oriented learning can be operationalized by manipulating item difficulty at the same time. This task design was chosen for Study 2.

3. Study 2

3.1 Introduction

Koriat et al. (2006) showed evidence for goal- and data-oriented learning within one task in young adults: participants gave higher JOLs for items with lower ST if items were of identical incentive value (data-oriented learning) but allocated more ST to items with higher value than with lower value (goal-oriented learning). From a developmental perspective, the interplay of the CM- and MC-model has only been studied for adolescents. To our knowledge, no data exists for elementary school children and older adults. In the only existing study including adolescents, fifth and sixth graders were not able to switch between data- and goal-oriented learning in a pair-associate task; only adolescents in 9^{th} grade were able to do so (Koriat et al., 2014). In fact, younger participants in this study relied more on item difficulty than on incentive value of word pairs, indicating that the CM-model had a greater impact on learning behavior than the MC-model. Although even 6-year-olds are able to control their learning behavior according to item value (Castel, Lee, Humphreys, & Moore, 2011), this seems to be more difficult when item difficulty greatly varies between item pairs. This might be due to the improvement in executive functions during adolescents (Diamond, 2002).

For older adults, Study 1 demonstrated for the first time that they are able to use ST as a cue for JOLs. Yet, clarification is needed for the question whether older adults can flexibly switch between data- and goal-oriented learning within one task. Generally, older adults are able to allocate ST according to the incentive value of items and seem to do so even more than younger adults (Castel, Benjamin, Craik, & Watkins, 2002). Price, Hertzog and Dunlosky (2010) manipulated both incentive value and difficulty of items within one learning task. Here, older adults relied more on item difficulty than on incentive value. This can be explained by the fact that older adults have lower learning goals than younger adults and therefore choose more difficult items independently of their incentive value with low probability (cf., agenda-based-regulation model, Ariel, Dunlosky, & Bailey, 2009). Accordingly, one can expect that for older adults, item difficulty will be a more important cue for ST than incentive value when given the goal to memorize as many word pairs as possible (Price et al., 2010).

We anticipated that both elementary school children and older adults have more difficulties to switch between data- and goal-oriented learning within one task than adolescents and younger adults. For both children and older adults, item-difficulty should be the most salient cue. Thus data-oriented learning should be the more easily detectable than goal-oriented learning in these age groups. In sum, Study 2 aimed to explore the interplay of the MC- and the CM-model within one learning task over a life-time sample for the first time.

3.2 Method

3.2.1 Participants

Again, N = 112 (53 male, 59 female) participants of the same four age groups (n = 28 in each group) and background as in Study 1 took part in the study. Recruitment and recompenses were identical to those in the previous study. Participants' mean ages were 8.14 (SD = 0.36) for the children, 13.07 (SD = 0.81) for the adolescents, 21.89 (SD = 2.59) for the younger adults and 67.18 (SD = 4.78) for the older adults.

3.2.2 Materials and Procedure

The learning items were identical to those in Study 1 with the exception that 12 item pairs were added to younger adults' list in order to further balance baseline differences in memory performance between the age groups. The procedure only differed in one aspect from Study 1: in the learning phase, 50% of the items (25% related and 25% unrelated) were marked with a big star containing a "5"; the other 50% of the items were marked with a smaller star containing a "1". Participants were instructed that they should memorize the items in order to collect as many points as possible. Each correct answer would provide them 1 or 5 point according to the star matched with the item. They were told that they would receive small additional gifts (children and adolescents) or a monetary reward (adults) according to their memory performance to emphasize the importance of the incentive. The JOL- and the recall-phase were identical to Study 1. At the end, the participants were asked to indicate on a 7-point-scale whether it was important to them to achieve as many points as possible (1: "not important at all"; 7: "very important"). In addition, children and adolescents were asked how much they liked the reward (1: "not at all"; 7: "very much").

3.3 Results

We start by presenting memory performance in terms of the percentage of correctly recalled items, mean ST and JOLs as a function of age group, item difficulty (related vs unrelated items) and incentive level. Then we will analyse the effects of ST on JOLs and recall performance. Lastly, the results of the questionnaire on incentives will be reported.

Preliminary analyses did not reveal any systematic effects of gender. The data was therefore collapsed across these variable. As a post hoc follow-up on main effects, Scheffé tests were used. The level of significance was set to $p < 0.05$.

Recall. The first column of Table 3 shows the percentage of correct responses. The ANOVA with recall as a dependent variable revealed a significant main effect of age group ($F(3,108) = 5.58$; $p < .01$; $\eta^2 = .13$). Post hoc tests clarified that younger adults (75.00%) outperformed children (58.18%; $p < .01$) and older adults (59.08%; $p < .05$). Furthermore, a main effect of item difficulty was found ($F(1,108) = 352.80$; $p < .001$; $\eta^2 = .77$) which was modified by a significant interaction between item difficulty and age group ($F(3,108) = 12.21$; $p < .001$; $\eta^2 = .25$). The difference in recall between related and unrelated items was higher in children ($d = 2.72$) and older adults ($d = 2.46$) than in adolescents ($d = 1.26$) and younger adults ($d = 1.12$; see Table 3). Still, for all age groups recall was higher for related than for unrelated items (all p's < .001 in t-tests). Finally, the main effect of incentive turned out significant ($F(1,108) = 36.92$; $p < .001$; $\eta^2 = .26$): 5 point items (69.59%) were associated with higher recall rates than 1 point items (60.12%).

Table 3. Recall, ST and mean JOLs as a function of age group, item difficulty, and incentive in Study 2

	Recall (%)		ST (s)		JOLs	
	1 pt.	5 pt.	1 pt.	5 pt.	1 pt.	5 pt.
Children						
Related	73.8 (20.0)	88.7 (12.9)	7.2 (2.8)	8.0 (4.3)	71.3 (16.6)	80.4 (15.5)
Unrelated	28.0 (23.6)	42.3 (28.5)	8.2 (3.2)	9.5 (5.3)	41.0 (21.6)	50.9 (22.5)
Overall	50.9 (18.2)	65.5 (16.2)	7.7 (2.6)	8.7 (4.5)	56.2 (17.0)	65.6 (14.9)
Adolescents						
Related	77.0 (19.3)	84.5 (14.0)	7.7 (4.5)	9.4 (5.9)	77.3 (18.8)	83.7 (11.9)
Unrelated	49.6 (31.5)	57.5 (27.2)	11.1 (7.0)	12.4 (7.6)	60.0 (23.9)	65.9 (18.8)
Overall	63.3 (23.3)	71.0 (18.2)	9.4 (5.5)	10.9 (6.6)	68.6 (18.8)	74.8 (13.7)
Younger adults						
Related	84.1 (15.9)	90.2 (15.3)	8.8 (4.1)	11.8 (5.9)	81.2 (15.7)	87.3 (12.8)
Unrelated	56.7 (31.1)	69.1 (26.9)	12.7 (6.4)	15.9 (7.6)	58.1 (24.5)	68.9 (19.8)
Overall	70.4 (22.0)	79.6 (18.6)	10.8 (4.9)	13.8 (6.6)	69.7 (18.0)	78.1 (13.5)

Older adults						
Related	81.6 (18.3)	89.3 (11.3)	5.6 (2.3)	5.9 (2.3)	85.3 (12.8)	84.0 (14.4)
Unrelated	30.4 (25.7)	35.1 (32.8)	8.8 (5.5)	9.3 (4.1)	44.6 (21.6)	45.6 (26.5)
Overall	56.0 (19.0)	62.2 (19.4)	7.2 (3.6)	7.3 (3.1)	65.0 (14.1)	64.8 (17.6)

Note. Standard deviations are in parentheses.

Study time. An ANOVA with mean ST as a dependent variable yielded a significant main effect of age group ($F(3,108) = 6.27$; $p < .01$; $\eta^2 = .15$). In post hoc tests, it was shown that younger adults (12.28 s) studied the items longer than children (8.20 s; $p < .05$) and older adults (7.43 s; $p < .01$). Additionally, the main effect of item difficulty ($F(1,108) = 100.46$; $p < .001$; $\eta^2 = .48$) and the interaction between item difficulty and age group ($F(3,108) = 4.22$; $p < .01$; $\eta^2 = .11$) turned out significant. T-tests revealed that for each age group, the difference in ST between related and unrelated items was significant; however this effect was less pronounced in children (children: $p < .01$; adolescents, younger and older adults: $p < .001$; see Table 3). Furthermore, the ANOVA revealed a significant main effect of incentive level ($F(1,108) = 22.98$; $p < .001$; $\eta^2 = .18$) which was modified by a significant interaction between incentive and age group ($F(3,108) = 3.21$; $p < .05$; $\eta^2 = .08$). Again, t-tests were conducted which showed that only in adolescents ($p < .05$) and younger adults ($p < .001$) the difference in ST between higher and lower valued items was significant (see Table 3).

Judgments of Learning. In an ANOVA with mean JOLs as dependent variable a significant main effect of age group was found ($F(3,108) = 4.60$; $p < .01$; $\eta^2 = .11$) with post hoc tests indicating that children gave lower JOLs (60.90) than younger adults (73.87; $p < .05$). Besides, the ANOVA revealed a significant main effect of item difficulty ($F(1,108) = 263.75$; $p < .001$; $\eta^2 = .71$) and a significant interaction between item difficulty and age group ($F(3,108) = 8.88$; $p < .001$; $\eta^2 = .20$). Although in every age group the difference between related and unrelated items was highly significant (all p's < .001 in t-tests), it was greatest in children ($d = 1.81$) and older adults ($d = 2.24$) as compared to adolescents ($d = 1.02$) and younger adults ($d = 1.18$; see Table 3). Concerning the incentives, a significant main effect ($F(1,108) = 25.78$; $p < .001$; $\eta^2 = .19$) and a significant interaction between incentive and age group $F(3,108) = 3.38$; $p < .05$; $\eta^2 = .09$) were found. T-tests revealed that only the three younger age groups (children and adolescents: p's < .01; younger adults: $p < .001$) gave significantly higher mean JOLs to 5 point than to 1 point items, but not the older adults (see Table 3).

Table 4. Mean within-person JOL-ST Pearson and ST-recall Gamma correlation as a function of age group and incentive level in Study 2

	Pearson correlation recall		**Gamma correlation ST-JOL-ST**	
	1 pt.	5 pt.	1 pt.	5 pt.
Children	-.02 (.32)	-.12 (.32)	-.12 (.37)	-.19 (.46)*
Adolescents	-.18 (.29)**	-.13 (.22)**	-.20 (.37)**	-.19 (.32)**
Younger adults	-.16 (.21)***	-.05 (.24)	-.16 (.44)	-.06 (.36)
Older adults	-.15 (.29)***	-.21 (.28)***	-.27 (.44)**	-.31 (.34)***

Note. Standard deviations are in parentheses. * p < .05; ** p < .01; *** p < .001.

Cue utilization: Memorizing effort as a cue for JOLs. As in Study 1, we aimed to examine the relationship between ST and JOLs by means of Pearson-correlations between both variables for each participant. This time, correlations were computed separately for each incentive level in order to eliminate the impact of goal-orientated processing. Mean correlations are depicted in Table 4. Children's correlations and younger adults' correlations in 5-point items were not different from zero; the other coefficients reached the significance level (adolescents: both p's < .01; younger adults: $p < .001$ for 1-point items; older adults: both p's < .001). A corresponding ANOVA yielded no significant main effects nor interactions. As above, these results were verified by contrasting mean JOLs above vs. below-median ST (see Figure 3). Incentive was included in the ANOVA as additional within-participant factor to keep goal-orientation on a constant level. A part from the significant main effect of age group ($F(3,108) = 4.50$; p

$< .01$; $\eta^2 = .11$) already reported in the JOL section, we found a significant main effect of ST ($F(1,108) = 30.30$; $p < .001$; $\eta^2 = .22$) with shorter studied items receiving higher JOLs (72.15) and longer studied items receiving higher JOLs (64.93). The main effect of incentive ($F(1,108) = 23.81$; $p < .001$; $\eta^2 = .18$) and the interaction between incentive and age group ($F(3,108) = 3.58$; $p < .05$; $\eta^2 = .09$) also have been documented above.

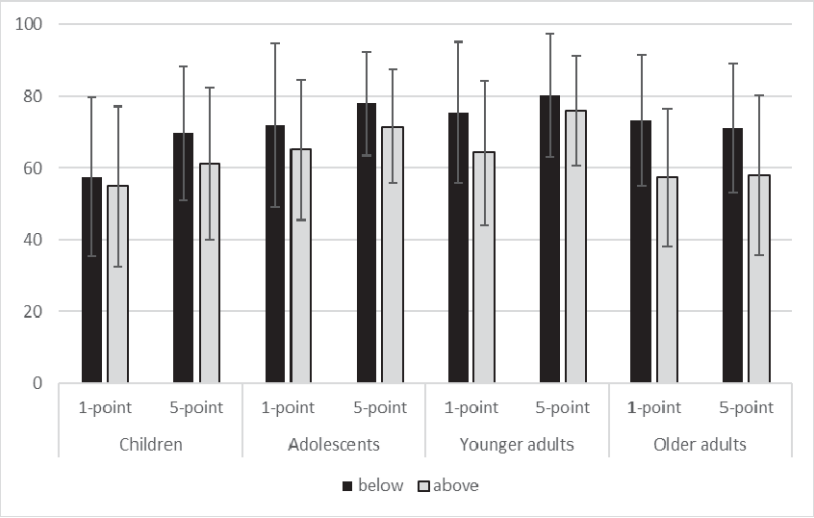

Figure 3. Mean JOLs for below-median and above-median ST as a function of age group and incentive level in Study 2

Cue validity: *The validity of ST as a predictor of recall*. The relationship between ST and recall was analyzed the same way as for Study 1; however, incentive level served as an additional factor. Mean gamma-correlations between ST and later recall for each age group and incentive are depicted in Table 4. In children, only the correlation in 5-point items was different from zero ($p < .05$); in adolescents and older adults both correlations reached the significance level (5-point items in older adults: $p < .001$; all other p's $< .01$); younger adults' correlations were both not different from zero. An ANOVA with age group and incentive as dependent variables revealed no significant main effects nor interactions. Furthermore, recall was calculated for below-median and above-median ST in 1-point items and in 5-point items (see Figure 4). An ANOVA with age group as between-participants factor and ST (below-median vs. above-median) and incentive as within-participant factors yielded a significant main effect of age group ($F(3,108) = 5.68$; $p < .01$; $\eta^2 = .14$) which has already been reported above in the recall section. Besides, a significant main effect of ST ($F(1,108) = 31.62$; $p < .001$; $\eta^2 = .23$) was found indicating that shorter studied items received higher recall rates (70.49%) than longer studied items (59.18%). Finally, the significant main effect of incentive ($F(1,108) = 34.76$; $p < .001$; $\eta^2 = .24$) already documented above was shown again.

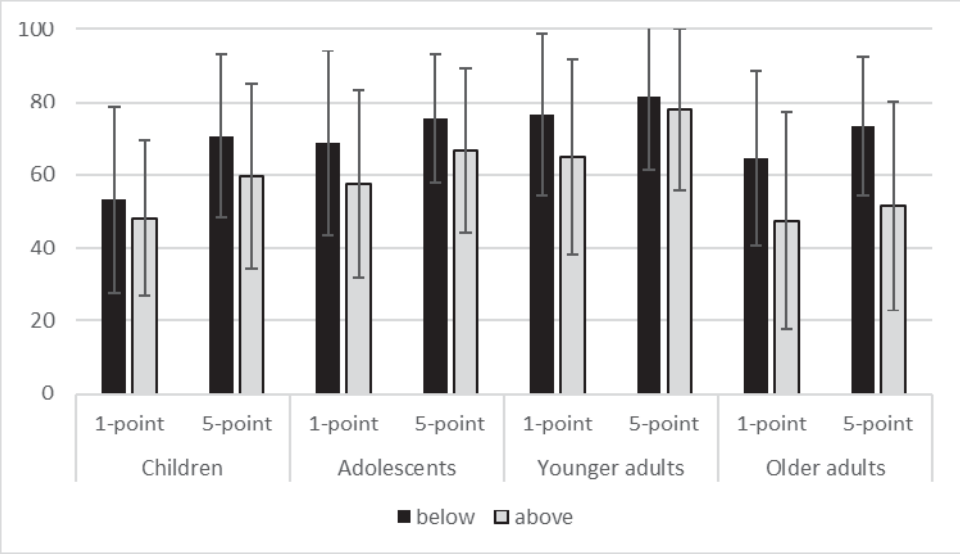

Figure 4. Mean recall in % for below-median and above-median ST as a function of age group and incentive level in Study 2

Questionnaire on incentives. Mean values on the 7-point-scale for question 1 concerning the incentives ("How important was it to you to achieve as many points as possible?") were rather high in each age group (children: M = 5.14; SD = 1.65; adolescents: M = 4.43; SD = 1.85; younger adults: M = 5.15; SD = 1.41; older adults: M = 4.25; SD = 2.27). The correspondent ANOVA with age group as between-participant factor revealed no significant main effect. Concerning question 2 ("How did you like the reward?"), mean values resulted rather high as well (children: M = 5.67; SD = 1.52; adolescents: M = 5.86; SD = 1.16). In a t-test, no significant difference was found between the two age groups.

3.4 Discussion

The first aim of Study 2 was to replicate the findings of Study 1 concerning the CM-model in all four age groups. Secondly, Study 2 was conducted in order to strengthen the still poor data base related to developmental studies on the relation between MC- and CM-processes within one learning task. This seemed important because so far no study has explored the flexible interplay of both processes for older adults and because every-day learning tasks often require the ability to consider both data and goal-oriented learning at the same time.

To account for different learning abilities, task difficulty was adapted to age group. Materials were identical to Study 1, expect the list for younger adults was expanded by 12 items in order to further match memory performance between age groups. Thus, bottom and ceiling effects could be successfully avoided in all age groups and base line difficulty was outbalanced between the age groups. Still, younger adults performed slightly better than the other age groups. The experimental conditions operated as expected: Recall was higher for related than for unrelated items and higher for 5 point than for 1 point items in all age groups.

Manipulation of incentive value was effective as participants of all age groups reported to be motivated to achieve as many points as possible and considered the rewards to be attractive.

Participants of all age groups showed data-oriented learning, that is gave higher JOLs for items with shorter ST than with longer ST. Thus, we were successful in replicating findings from Study 1 which for the first time provided evidence for the CM-model from elementary school age to older adulthood. Correlations between ST and JOLs depicted developmental trends, that is for adolescents, younger adults (only 1-point-items) and older adults but not for elementary school children correlations differed significantly from zero. Especially elementary school children seem to have difficulties with data-oriented learning when goal-oriented learning occurred simultaneously. In all age groups ST was generally a valid predictor for recall performance indicating that shorter studied items received higher recall rates than shorter studied items. Gamma correlations between ST and recall largely confirmed this pattern and were significant for elementary school children (5-point items), adolescents and older adults.

Concerning flexible alteration between goal and data-oriented learning, results show that adolescents and young adults were generally able to apply both the MC- and the CM-model within one learning task (cf., Koriat et al., 2014). In contrast, this posed a greater challenge for elementary school children and older adults. Especially, older adults seemed to rely their JOLs on item characteristics and ST (CM-model) but showed difficulties to achieve as many points as possible at the same time. Elementary school children depicted fewer hints for both goal and data-oriented learning than adolescents and young adults. The necessity to switch between both learning types seems to affect both processes in this age group. This is in line with existing data suggesting that the ability to react to both data and goal-oriented processes at the same time increases with age (Koriat et al., 2014). Possible causes for developmental trends form childhood to young adulthood and from young adulthood to older adulthood seem to differ. While elementary school children might have difficulties to integrate bottom-up and top-down processes (that is inferring from ST to JOLs and vice versa) into a single metacognitive judgment (Koriat et al., 2014), older adults' personal learning goal might hinder their ability to flexibly react to both processes (Ariel et al., 2009). Further research is needed to verify those developmental trends as well as their sources.

4. General Discussion

The results of the two studies presented here indicate that participants from elementary school age to older adulthood are able to use information from control processes to modulate monitoring processes (CM-model). The analyses of JOLs after median-split in both Study 1 and Study 2 showed significant main effects of ST but no significant interaction with age group. Although effect sizes were of medium height (η^2 between .16 and .22) the difference in JOLs for items with shorter and longer ST was not large enough to result in negative correlations between JOLs and ST on item level for all age groups. For elementary school children no correlation was significant, only for younger and older adults nearly all correlations reached significance. For adolescents, mixed results were found: in Study 1 correlations did not reach significance while in Study 2 the correlation between JOL and ST was significant. This is in accordance with existing data concerning developmental trends: From third grade on first evidence for the CM-model is detectable (Koriat et al., 2009) which becomes more stable from 5th grade on (Hoffmann-Biencourt et al., 2010). Both Study 1 and 2 added to the literature by providing evidence for the CM-model in older adults for the first time. No substantial deficits for older adults became evident. Low correlations between ST and JOL in Study 1 could not be replicated in Study 2. Thus it cannot be assumed that older adults generally show disadvantages in the interplay of monitoring and control processes due to deficits in executive functions (Pansky et al., 2009; Souchay & Isingrini, 2004). Further evidence for the stability of the CM-model in older adults derives from the fact that performance did not suffer from simultaneous manipulation of goal orientation in Study 2.

Furthermore, our studies demonstrated age effects for the flexible use of both the MC- and the CM-model within one learning task. Adolescents and younger adults showed the best abilities to do so. Older adults adapted neither ST nor JOLs to item value while elementary school children adapted their JOLs only. These findings cannot be explained by a general deficit concerning the MC-model in these age groups as it has been documented that children and older adults are able to monitor their ST on the basis of monitoring processes (Dunlosky & Connor, 1997; Lockl & Schneider, 2003). A more likely cause appears to be that switching between both models posed difficulties for these age groups (Koriat et al., 2014) as potentially coordinating the use of two cues poses high cognitive demands. Another possible explanation is the higher salience of item difficulty compared to item value (Ariel et al., 2009; Lockl & Schneider, 2004; Price et al., 2010). Further research should aim to investigate the alteration between data and goal-oriented learning with item pairs of identical difficulty in order to make item value more salient (Ariel et al., 2009; Koriat et al., 2006, 2014).

Additionally, for elementary school children no significant correlations between JOLs and ST (CM-model) could be detected. Only the analysis of ST after median-split turned out to be significant in this age group. This pattern of results was confirmed in Study 1 for data-oriented learning and in Study 2 for both data- and goal-oriented learning within one task. Thus, it can be assumed that the sensitivity for data-oriented processes increases after elementary school age (cf., Koriat et al., 2014) and that the interplay between both learning processes also becomes more flexible with age.

In sum, integrating goal-oriented learning (top-down-process) and data-oriented learning (bottom-up-process) within one metacognitive judgement seems to be a complex process (Schneider, 2015). Adolescents and young adults appear to master this task successfully. In contrast, for elementary school children and older adults this appears to be challenging. Yet, generally both age groups are able to apply goal- and data-oriented learning in separate learning tasks. Further research should aim to specify underlying mechanisms of these developmental

trends. As our findings represent the first approach using a lifespan sample, our conclusions remain preliminary and require replications with different age groups and different item values. Studies relating goal- and data-oriented learning within one learning task are still scarce, particularly for elementary school children and older adults. This is surprising given that that everyday learning often requires flexible use of both learning processes. Hence expanding our findings to more age groups would allow to account for more fine-grained developmental changes, especially from childhood to adolescence and from younger to older adulthood. Additionally, it would be worth to include individuals with cognitive limitations like mild cognitive inertia or intellectual difficulties in further studies. Overall, the results suggest that, although goal- and data-oriented learning abilities are present over a large age range, especially children and older adults have room for improvement. Thus our findings indicate that exploring the underlying processes of metacognitive abilities is worth to be pursued in future research.

Acknowledgments

This research was conducted as part of a research project on the development of procedural metacognitive knowledge across the life-span and financed by the German Research Foundation (DFG-Gz. SCHN 315/45-1). We wish to thank all participating children, adolescents and adults as well as teachers, principals and parents for their cooperation.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Application of the Theory of Mind, Theory of Executive Functions and Weak Central Coherence Theory to Individuals with ASD

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Received: November 21, 2016 Accepted: December 19, 2016 Online Published: December 25, 2016

doi:10.5539/jedp.v7n1p102 URL: http://dx.doi.org/10.5539/jedp.v7n1p102

Abstract

The present study examined the application of three cognitive theories—the Theory of Mind (ToM) deficit, the Theory of Executive Functions (EF) and Weak Central Coherence Theory (WCC)—in children with Autism Spectrum Disorders (ASD). 9 children with ASD and 18 children of Typical Development (TD) participated in the study. According to the results, most of the children with ASD showed significant deficits in the development of ToM, while a few of them succeeded in all the ToM tests. With regard to EF theory, the children with ASD did not present a deficit in any of the four executive functions in which they were examined, since their performances were similar to those of TD children. As for the WCC theory, the results cannot support the existence of a deficit. However, it seems that children with ASD struggle in respect of global precedence when a local interference effect is present.

Keywords: Autism Spectrum Disorders, Theory of Mind, Theory of Executive Functions, Weak Central Coherence Theory

1. Introduction

Individuals with Autism Spectrum Disorder (ASD) are characterized by deficits in social communication and social interaction across contexts and restricted, repetitive patterns of behavior, interests or activities (A.P.A., 2013). Cognitive theories investigating the mechanisms that underlie these deficits include the Theory of Mind (ToM), the Executive Functions (EF) theory and the Weak Central Coherence Theory (WCC).

1.1 Theory of Mind

Theory of Mind (ToM) is the ability of the individual to attribute such mental states as beliefs, intentions, desires and pretense to themselves and to others and the ability to appreciate that others may have different beliefs, intentions and desires from their own (Mitchell, 1996; Karpinski & Scullin, 2009). The development of ToM is of paramount importance as people are constantly trying to deduce the emotional and mental states of other people, and it helps in self-organization and self-regulation, as well as in the behavior management of others. On the other hand, restricted development impedes understanding of the social world and employment of the appropriate behavior or strategy in social settings (Doherty, 2008; Korkmaz, 2011). It has been claimed that this inability to "mentalise" is responsible for the failure of individuals with ASD to engage in normal social interaction (Rajendran & Mitchell, 2007).

Researchers using first- and second-order false belief tests previously argued that children with ASD show significant deficits in ToM development compared to TD children and children with Intellectual Disabilities (ID) (Baron-Cohen, Leslie, & Frith, 1985; Baron-Cohen, 1989b) and children with Specific Language Impairment (SLI) (Leslie & Frith, 1988; Perner, Frith, Leslie, & Leekam, 1989).

Since then, various tests have been devised controlling ToM ability (Wimmer & Perner, 1983; Perner & Wimmer, 1985; Baron-Cohen, 1989a; Perner et al., 1989; Zaitchik, 1990; Happe, 1994; Baron-Cohen, Wheelwright, Jolliffe, & Therese, 1997a; Baron-Cohen, O'Riordan, Stone, Jones, & Plaisted, 1999; Baron-Cohen, 2000; Gallagher et al., 2000) and studies conducted with ASD individuals have argued that the latter are devoid of a ToM. However, in all the studies there has always been a low percentage of participants with ASD who succeeded in the tests.

Bowler (1992) claimed that a ToM deficit or delayed ToM development does not characterise all individuals with ASD. Furthermore, Ozonoff, Rogers, and Pennington (1991b) showed that some people with ASD perform as well as TD comparisons in these tests. Apart from that, failure in ToM tests could not totally explain all the features of the disorder.

1.2 Executive Functions

Executive Functions Theory emerged partially from the observation that some of the clinical symptoms of autism were similar to those associated with specific brain injury. Features such as the insistence on sameness, difficulty switching attention and a lack of impulse control led researchers to conclude that autism might be explained as a deficit in executive functions (Rajendran & Mitchell, 2007).

"Executive functions" is an umbrella term that includes a wide range of cognitive processes and behavioral skills and refers to neuropsychological processes that allow physical, cognitive and emotional self-control (Corbett, Constantine, Hendren, Rocke, & Ozonoff, 2009). It comprises such functions as planning, reasoning, memory, impulse control, inhibition, cognitive flexibility, initiation and monitoring of action, problem-solving, the ability to sustain attention and the ability to deal with novelty (Elliott, 2003; Hill, 2004; Chan, Shum, Toulopoulou, & Chen, 2008).

Dysfunction of executive functions has been observed in patients with acquired damage to the prefrontal cortex as well as in a range of neurodevelopmental disorders with congenital deficits in this area (Elliott, 2003; Hill, 2004). However, studies have also identified deficits in various executive functions in individuals with ASD, even though there is no apparent damage in the prefrontal lobes (Bennetto, Pennington, & Rogers, 1996; Corbett et al., 2009). These deficits may explain some clinical behavioral signs of autism, such as rigid behavior, insistence on sameness and inappropriate response to social situations. The present study will deal with the following four executive functions: planning, cognitive flexibility, inhibition and working memory.

1.2.1 Planning

Planning is a complex, dynamic function of the brain, in which a sequence of planned actions are generated and constantly controlled, evaluated and updated. An individual should be aware of the current state and the possible changes in order to design an appropriate action plan and accomplish their aim (Owen, 1997; Hill, 2004).

Various studies have researched planning ability in individuals with ASD deficits (Rumsey & Hamburger, 1988; Prior & Hoffmann, 1990), especially those which used the Tower of London and Tower of Hanoi tests as their evaluation tool (Ozonoff et al., 1991a; Ozonoff & McEvoy, 1994; Hughes, Russell, & Robbins, 1994; Bennetto et al., 1996; Ozonoff & Jensen, 1999; Verte, Geurts, Roeyers, Oosterlaan, & Sergeant, 2006; Robinson, Goddard, Dritschel, Wisley, & Howlin, 2009; Pellicano, 2010a; Zinke et al., 2010).

On the other hand, a number of studies (Goldberg et al., 2005; Happé, Booth, Charlton, & Hughes, 2006; Corbett et al., 2009) have not confirmed the existence of a planning deficit in individuals with ASD, on the basis of the results obtained with the Stockings of Cambridge evaluation tool, which constitutes a computerised version of the Tower of London and Tower of Hanoi tests. One exception is the study conducted by Ozonoff et al. (2004). Of two studies that used Mazes of WISC-III (Nydén, Gillberg, Hjelmquist, & Heiman, 1999; Pellicano, Maybery, Durkin, & Maley, 2006), neither found a deficit in planning. More specifically, Pellicano et al. (2006) used two different tools in the same sample: the Tower of London and the Mazes of WISC-III. The first tool found a statistically significant difference while the second did not.

In short, research reveals a tendency for individuals with ASD to have a deficit in planning. However, the type of tool used may play a mediating role, as studies using the Tower of London and Tower of Hanoi tests found differences while studies using the Stockings of Cambridge and Mazes of WISC did not find differences.

1.2.2 Cognitive Flexibility

Cognitive/mental flexibility is defined as the readiness with which an individual's concept system changes in response to environmental stimuli (Scott, 1962). Poor mental flexibility is illustrated by perseverative, stereotyped behavior and difficulties in the regulation and modulation of motor acts, indicating problems in the ability to shift to a different thought or action according to changes in a situation (Hill, 2004).

The majority of studies examining cognitive flexibility have used the Wisconsin Card Sorting Test (WCST) as their evaluation tool, with conflicting results. On the one hand, a number of studies have found significant deficits in individuals with ASD compared to TD individuals (Rumsey & Hamburger, 1988; Prior & Hoffmann,1990; Pascualvaca, Fantie, Papageorgiou, & Mirsky, 1998; Shu, Tien, & Chen, 2001; Verte et al.,

2006) and also compared to individuals with ADHD, Tourette Syndrome (TS) and ID (Rumsey & Hamburger, 1990; Ozonoff et al., 1991; Ozonoff & McEvoy,1994; Bennetto et al., 1996; Ozonoff & Jensen, 1999).

On the other hand, there have been studies (Minshew, Muenz, Goldstein, & Payton, 1992; Kaland, Smith, & Mortensen, 2008; Robinson, Goddard, Dritschel, Wisley, & Howlin, 2009; Van Eylen et al., 2011) that did not detect any significant difference. Furthermore, Nydén et al. (1999) found that only individuals with ADHD had a statistically significant lower performance in comparison to a TD population. Generally, the WCST has been criticized as it involves several executive functions simultaneously (Ozonoff, Strayer, McMahon, & Filloux, 1994) and causes difficulties in the interpretation of the results (Hill, 2004).

Instead of WCST, the Intradimensional/Extradimensional Shift task has also been administered, with conflicting results as well. Some studies have detected a deficit in cognitive flexibility (Hughes et al., 1994; Ozonoff et al., 2004; Yerys et al., 2009), while others have detected no deficits at all (Edgin & Pennington, 2005; Goldberg et al., 2005; Corbett et al., 2009).

Two more tools have been used in the form of the DCCS and Set-Shifting tasks, confirming previous results, in which children with ASD performed significantly worse than TD children (Pellicano et al., 2006; Dichter et al., 2010; Pellicano, 2010a).

It seems that not all individuals within the spectrum are characterised by a deficit in cognitive flexibility, as there are different findings, despite the use of the same tool.

1.2.3 Inhibition

Inhibition is the restraint of a mental process, behavior, desire, impulse, in whole or in part, with or without intention (MacLeod, 2007). Studies using a variety of tools have examined the executive function of inhibition with conflicting results, even in studies conducted by the same group of authors. Interpreting results becomes even more difficult due to the great heterogeneity of the control groups. On the one hand, there are findings which support an inhibition deficit in individuals with ASD (Russell, Mauthner, Sharpe, & Tidswell, 1991; Hughes & Russell, 1993; Ozonoff et al., 1994; Nydén et al., 1999; Russell et al., 2003; Pellicano et al., 2006; Verte et al., 2006; Corbett et al., 2009; Robinson et al., 2009) while on the other, there are studies that reject the hypothesis of a deficit (Eskes, Bryson, & McCormick, 1990; Ozonoff & Strayer, 1997; Ozonoff & Jensen, 1999; Russell, Jarrold, & Hood, 1999; Goldberg et al., 2005; Happé et al., 2006).

1.2.4 Memory

Memory constitutes the structures and processes involved in the three stages of memory: Encoding, storage and subsequent retrieval of information (McLeod, 2007).

Storage is divided into two subcategories, Short-Term Memory (STM) and Long-Term Memory (LTM) (McLeod, 2007). Baddeley and Hitch (1974) and Baddeley (2002) replaced the concept of STM with the model of Working Memory (WM), which includes STM and a memory which is actively processing information. LTM is divided into declarative and non-declarative memory (Squire & Dede, 2015). The aim of the present study is to explore whether STM/WM affects individuals with ASD in their daily tasks.

Research findings are even more difficult to explain, due to the plethora of tools used, the complex testing processes and the sensory organ (vision-hearing) being utilized. Studies have used different tools in the same sample of participants with conflicting results. Studies have also been divided into three categories based on their findings: studies that found a deficit in STM/WM in children with ASD (Nydén et al., 1999; Minshew & Goldstein, 2001; Goldberg et al., 2005; Verte et al., 2006; Steele, Minshew, Luna, & Sweeney, 2007; Corbett et al., 2009); studies that failed to detect any deficit (Rumsey & Hamburger, 1988; Ozonoff & Strayer, 2001; Edgin & Pennington, 2005; Happé et al., 2006; Chan et al., 2009), and those studies with mixed results (Prior & Hoffmann, 1990; Rumsey & Hamburger, 1990; Bennetto et al., 1996; Minshew et al., 1992; Williams, Goldstein, Carpenter, & Minshew, 2005; Alloway, Rajendran, & Archibald, 2009; Zinke et al., 2010) owing to an uneven performance across the trials. This has led some researchers to support the view that individuals with ASD present no deficits in memory and merely fail to use the appropriate storage strategies (Minshew et al., 1992; Bennetto et al., 1996).

1.3 Weak Central Coherence

Central coherence is one's ability to process incoming information in its context for higher-level meaning, at the expense of memory for detail (Happé, 1999). Weak Central Coherence theory claims that individuals with ASD tend to process information in a detail-focused way, at the expense of global meaning (Frith, 1989; Frith & Happé, 1994).

Initially, WCC theory was supported by studies claiming that individuals with ASD either performed significantly better than TD individuals in local precedence tests (Shah & Frith, 1983, 1993; Jolliffe & Baron-Cohen, 1997; Plaisted, Swettenham, & Rees, 1998; O'Riordan, Plaisted, Driver, & Baron-Cohen, 2001; Pellicano et al., 2006) or showed poor performance in global precedence tests (Rinehart, Bradshaw, Moss, Brereton, & Tonge, 2000). On the other hand, a number of studies did not confirm the WCC theory (Ozonoff et al., 1994; Brian & Bryson, 1996).

Happé (1996) claimed that individuals with ASD do not succumb to visual illusions, although these findings were not confirmed by Ropar and Mitchell (1999, 2001). Furthermore, Happé (1996) showed that individuals with ASD perform significantly better in local precedence tests only in comparison to younger TD individuals.

Mottron and Belleville (1993) showed that individuals with autism process both at the local and global levels, like the individuals in the TD controls, but there is an interference of the local over the global level when the stimuli are incongruent. Subsequent studies confirmed these findings (Plaisted et al., 1999; Jolliffe & Baron-Cohen, 2001; Rinehart et al., 2001). More studies were conducted using more than one tool, with mixed findings (Edgin & Pennington, 2005; Pellicano, 2010a).

The original WCC theory has not been confirmed and the modern trend is for autism to be considered as a multiple deficit (Pellicano et al., 2006; Rajendran & Mitchell, 2007), combining the three aforementioned theories. However, there has been criticism of the validity of these three theories and the universality of each separately across the spectrum.

2. The Present Study

This study aims to investigate whether children with ASD present deficits in the three aforementioned cognitive theories compared to TD children, matched on chronological age and gender. The next aim was to determine possible links between the measures used for the three theories and the independent variables of chronological age, verbal and nonverbal ability and correlations among the measures used for the three theories. The final objective was to investigate the effect of ASD on the performance of each test separately.

2.1 Method

2.1.1 Participants

A total of 27 children participated in the study: 9 children with ASD (8 boys) and 18 TD children (16 boys) matched on chronological age and gender. The ASD group had a mean age of 140.44 months (SD = 30.10, range = 100-185) and the TD group had a mean age of 141.44 months (SD = 29.96, range = 105-187). All ASD children had received an independent clinical diagnosis of either autism (N = 5) or Asperger Syndrome (N = 4), according to DSM-IV criteria (APA, 2000). Children diagnosed with a Childhood Disintegrative Disorder or the Pervasive Developmental Disorder NOS were excluded owing to the controversy over DSM-5. All of the children obtained a verbal and nonverbal ability raw score over 11, as assessed by the Vocabulary and Block Design test of the Greek edition of WISC III (Georgas, Paraskevopoulos, Bezevegis, & Giannitsas, 1997) to prevent failure in tests due to low verbal and nonverbal ability. The participants were recruited following a search in the researcher's broader family and social circles. Each participant with ASD was matched with two TD children of the same gender and chronological age. 6 children with ASD were primary school pupils and 3 secondary school pupils. 12 TD children were primary school pupils and 6 secondary school pupils, respectively.

2.1.2 Measures

1) Verbal and nonverbal ability measures

Vocabulary and Block Design subtests of WISC III (Greek edition) were administered as indices of verbal and nonverbal ability. These two tests have been used together reliably as a short form of WISC-III (Edgin & Pennington, 2005; van Nieuwenhuijzen & Vriens, 2012) due to a high correlation with Full Scale IQ (Silverstein, 1970).

a) Vocabulary: This task is a subtest of WISC III (Greek edition). It consists of a series of orally presented words, which the child orally defines. It is used as an index of verbal ability and carries a maximun score of 60.

b) Block Design: This task is a subtest of WISC III (Greek edition). It consists of a set of two-dimensional geometric patterns which the child replicates using two colour cubes. It is used as an index of nonverbal ability as it has been standardized to measure intelligence while eliminating the factor of language and carries a maximun score of 69.

2) Theory of Mind measures

The children watched eight false-belief tasks-scenarios on a laptop, each of 30-120 duration. The scenarios consisted of three first-order false-belief tasks-scenarios, three second-order false-belief tasks-scenarios and two modified Faux Pas test scenarios (Baron-Cohen et al., 1999). Plastic and paper figures and objects, as well as a Sony Cyber-shot camera were used for the filming of the scenarios. The scripts and the sources of the scenarios are described in detail in Appendix A.

In the first- and second-order false belief tasks, at the end of each trial, the children were asked a critical belief question, a control question and a memory question. A score of 1 was given for each correct answer to a false-belief test question.

a) In the Faux Pas scenarios, the children were asked four questions: a Faux Pas detection question, an identification question, a control question and a False Belief question. The children were given a score of 1 when they answered all four questions correctly. If the children answered the first question incorrectly then the other questions were not asked. There were no memory questions in these two kinds of scenarios.

The maximum score for the false belief tasks and control questions was 8, while it was 6 for the memory questions. A scenario for familiarization was administered before the false belief tasks, in which two control questions were asked.

3) EF measures

a) Luria's Handgame (Hughes, 1996). The children were asked to point their index finger and then form a fist, ensuring they could imitate the experimenter. In the Imitation condition, children were told they had to put their hands behind their backs and when the experimenter showed his hand they had to make the same shape (fist or index finger). Out of a total of 10 trials, one point was given, for each correctly imitated trial. In the Conflict condition, children were asked to perform the opposite action. One point was awarded for each successful conflict trial, out of a total of 10 trials. In each condition, the five finger and five fist trials were presented in a randomised order, while the order of presentation of conditions was counterbalanced across participants. High scores on the Conflict condition reflect good inhibitory processes.

b) Digit Span. This task is a subtest of WISC III (Greek edition). It consists of a series of orally presented sequences of digits. The respondent has to repeat these sequences verbatim for Digits Forward, measuring STM and in reverse for Digits Backward, measuring WM. The maximum score for STM is 16, while that for WM is 14 and the composite maximum score is 30.

c) Card Sorting Task. The children were presented with three teddy bears and three different decks of cards, in terms either of the picture shown (hearts vs. triangles, squares vs. circles, or stars vs. happy faces), color (green vs. pink, blue vs. red, or yellow vs. purple), or picture's size (small vs. large). The children had to work out which cards teddy liked best. When a card was one of teddy's favorites, children turned the card face down in front of the teddy. Alternatively, when a card was not one of teddy's favorites, children turned the card face down far away from the teddy. Feedback was provided after each trial. When six cards in a row were sorted out successfully, or when a maximum of 20 trials had been presented, the sorting rule (e.g., color, shape, size) changed, upon which they were presented with a new teddy bear and a new deck of cards. The children were not alerted to a change in the sorting rule as it was implied in the fact that they were presented with a new situation. Set-shifting performance was rated by the proportion of errors committed following the first sort to criterion (Pellicano, 2010b).

d) Mazes. This task is a subtest of WISC III (Greek edition). Children are required to complete a set of progressively more complex mazes, planning their route ahead, to reach the opening of the maze while making minimal errors. High scores indicate good planning ability. The maximum score is 28.

4) Central Coherence measures

Picture Completion. This task is a subtest of WISC III (Greek edition). It consists of a set of 30 colorful pictures of common objects and scenes, from each of which an important part is missing, which the child has to identify. The task was used in this study to measure local precedence. The maximum score is 30.

a) Object assembly. This task consists of a set of 5 puzzles of common objects, each presented in a standardized configuration, which the child assembles to form a meaningful whole. It is used to measure the concrete construction of parts to make a recognizable whole. The maximum score is 44.

3. General Procedure

The measures were administered by the principal investigator and a certified psychologist in a quiet room in each of the participants' homes. Initially, researchers informed parents about the nature of the study and, once parental consent had been granted, all the measures were administered within the space of 90 minutes. The measures of verbal and nonverbal ability were always administered first. The order of presentation of the remaining tasks was randomized across participants. A Hewlett Packard 2140 portable computer was also used for observing the ToM tasks.

4. Results

4.1 Preliminary Analyses

Table 1 presents the descriptive statistics for chronological age, verbal and nonverbal ability. No group differences were found relating to chronological age. As regards nonverbal ability, the TD children performed better than the children with ASD, but the difference was not statistically significant, as the non-parametric Mann-Whitney U ($z = 1.338$, $p = .181$) indicates.

However, a number of statistically significant differences were found, as the children with ASD performed worse in the vocabulary tests than the TD children, as the non-parametric Mann-Whitney U ($z = -2.188$, $p = .029$) shows. This finding is consistent with the fact that children with ASD are likely to fall behind in language development in comparison to TD children of the same age (Tager-Flusberg, 1999; A.P.A., 2013).

Table 1. Descriptive statistics for chronological age, verbal and nonverbal ability

	Group	
Variables	ASD (N = 9)	TD (N = 18)
Age (months)		
Mean	140.44	141.44
SD	30.10	29.96
Range	100-185	105-187
Vocabulary (out of 60)		
Mean	23.44*	32.17
SD	9.369	7.641
Range	11-36	20-47
Block Design (out of 69)		
Mean	37.56	44.67
SD	13.333	11.01
Range	20-60	26-63

*$p < .05$ (two tailed)

4.2 Theory of Mind Results

Table 2 presents the mean performance of the two groups on the ToM tasks. The children with ASD performed worse at all levels of ToM compared to the TD children. This difference is statistically significant in the ToM first-order false belief tests as the Mann-Whitney U (z = -3.426, p = .001) shows, at a significance level of a = 0.05, and in the ToM composite score (z = -2.198, p = .028). This poor performance in the ToM tests does not stem from memory problems or misunderstanding of stories, as the children with ASD had high scores both in the control and memory questions.

Table 2. Mean performance on Theory of Mind tasks

	Group	
Measure	ASD	TD
	(N = 9)	(N = 18)
ToM 1st Order (out of 3)		
Mean	2.33*	3.00
SD	.707	.00
Range	1-3	3
ToM 2st Order (out of 3)		
Mean	1.44	2.50
SD	1.509	.514
Range	0-3	2-3
ToM Faux Pas (out of 2)		
Mean	1.44	1.83
SD	.726	.383
Range	0-2	1-2
ToM Composite (out of 8)		
Mean	5.22*	7.33
SD	2.33	.594
Range	2-8	6-8
Control questions		
Mean	7.44	7.94
SD	.726	.236
Range	6-8	7-8
Memory questions		
Mean	5.78	6
SD	.441	.000
Range	5-6	6

*p < .05 (two tailed)

Table 3 presents the frequencies of correct responses for the two groups in the ToM false belief tests. In the first-order false belief tasks, all the TD children passed all 3 scenarios successfully, while only 4 children with ASD passed all 3, revealing a decline in ToM development. In the second-order false belief tasks, due to the greater degree of difficulty, 4 children with ASD failed to give any correct response, while half of the TD group answered all three false belief tasks correctly and the other half answered at least 2 false belief tasks correctly. In

the Faux Pas false belief tasks the children with ASD performed better in comparison to their performance in the previous tasks. It seems that these kinds of ToM tasks are easier for them to understand.

Table 3. Frequencies of correct responses in ToM false belief tests

	Group					
	ASD (N = 9)			TD (N = 18)		
Correct responses	**ToM 1st order**	**ToM 2nd order**	**ToM Faux Pas**	**ToM 1st order**	**ToM 2nd order**	**ToM Faux Pas**
0	-	4	1	-	-	-
1	1	1	3	-	-	3
2	4	-	5	-	9	15
3	4	4	N/A	18	9	N/A

N/A: Not available

4.3 Executive Function Results

Table 4 presents the mean performance of the two groups on the four Executive Function tasks. Both groups had a similar performance on the inhibition and planning measures. On the memory and cognitive flexibility measures, the children with ASD performed slightly worse than their TD comparisons, without the result being statistically significant. Therefore, the hypothesis of a deficit in these executive functions cannot be supported, according to the results of this study.

Table 4. Mean performance on Executive Function tasks

	Group	
Measure	ASD (N = 9)	TD (N = 18)
Luria's Handgame (out of 10)		
Mean	8.78	8.78
SD	1.48	1.39
Range	6-10	5-10
Mazes (out of 28)		
Mean	19.44	19.1
SD	5.50	4.28
Range	12-26	13-27
Memory forward (out of 16)		
Mean	7.00	8.44
SD	2.50	1.68
Range	4-12	5-11
Memory backwards (out of 14)		
Mean	5.44	5.78
SD	3.71	2.01
Range	2-14	3-11

Memory composite (out of 30)		
Mean	12.44	14.22
SD	6.02	3.30
Range	8-26	10-22
Card Sorting Task (out of 60)**		
Mean	28.78	27.06
SD	4.41	5.87
Range	24-37	21-44

*p < .05 (two tailed)

**60 is the worst possible score and 18 the best

4.4 Weak Central Coherence Results

Table 5 presents the mean performance of the two groups on two Central Coherence tasks. In the picture completion, in which local precedence is investigated, both groups performed similarly. In the object assembly, in which global precedence is investigated, the TD children achieved a better score than the children with ASD, although the difference in scores was not statistically significant. The results do not permit us to support the WCC theory, although the difficulty of children with ASD in a global precedence task, where a transition from partial to holistic is required, is reflected.

Table 5. Mean performance on Central Coherence tasks

	Group	
Measure	ASD	TD
	(N = 9)	(N = 18)
Picture completion (out of 30)		
Mean	18.78	19.83
SD	3.42	3.46
Range	13-24	14-24
Object assembly (out of 44)		
Mean	21.56	25.17
SD	6.91	6.75
Range	8-30	13-34

*p < .05 (two tailed)

5. The Relationships between Cognitive Measures in All Three Domains with Age, Verbal and Nonverbal Sbility for the ASD and TD Groups

For both groups, the analyses revealed significant relationships (Table 6). For the ASD group, age was highly correlated with ToM ($r = .865$, $p < .01$), planning ($r = .916$, $p < .01$) and local precedence task ($r = .727$, $p < .05$). Verbal ability was highly correlated with ToM ($r = .795$, $p < .05$), planning ($r = .854$, $p < .01$) and local precedence task ($r = .725$, $p < .05$) and nonverbal ability was highly correlated with ToM ($r = .896$, $p < .01$), planning ($r = .756$, $p < .05$) and local precedence task ($r = .724$, $p < .05$). The lack of correlations with other tasks possibly reflects the great heterogeneity that exists amongst the skills of children with ASD.

On the other hand, for the TD group, no correlation was found between these three indicators and ToM. This finding seemed reasonable as we expected all the TD children over the age of 6 years to pass the majority of the ToM tests. As regards the EF and CC measures, correlations were revealed with at least two of the three indicators.

Table 6. Pearson correlations between cognitive measures in all three domains with age, verbal and nonverbal ability for ASD and TD groups

Group	Measure	Age	Verbal ability	Nonverbal ability
ASD	ToM	.865**	.795*	.896**
	Mazes	.916**	.854**	.756*
	Luria's Handgame	-.112	-.298	-.063
	Memory forward	.336	.368	.041
	Memory backwards	.609	.576	.280
	Memory composite	.515	.508	.190
	Card Sorting Task	.098	.121	-.083
	Picture completion	.727*	.725*	.724*
	Object assembly	.538	.299	.613
TD	ToM	-.115	-.350	-.171
	Mazes	.652**	.438	.538*
	Luria's Handgame	.514*	.693**	.255
	Memory forward	.426	.591**	.562*
	Memory backwards	.479*	.575*	.425
	Memory composite	.510*	.654**	.547*
	Card Sorting Task	-.579*	-.566*	-.260
	Picture completion	.603**	.680**	.548*
	Object assembly	.340	.521*	.754**

*p < .05 (two tailed)

**p < .01 (two tailed)

5.1 The Relationships of Cognitive Tasks across Groups

As shown in Table 7, for the ASD group, a strong, positive correlation was found between ToM and picture completion ($r = .728$, $p < .05$), between mazes and memory backwards ($r = .668$, $p < .05$) and between memory composite and the card sorting task ($r = .682$, $p < .05$). For the TD group, a series of correlations were revealed and are set out in detail in Table 8.

Table 7. Pearson correlations of cognitive tasks for ASD group

	Luria's Handgame	Mazes	Memory forward	Memory backwards	Memory composite	Card Sorting	Picture completion	Object assembly
ToM	-.201	.653	.000	.362	.223	-.128	.728*	.456
Luria's Handgame		-.048	.473	.361	.419	.585	-.554	-.133
Mazes			.473	.668*	.608	.365	.564	.535
Memory forward				.876**	.955**	.658	-.190	-.318

Memory backwards	.980**	.664	.058	-.079
Memory composite		.682*	-.043	-.181
Card sorting			-.426	-.008
Picture completion				.545

*p < .05 (two tailed)

**p < .01 (two tailed)

Table 8. Pearson correlations of cognitive tasks for TD group

	Luria's Handgame	Mazes	Memory forward	Memory backwards	Memory composite	Card Sorting	Picture completion	Object assembly
ToM	-.260	.170	-.215	.065	-.070	.095	-.228	-.425
Luria's Handgame		.349	.419	.462	.497*	-.565*	.344	.347
Mazes			.497*	.296	.435	-.437	.449	.355
Memory forward				.584*	.868**	-.234	.516*	.612**
Memory backwards					.910**	-.401	.449	.258
Memory composite						-.365	.538*	.470*
Card Sorting							-.490*	-.122
Picture completion								.491*

*p < .05 (two tailed)

**p < .01 (two tailed)

5.2 Regression Analysis

Seven econometric models were analyzed with the regression analysis method. The cognitive measures of the three theories were used as dependent variables, while sex, group, educational level (primary and secondary level) and age were used as independent variables. The results were controlled for the existence of heteroscedasticity, using the White control, for the existence of autocorrelation, using the Breusch-Godfrey control, and for multicollinearity, using VIF (variance inflation index). None of these affected the results of the present study.

Out of seven models, only regression analyses for ToM revealed group effect (Table 9). The constant was a = 0.1, while the variable «group» was statistically significant at significance level a = 0.05. The evidence indicates that children with ASD will present a worse performance in ToM tasks in comparison to TD children of the same age (-2.108).

Table 9. Regression analyses for ToM

Variable	Unstand. Coefficient	Std error	t-statistic	Sig	VIF
Constant	6.925	3.985	1.738	.096**	*N/A*
Sex	.595	.982	.606	.551	1.434
Group	**-2.108**	.547	-3.852	**.001***	1.002
Educational level	-.928	1.393	-.666	.512	6.495
Age	.004	.024	.144	.887	7.504
R-squared	0.483				

**95% confidence interval, **confidence interval 90%*

6. Discussion

According to the results of this study, a deficit in the development of ToM appears in children with ASD. This has also been supported by a number of other studies (Happé, 1994; Baron-Cohen et al., 1997b; Baron-Cohen et al., 1999; Pellicano et al., 2006; Pellicano, 2010a). However, the results should be treated with caution. Firstly, in spite of the fact that the degree of difficulty remains the same, for instance in the first-order tasks, children with ASD succeeded in scenarios that differed from each other. Thus, if a child fails in a single task, this does not automatically mean that they have not reached a specific developmental stage. This fact should be emphasized because early research used only one scenario to demonstrate if children succeeded or not in the first and second-order tasks of ToM (Baron-Cohen et al., 1985; Baron-Cohen, 1989b; Perner et al., 1989; Bowler, 1992). Secondly, on many occasions no absolute success or absolute failure could be identified in their performance, as children succeeded in different scenarios at all three levels. Furthermore, children with ASD performed much better in the modified Faux Pas tasks, highlighting the fact that there are more nuances in the development of ToM to be explored, since children with ASD seemed to have a better grasp of the false beliefs in more difficult circumstances.

Despite the apparent difficulty of children with ASD in successfully completing the false belief tasks, the universality of the phenomenon cannot be supported as there is a percentage of individuals who succeed in the first and second-order false belief tests (Bowler, 1992). It is possible that a delay in the development of ToM and not necessarily a deficit, affected by delayed language development, may be responsible for underperformance. Happé (1995) found that verbal mental age is the main predictor of success in first-order false belief tests for individuals with ASD, while for TD children, the main predictors are both age and verbal mental age.

Mitchell's suggestion (1996) that children with ASD may not pass false belief tests because they are locked into "current reality", where the object is placed, without taking into consideration another's person belief about where it might be, should also be taken into account. Additionally, the mechanisms used by children with ASD in order to succeed in a ToM false belief task are not certain. Although a child may have passed a ToM test, it may not have developed the ability of empathy, merely solving the task as if it were a mathematical problem (Pellicano et al., 2006; Rajendran & Mitchell, 2007).

Regarding EF theory, the children with ASD did not present any deficit in the four executive functions investigated. First of all, the children with ASD were not found to have a deficit in inhibition in comparison to the TD children. This finding is consistent with several studies (Eskes et al., 1990; Ozonoff & Jensen, 1999; Happé et al., 2006), though not with that by Pellicano et al. (2006) who used the same instrument. This discrepancy among studies may have occurred due to the age difference of the participants, as in that study (Pellicano et al., 2006) the participants were 4-7 years old, while in this study the participants were 8-15 years old. We assume that a possible delay in the development of EF in the early years may not be apparent as children with ASD grow.

With regard to the planning function, both groups displayed equal capability. They had almost the same score, therefore it would seem wrong to assume the existence of a deficit. In this finding, the specific assessment tool used might have played a mediative role as no differences were found in other studies that used the same instrument (Nydén et al., 1999; Pellicano et al., 2006).

In the Executive function of memory, the children with ASD had marginally lower scores in relation to the TD children. The findings of this study are consistent with those of other studies that used the same instruments

(Rumsey & Hamburger, 1990; Minshew et al., 1992; Bennetto et al., 1996). In fact, a great diversity in the responses amongst participants was revealed. On the one hand, there were children with ASD who surpassed all the TD children, while, on the other, there were also ASD children with very low scores.

As for the cognitive flexibility function, the children with ASD performed slightly worse than the TD children, without this difference being statistically significant. These findings contradict those of other studies using the same instrument (Pellicano et al., 2006; Pellicano, 2010a). The difference may be due to the age difference between the participants. However, this finding is consistent with those of other studies that used different tools (Edgin & Pennington, 2005; Goldberg et al., 2005; Corbett et al., 2009).

The finding that emerges from all these EF tests is that children with ASD constitute a capable group, in which various individuals surpassed their TD peers in various tests. Therefore, it is evident that children with ASD have also strengths and weaknesses like their TD comparisons. Even studies that found a deficit in EF, claimed that these deficits characterized only half of their sample of children with ASD (Pellicano et al., 2006).

Regarding WCC theory, in the picture completion task the children with ASD achieved slightly lower scores than their TD comparisons. In contrast to research supporting the superiority of children with ASD in local precedence (Shah & Frith, 1983; Jolliffe & Baron-Cohen, 1997), according to the results of this study, the children with ASD presented the same performance patterns as those of the TD children, consistent with other studies that did not confirm the superiority of ASD children over TD children of the same age (Brian & Bryson, 1996; Ropar & Mitchell, 1999, 2001).

In the object assembly task, the children with ASD obtained lower scores than the TD children, although the difference was not statistically significant. However, this difference might reflect their difficulty in global precedence where local interference takes place, as they needed more time and less successful connections were completed. Although our data and the current trend in research (Rajendran & Mitchell, 2007) do not permit us to support the WCC theory, children seem to prefer local over global processing and, furthermore, find global processing difficult when it consists of smaller incongruent parts (Mottron & Belleville, 1993). It seems rather to be a case of a personal information processing style (Happé, 1999), without, however, being a universal feature over the entire spectrum.

In our attempts to find correlations among the tests performed for the three cognitive theories, in the case of the ASD group, a high correlation was found between the ToM tests and the picture completion task. Children demonstrating good local precedence succeeded in the false belief tests. It could be assumed that even a detail-focused processing style can help them understand and attribute beliefs to others. A high correlation was also found between the results of the mazes task and memory backwards. This finding might indicate the strategy that was followed, as many children mentally started from the exit of the maze, proceeded to the center and then solved the maze problem. Conversely, in the TD group a high correlation was found between the results of the mazes task and memory forward, which perhaps suggests a different planning strategy.

Moreover, a high correlation was found between the memory composite score and the results of the card sorting task for the ASD group. This finding seems reasonable since it is necessary to remember features of the first and the following cards in order to identify the sort criterion with the fewest possible cards. A negative correlation was also found between the results of the Luria's handgame and card sorting tasks for the ASD group. Low scores on the inhibition task means that the child exhibits impulsive behavior, while a high score in the card sorting task means a weak performance in cognitive flexibility. So, the more impulsive a child is, the more likely it is to fail to inhibit itself, giving a wrong answer in the cognitive flexibility task.

For the TD group, a high correlation was found between the results of the picture completion task and the object assembly task, suggesting that both local and global precedence are equally developed processing styles, in contrast to children with ASD, where such a correlation is not apparent.

Due to the fact that different correlations were revealed among the tests investigating various abilities, it should be borne in mind that when a test is administered, it is difficult to isolate and investigate a single ability on its own, as in most tasks individuals must employ a range of skills, like memory, inhibition and planning. Therefore, terms like "deficit" or "dysfunction", should be used cautiously every time a child fails in a test, because it is impossible to be absolutely sure about the underlying mechanisms that caused a child to underperform.

As mentioned earlier, individuals with ASD must be considered as a heterogeneous group with varying strengths and weaknesses. Theories can help delineate a general profile and outline the main difficulties faced by this

group in its daily activities. Beyond that, however, our belief is that children with ASD require individualized educational programs that take advantage of their strengths and improve their weaknesses.

6.1 Limitations and Suggestions for Future Research

The conclusions drawn from this research are subject to a number of limitations. The first of these is the low sample number of ASD participants that affects the effect size of the study. We should be careful when interpreting the results, as some tendencies could well be due to this low sample size. The second limitation is the heterogeneity of the ASD participants, as 5 children had received an independent clinical diagnosis of autism and 4 children had received an independent clinical diagnosis of Asperger Syndrome, according to DSM-IV criteria (APA, 2000). However, since new diagnostic criteria released in the DSM V (A.P.A., 2013) these 2 groups fall within the same group. Another limitation is the administration of the vocabulary and Block Design subtests as indicators of verbal and nonverbal ability in order to reduce the length of the experimental procedure. It would have been more appropriate to use the Peabody Picture Vocabulary Test and the Leiter scale for measuring verbal and non-verbal ability, respectively.

Regarding recommendations for future research, more studies should be conducted in which children's performances in relation to the three above mentioned theories should be assessed on an annual basis. This would help us monitor their progress and identify possible links with verbal, non verbal and chronological age, and plan age appropriate interventions. Furthermore, each theory or ability should be investigated by at least two tools and the existing assessment tools should be improved and new tools should be introduced which will be more accurate and will give a clearer picture, in spite of the heterogeneity that exists in the profile of individuals with ASD. Finally, future studies should also include educational interventions to determine which of these improve the abilities of children with ASD and establish differentiated teaching programs that will be based on research data.

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Appendix A

1) First-order false belief tests

Unexpected transfer scenario (Wimmer & Perner, 1983; Simon Baron-Cohen et al., 1985).

The children saw a character, Maria, placing a marble in a handbag and then leaving the scene. While Maria was absent, another character, Kostas, transferred the marble in a box. Initially, children were asked by the experimenter the false belief question: "Where will Maria look for her marble?". Children were also asked a control question: "Where is the marble really?", and a memory question: "Where was the marble at the beginning?".

Unexpected replacement task (Pellicano et al., 2006)

The children saw a character, Helen, placing a ring in a box and then leaving the scene. Another character, John, while Helen was not present, removed the ring and replaced it with a pencil sharpener. Initially, the children were asked the false belief question: "What does Helen think is inside the box?". They were also asked a control question: "What is really inside the box?", and a memory question: "What had been placed inside the box at the beginning?".

Unexpected content task (Perner et al., 1989)

The children were shown a closed Smarties box whose content had been replaced with pencils and they were asked what they thought was inside. Then the experimenter revealed the true content and children were then asked a memory question requiring them to recall their own false belief: "Before you looked inside, what did you think was in the box?", and a reality control question: "What is really in the box?". Afterwards, a teddy bear was taken out and placed in front of the box. The children were asked the false belief test question to predict the teddy bear's false belief, "What will the teddy bear think is inside the box?".

2) Second-order false belief tests

Trial of unexpected transfer of object (Pellicano et al., 2006).

The children saw a character, Helen, placing a miniature teddy bear in a handbag and then leave the scene. While Helen was not there, another character, John, moved the teddy bear to a different place, inside a box. However, unbeknownst to John, Helen was watching the transfer through a window. Initially, the children were asked by the experimenter the false belief question: "Where will John think that Helen will search for her object?". The children were also asked a control question: "Where is teddy bear really?", and a memory question: "Where did Helen place the teddy bear at the beginning?".

Two modified scenarios from Perner and Wimmer's (1985) stories

1st scenario

The children saw three characters: Kostas, John and Stavros, who agreed to meet in the afternoon at school to play football. However, Kostas called John and told him that instead of meeting at school, it would be better to meet at the playground. Stavros was not informed about this change and John took on the responsibility of going to Stavros' house in the afternoon to pick him up and take him to the playground instead of school.

In the afternoon, as Kostas was going towards the playground, he passed Stavros' house. Stavros spotted him from his balcony and asked him where he was going. Kostas informed him that the meeting point had changed and he was going towards the playground. Stavros told him to wait for a second and they went to the playground together. But John didn't know that Kostas had met Stavros and had gone to the playground together. John went to pick Stavros up from his house, rang the bell and Stavros' father opened the door. John asked him where Stavros was and the father replied that Stavros had gone to play football.

Initially, the children were asked by the experimenter the false belief question: "Where will John think Stavros has gone?". The children were also asked a control question: "Where in fact are Kostas and Stavros?", and a memory question: "Where was the meeting point at the beginning?".

2nd scenario

The children saw two characters, John and Mary, together in the park. In the park there was also an ice-cream man, Mr. Nikos, in his van. Mary wanted to buy an ice cream but she had left her money at home. So she decided to go home to get some money and return to the park to buy some ice cream. She told John to wait for her. While Mary was away, John saw Mr. Nikos leaving the park. John asked Mr. Nikos where he was going and Mr. Nikos replied that he was driving his van behind the church to sell ice cream. While Mr. Nikos was driving his van over to the church, he passed Mary's house. Mary saw him from her balcony and asked him where he was going. He replied that he was going behind the church to sell ice cream. Then, Mary left her house and went right away behind the church to buy some ice cream. But John didn't know that Mary had talked to the ice-cream man. He went over to Mary's house, rang the bell and Mary's father opened the door. John asked where Mary was and her father replied that she had gone to buy some ice cream.

Initially, the children were asked by the experimenter the false belief question: "Where will John think that Mary has gone?". The children were also asked a control question: "Does John know that the ice-cream man has talked to Mary?", and a memory question: "Where was the ice-cream man at the beginning?".

3) Trials Faux Pas test

Two modified Faux Pas test scenarios (Baron-Cohen et al., 1999).

1st scenario

The children saw three characters: Uncle Sakis, Helen and Helen's mother. Helen and her mother made an apple-pie for Uncle Sakis, who was going to visit them. When he entered the house, Helen announced that she had made a pie for him. Uncle Sakis replied: "Thanks Helen, I hope it's not an apple pie, I hate apples".

Initially, the children were asked by the experimenter the Faux Pas question: “In the story did someone say something that they should not have said?” The children were also asked an identification question: “What did they say that they should not have said?”, a control question: “What kind of pie did Helen make for her uncle?”, and a false belief question: “Did Uncle Sakis know the pie was an apple pie?”.

2nd scenario

The children saw three characters: Kostas, John and Peter. Peter was inside the school WC. A few seconds later, Kostas and John went to the toilet to wash their hands. Kostas said to John: “Do you know Peter, the new boy that has just arrived in our school. I don’t like him at all, he’s weird”. At that moment, Peter stepped out of the WC and John said to him: “Hi Peter, would you like to play football with me?”.

Initially, the children were asked by the experimenter the Faux Pas question: “In the story did someone say something that they should not have said?”. The children were also asked an identification question: “What did they say that they should not have said?, a control question: “Where were Kostas and John while they were talking to each other?”, and a false belief question: “Did Kostas know that Peter was inside the toilet?”.

Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Use of Evidence-Based Survey Methods to Explore Early Elementary School Teachers' Approaches to Managing Student Anxiety

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Received: December 11, 2016 Accepted: December 23, 2016 Online Published: January 3, 2017

doi:10.5539/jedp.v7n1p123 URL: http://dx.doi.org/10.5539/jedp.v7n1p123

Abstract

The purpose of this study was to describe and explore early elementary school teachers' practices with regard to addressing student anxiety, focusing on the types of anxiety-reducing strategies they teach in their classes, the level at which they teach them (i.e., on an individual, small group, or whole class level), and the nature of the approach they use (i.e., proactive or reactive). Using a modified version of Tailored Design Methodology (TDM; Dillman, Smyth, & Christian, 2014), survey results (N=190 teacher participants; 64% response rate) indicated that almost two-thirds (66%) of teachers affirmed that student anxiety was impacting their classrooms. Almost all teachers (i.e., 90%) acknowledged teaching multiple anxiety-reducing strategies to their students, contrary to expectations. Survey participants most commonly reported teaching strategies to the whole class, as opposed to teaching strategies to small groups of students or to students on an individual basis. Use of reactive, as opposed to proactive approaches to teaching these strategies were more often reported. Implications are provided for how school personnel can support teachers in using a more proactive approach and ensuring that targeted instruction is available for students with more intensive needs.

Keywords: anxiety, children, intervention, school, teachers

1. Introduction

Despite the numerous mental health challenges that children and adolescents face, there are regrettably few available resources to meet the overwhelming need; mental health professionals are in serious demand (Albee, 2006). The inability to meet the scope of the problem suggests that mental health prevention efforts must be undertaken (Donovan & Spence, 2000). Prevention is particularly important to reduce the incidence of anxiety disorders which are the most widespread mental health disorders in childhood and adolescence with prevalence estimates ranging between 2%-27% (Sulkowski, Joyce, & Storch, 2012). Anxiety experienced during childhood and adolescence can adversely impact physical, emotional, and social functioning (Rockhill et al., 2010). It is linked to dysfunction within family relationships, school environments, and peer interactions (Rapee, Schniering, & Hudson, 2009; Wood, 2006).

Experts contend that it is often difficult to treat mental illness after the fact, suggesting it is much more effective to prevent mental health challenges rather than try to manage them after they have manifested (Doll & Cummings, 2008; Donovan & Spence, 2000; Kendall, Settipani, & Cummings, 2012; National Association of School Psychologists, 2009). Thus, a focus on mental health prevention, rather than providing treatment solely after illnesses become established is both practically more resource efficient and clinically more effective. Further, timing, or when to begin strategy implementation is an important consideration with prevention interventions (Donovan & Spence, 2000). As experts reason, younger children have more neuroplasticity, meaning that many unwarranted behaviors are more easily altered at an earlier stage in development (Hirshfield-Becker & Biederman, 2002).

Schools have been proposed as an ideal place to prevent mental health challenges (Strein, Hoagwood, & Cohn, 2003). They offer convenient locations to serve large numbers of children who may not have access to mental health services (Adelman & Taylor, 2012; McLoone, Hudson, & Rapee, 2006). Moreover, schools provide an authentic setting for children to practice coping skills with staff and administrators who are ideally situated to

supervise children and monitor their behavior (McLoone et al., 2006). Teachers can play a major role in helping build social and emotional protective factors within children who are at-risk for future developmental challenges (Jennings & Greenberg, 2009).

Cognitive Behavioral Therapy (CBT)—a hybrid method that incorporates cognitive, behavioral, emotion-centered, and social strategies to affect psychological change—is recognized as the primary evidence-based psychological treatment for childhood anxiety disorders and symptoms (Seligman & Ollendick, 2011). CBT has been effectively delivered in both individual and group formats (Silverman, Pina, & Viswesvaran, 2008), with evidence showing positive effects with children as young as preschool age (Minde, Roy, Bezonsky, & Hashemi, 2010). Although many CBT programs are implemented by trained psychological professionals, some CBT programs utilize more basic cognitive-behavioral techniques and can be implemented by other professionals, such as classroom teachers or school staff (Forman & Barakat, 2011). Ultimately, the flexibility inherent in CBT-based programs makes it possible to deliver effective treatments in environments, such as schools, where resources are lacking but still needed (Mychailyszyn et al., 2011). For instance, research-based programs implemented in schools, such as the individual or small group designed CBT-based *Coping Cat* program (Kendall & Hedtke, 2006) and the CBT-based *FRIENDS* program (Barrett, Lowry-Webster, & Turner, 2000), which is intended to be implemented at the classroom level, have been shown to be successful in helping students learn to manage anxiety (Barrett, Farrell, Ollendick, & Dadds, 2006; Kendall, 1994). When properly trained, teachers have been able to successfully implement prevention programs for mental health, including programs such as *FRIENDS* (Barrett et al., 2006). The *FRIENDS* program involves teaching students specific steps for coping with their anxiety. Each step is represented by a letter in the program title as follows: “F” stands for “feeling worried”, “R” stands for “relax and feel good”, “I” stands for “inner thoughts”, “E” stands for “explore plans of action”, “N” stands for “nice work, reward yourself”, “D” stands for “don’t forget to practice”, and “S” stands for “stay cool” (Barrett & Turner, 2001). In teaching these coping steps, teachers lead students through relaxation techniques, cognitive restructuring, attention exercises; family and peer supports are also addressed through the program.

There are often numerous barriers to program implementation in schools, despite the various aforementioned positive aspects and outcomes (Greenberg, 2010). For example, social-emotional program implementation can be time consuming (i.e., required training of staff and associated coordination efforts), and may be a lower priority for administrators than directly addressing academic deficiencies. These barriers may contribute to a lack of sufficient program buy-in and poor implementation fidelity (Adelman & Taylor, 2012). Despite these challenges, teachers are ultimately responsible for addressing children’s mental health needs on a daily basis, due to the influence that poor mental health can have on academic progress (Jennings & Greenberg, 2009; Koller & Bertel, 2006).

Unfortunately teachers receive minimal applied mental health training at the pre-service level (Jennings & Greenberg, 2009; Koller & Bertel, 2006). With regard to internalizing disorders, such as anxiety, Bryer and Signorini (2011) found that pre-service teachers’ experience and knowledge of suffering students occurred mainly unintentionally, such as through personal exposures with family and friends with anxiety disorders, through information acquired in popular media, and through chance experiences with students in their practicum sites. Further, practicing teachers themselves have reported heavy exposure to students with mental health challenges, but limited knowledge for working with them. For instance, in a study examining early childhood and elementary school teachers’ (n=292) perceptions of student mental health challenges, 75% reported that they either taught or referred a student with mental health challenges to school mental health professionals, and 76% indicated that they believed anxiety problems were major mental health challenges in their classrooms (Reinke, Stormont, Herman, Puri, & Goel, 2011).

Apart from situations in which researchers have studied the implementation of specific classroom-based anxiety prevention programs, research is not readily available to more generally describe how teachers are currently addressing student anxiety in their classrooms. Experts contend that current school policies for addressing mental health concerns (e.g., anxiety) are likely rooted in a more traditional, “wait-to-fail” philosophy, with less of a prevention-focused mind-set (Albers, Glover, & Kratochwill, 2007). Jones and Bouffard (2012) assert that everyday Social Emotional Learning (SEL) practices integrated into the curriculum are likely unplanned and not research driven. For those schools that do provide a range of SEL practices, Jones and Bouffard (2012) maintain that supports are likely in the form of universal programming or individually focused instruction.

The descriptive study by Reinke et al. (2011) highlighted that teachers felt unprepared to manage students with mental health challenges in their classrooms. Building off of this research, the current study focuses on one area of student mental health, anxiety, in order to identify ways in which teachers report helping students build skills for managing their symptomology.

Gaining this information may help to (a) better understand the current state of teacher classroom support for students presenting with anxiety, and (b) inform the work of school mental health staff who are interested in helping teachers most effectively address student anxiety at the classroom level. Specific research questions addressed and associated hypotheses include the following:

1) To what extent do teachers (a) report that student anxiety is impacting the classrooms, (b) report using published programs to teach strategies for anxiety in their classrooms, and c) report teaching strategies that are aligned with CBT-based approaches for managing anxiety?

2) How are these strategies taught to students (i.e., whole class instruction, small group instruction, individualized instruction)?

3) Do teachers teach these strategies preventatively or reactively (i.e., prior to or in reaction to students' display of anxiety)?

Based upon the aforementioned research by Reinke et al. (2011), and insights derived from experts (e.g., Albers et al., 2007; Jones & Bouffard, 2012), we hypothesized that teachers would report student anxiety to be impacting their classrooms, teach a limited number of CBT-based strategies, and most frequently teach them on an individual level in a reactive manner.

2. Methods

2.1 Participants and Setting

Following approval of the research procedures by an institutional review board, 299 general education teachers were invited to participate in a survey and 190 participated (response rate of 64%). To help understand the characteristics of the sample surveyed, a summary of demographic data collected is presented. Ninety-five percent of the responding teachers identified as White/Caucasian, 3% identified as African American, 1% identified as Asian American, and 1% identified as Hispanic American. Seventy percent of respondents reported having a master's degree, and 30% reported having a bachelor's degree. Sixty-eight percent of teachers reported having more than 10+ years of experience, 32% reported having between zero and nine years of experience. Testing for single proportions revealed no significant differences between these demographic characteristics and those associated with teachers in the corresponding state for the academic year 2011-2012 as reported by the U.S. Department of Education (National Center for Education Statistics, 2013a, 2013b). However significant differences were identified between the percentages of teachers reporting as males (3%) and females (96%) in our study compared to the percentages of male (24%) and female (76%) elementary school teachers for the state, z=6.978, p<.001, and z=6.48, p<.001 as reported by the National Education Association (2014).

Respondents consisted of kindergarten (33%), first grade (32%), and second grade (35%) general education teachers. They served school districts in 34 of 83 counties in the entire state in which the study was located. Twenty-eight percent of teachers reported teaching in counties with a low proportion of students receiving free and reduced priced lunch (FRL), 25% reported teaching in counties with a moderate proportion of students receiving FRL, and 37% reported teaching in counties with a high proportion of students receiving FRL. Ten percent of teachers did not report the county in which they worked, and so the proportion of students with FRL could not be determined.

2.2 Procedure

Teachers were recruited from within a Midwestern state. All public schools in the state with students in kindergarten, first, and second grades were arranged into three groups—low (0-33%), medium (34%-66%), and high (67%-100%)—based upon percentages of students who received FRL. This was done to obtain a representative sample of teachers from low, medium, and upper income communities. The percentages of students receiving FRL were determined from data reported in 2013 via the Michigan Department of Education (Center for Educational Performance and Information, 2014). One hundred schools were then randomly selected so that 33 schools were from the low FRL group, 34 from the medium FRL group, and 33 from the high FRL group. Teachers' names and the grade level they taught were then ascertained through publically displayed websites. Three teachers (i.e., one kindergarten, one first grade, and one second teacher) were then randomly selected to

participate from each school. In situations where teacher grade level or teacher names were not publically displayed, a different school was randomly selected from the same FRL group.

All teachers were contacted via postal mail and were asked to participate using a modified version of the Tailored Design Methodology (TDM; Dillman, Smyth, & Christian, 2014). The TDM strives to build a positive social exchange with participants and involves customizing survey methods to each specific situation in accordance with the audience, available funding, and necessary time frame for response (Dillman et al., 2014). It has been shown to yield response rates above 50% (Chidlow, Ghauri, Yeniyurt, & Cavusgil, 2015; Dillman et al., 2014). For the current study, three mail-based contacts were made with potential participants. The first included a survey invitation letter, a $2 unconditional incentive and an envelope and paid postage for survey return. Research on survey incentives has shown prepaid cash incentives to result in greater rates of participation than just promised incentives (Dillman et al., 2014; Singer & Ye, 2013). The second mailing consisted of a follow-up postcard and the third and final mailing sent to all 299 teachers contained a final reminder letter and a replacement survey (see Table 1 for return rate data for the three mailings).

Table 1. Return rate for the three mailings

Mailing	Mailing Period	Surveys Received (n)	% of total	Total Surveys Received (n)
Mailing 1: Survey	1/20/15 to 1/26/15	21	11%	21
Mailing 2: Postcard	1/27/15 to 2/3/15	38	20%	59
Mailing 3: Survey	2/4/15	132	69%	191

2.3 Measures

The survey consisted of three sections: teacher demographics, teacher beliefs about anxiety and anxiety program implementation history, and current teacher practices. Questions were created through a process that included multiple revisions as a result of feedback garnered from other researchers and elementary school teachers. Evidence for content validity was derived using the anxiety, mental health prevention, and CBT literature as guides for survey content. Two university professors with expertise in student anxiety reviewed item content and provided suggested revisions. The survey was then piloted with four teachers in a local elementary school district to obtain feedback on question clarity.

2.3.1 Teacher Demographics

Teachers were asked to provide individual demographic information including current instructional grade level, years of teaching experience, degree attainment, gender, race, and county where they taught. Data obtained from questions in this section were analyzed using descriptive statistics. Of note, to maintain participant anonymity, participants were only requested to provide the name of the county in which they taught. This was done to establish a general estimate of the socioeconomic status (SES) of their school communities. County-wide FRL data (i.e., the percentage of students receiving either a free or reduced priced lunch) was then gathered from each county (Kids Count Data Center, 2015; Michigan League for Public Policy, 2015). County data were then ranked in order by FRL percentage and organized into thirds, consisting of low, medium, and high categories. It should be acknowledged that using free and reduced lunch percentages as an indicator of socioeconomic status is widely used in school-based studies despite numerous limitations (Harwell & LeBeau, 2010).

2.3.2 Program Implementation History

The second section of the survey included items concerning teachers' perceptions of how anxiety impacts their classroom and items related to present and past implementation of published programs addressing student anxiety. Data obtained from questions in this section were analyzed using descriptive statistics.

2.3.3 Current Teacher Practices

(1) Number of CBT-based strategies taught. Teachers were asked to respond either *yes* or *no* as to whether they taught seven specific strategies for managing anxiety to their students. If they answered *no* for a strategy, they were prompted to respond to the next CBT-based, core strategy question. Sum scores (0-7) for each teacher were then determined to describe each teacher's strategy use.

Items corresponding to teachers' use of CBT-based strategies were adapted to address the following core CBT components: psychoeducation, relaxation training, exposures, cognitive restructuring, modifying contingencies, and skills training (Suldo & Ogg, 2014). For the sake of survey question clarity, it was decided that teachers' use of relaxation training should be split into two different questions: one focused on cognitive relaxation and one focused on physical relaxation. Thus, seven total questions were developed addressing the use of the six aforementioned CBT-based components. See Table 2 for the specific questions used.

Table 2. Teachers' responses to teaching core CBT-based strategies (N=190)

Question	Yes	
	n	%
Do you teach individual students about anxious thoughts, feelings, and behaviors (e.g., expectation of negative outcomes, butterflies in their stomachs, running away and hiding) and how to identify these in themselves?	121	64
Do you teach mental relaxation exercises for anxiety (e.g., breathing, meditation) to help students become aware of/reduce anxious thoughts in their minds/bodies?	110	58
Do you teach physical relaxation exercises for anxiety (e.g., yoga, stretching, dancing or jumping up and down) to help students become aware of/reduce tension in their bodies?	122	64
Do you use imaginary scenarios and/or role-play exercises with your students in order to teach them how to manage stressful situations (e.g., speaking in front of class, asking a new child to play)?	130	68
Do you teach and encourage students to challenge their anxious thoughts (e.g., "My parents will forget to pick me up from school today.") and encourage more positive, confident thinking (e.g., "My parents always pick me up everyday. They'll be here today!)	119	63
Do you teach students to appreciate and reward themselves for the efforts/actions they take in addressing their anxieties?	98	52
Do you teach students a specific step-by-step, problem solving process or method to help them develop the skills to find positive solutions for reducing or eliminating particular anxieties?	64	34

(2) Strategy teaching by level. If teachers answered *yes* to teaching a specific CBT-based strategy, they were then asked whether they taught the given strategy on a whole class, small group, or individual level. Respondents had the option to select one, two, or all three levels. Three separate sum scores were created for each responding teacher representing the number of strategies endorsed at the (a) whole class, (b) small group, and (c) individual student level.

(3) Proactive and reactive strategy implementation. If teachers answered *yes* to indicate teaching a specific CBT-based strategy, information on the use of proactive (i.e., meaning that they planned a lesson ahead of time to teach the strategy) and reactive (i.e., meaning they taught the strategy spontaneously in response to a particular classroom situation) approaches was also gathered. Respondents had the option to select one or both implementation types. Two sum scores were created for each responding teacher. The first indicated the number of strategies teachers reported using in a proactive manner and the second indicated the number of strategies teachers reported using in a reactive manner.

2.4 Missing Data

Missing data were evident for just 1% of possible responses across values collected for analysis in the current study. Missing data imputation was based upon logical rules (Gelman & Hill, 2007). In cases where teachers failed to report the level and implementation type for a strategy that they reported using, the associated sum scores were calculated using the remaining items on which they did report information.

3. Results

3.1 Impact of Anxiety on the Classroom

Teachers' were asked to provide information about whether they believed student anxiety had an influence within their classrooms. Sixty-six percent of teachers reported that they agreed or strongly agreed that student anxiety influenced the classroom setting. A total of 14% reported that they neither agreed nor disagreed that student anxiety impacted the classroom. A total of 20% or 1 in 5 teachers indicated that anxiety did not impact the classroom.

3.2 Program Implementation Practices

When asked whether or not they had used a specific program (e.g., *FRIENDS*) to address student anxiety with their whole class, 87% of teachers (165) reported they had not. For the 13% (25 teachers) who reported they had used a program and were asked to provide a specific name of that program, 16 teachers reported they used *Second Step*, with two teachers reporting that school counselors—not the teachers themselves—taught *Second Step* to their classrooms. The remaining teachers either specified programs not typically associated with addressing anxiety (e.g., *CHAMPS*), or reported that school counselors or social workers taught lessons—not the teachers themselves.

3.3 Number of CBT-Based Strategies Taught

On average, teachers reported teaching four of the seven possible strategies (M=4.02, SD=1.92). Nine teachers (4.7%) reported teaching zero strategies, 10 teachers (5.2%) reported teaching one strategy, 22 teachers (11.6%) reported teaching two strategies, 37 teachers (19.5%) reported teaching three strategies, 34 teachers (17.9%) reported teaching four strategies, 26 teachers (13.7%) reported teaching five strategies, 31 teachers (16.3%) reported teaching six strategies, and 21 teachers (11.1%) reported teaching seven strategies. See Table 2 for specific information on the percentage of teachers reporting use of each strategy examined. Teachers most frequently (68%) reported using imaginary scenarios and role-playing exercises to help students practice managing their anxiety in different stressful situations. They least frequently (34%) reported teaching a step-by-step problem solving process with their students.

3.4 Strategy Teaching by Level

Using discrete count data as dependent variables necessitated the use of a Poisson distribution to perform the remaining analyses (Dunteman & Ho, 2006). Given that the count data lacked independence, a mixed model was used to account for the dependency. Moreover, to confirm that normality assumptions were met, residual data points were examined with histograms and stem and leaf plots. These visual depictions indicated that residual data points satisfactorily met these assumptions.

Estimates obtained through the use of a Poisson Regression Mixed Model showed the mean number of strategies teachers reported teaching on an individual level to be 1.9 (SE=.13). The mean number they reported teaching on a small group level was .6 (SE=.07), and the mean number they reported teaching on a whole class level was 3.0 (SE=.17; see Tables 3 and 4 for information on strategy teaching by level). A significant difference was found for implementation level (p<.001). On average, the mean number of strategies teachers reported teaching on a small group level was 80% less than those they reported teaching on a whole class level. The mean number of strategies teachers reported teaching on an individual level was 40% less than those they reported teaching on a whole class level.

Table 3. Poisson regression mixed model means, standard errors, and Confidence Intervals (CI) for strategy teaching by level and proactive or reactive strategy teaching implementation

Variable	M	SE	95% CI
Strategy Teaching By Level			
Individual	1.9	.13	[1.6, 2.2]
Small Group	.6	.07	[.5, .7]
Whole Class	3.0	.17	[2.7, 3.4]
Proactive or Reactive Strategy Teaching			
Proactive	1.7	.12	[1.5, 1.9]
Reactive	3.9	.18	[3.6, 4.3]

Table 4. Poisson regression mixed model coefficients, t-scores, p-values, exponential coefficients, and Confidence Intervals (CI) for strategy teaching by level and proactive or reactive strategy teaching implementation

	Coefficient	SE	t	p	Exp (Coefficient)	95% CI
Strategy Taught By Level						
Intercept	1.113	.06	19.86	<.001	3.0	[2.7, 3.4]
Individual	-.485	.09	-5.34	<.001	.6	[.5, .7]
Small Group	-1.659	.14	-11.84	<.001	.2	[.1, .3]
Strategy Implementation						
Intercept	1.364	.05	29.18	<.001	3.9	[3.6, 4.3]
Proactive	-.846	.09	-9.92	<.001	.4	[.4, .5]

Note. "Whole Class" and "Reactive" used as the references for the intercepts.

3.5 Proactive and Reactive Strategy Implementation

Further applying a Poisson Regression Mixed Model analysis showed that the mean number of strategies that teachers reported teaching in a proactive manner was 1.7 (*SE*=.12), whereas the mean number that teachers reported teaching in a reactive manner was 3.9 (*SE*=.18; see Tables 3 and 4 for more information on proactive and reactive strategy teaching implementation). A significant difference was found, with teachers reporting teaching strategies 60% less proactively than reactively ($p<.001$).

4. Discussion

Research has shown that teachers have indicated anxiety as a major concern in their classrooms and the findings of this survey-based study further support the scope of this concern. Almost two-thirds (66%) of teachers surveyed agreed or strongly agreed that anxiety was impacting their classrooms. When considering this finding within the context of prior research showing that only 34% of teachers felt they had the skills needed to properly support children with mental health needs (Reinke et al., 2011), questions arise about how teachers are addressing the pervasiveness of anxiety within their classrooms. The purpose of this study was to more closely examine early elementary school teachers' anxiety reduction practices. We explored the types of strategies teachers might be teaching them (i.e., at what level), and the manner in which the strategies were implemented (i.e., proactively vs. reactively).

It was hypothesized that teachers would report limited to no involvement in the use of CBT-based strategies for students with anxiety. Contrary to this expectation, the majority of teachers (90%) reported using two or more CBT-based strategies. Additionally, survey responses indicated that teachers used numerous CBT-based strategies in the classroom (an average of four). The most commonly reported strategy was using imaginary

scenarios and role-play exercises (with 68% reporting using this strategy). This was a surprising result, particularly given prevailing literature indicating minimal teacher training with regard to student mental health management (e.g., Freeman, Simonsen, Briere, & MacSuga-Gage, 2014; Jennings & Greenberg, 2009; Koller & Bertel, 2006). However, only a small proportion (34%) of teachers reported teaching a step-by-step problem solving method. This seems to align with the notion that teachers do not typically apply a structured curriculum to address student anxiety. In contrast, in a CBT-based anxiety management program such as *Coping Cat*, children are taught to use the four-step, problem solving *FEAR* plan when they experience anxiety in a particular situation—with each letter of the acronym *FEAR* standing for a different skill they have learned (Kendall & Hedtke, 2006). The fact that a majority of teachers did not report teaching this type of problem solving process may be an indication that teachers are most comfortable in informally addressing issues of anxiety as they unfold within their classrooms.

It was hypothesized that teachers would report teaching the CBT-based strategies most often on an individual level. Yet, our results showed that teaching strategies on a universal (i.e., whole classroom) level was found to be most common, followed by teaching strategies at the individual level. Teaching strategies at the small group level was the least common. Based on these results, it may be the case that teachers recognize or intuitively sense that all students may benefit from being taught these strategies when certain anxiety-provoking situations arise and are therefore using the strategies on a universal level. Furthermore, for those students who are specifically struggling or in need of additional assistance, individual support is provided. The limited reporting of small group level teaching may be an indication that it is challenging for a classroom teacher to provide small group instruction to students on this topic.

Finally, it was hypothesized that teachers would more commonly report teaching strategies in a reactive as opposed to a proactive manner. The results supported this hypothesis: teachers reported teaching strategies reactively two times more often than they reported teaching strategies proactively. Based on the results of this survey, it appears that teachers often wait to address anxiety until students display anxious behavior within the classroom. In Reinke et al. (2011) teachers reported they felt it more appropriate for school-based mental health staff (e.g., school psychologists, social workers) to teach social-emotional lessons. This finding seems to align with the results from the current study. Although teachers did report teaching multiple CBT-based strategies, they reported doing so in a reactive manner, not proactively planning a lesson ahead of time. Experts advocating a proactive, prevention-based approach to mental health are numerous (e.g., Doll & Cummings, 2008; Hirshfeld-Becker & Biederman, 2002; Strein et al., 2003), not only because of the efficacy of addressing challenges before they manifest and become intensified, but also as a way of promoting wellness. A proactive approach can provide students with the skills to manage emotions when anxious situations are presented (Hirshfeld-Becker & Biederman, 2002).

4.1 Limitations

Certain limitations in this study should be acknowledged. Because this study relied on teachers' self-report of their practices, it is possible that these reports do not adequately represent actual practice. Systematic observation and interviews would offer more objective information on teachers' actual teaching of these strategies. Also, the sample is limited to teachers in one state, with the vast majority of teachers acquiring their degree in the state as well (95%). Pre-service teacher training programs likely differ across states and therefore results may vary in other areas. Additionally, we did not ask teachers to report on the frequency with which they teach each of the various strategies. It may be the case that although many teachers reported teaching the given strategies, they only do so in rare situations. Not reporting frequency also limited our ability to more thoroughly compare and contrast teachers' use of the individual techniques. Furthermore, sampling bias may be present in the current study results given that 36% of those invited to participate did not respond.

4.2 Implications for Practice

Results from this study suggest that teachers perceive student anxiety to be impacting their classrooms and are actively engaging in informal classroom-based approaches to address this anxiety. Further educating teachers about best practices for managing and preventing student anxiety is important, particularly in the absence of adopting formal programs aimed at preventing anxiety in the classroom. Additionally, school personnel (e.g., principals, social workers, school psychologists) might assist teachers in embedding CBT-based exercises for anxiety into already existing academic or social emotional lessons. Though this would not be a comparable substitute for more formalized program implementation (e.g., *FRIENDS*), it still may help teachers manage and prevent related challenges as well as equip all students with coping skills that can help them be successful in a

variety of situations. In particular, this could occur in situations where barriers exist to implementing a published evidence-based program.

Teachers appear to target instruction to address anxiety to the whole class, with fewer teachers reporting targeted instruction for small groups and individual students. It may be the case that in many situations, more targeted and individualized instruction is needed. Given teachers' reported lack of knowledge and inadequate training for meeting their students' mental health needs (e.g., Reinke et al., 2011), questions must be raised whether teachers are actually equipped to effectively offer this type of instruction. School-based mental health personnel can play a key role in assisting teachers to both identify related student needs, as well as to help teachers develop targeted interventions for those who are at-risk for heightened levels of anxiety.

Results from this study also indicate that teachers were teaching strategies more reactively than proactively. Teachers should be encouraged by school-based mental health personnel to take a more proactive approach by consulting with them about the benefits of prevention, but also by providing them with the necessary tools to do so (i.e., through best practices training and ongoing support and consultation). Whitley, Smith, and Vaillancourt (2012) suggest that in order to effectively prevent mental health challenges in students, it is vital for teachers to have the understanding, abilities, and mindsets to be successful. They suggest developing teachers' mental health literacy by holding ongoing professional development rather than one-time only workshops, using extant literature to effectively target known teacher knowledge gaps and misperceptions, and creating professional learning communities where teachers can learn and develop their knowledge and skills while collaborating with fellow colleagues.

Overall, given the widespread prevalence of anxiety disorders in childhood (e.g., Rapee et al., 2009) and the significant impact that they can have on immediate and long-term development (e.g., Rapee et al., 2009), including physical, social and emotional functioning (e.g., Rockhill et al., 2010), it is imperative that schools capitalize on opportunities to help those students in need. Teaching in a preventative fashion can be an efficient use of limited resources and advantageous to all students, particularly given the fact that they may experience multiple anxiety-provoking situations at different times in their lives. Learning effective coping strategies could prove highly beneficial for all students. In a school environment, teachers are key to intervention efforts but likely benefit from the support of school psychologists to help develop the necessary skills.

4.3 Implications for Future Research

Additional research is needed to better understand teacher practices related to management of student anxiety in their classrooms. In addition, teachers' roles and responsibilities with respect to assessment, consultation, and intervention around student mental health needs warrant additional attention in the literature. Specifically, observation and interview methods may help to further identify how and why teachers are implementing particular practices to address student mental health problems and whether what is reported in this survey-based study would be consistent with their actual/observed day-to-day practices. Moreover, it is important to evaluate how effective each of these practices is in building students' coping skills when implemented by teachers. This study only examined kindergarten, first, and second grade teacher practices. Future research should examine the extent to which teachers at other grade levels are involved in teaching such strategies.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Ethnic Cognition and Affect of British-Born Chinese Children

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Received: August 31, 2016 Accepted: October 20, 2016 Online Published: January 11, 2017

doi:10.5539/jedp.v7n1p135 URL: http://dx.doi.org/10.5539/jedp.v7n1p135

Abstract

Little research has explored the ethnic cognition and affect of ethnic Chinese children from Britain and Europe, contrasting the established literature from North America. The present paper reports research which tested these developmental aspects among British-born ethnic Chinese children aged 5 to 10 years from London attending a Chinese supplementary language school. Children were given measures on categorisation skills, self- and other identifications, target matching (by gender and ethnicity), own preference and rejection, inferred preference and rejection of mothers, and trait attributions. Results showed that age was associated with categorisation skills and target matching, but not self- or other ethnic identifications on which children exhibited high performance. The majority of children preferred Chinese peers and rejected non-Chinese peers and inferred their mothers to do the same, and own and inferred mothers' rejection choices were related to each other. These findings are discussed in relation to previous research findings from other ethnic minority children including British Chinese children and ethnic Chinese children from elsewhere, and the theoretical and contextual factors that may impact British Chinese children's ethnic identity and attitudes.

Keywords: British-born Chinese children, ethnic cognition, ethnic affect

1. Introduction

Britain is widely seen as an ethnic diverse country and sociological and social policy literature has documented numerous challenges facing children that grow up with such diversity on these isles and its potential impact on identities and intergroup relations (Barron, 2007; Connolly, 1999, 2001; Connolly & Hosken, 2006). Relatively little systematic quantitative research has investigated British children's ethnic cognition, however, with notable exceptions (Dai, McGregor, & Williams, 2014; Davey, 1983; Lam, Guerrero, Damree, & Enesco, 2011; Leman & Lam, 2008; Milner, 1983; Norburn, 1983; Rutland, Cameron, Bennett, & Ferrell, 2005).

The present paper reports a study that systematically investigated aspects of ethnic cognition and affect among British-born Chinese children aged 5 to 10 years. Hitherto, there has been only one published quantitative study of British Chinese (Scottish Chinese; Dai et al., 2014) children's identities and attitudes. This paucity is curious. With the increase in immigration from China to Britain (and other European countries) since three decades ago, the country has seen a steady population growth in its British-born younger generations with Chinese parentage (ONS, 2011). The relative lack of psychological research on British Chinese children's ethnic perception means that much of this review will draw on the literature of ethnic majority and minority children from Britain as well as elsewhere and sources about the British Chinese other than psychological literature.

The general consensus from the extensive research on ethnic and racial awareness of children from the US and Canada has been that children consciously notice those gross morphological differences between "basic" Black and White racial stimuli by the age of three years, and by the age of five most children can identify themselves by racial or ethnic labels (Katz & Koftin, 1997). In ethnic diverse societies children are aware of such diversity and can self-identify even earlier, in particular those from minority groups (Katz, 1983; Ramsay, 1987). This is possibly due to the higher salience of ethnicity sensed by those who form a distinctive minority in their contexts (McGuire, McGuire, Child, & Fujioka, 1978). This would mean that ethnic salience will diminish with increasing diversity in a given context, and this has been supported empirically (Dutton, Singer, & Devlin, 1998; Ramsay, 1991). However, whether a group is the "majority" or a "minority" is not only a matter of numbers, but carries connotations of power status. In North American or European societies that are highly diverse nowadays,

the "dominant" group in power is still the "White" population in terms of political and media representations and relative socioeconomic status, and this "status quo" may be subtly picked up by young minority children seeing their own group as the "other" in society (Cameron, Alvarez, Ruble, & Ruligni, 2001).

The way in which children readily identify themselves and others as members of their racial or ethnic "ingroup" or "outgroups" and notice the status differentials between groups are further borne out by their attitudes towards such groups. Since the earliest work (Clark & Clark, 1947) it has been reported that White children exhibit clear ingroup bias in the form of greater preference or liking towards White stimuli by the age of three. Furthermore, many non-White ethnic minority children in White-dominant countries (e.g., Aboud & Skerry, 1983; Annis & Corenblum, 1986) and even non-White majority children in countries or communities with few Whites (Bruce, Curtis, & Johnson, 1998; Cramer & Anderson, 2003) show obvious pro-White biases. Pro-White favouritism—often, if not always, concomitant with the rejection of, or negativity towards, non-White stimuli—has also been reported from middle through to later childhood in numerous studies (e.g., Aboud, 1988; Katz & Kofkin, 1997; Leman & Lam, 2008; Rutland et al., 2005).

Developmentally, an account that dominated for a considerable time is Social Cognitive Theory (SCT; Aboud, 1988), which proposed that cognitive development (along with certain social and motivational factors in a more minor role) contributes towards children's awareness of, and affect towards, members of different social groups. For the younger preoperational child, the key cognitive skill that is pertinent for person perception is perceptual categorisation, such as object classification, which requires the child being able to register both similarities and differences between group members along multiple dimensions (e.g., Bigler, Jones, & Lobliner, 1997; Ramsey & Myers, 1990). In this vein children evaluate group members in such a way where those similar to themselves are liked or seen as "good", and those more different are less liked or perceived as "bad", due to the focus on the self with perception dominated by affective processes featuring a fear of the unfamiliar (Aboud, 1988).

The notion that what is similar to the self is liked/good and what is different from it is disliked/bad also fits with the key premise of Social Identity Theory (SIT; Tajfel, 1981; Tajfel & Turner, 1979), which proposes that mere categorisation is sufficient to create ingroup bias and outgroup prejudice. Self-categorisation with the ingroup is also an evaluative process where favourable comparisons with outgroups enhances one's social identity. This in part explains White children's ethnic attitudes as their ingroup compares favourably with others and non-White children's "misidentification" or White bias as reflecting their awareness of social norms and status imbalances. After improved representations of minorities in post-desegregation eras, increases in ingroup identification and favouritism versus earlier times in African-American children were found (Semaj, 1985; Spencer & Markstrom-Adams, 1990). Still, to this day a substantial minority to a majority of non-White children in numerous studies, including some from Britain (Lam et al., 2011; Leman & Lam, 2008), have found neutral or pro-White attitudes.

While one may expect the above identity and attitude pattern concerning ethnic minority groups to also hold for British Chinese children as a minority, "unfavourable" comparisons with the White majority might not as readily apply in this case. Chinese Americans (and other Asian Americans) were hailed as some of the "success stories" of immigrants for some time, with the younger generations cast as the academic achievers compared with other groups, including White Americans (Cheng & Kuo, 2000; Fugligni, Witkow, & Garcia, 2005). The featuring of Chinese people as a "model" minority is mirrored in Britain and can be attributed to similar factors. The Chinese in Britain are seen as highly self-dependent (due to their entrepreneurial beginnings; Parker, 1995), if relatively placid, isolated, and vulnerable (to discrimination; Pai, 2005). The educational success of British Chinese youth has been an interesting phenomenon given the "working-class" positioning of many families, who are argued to employ "family capital" (cultural, social and economic) and a "diasporic discourse" of valuing of education that promotes academic success, leading to a "transcending" of social class (Archer & Francis, 2006). The synergy of positive motivation of the children and their parents' objectives are sometimes coined a form of "filial piety" that is responsible for the relatively high levels of achievement of less affluent Chinese pupils (Gates & Guo, 2014).

The academic successes of British Chinese children with a backdrop of high familial expectations might come at a cost to their social representations. Chinese students in British education have been homogenised as "naturally good" or "not laddish" (if boys) or "passive" and "repressed" (if girls; Archer & Francis, 2005). Such stereotypes are similar to those about Chinese Americans (e.g., Jackson Lewandowski, Ingram, & Hodge, 1997; Spencer & Markstrom-Adams, 1990). Experiences of isolation and discrimination were previously described about Chinese youth that led a "quiet" struggle with their identity while living an outwardly "British" lifestyle, or practicing the ethnic culture in private (Parker, 1995). By contrast, a recent study found that a dual (Scottish/Chinese) identity

was expressed by Chinese children (aged 8-14 years) born in Scotland most of who showed a greater liking for, and attributed more positive traits to, Chinese versus Scottish people (Dai et al., 2015). Such recent findings are more in line with those from previous research on Dutch Chinese youth. Compared with other ethnic minorities, Dutch Chinese exhibited stronger ingroup identification and bias, which were attributed to their greater ingroup involvement and participation in cultural traditions (Verkuyten & Kwa, 1996; Verkuyten, 1992). These factors are important to consider and contribute to making relevant predictions about our current sample.

The present study recruited its sample via the "supplementary" language school system that has, for a long time, provided tuition on native languages and cultures for many of Britain's ethnic minorities, often in the weekends. That the sample attended a Chinese language school indicates that they had relatively high levels of involvement with the ingroup and participation in cultural traditions. Based on these conditions and existing research findings about British Chinese children, our sample could be expected to exhibit high levels of ethnic awareness and self-identification (in cognition tasks) as well as ingroup biases (preference and trait attributions). The level of ethnic identification was expected to increase with age based on the pattern found about other British Chinese children (Dai et al., 2015). Ingroup bias should also increase with age, although the levels may "plateau", or even decline, towards later childhood, going by the premises of SCT concerning cognitive maturation of children at that stage, which purportedly moderates ingroup/outgroup perception. The children were also asked to infer their mothers' ethnic affect as a "significant other" (with an influence on children's own attitudes), where previous research has documented moderate associations between children's and perceived parental ethnic attitudes (Castelli, Carraro, Tomelleri, & Amari, 2007; Lam et al., 2011). It is likely that British-born Chinese children's ethnic affect would therefore resemble their mothers' inferred affect.

2. Method

2.1 Participants

The sample consisted of 60 British-born Chinese children who attended a Chinese association language school with around 100 students in South London on Saturdays. So that age and gender differences could be analysed, children were sampled on the basis of their falling into three key age groups, 5-6 years (M_{age}=5.65, SD_{age}=.49; N=20), 7-8 years (M_{age}=7.40, SD_{age}=.50; N=20) and 9-10 years (M_{age}=9.55, SD_{age}=.51; N=20), with an equal representation of boys and girls in each group. The parents gave written consent for their child to take part and the majority self-identified as "Chinese" (40%) or "Chinese Vietnamese" (ethnic Chinese that migrated from Vietnam; 35%) with a minority of "Hong Kong Chinese" (Chinese that migrated from Hong Kong; 20%).

2.2 Materials and Procedure

Children were seen individually by a British Chinese experimenter in a quiet room in the supplementary school. She explained that they would play some "games" with photographs, drawings or word cards. The materials and tasks were adapted from previous studies with children of a similar or slightly younger age range (Guerrero et al., 2011; Lam et al., 2011). The social stimuli's (targets) ethnic groups were selected based on their numerical representations in the sample's neighbourhood (apart from the noticeable minority of Chinese residents, Black and White people formed the majority, 75%). The tasks were given in the following order.

2.2.1 Social Categorisation

First, children were asked to sort photographs of unfamiliar children (targets). Photographs were used to permit realistic variations in features, but the targets were chosen on the basis that they represented features relatively typical of their ethnic grouping (Katz, Sohn, & Zalk, 1975) and children primarily rely on such visible concrete information including skin colour and hair to categorise people (Aboud & Skerry, 1983). Six photographs were chosen from a larger batch based on their comparable attractiveness ratings by adult judges. They showed three boys and three girls (one each of Black, White and Chinese ethnicity) all with smiling expressions differing in colour of clothing (orange or blue). The images were laid in front of each child, who was asked to sort them into two groups ("Can you put the ones that go together on one side…") and give his/her reason for the sorting. Then the images were shuffled and laid out again, and the child was asked to sort them using another criterion ("Sort them again, but in a different way from last time…") and give his/her reason for the second sorting.

2.2.2 Target Matching

To test children's attention to features denoting social categories, children were asked to pair a drawing with a photographed target, thereby "matching" their gender and ethnicity. Pictorial representations have been used in research examining ethnic cognition or affect with the advantage of being able to manipulate targets by features of interest (Augoustinos & Rosewarne, 2001). In the trials the child was shown two drawings, one a Black child

and the other Chinese (order of targets counterbalanced) of his/her own gender and four photographs (Black boy and girl, and Chinese boy and girl, as above). Each time the child was asked to choose the photograph on which the drawing was based ("Someone made this drawing of one of these children. Which is the child?").

2.2.3 Preference and Rejection

The six photographic targets above were shown again and children were asked to pick the one whom they would most like, or not like, to befriend ("which one of these children would you most like/most not like to be friends with?"). Each child was also asked for the reason for their choice each time as a check of their understanding.

2.2.4 Inferred Preference and Rejection

To explore the above measures in relation to children's inferences about their significant adult, children were asked which target their mother would prefer, or refuse, to invite to their own birthday party ("Which one of the children would your mum most like/not like to come to your birthday party?"). Each time the child was again asked for the reason for their choice as a check of their understanding of the questions.

2.2.5 Trait Attributions

This task involved presenting the three ethnic targets (Black, White and Chinese) matching the child's gender. She/he was asked to pick one that fitted each of a series of eight (four positive, four negative) traits (drawn from Augoustinos & Rosewarne, 2001): good, smart, nice, good-looking, bad, stupid, ugly and dirty ("Which of these is the … one?") in a randomised order. Children were also asked for the reason for their choice each time.

2.2.6 Ethnic Identification

To see whether children recognised the differences between the above ethnic groups and their common societal (British) labels, they were asked to slot the six photographs into three different boxes labelled "Black", "White" and "Chinese" accordingly (e.g., "Put the Black children's photos into this box…").

2.2.7 Self-Identification

In a way typically used for testing children's recognition of their own gender or ethnicity (Katz et al., 1975), the six targets were presented again and children asked to select the one that was "most like" them. As an indication of recognition of their group memberships, children were asked for the reason for their choice.

3. Results

An analysis comparing boys' and girls' responses on each measure was first run to check for gender differences, and no differences were shown in either ethnic cognition (social categorisation, ethnic and self-identifications, and matching) or affect (own and inferred mothers' preference and rejection and trait attributions) tasks. For the measures after social categorisation, responses were compared across age groups, and "social-cognitive levels" as derived from the social categorisation tasks (see below).

3.1 Ethnic Cognition

3.1.1 Social Categorisation

All, but three, children managed at least one logical sorting, even though the criteria for sorting were not limited to the set of social categories presented (gender, ethnicity or colour of clothing)—some (N=15, first sort; N=13, second sort) children used the length of hair (the White girl target had shorter hair than the other girls) and facial expression (interpreting some targets to smile "bigger" or look "happier") deemed reasonable for sorting. Table 1 presents the criteria used by each age group for their first and second sorting. Children used ethnicity less frequently than other criteria for sorting, but no associations between criterion and age group were found. However, on first sorting the youngest group were less likely to sort correctly (5-6 years, N=14) than the older groups (7-8 years, N=18; 9-10 years; N=19; χ^2=5.49, p=.03, 1-tailed). Children also differed in their ability to sort twice (10 did not manage the second sort requiring a change of criteria). A coding system was devised so that those who managed no logical sorting were coded level 0, those who managed one sorting were coded level 1, and those who managed two were coded level 2. The number of children falling into each level varied by age group (χ^2=7.61, p=.05, 1-tailed). All (N=3) children at level 0 were 5-6-year-olds, ten that achieved level 1 were split with two at age 9-10 and four each at 7-8 and 5-6 years, and level 2 was achieved by 13 at 5-6, 16 at 7-8 and 18 at 9-10 years of age. A Pearson's correlation test with age (in months) and sorting (social-cognitive) level found the correlation to be significant (r=.30, p<.01; 1-tailed).

Table 1. Criteria for social categorisation by age group (figures out of 20)

Age group	Sorting	Ethnicity	Gender	Clothing	Other
5-6 years	First	6	2	5	7
	Second	2	5	5	8
7-8 years	First	2	8	7	3
	Second	4	5	8	3
9-10 years	First	4	3	8	5
	Second	2	11	5	2
Sample	First	12	13	20	15
	Second	8	21	18	13

3.1.2 Ethnic and Self-Identifications

For identification of others, children had to sort all targets correctly into three labelled boxes ("White", "Black", "Chinese") to be marked "correct". All but four children (all 5-6-year-olds; χ^2=8.57, p<.01, 1-tailed) correctly performed this task, and social-cognitive level was not associated with this performance. For self-identification, children had to choose the target of their own gender and ethnicity (Chinese) for a correct answer. All but two (both 5-6-year-olds; *N.S.*) were correct.

3.1.3 Target Matching

For these tasks, children had to match two target drawings (one Black and one Chinese) with the photographed targets by gender and ethnicity. All but five children (four 5-6-year-olds, one 7-8-year-olds; χ^2=5.67, p=.03, 1-tailed) correctly matched the Chinese targets. Only two children (both 5-6-year-olds; *N.S.*) did not correctly match the Black targets. Performance in each task was not associated to social-cognitive level. Performances on both tasks (coded 0 for incorrect, 1 for correct) were combined to form a 0-2 scale to explore the associations between matching and age in months, social-cognitive level and ethnic identification. Significant associations were found with age (r=.24, p=.04; 1-tailed) and ethnic identification (r=.46, p<.001; 1-tailed).

3.2 Ethnic Affect

3.2.1 Own Preference and Rejection

Table 2 shows the number of children from each age group that chose a White, Black or Chinese target as the child that they "most liked" or did "not like" to be "friends" with. Chi Square tests of independence found that the sample showed a preference for, and least rejection of, Chinese targets (χ^2=9.10, p=.01; χ^2=17.10, p<.001, respectively, 1-tailed). The increase in Chinese preference towards age 7-8 years was not significant, and there were no associations between social-cognitive level and preference or rejection. Meanwhile, there was a significant association between children's preference and rejection (χ^2=14.34, p=.006, 1-tailed). Table 3 lists the percentages of children that opted for each combination of ethnic targets. Post hoc tests found that children that preferred a Chinese target were less likely to reject a Chinese target (p<.01).

Table 2. Target ethnicity of own and mothers' inferred preference and rejection by age group (figures out of 20)

		5-6 years	7-8 years	9-10 years
Own Preference	White	8	7	4
	Black	5	1	5
	Chinese	7	12	11
Own Rejection	White	12	6	11
	Black	6	13	7
	Chinese	2	1	2
Mothers Preference	White	4	6	3

	Black	3	4	1
	Chinese	13	10	16
Mothers Rejection	White	8	5	6
	Black	9	12	14
	Chinese	3	3	0

3.2.2 Mothers' Preference and Rejection

Table 2 also presents the number from each age group that inferred that their mother would prefer, or refuse, to invite a White, Black or Chinese target to their home. Chi Square tests found the sample with an overall inferred preference for, and least rejection of, Chinese targets (χ^2=27.70, p<.001; χ^2=21.10, p<.001; respectively, 1-tailed). Post hoc tests confirmed that children were more likely to infer that their mother would prefer Chinese over White and Black targets (ps<.001) as well as less likely to infer that she would reject Chinese over those targets (ps<.01). No associations between inferred affect and age or social-cognitive level were reported. Like own affect, there was a significant association between inferred preference and rejection (χ^2=21.60, p<.001, 1-tailed). Table 3 also presents the percentages of children that inferred their mothers to prefer and reject each combination of targets. Generally, after children inferred that their mother would prefer a target of an ethnicity, they were less likely to infer that she would also reject a target of that ethnicity, and this was confirmed for each target ethnicity by post hoc tests (White, ps<.01; Black, ps<.01; Chinese, ps<.001).

Table 3. Cross-tabulation of the target ethnicity of own preference/rejection, mothers' preference/rejection and own/mothers' rejection (figures in percentages)

	Own preference/rejection			Mothers' preference/rejection			Own/ mothers' rejection		
	White	Black	Chinese	White	Black	Chinese	White	Black	Chinese
White	37	47	16	0	85	15	41	52	7
Black	82	0	18	63	0	38	19	73	8
Chinese	43	57	0	36	62	3	40	20	40

Associations between children's own and inferred preference about mothers, and between their own rejection and inferred rejection about mothers, were also explored. Only the latter was found to be significant (χ^2=9.61, p<.05, 1-tailed). Post hoc tests showed that children that rejected a Black target were more likely to also infer that their mothers would reject a Black target over a White or Chinese ethnic target (ps<.01).

3.2.3 Trait Attributions

Children chose a target that they felt best represented each of eight traits. Table 4 shows the number of children (out of 60, the sample) that chose each ethnic target for each trait. Children clearly favoured Chinese over other ethnic targets for positive traits, but for negative traits, the patterns were not significant apart from "bad", where Chinese targets received fewer nominations than either Black or White targets (ps<.01, 1-tailed). There was no association between the attribution of any single trait and age or social-cognitive level.

Table 4. Number of attributions (figures out of 60) on eight traits and mean positive/negative trait scores by target ethnicity

	White	Black	Chinese	χ^2/F
Good	22	8	30	12.40**
Nice	14	17	29	6.30*
Good-looking	19	9	32	13.30***
Smart	17	14	29	6.30*
Bad	23	29	9	9.70**
Dirty	25	21	14	3.10
Ugly	18	22	20	.40
Stupid	20	26	14	3.60
Mean	1.22	.82	1.98	16.91***
Positive	(.94)	(.79)	(1.00)	
Mean	1.42	1.63	.93	4.43**
Negative	(1.15)	(1.10)	(.97)	

*p<.05; **p<.01; ***p<.001.

For further analysis, each trait attribution for a target ethnicity was coded 1 so that, for each child, both positive and negative traits were scored between 0 and 4 for each target ethnicity. Table 4 also shows the mean positive and negative attribution scores for each target ethnicity. It is clear that Chinese targets scored higher on positive, and lower on negative, attributions compared with White and Black targets, and this was confirmed by follow-up analyses (positive ps<.01; negative ps<.05). Finally, for each target ethnicity, the negative score was also subtracted from the positive score to form an overall trait attribution score for each child before the scores were entered to a repeated measures ANOVA, which showed a significant effect of trait attribution, $F(2,116)=11.00$, p<.001. Follow-up tests confirmed that Chinese targets (M=1.05; SD=1.81) scored higher than both White (M=-.20; SD=1.94; p<.01) and Black (M=-.82; SD=1.68; p<.001) targets.

4. Discussion

The present study was conducted to examine British-born Chinese children's recognition of, and affect towards, ethnic ingroup and outgroup members. Only scarce psychological research (Dai et al., 2014) has systematically studied ethnic cognition and affect of British-born descendants from ethnic Chinese communities despite their growing demographic in the host country. We will first discuss the findings concerning ethnic cognition before those concerning ethnic affect.

4.1 Ethnic Cognition

We found that although our British Chinese sample aged 5 to 10 years were generally highly aware of their own and others' ethnic group membership (evident in their self- and ethnic identification and matching performance), they were relatively unlikely to spontaneously use ethnicity for categorising others (evident in their responses on the social categorisation task). The latter pattern is in line with the existing research findings of other British children (e.g., Lam et al., 2011) and those of children from most other countries (Aboud, 1988; Katz & Kofkin, 1997). This finding also supports the idea that, provided that other categorical and non-categorical attributes are available, ethnicity does not offer the most salient characteristics for person perception (cf., Bennett et al., 1991; Ramsey & Myers, 1990). This was the case in spite of the current context—being a study about ethnic cognition and affect conducted within a Chinese community school setting—which was considered to potentially raise the salience of ethnicity.

Although the youngest age group (5-6 years) were less "accurate" in ethnic cognition compared with their older counterparts (as evident in identification and matching performance), few age group differences were observed, apart from the relationship between age in months and overall matching performance. Similarly, no association between social-cognitive level and any other ethnic cognition area was found, perhaps unsurprisingly as social-cognitive level was related to age. Therefore, our finding is, at best, only roughly in line with that

predicted by SCT, where children become more aware of, and accurate at distinguishing, persons from different groups that feature more subtle differences and identifying societal labelling closer to age 7 years, when cognitive maturity gives greater capacity for honing these categorisation skills (Aboud, 1988). That most of the younger children in this sample performed equally well at the ethnic cognition tasks as older children, and that their social-cognitive levels were only slightly lower than those of their counterparts, may also bear out the possibility that the social categorisation task (from which those levels were derived) was relatively simple (Bigler et al., 1997). In future research, more sophisticated methods for gauging multiple classification skills should be used.

The above findings may also reflect, as earlier reviewed, the ethnic salience in this context; the fact that parents sent their children to extracurricular schooling that educated them about their "mother tongue" and ethnic culture suggests that ethnicity was an important aspect of these children's upbringing. Furthermore, although the ethnic Chinese in Britain form a growing population, they are still a very small minority within the "ethnic minority" population (ONS, 2011) and this is likely to make their ethnicity salient in general (Dutton et al., 1998; Ramsay, 1991). Further studies may illuminate such contextual issues by sampling from more "normative" settings (such as state day schools—considering the very small numbers of Chinese pupils per school in that system) Chinese children as well as children from other ethnic groups with a wider range of ethnic identifications.

4.2 Ethnic Affect

Our findings showed a clear pattern of ingroup preference and least ingroup rejection (evident in own preference and rejection responses) as well as favourability towards the ingroup (evident in trait attributions) among British Chinese children. This is in line with previous findings from White (Aboud, 1988) and British Chinese children (Dai et al., 2014) and corresponds with the general premise of SIT. In addition, children's inferences about their mothers' affect resembled their own, again in line with existing findings (Castelli et al., 2007; Lam et al., 2011). Similar to ethnic cognition above, although there was greater ingroup preference from 7-8 years, there were no significant differences between age groups. There were also no associations between social-cognitive level and affect. Hence, our findings were not fully in support of the premises of SCT which denote that children's ethnic bias would "peak" towards around 7 years of age before declining towards late childhood where they pass stages from focusing on between-group differences and within-group similarities to noticing individual characteristics featuring within-group differences and between-group similarities with cognitive development (Aboud, 1988).

The findings that, regardless of age or socio-cognitive level, these British-born Chinese children preferred ethnic ingroup members as potential friends and judged them more favourably over outgroup members, expecting that their mothers would feel the same, might again bear out the salience of their ethnicity, since a young age, in both the supplementary school and family contexts. The latter context might also be borne out by the relationship between children's own and inferred mothers' rejection (where children were most likely to themselves reject, and to infer that their mothers would reject, a Black peer). That Black targets were also the least favoured group (evident in trait attributions) might betray the fact that, although Black people formed the numerically dominant ethnic minority group (after the White majority) in the neighbourhood, there are still a great deal of negative stereotypes attached to Black Britons, particularly younger Black males (Connolly, 1999; Lam & Smith, 2009). Further research could include more measures of children's own and their parents' social stereotypes about different ethnic groups to ascertain this possibility.

Unlike the findings from recent research with other ethnic groups (Guerrero et al., 2011; Lam et al., 2011), this British Chinese sample's preference and rejection choices were related. While those studies found the inferences about mothers' preference and rejection to be associated, as was the case here, children's own choices were not. This, again, might be a result of the ethnic salient context (ingroup identity was likely strong), where children were relatively "logical" about both their own choices and inferences about the significant adult. Contexts where children vary more in their ethnic identification for further research may ascertain better the distinction between ingroup positivity and outgroup negativity, even though this distinction was reflected by trait attributions in this study as ingroup favourability was clear from children's responses to the positive, but not negative, traits.

The findings of this study mainly differed from those of studies with children of other British ethnic minorities (e.g., Lam et al., 2011; Leman & Lam, 2008), in terms of the lack of White preference (or mothers' inferences). This might be in part due to the older sample in the current study (cf., preschoolers; Lam et al., 2011) or it could be that ingroup bias tends to consolidate through middle childhood though this has been largely the case only for White-majority children (Katz & Koftin, 1997). The relatively "uniform" ingroup preference and favourability in British-born Chinese children might also reflect the sample's high levels of involvement with the ethnic ingroup

(through the language school and family contexts), factors that are important for ingroup identification and bias (Verkuyten & Kwa, 1992). Additionally, as a "model" minority that can compare favourably with other groups (Gates & Guo, 2014) ingroup identification and bias are likely to be strong according to SIT.

4.3 Limitations

There are several limitations to this study that ought to be considered for future research, whether with British Chinese children or other ethnic groups. Our sample was drawn from the supplementary school sector primarily due to logistics (very few Chinese pupils in most British schools). The highly ethnic salient school context itself might have influenced children's responses to be more pro-ingroup than they might have been elsewhere. While the sector is still useful for future sampling, alternative testing locations and methods (such as at home or on campus and comparing explicit and implicit measures) may be used so that levels of identification and affect are more independent from the school context. Alternatively, children's cognition and affect may be assessed across different contexts systematically to explore the impact of context.

The ethnic "targets" in this study were represented by photographs of unfamiliar children to evoke affect towards different group members. Whether children's choices and evaluations reflect their "real-life" peer preference and attitudes or whether existing friendships or prior experiences with ethnic group members affect their judgments is unclear. Future studies may check the consistency between children's projected and real-life ethnic preference and intergroup attitudes by collecting data on the social group memberships of children's friends and their day school's demographics (which can impact opportunities for intra- and intergroup friendship formation). A fuller account for the ethnic cognition and affect of particular groups of children could only be ascertained by more studies with those children in different familial and educational settings with more detailed data on the specifics of those settings.

5. Conclusion

The current study systematically examined ethnic cognition and affect of British-born Chinese children aged 5 to 10 years. It found that the children did not tend to categorise people by ethnicity spontaneously, even though they were highly aware of ethnic group differences and labels, displayed clear ingroup biases, and deduced that their mothers would share such biases. Both psychological and contextual factors may explain such patterns, but more research is needed to study this under-researched, yet growing, ethnic group in Britain.

Acknowledgments

We thank the children, parents and teachers at the Chinese association supplementary language school (school is anonymised to protect privacy) who made this study possible, and our colleagues who commented on an earlier version of this paper before its submission.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Effort, Ability, or Difficulties? Parents' and Teachers' Explanations of the Malleability of Children's Competences

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Received: September 12, 2016 Accepted: November 1, 2016 Online Published: January 11, 2017

doi:10.5539/jedp.v7n1p146 URL: http://dx.doi.org/10.5539/jedp.v7n1p146

Abstract

This study set out to examine parents' and teachers' explanations of the malleability of children's competences. Parents and teachers were asked in which aspect of schoolwork the child could improve his/her competence most and to explain why. The participants were parents and teachers of third- and sixth-grade boys and girls (n=97). The parents and teachers were found to refer to the amount of effort, motivation, and ability in their explanations of the malleability of children's competences. The explanations concerning ability divided into those in which the child was seen as possessing ability and those in which the child was seen as lacking ability or having difficulties that prevented her/him from succeeding. The teachers perceived sixth-graders as needing more effort and motivation than third-graders did, and girls as somewhat more competent and motivated than boys. The teachers also seemed to explain children's potential for improvement in more complex ways than the parents did.

Keywords: children, competences, explanations, grade-level, malleability, parents, teachers

1. Introduction

This study affords a novel approach to examining parents' and teachers' perceptions of children's academic achievement. First, the study was concerned with parents' and teachers' explanations of the malleability of children's competences, i.e., children's potential for improving their competences. Second, parents' and teachers' explanations of the malleability of children's competences were examined in regard to several specific aspects of schoolwork. Third, the explanations were elicited with open-ended questions, which allowed the respondents to better bring forth their own views. It has been observed in previous work that parents' and teachers' responses are more likely to reflect their own perceptions when there are no ready-made options to choose from, whereas ready-made options may steer the responses in a certain direction and thus reduce their variation (cf., e.g., Hewstone & Fincham, 1996).

The explanations given by parents and teachers for the malleability of children's competences may be consequential for the children's achievement and learning (cf., e.g., Butler, 2000; Pomerantz & Dong, 2006; Spinath & Spinath, 2005; Wigfield et al., 1997): for example, parents and teachers who believe that achievement comes from effort may encourage children to go on practicing even if the task is demanding, whereas parents and teachers who believe that abilities are rather unchangeable are likely to focus on evidence of good performance, such as test results and grades, to take the child's failures in learning more seriously, and to exhort the child to reach for good grades.

Our first aim in this study was to examine the parents' and teachers' views as to the aspects of schoolwork in which the child could improve his/her competence the most. The aspects of schoolwork included in the study were mathematics, Finnish (=mother tongue), handicrafts, sports, and diligence and attention, which are all important skills for school-aged children. Since academic school subjects, mathematics in particular, are traditionally seen to reflect "real" or innate intelligence, available to only a few (Mugny & Carugati, 1989), we hypothesised that the parents and teachers would perceive the child's potential for improvement as lower in mathematics and Finnish than in other aspects of schoolwork.

The second aim was to examine what kinds of explanation the parents and teachers would give for the malleability of children's competences. Earlier studies have shown that children tend to refer both to the amount

of effort and practice and to ability or talent in their explanations for their potential for improvement (e.g., Droege & Stipek, 1993; Nicholls, 1990; Räty, Kärkkäinen, & Kasanen, 2010; Stipek & Gralinski, 1996). Explanations referring to effort and ability reflect the theory of the malleability of intelligence presented by Dweck (1999). According to this theory, intelligence is seen either as rather a changeable property that can be increased through effort and practice or as rather a permanent property, i.e., a talent that cannot be changed. Although the theory of the malleability of intelligence has been tested among children in particular (e.g., Blackwell, Trzesniewski, & Dweck, 2007; Dweck & Leggett, 1988; Elliott & Dweck, 1988; Henderson & Dweck, 1990), it seems to lend itself to parents' and teachers' perceptions as well (cf., Butler, 2000; Matteucci, 2007; Pomerantz & Dong, 2006; Rautiainen, Räty, & Kasanen, 2016). We therefore expected the parents and teachers in this study to spontaneously bring forth at least the amount of effort and ability in their explanations for children's potential for improvement in different aspects of schoolwork.

Our third aim was to examine whether there were differences between the parents' and the teachers' explanations for the malleability of children's competences. In an earlier study we had found that parents had a more optimistic view of their child's potential for improvement in mathematics and Finnish than teachers did (Kärkkäinen & Räty, 2010). Generally, too, parents tend to see their child's learning in an optimistic light (cf., Goodnow & Collins, 1990), whereas teachers may duty-bound professionally to assess and rank the pupils' achievement in normative terms. We therefore expected the parents to make more references to the amount of effort and practice in their explanations for the malleability of children's competences than the teachers would and the teachers in turn to make more references to rather unchangeable properties, such as ability or talent.

The fourth aim was to examine whether the child's gender and grade-level and the parent's education made a difference in the parents' and teachers' explanations for the malleability of children's competences. We included the child's gender in the present study since parents' and teachers' perceptions of girls' and boys' school achievement are known to be gender-stereotyped: boys are usually seen as more talented in mathematics and sports than girls, who in turn are seen as more competent in the mother tongue and in other school subjects as well. Moreover, boys' success is more often seen as a consequence of talent and girls' success as due to hard work and diligence (Eccles, Jacobs, & Harold, 1990; Jussim & Eccles, 1992; Räty, Kasanen, & Snellman, 2002; Yee & Eccles, 1988).

The parent's education was included in the analysis since it is known to be related to children's achievement at school (OECD, 2014). Moreover, highly educated parents perceive their children's cognitive-verbal skills in a more optimistic light than other parents do (e.g., Räty, Kasanen, & Honkalampi, 2006). Lastly, we included the child's grade-level since it is related to their potential for improvement, at least in the perceptions of children themselves (e.g., Droege & Stipek, 1993; Räty, Kasanen, & Honkalampi, 2006), and we therefore wanted to see if it was also associated with the parents' and teachers' explanations for the malleability of children's competences. However, we did not set any specific hypotheses concerning the possible differences between these groups.

Our fifth aim was to examine whether the parents' and teachers' explanations for the malleability of children's competences were associated with their assessments of the child's current performance in these areas. Earlier studies of parents' perceptions have shown that the child's good performance is seen as relating to rather permanent reasons, such as ability or talent, whereas the child's poor performance is seen as relating to rather changeable reasons, such as lack of effort (cf., Räty, Kasanen, & Kärkkäinen, 2006; Rytkönen, Aunola, & Nurmi, 2005; Yee & Eccles, 1988). In our earlier study (Kärkkäinen, Räty, & Kasanen, 2010), too, we found that parents and teachers perceived those children as having more stable competences who were seen as doing well at school. And again, the children who were seen as doing not so well were perceived as more capable of improvement. We therefore hypothesised in this study that the parents' and teachers' explanations for the malleability of children's competences would relate to their assessment of the children's current competences, i.e., if the child was seen as doing well, the parents and teachers would refer to ability or talent more often, whereas if the child was seen as doing not so well, they would make more references to the amount of effort and practice.

2. Method

2.1 Participants

The study included 97 parents, of whom 50 were mothers and 46 fathers (with one respondent's gender not specified). The sample comprised parents of girls (n=48) and boys (n=49) and parents of third-graders (n=41) and sixth-graders (n=56). The third-graders were approximately nine years and the sixth-graders approximately 12 years of age. Of the parents, 59 were vocationally educated (including vocational school and vocational

institute education) and 33 were academically educated (including polytechnic and university education). One respondent's education was not specified and four had no post-primary education. These parents were excluded from the analysis concerning the parent's educational level.

The study included eight class teachers, who assessed a total of 103 children. Of the children, 52 were girls and 51 were boys, and 44 were third-graders and 59 sixth-graders. One half of the teachers worked on the third grade and the other half on the sixth. Five of the teachers were female and three male. The teachers' professional experience was 21 years on average, ranging from 8 to 33 years, and they had taught their current class an average of 2.7 years, ranging from just a few months to over 5 years.

2.2 Procedure

Teachers from four schools were asked whether they would be willing to participate in a study in which parents would answer questionnaires, pupils would be interviewed, and the teachers themselves would rate the pupils' achievement in different aspects of schoolwork. After eight teachers had consented to take part in the study, no more participants were sought.

Subsequently, the pupils' parents were sent letters asking for a written permission to interview their child, to send them a questionnaire with questions about their child's schooling and competences, and to ask their child's class teacher about her/his views of the child's competences in different aspects of schoolwork. A total of 191 letters were sent asking both parents to participate, and 164 parents were willing to take part. They were parents of 106 children, since in some families both parents were willing to answer the questionnaire. Three of the children were excluded for various reasons, such as moving out of town.

We sent a total of 159 questionnaires to the parents, and 140 were returned, 93 of which were completed by mothers and 46 by fathers (with one respondent's gender not known). Since we wanted to compare parents' and teachers' ratings, only one parent per child was included in the study, even if both parents had taken part. To ensure an even gender distribution, we first included all the fathers who had filled in the questionnaire and finally included 97 parents in the study.

2.3 The Questionnaire

Explanations for potential for improvement: the parents and teachers were asked "In which of the above-mentioned aspects of schoolwork could your child/the pupil improve her/his performance the most? Why?" The aspects of schoolwork were mathematics, finnish, handicrafts, sports, and diligence and attention. The Why-question was an open one, with a request to write out an explanation.

Assessment of the children's current competences: The parents and teachers were also requested to rate each child's current competences in different aspects of schoolwork with the question "How would you rate your child's/the pupil's performance in the following aspects of schoolwork at the moment?" Please circle the best alternative by using the following scale: 1) not so good, 2) fair, 3) fairly good, 4) good, 5) excellent. Out of the parents' and teachers' ratings of the child's current competences, sum variables were formed, which included the parent's/teacher's rating of the child's performance in mathematics, Finnish, handicrafts, sports, and diligence and attention. The Cronbach's alpha coefficients for both the sum variable formed out of the parents' ratings (α=.62) and that formed out of the teachers' ratings (α=.73) were acceptable. On average, the parents' ratings (M=3.86, sd=.50) and the teachers' ratings (M=3.71, sd=.65) of the children's current performance in the aspects of schoolwork were positive.

3. Results

3.1 In Which Aspect of Schoolwork the Child Could Improve Her/His Performance the Most

In their answers, the teachers cited mathematics the most often and Finnish the second most often. The parents cited mainly diligence and attention and, right after that, Finnish and mathematics (see Table 1).

Table 1. Frequencies and percentages of answers given to the question "In which aspect of schoolwork could your child/the pupil improve her/his performance the most?"

	Teachers		Parents	
	n	%	n	%
Mathematics	30	29.1	19	19.6
Finnish	24	23.3	20	20.6
Sports	18	17.5	10	10.3
Handicrafts	10	9.7	6	6.2
Diligence and attention	17	16.5	21	21.6
No response	4	3.9	21*	21.6
Total	103	100	97	100

*This frequency is high because many parents did not answer the open questions at all.

3.2 Classification of the Explanations

After several thorough readings of the answers, the parents' and teachers' answers to the why-question were classified into the following 5 categories:

1) CONDITIONAL EFFORT AND MOTIVATION: conditional references to effort and practice or to the need to work up more motivation or self-confidence or a better performance, e.g., "by trying harder, that is by practicing, the performance in maths can be improved", "he/she could work harder", and "we should find a way to motivate the child to the subject".

2) ABILITY AND MOTIVATION: references to things going well and to the child's being enthusiastic about the subject, e.g., "she/he is quite good already" and "is very keen on it (mathematics)".

3) LACK OF ABILITY, "DOESN'T COME EASY", DIFFICULTIES: references to lack of ability and difficulties, e.g., "Reading skills and reading comprehension are deficient. Text production is difficult and slow", "poor performance at the moment", "we have a case of dyslexia here, and that calls for a lot of work".

4) UNEVEN PERFORMANCE: references to partial difficulties, e.g., "Reads and writes fairly well. Sentence structures, e.g., full stop, capitalisation, etc., do not yet click into place in the best possible way". And "There are still a lot of spelling errors, such as the geminate consonant. There's plenty of imagination for writing a story, but the sentence structures are still deficient".

5) OTHER EXPLANATIONS: references to other explanations, e.g., "woodwork is a new thing this year", "the teacher's teaching style and the child's learning style do not meet", "large restless class", and "nervousness in these exams (mathematics)".

The parents' and teachers' explanations were assigned to the coding categories dichotomously (0=not mentioned, 1=mentioned). The classification was not exclusive, i.e., if the parents and teachers gave many different explanations for one rating, these were each assigned to separate categories. However, if the parents and teachers gave many explanations that belonged to the same category, these were coded only once. To examine the inter-rater agreement of the codings, two raters classified 20 randomly chosen answers (10 for parents, 10 for teachers) independently. The raters reached a 88 % agreement on the classifications.

3.3 The Most Frequent Explanations for the Malleability of Children's Competences Given by the Parents and Teachers

The teachers gave a total of 109 explanations and the parents 66 explanations in response to the why-question. As the parents and teachers assessed the same child, a paired-samples t-test was used. According to the paired-samples t-test the teachers gave statistically significantly more explanations than the parents did ($t(56)=2.18$, $p<.05$). Both the teachers and the parents made the most references to the category *Conditional effort and motivation* (see Table 2). The teachers failed to give an explanation in the case of 9 children and the parents in the case of 12 children though they had mentioned an aspect of schoolwork in which the child could improve the most.

Table 2. Parents' and teachers' explanations in reply to the why-question

	Teachers		Parents	
	n	%	n	%
Conditional effort and motivation	47	43.1	28	42.4
Ability and motivation	10	9.2	3	4.5
Lack of ability, difficulties	26	23.9	15	22.7
Uneven performance	15	13.8	2	3.0
Other explanations	11	10.1	18	27.3
Total	109	100	66	100

According to the McNemar test for paired samples, the teachers' and the parents' explanations differed only in regard to the category *Uneven performance*, which was offered more often by the teachers than by the parents ($\chi^2(1)=8.10$, $p<.005$; see Table 2).

3.4 The Associations of the Explanations with the Child's Gender and Grade-Level, with the Parent's Education, and with the Parents'/Teachers' Assessment of the Child's Current Competences

To examine whether the child's gender and grade-level, the parent's education and the parents'/teachers' assessment of the child's current competences were associated with the explanations given by the parents and teachers, a set of logistic regression analyses with the enter method were used. The logistic regression analyses were run separately for the parents' and the teachers' explanations, with the five explanation categories as dependent variables one at a time. To assess the regression models obtained, the Omnibus Tests of Model Coefficients was used, and to indicate the amount of variation in the dependent variable accounted for by the model, the Nagelkerke R-square values were used.

In regard to the parents' explanations of the malleability of children's competences, none of the regression models reached statistical significance.

In regard to the teachers' explanations, the following regression models were statistically significant: first, the category *Conditional effort and motivation* ($\chi^2(4)=10.89$, $p<.05$) explained 18.8% of the variance and correctly classified 55.6% of the cases. In this model, the child's grade-level was a statistically significant predictor ($\beta(1)=1.72$, $p<.005$), indicating that the teachers perceived the sixth-graders as needing more effort and motivation than the third-graders did (see Table 3).

Second, the category *Ability and motivation* ($\chi^2(4)=11.53$, $p<.05$) explained 28% of the variance and correctly classified 87.5% of the cases. In this model, the child's gender was a marginally significant predictor ($\beta(1)=2.16$, $p=.069$), indicating that in their explanations for girls' potential for improvement the teachers made more references to the presence of ability and motivation than they did in the case of boys (see Table 3).

Table 3. Frequencies (and percentages) of the explanations by the child's gender and grade-level and the parent's education

	Teachers						Parents					
	Child's gender		Child's grade-level		Parent's education		Child's gender		Child's grade-level		Parent's education	
	Girl	Boy	3rd	6th	Acad.	Vocat.	Girl	Boy	3rd	6th	Acad.	Vocat.
Conditional effort and motivation	25 (47.1)	22 (39.3)	14 (26.4)	33 (59.0)	14 (38.9)	27 (45.0)	14 (45.2)	14 (40.0)	14 (50.0)	14 (36.8)	8 (33.3)	17 (44.7)
Ability and motivation	9 (17.0)	1 (1.8)	9 (17.0)	1 (1.8)	4 (11.1)	5 (8.3)	1 (3.2)	2 (5.7)	-	3 (7.9)	2 (8.3)	1 (2.6)
Lack of ability, difficulties	6 (11.3)	20 (35.7)	12 (22.6)	14 (25.0)	11 (30.6)	12 (20.0)	7 (22.6)	8 (22.9)	9 (32.1)	6 (15.8)	5 (20.8)	9 (23.7)
Uneven performance	6 (11.3)	9 (16.1)	10 (18.9)	5 (8.9)	3 (8.3)	11 (18.3)	-	2 (5.7)	-	2 (5.3)	-	2 (5.3)
Other explanations	7 (13.2)	4 (7.1)	8 (15.1)	3 (5.4)	4 (11.1)	5 (8.3)	9 (29.0)	9 (25.7)	5 (17.9)	13 (34.2)	9 (37.5)	9 (23.7)
Total	53 (100)	56 (100)	53 (100)	56 (100)	36 (100)	60 (100)	31 (100)	35 (100)	28 (100)	38 (100)	24 (100)	38 (100)

4. Discussion

In all, the results of this study indicate that parents and teachers refer to effort and ability when they explain, in their own words, the malleability of children's competences in specific aspects of schoolwork. Moreover, the explanations seem to divide into those in which the child is seen as possessing ability and motivation and those in which the child is seen as lacking ability or having difficulties that prevent him/her from succeeding.

The first aim of this study was to examine the parents' and teachers' views as to the aspects of schoolwork in which the child could improve his/her competence the most. Since academic school subjects, especially mathematics, are usually considered to reflect rather unchangeable intelligence, real or innate (cf., Mugny & Carugati, 1989), we hypothesised that the parents and teachers would perceive the other competences, i.e., sports, handicrafts, and diligence and attention, as more malleable than mathematics and Finnish. Rather surprisingly, however, the parents and teachers referred precisely to the academic subjects when picking an aspect of schoolwork in which the child could improve the most. The result may reflect the circumstance that due to their responsibility as fosterers, parents and teachers may be inclined to perceive children's achievement as good in these particular school subjects, which are regarded as the most important ones at school and also in the defining of the child's educability (cf., Carugati & Selleri, 1998; Mugny & Carugati, 1989).

The result also accords with earlier results, which have shown that parents usually consider mathematics or the mother tongue as their child's strongest school subject (Räty, Kasanen, & Kärkkäinen, 2006). It may also be the case that for some pupils the parents and teachers perceive precisely the academic subjects as strong and improvable still, whereas for other children the parents and teachers may perceive the academic school subjects as weak and less improvable, i.e., the parents' and teachers' explanations may contain polarisation among pupils. It was further found in the present study that the parents included diligence and attention among the aspects of schoolwork in which the child could improve the most; this finding may relate to pupil behaviour such as attending to homework, which is often observable to parents.

Our second aim was to examine what kinds of explanation the parents and teachers would give for the malleability of children's competences. As hypothesised, the parents' and teachers' explanations included references to the amount of effort and practice and to ability or talent; that accords with earlier research on children's explanations for their potential for improvement (cf., e.g., Droege & Stipek, 1993; Stipek & Gralinski, 1996). Also, as in earlier research on children's explanations (Räty, Kärkkäinen, & Kasanen, 2010), the parents and teachers made the most references to the amount of effort and motivation.

The explanations for children's ability seemed to divide so that the parents and teachers perceived the child either as possessing ability and motivation or as lacking ability and having difficulties, which should be overcome to make achievement possible. Considering that significant adults' perceptions may be consequential for children's achievement (cf., Butler, 2000; Pomerantz & Dong, 2006; Spinath & Spinath, 2005; Wigfield et al., 1997), this result may also be considered to reflect the growing polarisation of children's competences: those children who are perceived as possessing ability may get further encouragement to do well from their parents and teachers, who believe in their abilities, whereas for those children who are perceived as lacking ability and having difficulties, the parents' and teachers' low expectations may weaken their performance further.

It must also be noted that even if the parents and teachers referred to effort and ability in their explanations for the malleability of children's competences, these categories included variation and combinations of explanations: for example, motivation was included in the explanations referring to effort and practicing, and the category *Uneven performance* contained explanations referring to both ability and lack of ability, i.e., partial difficulties. Indeed, this study afforded a more comprehensive picture of the parents' and teachers' views by asking them to answer open-ended questions in their own words than it would have if ready-made options had been used (cf., Hewstone & Fincham, 1996; Räty & Kärkkäinen, 2011).

The third aim was to examine whether there were differences between the parents' and the teachers' explanations for the malleability of children's competences. Since parents are usually motivated to perceive their child's learning in an optimistic light (cf., Goodnow & Collins, 1990; Kärkkäinen & Räty, 2010) whereas teachers have the professional duty to assess and rank pupils' achievement, we hypothesised that the parents would refer to the amount of effort and motivation more frequently and that the teachers would make more references to rather permanent properties, such as ability, in their explanations for the malleability of children's competences. Our hypothesis, however, did not hold true but only one difference between parents' and teachers' explanations was found when the teachers perceived pupils as having more partial difficulties than the parents did. It may be the case that because of the teachers' double duty to both rank pupil performances and promote

them, they assessed pupil performance in more complex ways than the parents did. This notion is also supported by the finding that the teachers gave more explanations for the malleability of children's competences than the parents did.

Our fourth aim was to examine whether the child's gender and grade-level and the parent's educational level made a difference in the parents' and teachers' explanations for the malleability of children's competences. It was found that the teachers perceived the sixth-graders as needing more effort and motivation than the third-graders did. This finding may be associated with the notion that pupils work harder at the beginning of school but perhaps also with the notion that beginning pupils still have rather optimistic views of effort and practice as ways of improving their abilities (cf., e.g., Nicholls, 1990). The finding may also reflect developmental differences between the third- and sixth-graders: the sixth-graders have more mature cognitive abilities, and they may also be regarded as more mature to assess their own competences (e.g., Nicholls, 1990; Nicholls, Patashnick, & Gwendolyn, 1986). Moreover, the teachers were inclined to perceive girls as having somewhat more ability and motivation than boys had. This result may reflect the well-known circumstance that girls do generally better at school than boys (e.g., Räty, Kasanen, & Snellman, 2002). In the parents' explanations, however, there were no such differences. This may be because teachers, who have to assess pupils' achievement in their every-day work, perceive the differences between boys' and girls' competences and those between beginning and more advanced pupils more clearly than parents do.

Our fifth and last aim was to examine whether the parents' and teachers' explanations for the malleability of children's competences were associated with their assessments of the children's current competences in the corresponding aspects of schoolwork. We hypothesised that if the child's competences were seen as good, the parents and teachers would more often refer to ability, whereas if the child's competences were seen as poor, they would refer to more changeable qualities such as effort and motivation. This hypothesis did not carry, however: the explanations did not relate to assessed competences, which may be an indication of the relative independence of parents' and teachers' explanations of malleability vis-à-vis school assessment. In other words, the explanations given for the malleability of competences may reflect the parents' and teachers' expectations for the child's future performance and may therefore be relatively independent from current performance. This finding seems to underline the importance of examining parents' and teachers' perceptions of the child's potential for improving his/her competences in the future.

This study has limitations. First, the number of teachers included was small and their experiences with their respective classes were quite varied. Second, the parents may have formed a select group, taking part because their child was doing well at school. Third, the parents in particular may have found the questions as difficult or burdensome, as some of them left the open-ended questions of the questionnaire completely unanswered and also because the category *other explanations* turned out to be relatively large. In further work it would be interesting to interview parents and teachers about their perceptions of the malleability of children's competences and also to include children's own perceptions in the analysis.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

The Importance of the Sex of the Parents and of the Sex and Age of the Children with Autism Spectrum Disorders to Family Resilience

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Received: February 1, 2017 Accepted: February 10, 2017 Online Published: February 15, 2017

doi:10.5539/jedp.v7n1p155 URL: http://doi.org/10.5539/jedp.v7n1p155

Abstract

The resilience of parents of children with autism is considered as one substantial strategy to address the problems in raising a child with autism spectrum disorders. In this article, the results of the investigation of the relation between the parents' family resilience and their sex, as well as their children's sex and age, are shown. The parents of 312 autistic children in Greece, all in couples, namely 624 men and women, consisted the population sample. It was considered that, at least regarding the factor of the sex, the research would result in covering some research gaps of the bibliography, such as the interest in the fathers, provided that research usually investigates the female side, ignoring, to a great extent, the paternal behavior. Moreover, it was believed that the research can practically contribute as a guide for the inclusion of the parents themselves in the therapeutic interventions of autism and highlight the importance of dividing their responsibilities in the care of the autistic child, which is usually placed on the shoulders of women, namely on the mothers, with every possible consequence on their mental, emotional and physical health. The correlation of resilience and sex also took into account the parameter of the children's sex, as well as the issue of their age, in order to draw conclusions also about the importance of these factors of impact on the parents' resilience.

Keywords: resilience, autism, autistic child, parents' sex, mother, father, child's sex, child's age

1. Introduction

1.1 Parents' Sex

The research on the importance of resilience (Note 1) in the management of the syndrome of autism usually refers to either the parents in general or the mothers in particular. The side of the father is usually addressed less by the scientific community, and it is usually examined additionally to the one of the mother or within the framework of family jointly. For mothers, in particular, much has been said, such as the following:

For Santoso et al. (2015) the balance between the risk and the protective factors against the difficult conditions in the upbringing of a child with autism affects the person's resilience. The risk factors affect the physical and mental health and especially the mothers of children with autism have to address their children's behavioral problems, a fact that significantly affects their everyday life as one of the strongest sources of causing concern. For Griffith et al. (2014) the mothers of children with autism or developmental abnormalities run an increased risk of stress and mental health problems. For Smith, Greenberg and Mailick (2014) the parents of children with autism experience high levels of stress as carers, with one of the principal stressful factors being the offensive behaviors of the children with autism. However, they wonder and investigate to what extent the mothers who take care of adolescents and adults with autism is possible to experience more incidents that cause stress during one day, in comparison with the mothers who do not raise autistic children. Yarock Rutstein (2014) sets the finding that the syndrome of autism is quite stressful for the family and it causes quite increased levels of stress, on the basis of her theoretical concern. Despite her reference to parents in general, though, the researcher had the mothers of autistic children whose children had received therapeutic intervention services, as the sample of her research. And Brown (2014), while she refers to family issues and also partially correlates her research with the interest in the parents, and she focuses on the depression which possesses the carers of children with autism in a family context, shows targeted interest in the maternal depression, therefore, this study is also classified in the

papers that concern the mother's mental burden. Fairthorne et al. (2014) explored the effects of raising an autistic child in the mothers' quality of life, and found that the challenges the mothers of autistic children receive regarding their upbringing are much more than the ones that the mothers of normal children face, and they extend to the practical, behavioral and communication field of autism. Their quality of life is affected by the children's characteristics, such as the quick withdrawal, screaming, anger outbursts, self-injuries, violence and sleeping problems. The mothers record changes in their way of life, as their care increases, the expenses escalate, many mothers struggle to ensure services and some have suffered bullying or have been witnesses to their children's bullying. In fact, most mothers correlate the distress they feel with the sense of loss. They even reach the point of describing the feelings that the condition of the autistic child causes as the death of the child they should have. Moreover, the family relations are experienced by them as quite problematic, with their mates rejecting the autistic child, as well as the wider family often causing conditions of ignoring, or alienation, criticism and fault finding. Kwok, Leung and Wong (2014) had the marital satisfaction which the mothers of autistic children feel as the subject of their research and they highlight the great prognostic significance of the perceived stigma and the carer's burden syndrome in this field.

If the above points are indicative of the interest of research in the side of the mother, it can be added that even more is possible to be noted as well regarding the individual parameters which relate to resilience. For example, as to experiencing stress, this has been measured in higher levels in mothers, mainly those with irritable children, children of older age and children that cause self-injuries (Kotsopoulos, 2014). An explanation for the special burden that the mothers receive is given by Kwok, Leung and Wong (2014), who observe that the mothers of children with disabilities, who act as main health carers, face not only the everyday life stress, but also the one stemming from stressful factors which are unique in their children's condition. They are obliged to address special characteristics such as the offensive behavior, the reduced mental functioning, the physical limitations, the lack of self-sufficiency skills, the limited social skills. And they are in the invidious position of also addressing stigmatization, which stems from the different cultural interpretation of the disability, resulting in the increase of parenting stress. But also for the depression parameter, it is found that mainly the mothers, who are again most strongly affected, are possessed by despair and conflicted or ambivalent feelings (Bashir et al., 2014).

Much more research was accessed and the general conclusion from the review is that the interest that has existed is relatively one-sided. It is generally acknowledged that the mothers receive the greater burden within the framework of families which raise autistic children, on the one hand due to the nature of the maternal relationship between the mother and the child in general, on the other hand due to the increased obligations that the fathers face in the economic and therefore in the professional field. Bibliography usually has a lot to say for the burden the women receive, as well as the psychosomatic problems which they face due to the raising of their autistic child, both stress to cover his special needs, and depression for his condition, which seems to them, mainly not unfairly, incorrigible. The importance of the investigation of resilience for the mothers has launched a vicious, we could say, circle where they are considered to be the greater victims of the pressures of autism, without taking into consideration that this prejudice increases the pressures they receive, releasing the fathers from many more responsibilities which they should bear. Therefore, research focus on the side of women and this happens even in the cases in which the researches' titles refer to the parents and not the mothers exclusively.

We do not wish to overthrow a one so well studied finding, however, in our opinion, it is compulsory to turn the interest a little more towards the side of the resilience of the fathers and their obligations' undertaking, in a family where the obligations and the rewards should be shared equally to all. There are already findings that impose such a research addressing. It has been found, for example, that when the father suffers from depression, the stress levels for the mothers with an autistic child are significantly increased. Moreover, that the marriages of the parents with autistic children entail difficulties, dysfunctions and a great possibility to end up in a divorce; As well as that among the forms of formal and informal support, which include the husband, the friends, the early intervention in favor of the child and the medical support, the husband's support is the most common, as stated by a large percentage of women, a finding that is not surprising, since 90% of the participants in the research are married or cohabit with a mate. Even more researches that mention the wife's burden, imply or point out in one way or another the importance of the husband as supporter and enhancer of their resilience, however, they do not deal with his resilience to the extent its significance demands.

The writer has studied only one research, the one by Keller, Ramisch and Caloran (2014) which focuses exclusively on the fathers with an autistic child and examines their behavior and their feelings according to six parameters, out of which the one of paternal isolation being more direct for our research. It is the condition which fathers enter when they feel distress and loneliness due to their capacity as parents of children with autism.

And while the mothers of these children take part in support groups, no relevant reference was made by any father in the survey, at least regarding his participation on a regular basis. Of course, paternal isolation does not work respectively for every father. Different behaviors have been recorded: firstly not all of them are in a position to announce to others their joy for very little improvements in the skills of their autistic children, or they compare their child to those who are normal and eventually feel disadvantaged, with outbursts at the expense of the marital relationship and having as a consequence the reduction of the percentages of the couple's common time. They abandon things which they used to do and while they feel isolated from their friends, at the same time it is possible that they complain that the others do not sympathize with them. One research, however, is not enough, nor does it exhaust fields, regarding the fathers, which have already been discussed a lot about the mothers. This is the second research gap which the writer traced in the international bibliography and he ensured that his investigation parameters comprise a sufficient part of his questionnaire with which the described quantitative research was elaborated.

1.2 Child's Sex and Age

The data from the bibliography on the sex and age of the autistic children and the burden of the resilience due to these parameters are not only occasional and indirect, but also controversial. It has already been pointed out that higher levels of stress have been measured in mothers of autistic children of older age (Kotsopoulos, 2014). Van Bourgondien, Dawkins and Marcus (2014) observe that when the children with autism enter adolescence, their mothers seem to occasionally experience an increased reduction in the effort to face the stressful factors and more anger than the mothers of toddlers. And the use of more inefficient strategies of autism management in the period of adolescence of the young person with autism, is possibly a sign of the typical stressful factors that are related to the adolescent's care, but it is possible that they also reflect an increased sense of control that the parent may have towards an older autistic young person than towards a child.

However, with regard to the correlation, for example, of parenting stress with the older age of the children, all researches do not show a consistency in findings. Almansour et al. (2013), who agree on the fact that the parents consider that their increased psychological problems are interweaved with their children's problem, do not find in the negative feelings of the parents a significant effect of the child's age, whereas Smith, Greenberg and Mailick (2014) highlighted that the behavioral problems of the autistic children remain as they get older, however, there are indications of their reduction in the course of time.

It can generally be considered that, despite the controversy and occasionality of the findings, the autistic child's age is positively interweaved with the levels of maternal stress, apparently because the fatigue and disappointment are added, weakening the defence mechanisms. Moreover, the incidents that cause stress are experienced by the mothers of children with autism more frequently than it happens with the mothers of other children.

For the relation of the resilience with the child's sex, there was no possibility to establish a theoretical framework, at least in the light of the researches in the last four-year period (2013-2016) to which the study was limited.

2. Method

2.1 Purpose

This article is part of a wider research that aimed in exploring the way in which the family resilience of parents with a child with autism spectrum disorders interacts with the social context among which the family is placed, as well as with the stress the parents experience during the upbringing of a child with autism spectrum disorders. It is important to investigate how the resilience is affected when the social support that the family receives is low and the true stress high, with variables, apart from the level of social support that the parents receive and the stress they suffer from, certain demographic characteristics of the parents and of the child, too, such as age, sex and the diagnosis of the syndrome the child suffers from. In this article, the results of the investigation of the relation between the parents' family resilience and their sex, as well as their children's sex and age, are shown. It was considered that, at least regarding the factor of the sex, the research would result in covering certain research gaps of the bibliography, such as the interest in the fathers, given the fact that research usually investigates the female side, ignoring, to a great extent, the paternal behavior. With its results, the research was considered that it could practically contribute as a guide for the inclusion of the parents themselves in the therapeutic interventions of autism and highlight the importance of dividing their responsibilities in the care of the autistic child, which is

usually placed on the shoulders of women, namely the mothers, with every possible consequence on their mental, emotional and physical health.

2.2 Participants

Table 1. Demographic and other characteristics of the participants in the survey

	n	%
Sex		
Men	312	50,0
Women	312	50,0
Nationality		
Greek	609	97,6
Other	15	2,4
Religion		
Christians	586	93,9
Muslims	38	6,1
Prefecture of		
Kavala	52	8,3
Rodopi	80	12,8
Xanthi	72	11,5
Cyclades	74	11,9
Serres	96	15,4
Drama	120	19,2
Evros	130	20,8
Education		
Primary Education	171	27,4
Secondary School Graduates	80	12,8
Lyceum Graduates	168	26,9
HEI /TEI Graduates	205	32,9
Studies in Psychology or in Special Education	0	0,0
Annual Family Income		
Below 15.000 €	266	42,6
15.000 € - 20.000 €	272	43,6
Over 20.000 €	86	13,8
Family Status		
Single	0	0,0
Married	624	100,0
Widower/ Widow	0	0,0
Divorced	0	0,0
Family Relation to the Child		
Biological Father	312	50,0
Biological Mother	312	50,0
Step-father	0	0,0
Step-mother	0	0,0

As shown in Table 1, 624 parents of 312 children with autism spectrum disorders participated in the survey. The sample is uniformly distributed as to the parents' sex with 50.0% men and the same percentage of women.

97,6% of the sample, namely 609 parents, are Greeks, whereas 2,4%, namely 15 participants, are of a different nationality. 586 of the participants are Christians, 93,9% of the sample, whereas the remaining 6,1%, that is to say, 38 parents, are Muslims. As far as their place of residence in the Greek territory is concerned, 52 parents (8,3% of the total number) reside in the prefecture of Kavala, 80 parents (12% of the total number) reside in the prefecture of Rodopi, 72 participants (11,5% of the sample) in the Xanthi prefecture, 74 parents (11,9% of the sample) in the prefecture of Cyclades, 96 parents (15,4% of the total number) in the prefecture of Serres, 120 parents (19,2% of the total) in the prefecture of Drama and 130 parents (20,8% of the sample) in the prefecture of Evros.

The total number of the respondents (100,0% of the sample) are married and they are the biological parents of the child with autism spectrum disorders, 312 (50,0% of the sample) are the biological mothers and 312 (50,0% of the sample) the biological fathers.

The highest level of education for 27,4% of the participants (171 parents) is that of the primary education, 12,8% of the participants (80 parents) have received a low secondary education (*gymnasium*), 26,99% (168 parents) have received a high secondary education (*lyceum*), whereas the rest of the participants, that is to say, 32,9% of the sample (205 parents) have received a post-secondary education, as they are graduates of Higher Educational Institutes (HEI) and Technological Educational Institutes (TEI).

Concerning the annual family income, 42,6% of the sample (266 parents) declared an amount below 15.000€, 43,6% of the total number (272 parents) between 15.000€ and 20.000€ and the remaining 13,8% (86 parents), an income over 20.000€.

The children's characteristics are summarized in Tables 2-3 in this text.

Table 2. Sex of the children with autism spectrum disorders and Asperger syndrome

	n	%
Sex		
Boy	253	81,1
Girl	59	18,9
Diagnosis		
Autism	282	90,4
Asperger	30	9,6
I don't know	0	0

Table 3. Characteristic age values of the children with autism spectrum disorders

	Mean Value*	Standard Deviation	Skewness	Kurtosis
The Age of Children with Autism Spectrum Disorders	12,45	5,33	1,184	1,937

With regard to the child's sex, 81,1% of the respondents, namely 506 in number, are boys' parents and the remaining 118 parents (18,9% of the sample) are girls' parents. The average age of the 312 children whose parents participated in the research is $M = 12{,}45$ years with standard deviation $SD = 5{,}3$ years. 90,4% of these children, that is to say, 282 in terms of numbers, have been diagnosed with autism, whereas the remaining 30 children, 9,6% of the total number, have been diagnosed with Asperger syndrome. The children's characteristics are summarized in Tables 2 and 3 in the present text.

2.3 Note

The demographic characteristics of the families with dysfunctional children are factors relating directly to the parents' stress levels (Houser & Seligman, 1991; Keller & Honig, 2004). For this reason the questionnaire that was distributed to the participants contained specific fields the completion of which would provide the necessary demographic information on each family, namely on the sex, nationality, religion, education level, annual family income, current family status, family relation to the autistic child, the child's age and sex, as well as his accurate diagnosis.

2.4 Data Collection

The supplying and collection of the questionnaires were realized by the writer from July 2015 to February 2016. The search for parents with children with autistic spectrum disorders was conducted based on the catalogues of the Center for Differential Diagnosis, Diagnosis and Support (KE.D.D.Y.) in the prefectures of the Greek territory, where an archive is kept on the children that receive a diagnosis. The parents were approached via mail sent to their residence address, to which the research questionnaire was attached, as well as an accompanying form that informed them in detail of the purpose and the aims of the research process. Special emphasis was put on the importance of confidentiality and anonymity of the information, namely that the data of the child and of the parents themselves would remain anonymous, whereas the information will be used exclusively for the needs and the purpose of the present research.

Though the accompanying form the parents were informed that they had to complete the entire questionnaire and the duration of its completion should not exceed 60 minutes. The participants were urged to contact the researcher on his mobile phone for the provision of instructions and clarifications about the correct completion of the questionnaire. Moreover, the importance of the completion by every parent separately was specifically pointed out to the participants, without there being an exchange of views among the couples, so that the achievement of the research's aims be possible.

The collection of the completed questionnaires was realized with their return to the researcher, by mail, from the families that had consented to an analysis of their answers. The return of the questionnaires to the researcher was defined to take place within 30 days after the date of their dispatching to these families.

2.5 Data Analysis

For the investigation of the relations that govern the Social Support, Family Resilience and Parental Stress of parents with children with Autism spectrum disorders, the following three data collection tools were used.

***Social Support Index*:** The degree of the social support of parents who have a child with autism spectrum disorders was measured with the widely spread SSI tool (McCubbin, Patterson, & Glynn, 1982) which assesses the family social support as a factor in family resilience (Fischer, Corcoran, & Fischer, 2007). It contained 16 questions the answers to which were given in the 5-point Likert scale (0 up to 4). In every questionnaire statement, the respondents can state the measure of their agreement or disagreement by choosing one of the following answers: "I strongly disagree", "I agree", "I am not sure", "I agree" and "I fully agree", which are ranked on a scale of 0 to 4. In certain answers the scale was reversed so that a common conceptual content could be achieved. As to the answers' interpretation for the definition of the Social Support degree, the scores of the individual questions are summed, the highest scores indicating a highest Social Support degree. The span of the SSI scale was from 0 to 6 units. The SSI has a high internal validity index with a = 0,82. The Social Support scale was used as an independent variable.

***Family Resilience Assessment Scale*:** The FRAS scale of Tucker Sixbey (2005) was used to measure Family Resilience, based on the theoretical standard of Walsh (2006) on family resilience. It contained 66 closed-type questions which, as in the SSI case, they were answered in the Likert scale, but in a 4-point one, with values varying from 1 to 4, corresponding to the choices: "I strongly disagree", "I disagree", "I agree" and "I fully agree". The scale was reversed in four of these questions, and again for the acquisition of a common conceptual content. There was also an open-ended question. From these questions 54 were assessed, which were grouped together and formed 6 subscales of family resilience, as Tucker Sixbey (2005) suggests. More specifically, the subscales are as follows: 1) *Family Communication and Problem Solving*: here, 27 questions of the data collection tool correspond to it. The result of the subscale is given with Cronbach's alpha coefficient 0,96, whereas the horizontal sum of the individual questions forms the subscale's final rating with a span from 27 to 108 units. 2) *Utilizing Social and Economic Resources*: It is formed by 8 questions. Its rating is calculated by summing the participants' answers and it varies from 8 to 32 units. The subscale's reliability has a Cronbach's alpha index of 0,85. 3) *Maintaining Positive Outlook*: The questions composing the subscale are 6. The internal validity was calculated with the 0,86 Cronbach's alpha coefficient and in the same way the subscale's rating is calculated which varies from 6 to 24 units. 4) *Family Connectedness*: It is composed of 6 questions, among which the four ones in which the scale was reversed for conceptual reasons are also included. The sum of the score of all the questions that compose it, shapes the subscale's rating which it can also vary from 6 as minimal value to 24 as maximum value. Its reliability, measured with the Cronbach's alpha coefficient, was found to be of 0,70. 5) *Family Spirituality*: The subscale is composed of 4 questions. From the sum of the answers' score its rating varies from 4 to 16 units and the measurement of its internal validity gave a Cronbach's alpha coefficient

of 0,88. 6) *Ability to Make Meaning of Adversity*: It is formed by 3 questions, its rating is calculated by summing the answers of the respondent parents and it varies from 8 to 32 units. The subscale's reliability has a Cronbach's alpha index of 0,74.

Taking into consideration the exception of 12 questions, it must be noted that the rating for the measurement of the total family resilience results from the horizontal sum of the 6 subscales and may vary from 66 to 264 units. Both for the total family resilience assessment scale and its entire individual subscales, higher scores indicate higher levels of family resilience. The reliability and internal validity in total for the tool used were calculated with the Cronbach's alpha coefficient and was found to be of 0,96. It is noted that the open-ended question was omitted.

***Parenting Stress Index—Short Form*:** The parenting stress degree was measured by using the PSI-SF index (Abidin, 1995), which calculates the stress of the parents with children with autism spectrum disorders, which comes exclusively from their role as parents, without taking into consideration any external stressful factors, apart from the parent-child relation, as well as the child himself. The measurement tool consisted of 36 closed-type questions that were answered based on the 5-point Likert scale (1 to 5 = "I strongly disagree", "I disagree", "I am not sure", "I agree" and "I fully agree"). They were grouped together in three groups equal in number, that shaped the three index subscales as follows: 1) *Parental Distress*: It is made of questions 1-12 of the PSI-SF tool. The subscale rating is calculated by summing the answers and it varies from 12 to 60 units, reflecting the stress that is due to factors that concern the parents and which relate to the child's upbringing. The subscale's reliability has a Cronbach's alpha index of 0,85. 2) *Parent-Child Dysfunctional Interaction*: Questions 13 to 24 compose the second subscale of the Parenting Stress Index which represents the disappointment the parents feel regarding their interactions with their child. The sum of the score of all the questions that compose it, shapes its rating which may also vary from the minimum value of 12 units to the maximum value of 60 units. The subscale's reliability measured with the Cronbach's alpha coefficient was found to be of 0,68. 3) *Difficulty of Child*: It is formed by the twelve last questions in the questionnaire, 25 to 36. Its rating is calculated by summing the parents' answers, it varies from 12 to 60 units and assesses their perception about the self-regulation of their child's behavior. The subscale's reliability has a Cronbach's alpha index of 0,78.

The rating for the measurement of the total Parenting Stress results from the horizontal sum of the 3 subscales and varies from 66 to 264 units. Both for the scale and its subscales, high scores indicate high stress levels, whereas a low rating indicates low stress levels. According to the PSI-SF self-report index, the values between the 15^{th} and 80^{th} percentage point of distribution are considered to be normal stress levels, whereas for the individuals whose rating varies from values above the 90^{th} percentage point of distribution, it is regarded that they are in the clinical range of high stress levels. The reliability and internal validity in total for the tool used was calculated with the Cronbach's alpha coefficient and was found to be of 0,84.

The ***consistency check*** was performed via the alpha "coefficient" of Cronbach (Cronbach's a), with the use of which the reliability of the data collection tools and their individual parts is defined. Coefficient values higher than 0,6 are considered satisfactory and they ensure their cohesion and internal validity, functioning as elements of a unified group. For the ***description of the quantitative variables*** that participated in the statistical analysis, the mean values (Mean), the standard deviations (Standard Deviation = SD), the minimal and maximum values (Min-Max) as well as the third and fourth order moments (Skewness and Kurtosis) of their distributions were used. In the case of the qualitative data, their description was made via the recording of their relevant absolute (n) and percent (%f) frequencies. The ***linear correlation check*** between the quantitative variables was conducted via the Pearson r correlation coefficient. The r correlation coefficient varies between -1 and 1, whereas the higher it is in absolute value, the higher the correlation between the variables becomes. Even though there are no commonly accepted limits, index values, to an absolute value, lower than 0,3 indicate weak correlations, values between 0,3 and 0,5 indicate medium correlations, whereas values higher than 0,5 mark high and strong correlations. Positive values of the coefficient suggest a positive correlation, whereas negative values, a negative correlation. The statistical significance of the correlations is checked at significance levels $\alpha = 1\%$ and $\alpha = 5\%$. For the ***comparison of the quantitative variables*** and the drawing of the survey's main conclusions, the Independent Samples t-test and the Paired Samples t-test were used depending on the nature and kind of the variables under examination. Moreover, its generalization for variables with more than two levels, the one-way Analysis of Variance (ANOVA), was used. The further study on the differences in the factors' levels is carried out with the Tukey method for multiple comparisons. The check of the hypothesis on equality of the variances on the factors' levels is performed via the Levene's test, whereas the safeguarding of the basic conditions concerning regularity and independence of the method's errors was checked via the Kolmogorov-Smirnov test

and the Runs test, respectively. The aforementioned hypothesis checks are performed at a significance level $\alpha = 5\%$. For the ***processing and statistical analysis*** of the data the IBM SPSS Statistics 20 data statistic analysis software package was used.

3. Results

3.1 Parents (Sex)

One of the main objectives of this research was the investigation of the differentiations at the levels of the measured characteristics and their subscales between the mothers and fathers of children with autism spectrum disorders. The differences of the mean values of the scales and subscales regarding the sex of the parents of the 312 children of the survey are examined with the Paired Samples t-test, the results of which are shown in Table 4 that follows. It is noted that not only are the statistically significant differentiations at significance level $a = 0,05$ shown in the particular table, but also the results for all the measured scales and subscales.

Table 4. Comparison of mean values in the measurement scales and subscales regarding the respondents' sex

Scales & Subscales	Sex	Mean	SD	df	t	p-value
SSI	Women	41,96	5,013	311	-1,472	0,142
	Men	42,29	4,773			
FRAS totally	Women	154,37	8,786	311	2,721	0,007*
	Men	153,39	7,709			
FCPS	Women	78,86	4,999	311	2,056	0,041*
	Men	78,42	4,353			
USER	Women	22,77	1,637	311	1,669	0,096
	Men	22,64	1,491			
MPO	Women	17,39	1,145	311	1,048	0,295
	Men	17,32	1,181			
FC	Women	15,03	0,783	311	2,737	0,007*
	Men	14,88	0,690			
FS	Women	11,73	1,530	311	2,531	0,012*
	Men	11,58	1,455			
AMMA	Women	8,60	1,007	311	0,906	0,366
	Men	8,54	0,880			
PSI-SF totally	Women	106,83	10,508	311	-25,625	0,000*
	Men	124,04	14,454			
PD	Women	35,43	5,233	311	-9,520	0,000*
	Men	38,59	5,563			
P-CDI	Women	37,56	3,620	311	-20,864	0,000*
	Men	43,61	5,129			
DC	Women	33,84	3,578	311	-28,167	0,000*
	Men	41,85	5,779			

Note. *= p < .05.

Memo

SSI:	*Social Support Index*
FRAS:	*Family Resilience Assessment Scale*
FCPS:	*Family Communication and Problem Solving*
USER:	*Utilizing Social and Economic Resources*
MPO:	*Maintaining Positive Outlook*
FC:	*Family Connectedness*
FS:	*Family Spirituality*
AMMA:	*Ability to Make Meaning of Adversity*
PSI-SF:	*Parenting Stress Index – Short Form*
PD:	*Parental Distress*
P-CDI:	*Parent-Child Dysfunctional Interaction*
DC:	*Difficulty of Child*

According to the results of the check (Table 4), the difference of the average rating of the Family Resilience Assessment Scale as a whole emerged statistically significant, the women showing higher average rating $M = 154{,}37$ in comparison to the men $M = 153{,}39$ ($t(311) = 2{,}721, p = 0{,}007$). The three subscales for which similar statistically significant differentiations arose, are FCPS, FC and FS. The mothers of children with autism spectrum disorders present a higher average rating regarding Family Spirituality in comparison with the fathers ($t(311) = 2{,}531, p = 0{,}012$), the respective levels of it being shaped to $M - 11{,}73$ and $M = 11{,}58$ respectively. Regarding FCPS, the average rating of the subscale for women amounts to $M = 78{,}76$, higher than that of men $M = 76{,}42$ ($t(311) = 2{,}056, p = 0{,}041$), while for the FC component the respective values amount to $M = 15{,}03$ and $M = 14{,}88$ respectively, ($t(311) = 2{,}531, p = 0{,}012$).

Analyzing in the same way the components of the Parenting Stress index, as a whole, and its individual subscales, it is found that at significance level $a = 0{,}05$, the male parents of children with autism spectrum disorders show higher levels of stress in comparison with the mothers. The average score of total stress for mothers is formed to $M = 106{,}83$, whereas for male parents to $M = 124{,}04$, ($t(311) = -25{,}625, p = 0{,}000$). For PD subscale the average rating for the two sexes is $M = 35{,}43$ for women and $M = 38{,}59$ for men, the value of the statistical function being $t(311) = -9{,}520$ with $p = 0{,}000$. Regarding the P-CDI component, men show a higher average rating $M = 43{,}61$ against women for whom the respective rating is $M = 37{,}56$, ($t(311) = -20{,}864, p = 0{,}000$). Finally, the same differentiation ($t(311) = -28{,}167, p = 0{,}000$) is also found for the DC component, the average scores of the subscale being formed to $M = 41{,}85$ for the fathers and $M = 33{,}84$ for the mothers of children with autism spectrum disorders. The checks of the hypotheses for all the remaining scales and subscales did not show any statistically significant differentiations among their levels.

3.2 CHILD (Sex)

It was considered that it is important to seek also the differentiations that are potentially formed at the levels of the measured scales and subscales among the characteristics of the children that have been diagnosed with the syndrome of autism. Within this framework, the search for differences is conducted in the average ratings of the indexes for measuring the social support of the parents, their family resilience and the parenting stress they face, as well as all their components regarding the child's sex. The statistical Independent Samples t-test is the one used for indicating these differences.

On the basis of the check, at significance level $a = 0{,}05$, a statistically significant differentiation emerged in the average rating of only one measured subscale of family resilience, the one of the parents' Family Spirituality (FS). The parents of girls with autism spectrum disorders show higher average levels of family spirituality $M = 11{,}85$ against the parents of boys, for whom the average rating of the subscale amounts to $M = 11{,}61$ $t(258{,}115) = -2{,}008, p = 0{,}046$). For the total and all the remaining components of family resilience, as well as for the parenting stress index and its subscales, no statistically significant differences emerged.

Table 5. Comparison of mean values in the measurement scales and subscales regarding the sex of the children with autism spectrum disorders

Scales & Subscales	Child's Sex	Mean	SD	df	t	p-value
SSI	Boy	42,14	4,950	622	0,187	0,852
	Girl	42,05	4,661			
FRAS totally	Boy	153,92	8,501	622	0,230	0,818
	Girl	153,72	7,245			
FCPS	Boy	78,69	4,790	622	0,476	0,634
	Girl	78,46	4,242			
USER	Boy	22,71	1,638	228,418	0,266	0,790
	Girl	22,68	1,212			
MPO	Boy	17,38	1,180	622	1,373	0,170
	Girl	17,22	1,079			
FC	Boy	14,95	0,748	622	-0,230	0,818
	Girl	14,97	0,715			
FS	Boy	11,61	1,577	258,115	-2,008	0,046*
	Girl	11,85	1,043			
AMMA	Boy	8,58	0,942	622	0,251	0,802
	Girl	8,55	0,966			
PSI-SF totally	Boy	115,58	15,419	622	0,487	0,627
	Girl	114,82	14,736			
PD	Boy	37,17	5,683	622	1,524	0,128
	Girl	36,30	5,326			
P-CDI	Boy	40,56	5,422	622	-0,281	0,778
	Girl	40,71	5,154			
DC	Boy	37,85	6,315	622	0,063	0,950
	Girl	37,81	6,011			

Note. *= p < .05.

(Memo: same as memo in Table 4)

3.3 CHILD (age)

To study the impact of the age of the child diagnosed with autism on the formation of the measured scales of family resilience, social support and parenting stress and their subscales, the linear correlation coefficient Pearson r was used, without the emergence of any significant results. The children's age appears to relate statistically significantly, at significance level $a = 0,05$, to only two subscales of family resilience, the ones of Family Connectedness (FC) and Spirituality (FS). In both cases, the linear interactions were found to be very weak, the value of the correlation coefficient being formed to $r = -0,082$ with $p = 0,041$ and $r = 0,128$ with $p = 0,001$ respectively. For all the remaining components of family resilience as well as for the parenting stress

index and its subscales, no statistically significant interactions emerged at the considered significance level (see Tables 3, 5).

4. Discussion

The parent's sex significantly affects the levels of total family resilience, the male parents showing lower levels in relation to women. The same conclusion is drawn for three of its components, the fathers presenting less convenience in family communication & problem solving, lower family connectedness and lower family spirituality against the mothers with a child with autism spectrum disorders. Moreover, the differentiation of the two sexes regarding the level of stress they face is considered significant. In more than 95 out of 100 cases, the male parents form lower levels of parenting stress, parental distress and stress due to parent-child dysfunctional interaction and the difficulties the child faces. The parent's sex does not affect the social support he/she receives.

The above findings confirm the general theory which supports two views mainly regarding the sex and its connection with autism, at a level of its intake and subsequent emotional and psychological effects: a) the fathers distance themselves more than the mothers and bear lesser emotional weight in the child's upbringing in comparison with them, and b) the mothers experience bigger percentages of stress as well as depression than the fathers. More specifically, researches that do not highlight the significance of sex as the determining factor for the emotional and psychological intake of the disease, are probably exception to the general rule, such as the one by Almansour et al. (2013), who reach the conclusion that the parent's sex is not a determining factor for parental distress and concern, although they expected the mothers to be proven more affected. The rule consists of researches such as the one by Smith, Greenberg and Mailick (2014), who mention that the mothers face big consequences due to the upbringing of the autistic child, whereas, as Kotsopoulos (2014) notes, besides their increased involvement in the child's care, their high levels of stress and distress are increased when the father suffers from depression. Moreover, Kwok, Leung and Wong (2014) explain the special burden the mothers bear, who, furthermore, act as main health caregivers of their children with autism, as a result of the everyday life stress, as well as of the one stemming from, factors which are unique in their children's condition. These are the offensive behavior, the reduced mental functioning, the physical limitations, the lack of self-sufficiency skills, as well as the limited social skills. Moreover, according to Van Bourgondien, Dawkins and Marcus (2014), both the fathers and the mothers report an increased number of daily, stressful events, in particular, however, the mothers of autistic adults mention involvement in disagreements, stressful situations in the house and at work, as well as stressed caused by family members or friends more often than the mothers of children without developmental problems. Therefore, it is clear that the whole situation burdens the women far more than the men, a conclusion which the findings of our research are absolutely consistent with.

The sex of a child diagnosed with autism spectrum disorders significantly affects only his/her parents' family spirituality, the girls' parents experiencing higher family spirituality in relation to the boys' parents. The conclusion is very interesting because it concerns a potential different treatment of the autistic children by their parents according to their sex. However, the theoretical part of this paper focused on the parameter of the sex only regarding the parents and it did not include in its discussion the sex of the child with autism spectrum disorders. Therefore, it cannot be said whether the finding is consistent with the views on different or common treatment of the autistic children, a parameter that would obviously be of a great importance and significance, if it was the subject of future research work.

The age of a child diagnosed with autism spectrum disorders is related very weakly to the parents' family connectedness and family spirituality and cannot be presented as a strong conclusion of the survey. It must be pointed out that the impact of the child's age was expected to be stronger, given the view that higher levels of stress have been found in mothers with older children (Kotsopoulos, 2014), as well as more anger and less effort to address the stress causing factors (Van Bourgondien, Dawkins, & Marcus, 2014). However, the weak relation of the age to the parents' family connectedness and family spirituality is not a non-confirmed conclusion in previous bibliography because the view that significant impact of the child's age is not found on negative feelings of the parents has also been published (Almansour et al., 2013). The conclusion of Smith, Greenberg and Mailick (2014) that the child's behavioral problems, while they are not eliminated as he/she gets older, are reduced to a certain extent, might explain things up to a point. Or even the conclusion of Van Bourgondien, Dawkins and Marcus (2014) on the stronger sense of control that the parents of children with autism have when they enter adolescence. This being said, the 8th and 9th conclusion of the theoretical part that the more the autistic child grows up, the more exhausted his parents get as well as lose the sense of control against the offensive manifestations of his behavior, does not seem to be strongly confirmed in our survey. The child's age may

possibly have a greater impact, when with its increase the offensive and dysfunctional behaviors that the child has always presented are not reduced, therefore the mothers do not observe significant improvements in its problem. Namely, the child's age alone does not emerge as a strong factor of reduction of the resilience.

5. Methodological Limitations

The geographical distribution of the sample can be regarded as one basic limitation of the research. Despite the fact that as to its size, it is big enough and representative per district, it concerns only seven prefectures in the Greek territory. Consequently, generalizations of the conclusions that are drawn will have to be made with caution, even though it seems that they can be considered as particularly representative. An equally important limitation is that fact that the sample taken is exclusively from parents of a specific family structure. The families chosen are all two-parent families and the parents who participate in the survey have a specific family relation to the child. So, it cannot be assumed that the effects of the family structure and family relation have been adequately explored. Besides, the assessment that was made is based on the self-reports of the parents with a child with autism spectrum disorders, without other reports and information from other important persons of the parents' environment being detected, such as the rest of the families' members and health experts who possibly aid the parents. It must also be added that the survey is synchronic and interrelated, therefore it is not possible to discuss casual links between the factors under study. In addition, in this attempt no other possible parameters and co-morbidities linked to the levels of family resilience were assessed, such as depression, loneliness, the parents' interpersonal relations and social skills. All the aforementioned limitations must be taken into consideration during the study and interpretation of the present research findings.

6. Conclusions

As demonstrated by the survey and as it is consistent with the bibliography, the gender shows a different relation to the levels of family resilience, as the men show lower values in comparison with women. The fathers are also disadvantaged regarding family communication and problem solving, as well as the values of family connectedness and family spirituality. On the contrary, at a percentage of 95% their stress is lower than the one of the mothers, something which is also found for parental distress as well as for the stress stemming from the parent-child dysfunctional interaction and the difficulties their child has. Finally, social support does not significantly interact with the parents' sex. Regarding the child's sex, it significantly affects his/her parents' family spirituality. Namely, the parents with autistic girls experience higher family spirituality than the ones with boys, possibly because the children are treated differently, depending on their sex. Finally, the age of a child with autism appeared to relate weakly to family connectedness and family spirituality, that is to say, in this survey, it did not emerge as a strong conclusion. The impact of the child's age was expected to be stronger, according to the views expressed in the bibliography, although this correlation has been doubted in previous researches.

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Note

Note 1. As resilience, in this paper, is perceived an acquired and not an innate personal characteristic, which depends largely on the supportive relations of the parents, the peers and others, aiming at the strengthening of the person in order to manifest elements of positive adaptation despite the existence of serious threats, difficulties, traumas and pressures. According to Hamilton (2014) some families successfully meet the challenge of autism, while others do not manage equally well, with a significant impact on various aspects of family life. The *resilience* is perceived as positive adaptation within the framework of a big change and has attracted much attention in recent years because of the increased awareness of the various factors that affect it within the family.

Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

The Resume Research Literature: Where Have We Been and Where Should We Go Next?

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Received: January 24, 2017 Accepted: February 6, 2017 Online Published: February 15, 2017

doi:10.5539/jedp.v7n1p169 URL: http://doi.org/10.5539/jedp.v7n1p169

Abstract

The resume remains a common selection method used by organizations; however, much of the resume research literature is dated and there is a lack of an organizing framework regarding future resume-related research. Thus, the purpose of the current paper is to provide: (1) a synthesis of the historical empirical research literature through the lens of the advice that has accumulated to date; and (2) an organizing framework containing future research questions that need to be investigated in order to continue moving the literature forward. The current paper will be of use to job applicants, business communication instructors, and researchers.

Keywords: resume, cover letter, job applicant, job search, business communication, personnel selection

1. Introduction

It has long been established that first impressions have a substantial impact on the interpretation of subsequent information (e.g., Anderson & Barrios, 1961). In a business context, the first impression of a job applicant has traditionally been made through the resume (e.g., Knouse, 1989; Roderick & Jelley, 1992; Stanley-Weigand, 1991) and, despite many technological advancements since the initial resume-related publications began to appear in the research literature, the resume remains a common application component (e.g., Catano, Wiesner, & Hackett, 2016). Thus, the importance of job applicant resumes in terms of business communication cannot be understated; as one earlier resume communication scholar professed: "why teach anything about communicating within the organization unless we teach about how to get into the organization?" (Stull, 1978, p. 8).

Business communication instructors often teach a module on resume and cover letter writing. During this module, it is not uncommon for undergraduate and graduate students to mention the conflicting advice that they have received from the institution's career center, their other instructors, their friends, their family members, the popular press, and so on. Thus, it would be beneficial to have a current resource that synthesizes the extant empirical research literature in order to derive advice for resume and cover letter writing. Without such a resource, the alternative would be for business communication instructors to rely on, at best, a less comprehensive research resource, and, at worst, their own opinions about advice for resume and cover letter writing. The notion of utilizing the empirical research literature in order to derive advice is consonant with the recent and much needed movement towards incorporating evidence-based teaching into management classes (Erez & Grant, 2014). However, much of the resume research literature is quite dated and a potential barrier to more contemporary and systematic resume-related research is a lack of an organizing framework regarding future research.

Thus, the purpose of the current paper is twofold: (1) the current paper will provide a synthesis of the historical empirical research literature through the lens of the advice that has accumulated to date (i.e., where have we been?); and (2) the current paper will also provide an organizing framework containing future research questions that need to be investigated in order to continue moving the literature forward (i.e., where should we go next?). All of the research studies synthesized in the current paper are derived from empirical data collections from the business communication and human resources management fields, which most often utilized one of the following methodologies: (1) surveying organizational professionals regarding their resume-related preferences; or (2) conducting experimental studies by manipulating resume components. Moreover, the majority of the

extant research was conducted within the United States and it is noted where studies were conducted outside of the United States.

Research that has demonstrated findings related to information that is not under the control of the applicant or is no longer acceptable to provide based on anti-discrimination legislation (e.g., age, gender, race, marital status, dependents; e.g., Bendick, Jackson, & Romero, 1996; Bertrand & Mullainathan, 2004; Dipboye, Arvey, & Terpstra, 1977; Dipboye, Fromkin, & Wiback, 1975; Marlowe, Schneider, & Nelson, 1996; McIntyre, Moberg, & Posner, 1980; Muchinsky & Harris, 1977; Oliphant & Alexander, 1982; Renwick & Tosi, 1978) is not incorporated into the below discussion. Clearly, it has been established that the following personal information components should not be included in resumes: height, weight, race, religion, birth date, marital status, number of dependents, physical/health status, photographs, and social security number (Hutchinson & Brefka, 1997). Moreover, consistent with the empirical research-based mandate of the current paper, publications that involve merely opinions without supporting research evidence (e.g., Dittman, 1983; Stanley-Weigand, 1991) are also not incorporated into the below discussion.

The below discussion will involve a comprehensive integration of the most impactful, systematic, and empirical research available in order to see how the following questions have been historically answered in the literature: What information should be included in the resume? How long should the resume be? In what order and style should the resume content be arranged? What is the best available advice for cover letter writing? What other advice is there for resume and cover letter writing? Based on the information and advice that has accumulated to date, a framework for future research needs will be offered. Overall, the work presented in the current paper will be of use to job applicants, business communication instructors, and researchers interested in updating and advancing the resume research literature.

2. What Information Should Be Included in the Resume?

Compared with an application form, job applicants can choose what information to include in their resumes. Some of the options for categories to include are: (a) personal information; (b) personal opening, job objective, career objective, and summary of qualifications; (c) education; (d) work experience; (e) references; (f) scholarships, awards, and honors; (g) hobbies, interests, and extracurricular activities; and (h) willingness to relocate and travel. Next, the empirical research literature regarding the information that should be included in the resume for each of the aforementioned categories is reviewed.

2.1 Personal Information

A large and well-established body of research has suggested that the applicant's name, address, and phone number should definitely be included in the resume (Hornsby & Smith, 1995; Hutchinson, 1984; Hutchinson & Brefka, 1997; Mansfield, 1976; Wells, Spinks, & Hargrave, 1981). Although not focused on stylistic resume issues, a recent study by Burns, Christiansen, Morris, Periard, and Coaster (2014) has provided support for the inclusion of a school email address over a personal email address as their sample of human resource professionals provided more favorable judgments for resumes that included email addresses containing ".edu". The advice to include a school email address over a personal email address is especially applicable for student applicants and recent graduates but may also have implications for additional applicants. Specifically, future research should address whether more professional email addresses (e.g., givenname.surname@emailprovider.com) are rated more favorably than less professional email addresses.

2.2 Personal Opening, Job Objective, Career Objective, and Summary of Qualifications

Although recent research has provided support for the notion that there is no need for a personal opening in a resume (Burns et al., 2014), including a job objective and/or a career objective has traditionally been found to be important information to include in a resume (Harcourt & Krizan, 1989; Harcourt, Krizan, & Merrier, 1991; Hornsby & Smith, 1995; Hutchinson, 1984; Hutchinson & Brefka, 1997; Schramm & Dortch, 1991). Harcourt and colleagues' (1991) sample of 212 campus recruiters demonstrated a preference for a career objective over a job objective or a combined career and job objective. However, future research is needed to more conclusively demonstrate the impact of including a career objective, a job objective, or a combined career and job objective especially considering the technological advancements since some of this research was conducted. Lastly, a summary of qualifications may also be important to include in a resume (Harcourt & Krizan, 1989; Harcourt et al., 1991); however, future research is also needed to determine whether including a summary of qualifications is effective if a career objective, a job objective, or a combined career and job objective has already been included.

Overall, the best available advice for resume writers is to avoid a personal opening and to instead include an objective or a summary of qualifications.

2.3 Education

Both early and more recent resume research agree that resumes should include formal educational qualifications including information regarding the degree or designation as well as the major, minor, and, if applicable, the expected date of graduation (Burns et al., 2014; Feild & Holley, 1976; Harcourt et al., 1991; Holley, Higgins, & Speights, 1988; Horn, 1988; Hutchinson, 1984; Hutchinson & Brefka, 1997; Mansfield, 1976; McNeilly & Barr, 1997; Schramm & Dortch, 1991; Spinks & Wells, 1987, 1993; Su, Lorgnier, Yang, & Oh, 2015; Wells et al., 1981).

A less intuitive piece of advice for resume writers, based on a national study of practicing Society for Human Resource Management professionals, is to include Grade Point Average (GPA) data including GPA within major and possibly also overall GPA (Ray, Stallard, & Hunt, 1994). In fact, a convincing body of early and more recent research has supported the inclusion of GPA data in the resume (e.g., Brown & Campion, 1994; Burns et al., 2014; Campion, 1978; Chen, Huang, & Lee, 2011; Feild & Holley, 1976; Harcourt & Krizan, 1989; McNeilly & Barr, 1997; Schramm & Dortch, 1991) and the preference for this type of information increased since the Hutchinson (1984) study (Hutchinson & Brefka, 1997). Hutchinson and Brefka's (1997) sample of personnel administrators in Fortune 500 organizations demonstrated a preference for the inclusion of GPA information especially when it is high and perhaps even when it is low. In further support of this point, Oliphant and Alexander's (1982) sample of personnel professionals found that resumes including GPA information were rated more favorably than resumes that did not include GPA information when evaluating experimentally manipulated resumes. Moreover, research by Thoms, McMasters, Roberts, and Dombkowski (1999) that also used experimentally manipulated resumes found that resumes with higher GPAs were rated more favorably than resumes with lower GPAs by business professionals.

In further support of the inclusion of academic achievement-related information in the resume, early resume research by Hakel, Dobmeyer, and Dunnette (1970) found that out of scholastic achievement, experience, and personal interests, only scholastic achievement played a substantial role in the evaluation of applicant resumes when their sample of students as well as recruiters from Certified Public Accounting firms assessed the relative impact of each factor. Personal interests (which will be subsequently discussed), even when job-related, did not account for poor scholastic standing (Hakel et al., 1970). The relative importance of scholastic standing was also demonstrated by Dipboye and colleagues (1975) as well as Renwick and Tosi (1978) who demonstrated that field of specialization and graduate degree were more influential factors when making selection decisions based on experimentally manipulated resumes than personal variables, such as gender and marital status.

More recently Cole, Rubin, Feild, and Giles' (2007) sample of 244 experienced recruiters evaluating actual resumes of recent or soon-to-be college graduates demonstrated that strong academic qualifications can account for weaker work experience and extracurricular activities but also that strong work experience and extracurricular activities can account for weaker academic qualifications. Nevertheless, having a strong background in academic performance, work experience, and extracurricular activities is likely to lead to high ratings regarding employment suitability (Cole et al., 2007). Overall, future research should address whether it is most effective to include GPA within major, overall GPA, or both within major and overall GPA. There is also a gap in the research literature in that future studies should address whether the inclusion of GPA information is effective when applicants are applying to non-entry-level jobs.

There is some debate in the resume advice industry regarding the inclusion of high school data but previous research has suggested that this type of information is likely unnecessary and should probably be excluded from resumes (Harcourt & Krizan, 1989; Hutchinson, 1984; Hutchinson & Brefka, 1997; Spinks & Wells, 1987; Wells et al., 1981); that is, unless the high school information is the most recent educational experience that the applicant possesses (Hornsby & Smith, 1995). Harcourt and colleagues (1991) found that information regarding high school GPA, graduation date, and awards was not preferred by their sample of campus recruiters.

Some earlier resume research of the 500 largest corporations in the United States as listed in the Fortune directory has indicated a preference for the inclusion of the major source of financing during college or university to be listed in the resume (Wells et al., 1981). However, Mansfield (1976) found that 54% of her sample of Fortune 500 company officials indicated that the major source of financing formal education is of little or no importance. In more recent research, the source of financing while in school was found to be only somewhat important by Hutchinson and Brefka (1997) and to be decreasing in importance since the Hutchinson

(1984) study. Although it would appear that the major source of financing during college or university is not very important information to include in the resume, future research should update this literature and confirm whether a more effective strategy is to note the major source of financing during college or university or to not mention this information.

Regarding the possible inclusion of class projects and relevant coursework, there have been conflicting findings based on applicant experience and the functional areas in which applicants are applying for jobs (Charney & Rayman, 1989; Charney, Rayman, & Ferreira-Buckley, 1992). Nevertheless, some research assessing business professionals has provided support for the inclusion of coursework compared with no coursework being listed (Thoms et al., 1999). Overall, future research is needed in order to update this area of research and to determine whether resumes including class projects and coursework are in fact more effective than resumes that do not include this information.

2.4 Work Experience

A primary inclusion for the resume is the work experience section and applicants should include information regarding previous employers, the dates in which they worked for each employer, their job title at each previous employer, and whether each job was part- or full-time (Feild & Holley, 1976; Harcourt & Krizan, 1989; Harcourt et al., 1991; Holley et al., 1988; Horn, 1988; Hutchinson, 1984; Hutchinson & Brefka, 1997; Mansfield, 1976; McNeilly & Barr, 1997; Schramm & Dortch, 1991; Spinks & Wells, 1987, 1993; Wells et al., 1981). Moreover, it has been shown that it is important to include work experience information even if the previous experience is unrelated to the job in question (Hornsby & Smith, 1995; Sulastri, Handoko, & Janssens, 2015).

2.5 References

Regarding the inclusion of references in resumes, previous studies have indicated that the inclusion of references in a resume or at other initial screening stages is of little or no importance (Horn, 1988; Hutchinson, 1984; Hutchinson & Brefka, 1997; Ray et al., 1994; Schramm & Dortch, 1991); nor is it necessary to state that references are available upon request (e.g., Schramm & Dortch, 1991). However, it is worth noting that Harcourt and Krizan's (1989) sample of Fortune 500 personnel administrators as well as business communication instructors demonstrated an increasing desire for references to be included in the resume since the Hutchinson (1984) study and that Harcourt and colleagues (1991) found a preference for the inclusion of a "references available on request" (p. 269) statement. Moreover, other research has also advocated for the inclusion of references in the resume (e.g., Spinks & Wells, 1987; Wells et al., 1981). Thus, future research should address whether resumes prepared with or without references or the verbiage "references available upon request" are rated more favorably and this is an especially important area for research to update as the research cited above is somewhat dated. Regardless, the inclusion of personal as opposed to professional references in the resume should be avoided (e.g., Harcourt et al., 1991).

2.6 Scholarships, Awards, and Honors

Previous research has provided support for the inclusion of a list of scholarships, awards, and honors in resumes (Burns et al., 2014; Campion, 1978; Hornsby & Smith, 1995; Hutchinson & Brefka, 1997; Mansfield, 1976; Schramm & Dortch, 1991; Wells et al., 1981). Moreover, the preference for the inclusion of awards received on resumes increased in importance since the Hutchinson (1984) study (Hutchinson & Brefka, 1997).

2.7 Hobbies, Interests, and Extracurricular Activities

Despite the evidence in support of the inclusion of special skills and job aptitudes in resumes (e.g., languages, software; Harcourt & Krizan, 1989; Harcourt et al., 1991; Hutchinson, 1984; Wells et al., 1981), an ongoing debate in the literature pertains to the inclusion of categories, such as hobbies and interests. In early resume research (Mansfield, 1976), less than 50% of the company officials surveyed from the Fortune 500 Largest Industrial Corporations preferred information pertaining to non-job-related factors, such as hobbies and recreational interests to be included in the resume. Pibal (1985) also found that basic resume content (e.g., work experience, education) was ranked more highly than personal items. Harcourt and Krizan (1989) demonstrated that since the Hutchinson (1984) study, preferences of personnel administrators of Fortune 500 companies for the inclusion of hobbies and outside interests declined. Lastly, Hutchinson and Brefka (1997) provided evidence that the listing of memberships in college clubs, fraternities, and sororities as well as hobbies and interests are not important to include in the resume. Nevertheless, recent research by Burns and colleagues (2014) did provide evidence that would support the inclusion of social activities and hobbies (but not recreational sport activities).

Thus, future research is needed in order to determine the effectiveness of including hobbies and interests in resumes.

Conversely, there does appear to be a consensus regarding the benefits of including extracurricular activities in resumes (Burns et al., 2014; Chen et al., 2011; Schramm & Dortch, 1991; Rubin, Bommer, & Baldwin, 2002). Brown and Campion's (1994) sample of recruiters found an advantage for applicant resumes that included extracurricular activities so long as they were not associated with recreational sports or fraternity involvement, which helps to underscore the importance of including job-related information in all sections of the resume. Memberships in professional organizations and associations have been shown to be beneficial extracurricular activities to include in resumes (e.g., Campion, 1978; Harcourt & Krizan, 1989; Harcourt et al., 1991). The study by Brown and Campion (1994) also helps to demonstrate the progression of earlier resume research as Campion (1978) originally found a benefit associated with including fraternity and sorority membership in the resume; a conclusion that had clearly changed in his subsequent publication (i.e., Brown & Campion, 1994). There is also some evidence to support the advice that resume writers should exclude church involvement from their resumes (Harcourt & Krizan, 1989; Harcourt et al., 1991); moreover, other scholars have cautioned that religious, political, ethnic, or sociocultural affiliations may influence the decisions made by recruiters (Derous & Ryan, 2012).

Nemanick and Clark's (2002) sample of undergraduate students rating experimentally manipulated resumes found that applicants holding numerous (i.e., five) extracurricular leadership positions were judged very favorably and this was especially the case for those applicants with both career-related and social extracurricular activities. For applicants holding two leadership positions or five non-leadership positions, they were judged more favorably when they included career-related as opposed to social extracurricular activities (Nemanick & Clark, 2002). These findings help to supplement the research conducted by Blackburn-Brockman and Belanger (2001), which involved a sample of 105 Certified Professional Accountant recruiters indicating a benefit of elaborating upon extracurricular activities, professional accomplishments, and community service that reflect leadership, commitment, involvement, and balance but only when the applicants had outstanding grades and previous work experience.

Overall, extracurricular activities have been shown to be important to include in applicant resumes. However, resumes that elaborated upon work experience as opposed to extracurricular activities were still more likely to be perceived as qualified and employable; thus, more space in the resume should be dedicated to providing work experience details as opposed to educational experience or extracurricular activity details (McNeilly & Barr, 1997). Based on the fact that most of the aforementioned research has focused on student and recent graduate applicants, future studies should seek to update this body of research and assess whether extracurricular activities should be included in resumes for non-student applicants and non-recent graduate applicants.

2.8 Willingness to Relocate and Travel

Some empirical research literature has recommended the inclusion of information pertaining to an applicant's willingness or lack of willingness to relocate and travel in the resume (Harcourt & Krizan, 1989; Harcourt et al., 1991; Hutchinson, 1984; Wells et al., 1981). Moreover, willingness to relocate and travel information was found to be even more important to include since the Hutchinson (1984) study (Hutchinson & Brefka, 1997). However, it is a viable future research question to assess whether information regarding willingness to relocate and travel would be better included in the cover letter as opposed to in the resume. Moreover, based on the time that has passed since these initial studies have been conducted, future research efforts should seek to corroborate these findings in a more contemporary context as the business world continues to become more global.

3. How Long Should the Resume Be?

Once applicants have determined what information to include in their resumes, advice is needed regarding the most effective resume length. In the aforementioned study by Mansfield (1976), the company officials responding to her survey indicated a preference for a concise one- to two-page resume. The advice regarding not exceeding two pages for resumes has been a consistent finding in the literature over time (e.g., Feild & Holley, 1976; Harcourt & Krizan, 1989; Harcourt et al., 1991; Horn, 1988; Hornsby & Smith, 1995; Schramm & Dortch, 1991; Thoms et al., 1999). For example, previous research has demonstrated that one- to two-page resumes are more desirable than three-page resumes (Spinks & Wells, 1987; Wells et al., 1981).

However, some research as well as the resume advice industry in general has at times advocated for a one- over a two-page resume (e.g., Spinks & Wells, 1993). Moreover, 80% of the recruiters surveyed by McDowell (1987)

believed that resumes should be one page in length. On the contrary, two-page resumes were ranked more favorably by accounting firm recruiters than one-page resumes for accounting majors with strong school and work credentials when applying to professional accounting firms (Blackburn-Brockman & Belanger, 2001). Thus, although applicants should ensure that their resumes do not exceed two pages, future research should continue to pursue the quest for determining the most effective resume length. For example, no extant research has addressed whether two-page versus one-and-a-half-page resumes are more effective.

4. In What Order and Style Should the Resume Content Be Arranged?

An early study of professional recruiters assessing experimentally manipulated resumes by Penrose (1973) found no order effects when varying resume components while holding content constant, such as if major qualifications appeared first or last in the resume. Conversely, subsequent research by Schramm and Dortch (1991) found that more than 80% of their sample of on-campus recruiters reported that the order in which resume items appeared was of some degree of importance. This section will discuss the historical advice for applicants to consider regarding resume order, overall format, and other stylistic issues.

4.1 Resume Order

A common finding throughout various resume research endeavors is that the more traditional sequencing of resume content (e.g., opening with personal information, followed by education, experience, and then references; Wells et al., 1981) is preferred. Other, more recent research has corroborated the notion that education should be the first category on the resume and that experience should be the second category on the resume (Burns et al., 2014; Spinks & Wells, 1987). However, future research should assess the efficacy of this ordering for non-student applicants and non-recent graduate applicants as it could be reasoned that for these applicants, the work experience section is their greatest asset and thus, should precede the education section.

4.2 Overall Resume Format

Regarding resume format, there is a strong preference for the traditional, standard, historical, chronological format over alternative options (e.g., functional, informal, creative, imaginative, web-based, video-based; Hornsby & Smith, 1995; Schramm & Dortch, 1991; Toth, 1993). The aesthetic aspects of a resume likely have a substantial impact on being shortlisted for a job (e.g., Arnulf, Tegner, & Larssen, 2010; Chen et al., 2011). Specifically, Arnulf and colleagues' (2010) sample of Norwegian professional recruiters and students found that formal resume designs were preferred over more creative (i.e., colored and artistically arranged) designs; in fact, even resumes printed on colored paper ranked higher than the "creative" format. It is interesting to note that this study was conducted in Norway—a country where there are few standardized practices for resume creation—and the findings nevertheless corroborated the effectiveness of the traditional resume format. Schullery, Ickes, and Schullery's (2009) sample of 234 professionals from a wide range of company sizes and industries provided further evidence that there is no need to prepare resumes differently (e.g., so that they can be scanned by electronic devices, such as optical character recognition [OCR] readers).

Research conducted in the Netherlands with a sample of 445 unemployed job applicants has demonstrated that video-based resumes appear to have some benefits regarding applicant perceptions as they are considered by applicants (regardless of their ethnicity) to be fairer than traditional, paper-based resumes (Hiemstra, Derous, Serlie, & Born, 2012). However, laboratory research using an undergraduate sample suggested that evaluations of applied social skills and mental capabilities of applicants were lower when those evaluations were based solely on video resumes as opposed to when those evaluations were based solely on paper resumes (Waung, Hymes, & Beatty, 2014). In addition, a follow-up study utilizing a recruiter and student sample demonstrated the ineffectiveness of high levels of self-promotion in video resumes for men and the possible detrimental effects of high levels of self-promotion in video resumes for women (Waung, Hymes, Beatty, & McAuslan, 2015). From an applicant perspective, caution needs to be exercised when it comes to the use of video-based resumes as the aforementioned research suggests that they are also likely to be a less effective format than traditional resumes.

Similarly, some recent research using a hiring manager and human resource professional sample has tentatively advocated for the benefits of adding personality, emotional intelligence, diversity tolerance, and preferred organizational structure information to the standard resume (Wright, Domagalski, & Collins, 2011); however, caution should be taken with regards to this conclusion as well based on the aforementioned research advocating for the traditional resume format (e.g., Arnulf et al., 2010). Nevertheless, future research comparing the method advocated by Wright and colleagues (2011) with the traditional resume format is needed. Also, determining whether information pertaining to personality, emotional intelligence, diversity tolerance, and preferred

organizational structure is more effective when it is included in the resume or in the cover letter is another fruitful avenue for future research.

4.3 Other Resume Stylistic Issues

Regarding other resume stylistic issues, an early study by Helwig (1985) provided support for the importance of being concise and using traditional, short, bullet point resumes over highly elaborated, lengthy, narrative resumes. Subsequent research has provided further evidence supporting the advice to avoid a paragraph presentation style in the resume (Horn, 1988) as well as findings in support of using action verbs and bullets in addition to bolding in the resume (e.g., Burns et al., 2014; Hornsby & Smith, 1995). Being specific when possible, avoiding vague assertions (e.g., Oliphant & Alexander, 1982; Stephens, Watt, & Hobbs, 1979), providing details regarding jobs, skills, education, and experiences (Burns et al., 2014), and writing in the third person as opposed to the first person (Horn, 1988) are other stylistic recommendations that should likely be followed by applicants. Aligning job experience dates on the left- or right-hand side of the page (i.e., not with the job experience information itself) and ensuring that the margins are of a standard size should also help with the stylistic and aesthetic issues that can plague resumes (Burns et al., 2014). Lastly, regarding resume color, white or ivory documents are preferred over colored documents (Arnulf et al., 2010; Bird & Puglisi, 1986; Penrose, 1984; Schramm & Dortch, 1991; Stephens et al., 1979). Gold and light blue were shown to be the least preferred resume colors in the aforementioned Schramm and Dortch (1991) study.

5. What Is the Best Available Advice for Cover Letter Writing?

Cover letters—formerly referred to as transmittal letters (e.g., Weeks, 1975) or letters of application (e.g., Spinks & Wells, 1987; Welch, 1986)—are often included along with resumes in the initial job application process. A convincing body of literature has developed over time supporting the preference or expectation of a cover letter to be included along with a resume as opposed to a resume being submitted without a cover letter (DeKay, 2006; Harcourt et al., 1991; Hornsby & Smith, 1995; Schullery et al., 1999; Spinks & Wells, 1987; Wells et al., 1981).

Cover letters are perhaps most effective when they: (a) are written in the first person as opposed to the third person; (b) are customized for each application; (c) indicate the job for which the applicant is applying; (d) demonstrate knowledge regarding the potential employer, such as reasons why the applicant is interested in the particular job and company; (e) demonstrate the applicant's ability to contribute to the job in question, such as through an explanation of how the applicant's education and experience fit the job requirements; and (f) close by making a request for a personal interview (Horn, 1988; Mansfield, 1976; Spinks & Wells, 1987; Wells et al., 1981). Furthermore, there appears to be a general preference for avoiding redundancies with the information included in the resume (Mansfield, 1976) as well as for avoiding vague statements through the use of specificity and precision (Spinks & Wells, 1987; Wells et al., 1981). Regarding length, cover letters should be no longer than one page (Horn, 1988) and should contain less than four paragraphs (Augustin, 1991).

Overall, the cover letter appears to be an important opportunity for applicants to include relevant and unique items that are not included in the resume. However, much less empirical research has been conducted on cover letters compared with resumes and based on the benefits to applicants associated with including cover letters along with their resumes (DeKay, 2006; Harcourt et al., 1991; Hornsby & Smith, 1995; Schullery et al., 1999; Spinks & Wells, 1987; Wells et al., 1981) as well as the fact that many of the studies in this area are now dated, there is a need for subsequent research in this area. For example, Augustin (1991) assumed that a format containing only paragraphs should be used in cover letters but based on the short amount of time that recruiters likely spend reviewing cover letters, future research should investigate whether cover letters written in a paragraph format are in fact more effective than cover letters written in a combined paragraph and bullet point format or in a combined paragraph and table format. The nature of the job in question may also suggest that in some cases a more assertive cover letter should be written (e.g., for jobs in high-pressured sales environments); however, Horn (1988) demonstrated that a realistic attitude and modest confidence towards an applicant's own job-related qualifications are appreciated (especially in the cover letter). Regardless, future research should seek to identify the appropriate level of assertiveness to include in application materials.

6. What Other Advice Is There for Resume and Cover Letter Writing?

The synthesis of information presented in the current paper will conclude with further advice from the empirical research literature regarding resume and cover letter writing that did not fit under one of the aforementioned headings; specifically, this section will address: (a) grammar, spelling, word choice, punctuation, neatness, and professional appearance; (b) impression management; and (c) other additional advice.

6.1 Grammar, Spelling, Word Choice, Punctuation, Neatness, and Professional Appearance

It is of the utmost importance to have correct and error-free grammar, spelling, word choice, and punctuation as well as overall neatness and professional appearance in resumes and cover letters (Burns et al., 2014; Charney & Rayman, 1989; Charney et al., 1992; Culwell-Block & Sellers, 1994; Horn, 1988; Hornsby & Smith, 1995; Mansfield, 1976; McDowell, 1987; Schramm & Dortch, 1991; Spinks & Wells, 1987, 1993; Stephens et al., 1979; Wells et al., 1981). In fact, previous studies have demonstrated that resume and cover letter communication proficiency is at least as important as (Horn, 1988) if not more important than (Charney & Rayman, 1989) technical competence, relevant work experience, and qualifications. For example, resumes without errors but with less relevant work experience were rated more highly than resumes with errors but with highly relevant work experience by campus recruiters that typically employ mechanical engineers (Charney & Rayman, 1989). In a subsequent study, Charney and colleagues (1992) demonstrated that undergraduate business students evaluating marketing resumes do not penalize or distinguish between error-laden compared with error-free resumes; conversely, they found that the undergraduate students did distinguish between error-free and error-laden resumes when evaluating engineering resumes, but not to the same extent as actual engineering recruiters. Thus, perhaps one of the reasons why student applicants may have grammatical, spelling, word choice, punctuation, neatness, and professional appearance issues in their resumes and cover letters is that they typically underestimate the impact that these errors have on the evaluation of their application materials.

6.2 Impression Management

Submitting an application is in essence an exercise in impression management (Schlenker, 1980) as the applicant is hoping to control the impression that is formed by the recruiter of the applicant's competence, motivation, and experience. However, lower perceptions of applicant likability, truthfulness, and employability were found when impression management was used in resumes and cover letters (the effect was especially strong for resumes and the only positive was in terms of enhanced perceptions of applicant self-confidence as rated by the sample of executive MBA students; Knouse, Giacalone, & Pollard, 1988). Conversely, a subsequent study by Knouse (1994) utilizing a sample of Chamber of Commerce members demonstrated more favorable perceptions of applicant interpersonal skill, overall impressiveness, and hireability in addition to self-confidence (but desire to further verify applicant background was also rated more highly) when impression management was used. Nevertheless, as noted by Knouse (1994), the specific type of impression management technique being utilized might help to explain the discrepancy between these two studies.

Specifically, tactics associated with ingratiation and the exaggeration of personal traits and accomplishments (Knouse et al., 1988) are likely to be less effective than self-descriptive statements (e.g., examples and descriptions of favorable education- and job-related accomplishments) that clarify and enhance credentials in a reasonable and not overly exaggerated manner (Knouse, 1994). It appears that this latter set of impression management tactics are consistent with the aforementioned findings regarding appropriately elaborating upon and providing sufficient levels of detail regarding resume aspects, such as education, work experience, and extracurricular activities (Blackburn-Brockman & Belanger, 2001; McNeilly & Barr, 1997).

Overall, elaborating upon accomplishment statements as opposed to making unwarranted and exaggerated self-descriptive statements appears to be beneficial advice for applicants. In further support of this, Thoms and colleagues (1999) demonstrated that including accomplishment statements (e.g., "not one customer complaint in two years"; p. 347) resulted in more favorable ratings than resumes that do not contain these types of statements. Additional research utilizing a sample of managers and human resource consultants has specified the importance of including between two to six job competency statements (i.e., descriptions of knowledge, skill, ability, and other characteristics) in order to improve the hiring manager's impression of the applicant (Bright & Hutton, 2000).

Regarding applicants choosing to use video-based resumes (which, as discussed above, is likely to be a less effective resume format than the traditional resume format), they should be further cautioned regarding the use of impression management tactics in video-based resumes. This is especially the case when the impression management tactic used is of high intensity (e.g., "While working on this project I was told that I was an *ideal* [emphasis added] example to the newer interns due to my positive attitude and *unfailing* [emphasis added] professionalism"; Waung et al., 2015, p. 349) as high levels of self-promotion in video resumes were ineffective and this negative impact was strongest for male applicants (Waung et al., 2015).

6.3 Other Additional Advice

Here are a few final additional pieces of resume-related advice from the empirical research literature: applicants should: (a) print and bring copies of their resume to the interview (e.g., Spinks & Wells, 1993); (b) take the time and effort to customize their resumes specifically for each job that is desired (Brown & Campion, 1994; Holley et al., 1988; Hornsby & Smith, 1995); and (c) deliver their resumes to potential employers electronically—either via email (with the resume included as an attachment as opposed to pasted into the body of the email) or via the company's website; Schullery et al., 1999). Overall, many additional research questions will emerge regarding resume and cover letter writing especially considering the technological advancements since many of the studies cited in the current paper were conducted; for example, have the substantial technological advancements changed the way that employers prefer to receive resumes? Is it more effective to electronically submit resumes in an Adobe PDF file format or in a Word document file format? Is it more effective to electronically submit a separate resume file and a separate cover letter file or should one file containing both the resume and the cover letter be submitted? Should the cover letter be pasted into the email itself and the resume attached to the email or should the resume and cover letter be attached to the email and something else be written in the body of the email?

7. Discussion

Although some scholars have argued that "there are few fixed rules about resumes" (Dittman, 1983, p. 16), in some cases in the current paper, relatively consistent results were found across various research methodologies, geographic locations, and time periods. These more consistent results have been summarized in Table 1 and have resulted in a synthesis of the historical empirical research literature through the lens of the advice that has accumulated to date. As noted at the outset and throughout the current paper, technological and other advancements have changed the business landscape as a whole; thus, the premise of the current paper was to provide an organizing framework containing future research questions that need to be investigated in order to continue moving the literature forward. In addition to the recent technological and other advancements since some of the studies were published, discrepancies across studies as well as other ideas that require future research efforts were also noted throughout the current paper and the resulting framework for organizing future research has been summarized in Table 2.

Table 1. Where have we been? Historical advice for resume and cover letter writing

Area	Advice	Relevant Citation(s)
General	Do not include:	Hutchinson and Brefka (1997)
	• height	
	• weight	
	• race	
	• religion	
	• birth date	
	• marital status	
	• number of dependents	
	• physical/health status	
	• photographs	
	• social security number	
Personal Information	Include:	Burns et al. (2014)
	• name	Hornsby and Smith (1995)
	• address	Hutchinson (1984)
	• phone number	Hutchinson and Brefka (1997)
	• email address	Mansfield (1976)
		Wells et al. (1981)

Personal Opening, Job Objective, Career Objective, and Summary of Qualifications	Include: • objective • summary of qualifications Do not include: • personal opening	Burns et al. (2014) Harcourt and Krizan (1989) Harcourt et al. (1991) Hornsby and Smith (1995) Hutchinson (1984) Hutchinson and Brefka (1997) Schramm and Dortch, 1991
Education	Include: • degree, designation • major, minor • expected date of graduation (if applicable) • GPA Do not include: • high school GPA, graduation date, and awards (unless this is the most recent educational experience that the applicant possesses)	Burns et al. (2014) Cole et al. (2007) Feild and Holley (1976) Hakel et al. (1970) Harcourt and Krizan (1989) Harcourt et al. (1991) Holley et al. (1988) Horn (1988) Hornsby and Smith (1995) Hutchinson (1984) Hutchinson and Brefka (1997) Mansfield (1976) McNeilly and Barr (1997) Oliphant and Alexander (1982) Ray et al. (1994) Schramm and Dortch (1991) Spinks and Wells (1987, 1993) Su et al. (2015) Thoms et al. (1999) Wells et al. (1981)
Work Experience	Include: • employers (even if unrelated to the job in question) • dates of employment • job title • whether each job was part- or full-time	Feild and Holley (1976) Harcourt and Krizan (1989) Harcourt et al. (1991) Holley et al. (1988) Horn (1988) Hornsby and Smith (1995) Hutchinson (1984) Hutchinson and Brefka (1997) Mansfield (1976) McNeilly and Barr (1997) Schramm and Dortch (1991) Spinks and Wells (1987, 1993) Sulastri et al. (2015) Wells et al. (1981)

Scholarships, Awards, and Honors	Include: • a list of scholarships, awards, and honors received	Burns et al. (2014) Campion (1978) Hornsby and Smith (1995) Hutchinson (1984) Hutchinson and Brefka (1997) Mansfield (1976) Schramm and Dortch (1991) Wells et al. (1981)
Hobbies, Interests, and Extracurricular Activities	Include: • special skills and job aptitudes (e.g., languages, software) • extracurricular activities (e.g., memberships in professional organizations/associations, leadership positions—especially for career-related activities) Do not include: • recreational sport activities • memberships in college clubs, fraternities, and sororities • church involvement • more detail on extracurricular activities than on work experience	Brown and Campion (1994) Burns et al. (2014) Campion (1978) Chen et al. (2011) Harcourt and Krizan (1989) Harcourt et al. (1991) Hutchinson (1984) Hutchinson and Brefka (1997) McNeilly and Barr (1997) Nemanick and Clark (2002) Rubin et al. (2002) Schramm and Dortch (1991) Wells et al. (1981)
Willingness to Relocate and Travel	• indicate willingness or lack of willingness to relocate and travel	Harcourt and Krizan (1989) Harcourt et al. (1991) Hutchinson (1984) Hutchinson and Brefka (1997) Wells et al. (1981)
Length	• ensure that your resume does not exceed two pages	Feild and Holley (1976) Harcourt and Krizan (1989) Harcourt et al. (1991) Horn (1988) Hornsby and Smith (1995) Mansfield (1976) Schramm and Dortch (1991) Spinks and Wells (1987) Thoms et al. (1999) Wells et al. (1981)
Order	• order resume content in a traditional manner (e.g., personal information, education, work experience, extracurricular activities)	Burns et al. (2014) Spinks and Wells (1987) Wells et al. (1981)
Overall Format	• use the traditional, standard, formal, historical, chronological format over	Arnulf et al. (2010)

	alternative options (e.g., functional, informal, creative, imaginative, web-based, video-based)	Chen et al. (2011) Hornsby and Smith (1995) Schramm and Dortch (1991) Schullery et al. (2009) Toth (1993)
Other Stylistic Issues	• align job experience dates on the left- or right-hand side of the page (i.e., not with the job experience information itself) • ensure that margins are of a standard size • be concise yet specific and avoid vague assertions • use traditional, short, bullet point resumes with bolding and action verbs • write in the third person (e.g., "he", "she", "they") as opposed to the first person (e.g., "I", "we") • use white or ivory over colored documents	Arnulf et al. (2010) Bird and Puglisi (1986) Burns et al. (2014) Helwig (1985) Horn (1988) Hornsby and Smith (1995) Oliphant and Alexander (1982) Penrose (1984) Stephens et al. (1979)
Cover Letters	• include a cover letter with the resume • ensure that your cover letter does not exceed one page • ensure that your cover letter contains less than four paragraphs • customize the cover letter for each application • avoid redundancies with the information included in the resume • avoid vague statements by using specificity and precision • write in the first person (e.g., "I", "we") as opposed to the third person (e.g., "he", "she", "they") Include: • the job in question • knowledge regarding the potential employer • information regarding ability to contribute to the job in question • a request for a personal interview	Augustin (1991) DeKay (2006) Harcourt et al. (1991) Horn (1988) Hornsby and Smith (1995) Mansfield (1976) Schullery et al. (1999) Spinks and Wells (1987) Wells et al. (1981)
Grammar, Spelling, Word Choice, Punctuation, Neatness, and Professional Appearance	• ensure that all application materials are correct and error-free regarding grammar, spelling, word choice, and punctuation as well as overall neatness and professional appearance	Burns et al. (2014) Charney and Rayman (1989) Charney et al. (1992) Culwell-Block and Sellers (1994) Horn (1988) Hornsby and Smith (1995) Mansfield (1976)

		McDowell (1987) Schramm and Dortch (1991) Spinks and Wells (1987, 1993) Stephens et al. (1979) Wells et al. (1981)
Impression Management	Include: • between two to six examples and descriptions of favorable education- and job-related accomplishments that clarify and enhance credentials in a reasonable and not overly exaggerated manner Do not include: • flattery and ingratiation • unwarranted and exaggerated self-descriptive statements	Bright and Hutton (2000) Knouse (1994) Knouse et al. (1988) Thoms et al. (1999)
Other Additional Advice	• print and bring copies of the resume to the interview • customize the resume for each application • deliver the resume to potential employers electronically—either via email (with the resume included as an attachment as opposed to pasted into the body of the email) or via the company's website	Brown and Campion (1994) Holley et al. (1988) Hornsby and Smith (1995) Schullery et al. (1999) Spinks and Wells (1993)

Table 2. Where should we go next? An organizing framework for future research questions

Area	Future Research Questions
What information should be included in the resume?	Are more professional email addresses more favorably received than less professional email addresses?
	Is a career objective, a job objective, or a combined career and job objective received most favorably?
	Is a summary of qualifications effective if a career objective, a job objective, or a combined career and job objective has already been included?
	Is it most effective to include GPA within major, overall GPA, or both within major and overall GPA?
	Is the inclusion of GPA information effective when applicants are applying to non-entry-level jobs?
	Is information regarding the major source of financing during college or university important to include?
	Is information regarding class projects and coursework important to include?

	Are resumes prepared with or without references rated more favorably?
	If resumes are prepared without references, then should the verbiage “references available upon request” be included?
	Should hobbies and recreational/outside interests be included?
	Should extracurricular activities be included in resumes for non-student applicants and non-recent graduate applicants?
	Is it more effective to include information regarding willingness to relocate and travel in the resume or in the cover letter?
How long should the resume be?	Is the most effective resume page length one page or two pages?
	Is a full two-page resume more effective than a one-and-a-half-page resume?
In what order and style should the resume content be arranged?	For non-student applicants and non-recent graduate applicants, is it more effective for the work experience section to precede the education section?
	Are resumes that include information pertaining to personality, emotional intelligence, diversity tolerance, and preferred organizational structure (Wright et al., 2011) more effective than the traditional resume format?
	Is information pertaining to personality, emotional intelligence, diversity tolerance, and preferred organizational structure (Wright et al., 2011) more effective when it is included in the resume or in the cover letter?
What is the best available advice for cover letter writing?	Are cover letters written in a paragraph format more effective than cover letters written in a combined paragraph and bullet point format or in a combined paragraph and table format?
	What is the appropriate level of assertiveness to include in application materials?
What other advice is there for resume and cover letter writing?	Have the substantial technological advancements changed the way that employers prefer to receive resumes?
	Is it more effective to electronically submit resumes in an Adobe PDF file format or in a Word document file format?
	Is it more effective to electronically submit a separate resume file and a separate cover letter file or should one file containing both the resume and the cover letter be submitted?
	Should the cover letter be pasted into the email itself and the resume attached to the email or should the resume and cover letter be attached to the email and something else be written in the body of the email?

7.1 Potential Limitations

Overall, despite recent claims that "there are no commonly accepted resume items and attributes across jobs and industries" (Su et al., 2015, p. 712), even the focal practical implication of that paper for applicants (which was framed in the context of the hospitality industry and recommended focusing resume content on job-related degree and grade information) is clearly a conclusion that is consonant with the advice from the literature (e.g., Burns et al., 2014; Feild & Holley, 1976; McNeilly & Barr, 1997; Schramm & Dortch, 1991). Regardless, especially as a result of the aforementioned technological and other advancements since many of the research studies cited in the current paper have been conducted, future research should seek to replicate the historical advice regarding resume writing (which was summarized in Table 1) as well as to seek to further advance the resume research literature by beginning to answer the future research questions noted in Table 2.

An additional potential limitation associated with the current paper is the generalizability of the historical advice summarized. Contrarians may argue that the advice summarized in Table 1 does not generalize to all types of jobs, industries, companies, and geographic locations. Nevertheless, there is reason to believe that this potential limitation may be less concerning than some contrarians may assert. Specifically, no significant differences have been found between the resume and cover letter preferences of smaller and larger organizations (Ray et al., 1994; Spinks & Wells, 1993). In addition, some research has demonstrated relatively similar results regarding the perceptions of American and Australian personnel professionals when evaluating resumes (e.g., Welch, 1986). More recently, Schullery and colleagues (2009) found that preferences for resumes and cover letters were highly similar across geographic range, company size, and industry.

One final potential limitation associated with the current paper is that many of the studies in the resume literature (and thus, many of the studies summarized and integrated in the current paper) have focused on recent post-secondary graduates as applicants. As noted in various future research questions (see Table 2), it will be beneficial for subsequent studies to assess the generalizability of some of the findings that appear to be targeted predominantly towards current students and recent graduates—for example, should extracurricular activities be included in resumes for non-student applicants and non-recent graduate applicants? For non-student applicants and non-recent graduate applicants, is it more effective for the work experience section to precede the education section?

7.2 Conclusion

The current paper has summarized the extant empirical resume research literature that has accumulated over the last several decades in order to provide the most systematic and comprehensive summary to date. The current paper provided a synthesis of the historical empirical research literature through the lens of the advice that has accumulated thus far (Table 1) and also provided an organizing framework containing future research questions that need to be investigated in order to continue moving the literature forward (Table 2). Job applicants can glean advice from the accumulated research evidence, business communication instructors can instruct their students based on this evidence, and researchers now have an organizing framework with numerous future research questions in order to further advance the resume research literature.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Resilience of Parents with a Child with Autism Spectrum Disorders and Factors for Its Potential Enhancement: Family Income and Educational Level

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Received: February 1, 2017 Accepted: February 10, 2017 Online Published: February 15, 2017

doi:10.5539/jedp.v7n1p188 URL: http://doi.org/10.5539/jedp.v7n1p188

Abstract

Autism is linked to bodily and psychological challenges for the parents who raise autistic children, it creates increased stress levels and reduced resilience because of these factors. However, many parents face the additional problem of the weakness to cope with the expenses of each therapeutic intervention, whereas often they are not adequately educated so as to be able to manage properly the information about the treatment of autism and maybe also its intake as a compulsory condition for the family environment. The writer explored the effect of family income and the parents' educational level on the reduction of resilience through a quantitative research based on a population sample that consisted of the parents of 312 autistic children in Greece, all of them couples, namely 624 men and women, divided in equal numbers. The important impact of the annual family income on the shaping of the levels of the characteristics under study is confirmed, as the result that was drawn is that the level of financial strength is positively connected to the social support the parents receive and the resilience they develop. Likewise, the level of education is linked to social support. The social support increases when the educational level is higher, on the contrary, the opposite goes for the levels of the total stress, parental distress, parent-child dysfunctional interaction, difficulty of child, which the lower educational level increases.

Keywords: resilience, autism, autistic child, family income, parents' educational level, social support

1. Introduction

The researches in the latest years (2013-2016) have not allowed the composition of a widely theoretical framework about the effect of the family income and the parents' educational level, as factors of possibly reinforcing the resilience during the autistic child's upbringing. And even if these researches contain some references to the family income, the references to the educational level are scarce and rather indirect. Nonetheless, certain useful observations could be the following:

An important factor causing stress is the financial pressure in coping with the autism problems, since the intervention strategies are not only time-consuming, but also expensive. Both the proper food for the child may be expensive and the necessary medication, too, whereas the health insurance is insufficient to cover all the needs of raising an autistic child (Bashir et al., 2014). Obviously, the economic efficiency is not a determining factor itself, as the parenting stress intervenes negatively, which according to Batool and Khurshid (2015) stems from the unpleasant situation during where the balance between the parents' views on the demands of the upbringing of their autistic children and their views on the possibility to utilize their resources effectively for addressing the problem, is disrupted. Bhagat, Simbak and Haque (2015) characterize autism as a serious, persistent and dynamic disease the consequences of which are made worse by the way the parents behave to their children, influenced negatively also by the negative problems they face. The therapeutic interventions will have to take into account the financial matters very seriously.

The data on the educational level, as mentioned already, is even more indirect, however, the results that are drawn are not insignificant. Samadi and McConkey (2014) believe that it affects the health of the parent cares but they also support the usefulness of broader knowledge on autism which overrides the cultural differentiations

of the autistic children's care. Of course, good information and increased knowledge do not necessarily mean that the parents' educational level is higher, but when the information comes from books and computers, it may correspond to a more educated family. As it will be shown also by the views of Ammari, Ringel Morris and Yardi Schoenebeck (2016) presented in the section "DISCUSSION", maybe the choice of the information sources depends on the parents' educational level, who will have to be in a position to distinguish the correct piece of information from the incorrect one. In the section "DISCUSSION", other surveys are mentioned too, in which the sensitive field of information derived from the internet and the bibliography, such the survey by Selimoglu et al. (2013).

2. Method

2.1 Purpose

This article is part of a wider research that aimed in exploring the way in which the family resilience of parents with a child with autism spectrum disorders interacts with the social context among which the family is placed, as well as with the stress the parents experience during the upbringing of a child with autism spectrum disorders. It is important to investigate how the resilience is affected when the social support that the family receives is low and the true stress high, with variables, apart from the level of social support that the parents receive and the stress they suffer from, certain demographic characteristics of the parents and of the child, too, such as age, sex and the diagnosis of the syndrome the child suffers from. In this article, the results of the investigation of the relation between the family resilience of the parents and the family income, as well as between the resilience and the educational level, are shown. It was assumed that a better income would lead to an easier addressing of the autistic child's needs, while a higher educational level would cause more favorable conditions of understanding the situation on the part of the parents and of its addressing.

2.2 Participants

Table 1. Demographic and other characteristics of the participants in the survey

	n	**%**
Sex		
Men	312	50,0
Women	312	50,0
Nationality		
Greek	609	97,6
Other	15	2,4
Religion		
Christians	586	93,9
Muslims	38	6,1
Prefecture of		
Kavala	52	8,3
Rodopi	80	12,8
Xanthi	72	11,5
Cyclades	74	11,9
Serres	96	15,4
Drama	120	19,2
Evros	130	20,8
Education		
Primary Education	171	27,4
Secondary School Graduates	80	12,8
Lyceum Graduates	168	26,9
HEI /TEI Graduates	205	32,9
Studies in Psychology or in Special Education	0	0,0

Annual Family Income		
Below 15.000 €	266	42,6
15.000 € - 20.000 €	272	43,6
Over 20.000 €	86	13,8
Family Status		
Single	0	0,0
Married	624	100,0
Widower/ Widow	0	0,0
Divorced	0	0,0
Family Relation to the Child		
Biological Father	312	50,0
Biological Mother	312	50,0
Step-father	0	0,0
Step-mother	0	0,0

As shown in Table 1, 624 parents of 312 children with autism spectrum disorders participated in the survey. The sample is uniformly distributed as to the parents' sex with 50.0% men and the same percentage of women. 97,6% of the sample, namely 609 parents, are Greeks, whereas 2,4%, namely 15 participants, are of a different nationality. 586 of the participants are Christians, 93,9% of the sample, whereas the remaining 6,1%, that is to say, 38 parents, are Muslims. As far as their place of residence in the Greek territory is concerned, 52 parents (8,3% of the total number) reside in the prefecture of Kavala, 80 parents (12% of the total number) reside in the prefecture of Rodopi, 72 participants (11,5% of the sample) in the Xanthi prefecture, 74 parents (11,9% of the sample) in the prefecture of Cyclades, 96 parents (15,4% of the total number) in the prefecture of Serres, 120 parents (19,2% of the total) in the prefecture of Drama and 130 parents (20,8% of the sample) in the prefecture of Evros.

The total number of the respondents (100,0% of the sample) are married and they are the biological parents of the child with autism spectrum disorders, 312 (50,0% of the sample) are the biological mothers and 312 (50,0% of the sample) the biological fathers.

The highest level of education for 27,4% of the participants (171 parents) is that of the primary education, 12,8% of the participants (80 parents) have received a low secondary education (*gymnasium*), 26,99% (168 parents) have received a high secondary education (*lyceum*), whereas the rest of the participants, that is to say, 32,9% of the sample (205 parents) have received a post-secondary education, as they are graduates of Higher Educational Institutes (HEI) and Technological Educational Institutes (TEI).

Concerning the annual family income, 42,6% of the sample (266 parents) declared an amount below 15.000€, 43,6% of the total number (272 parents) between 15.000€ and 20.000€ and the remaining 13,8% (86 parents), an income over 20.000€.

The children's characteristics are summarized in Table 1 in this text.

Table 2. Sex of the children with Autism spectrum disorders and Asperger syndrome

	n	**%**
Sex		
Boy	253	81,1
Girl	59	18,9
Diagnosis		
Autism	282	90,4
Asperger	30	9,6
I don't know	0	0

Table 3. Characteristic age values of the children with autism spectrum disorders

	Mean Value*	Standard Deviation	Skewness	Kurtosis
The Age of Children with Autism Spectrum Disorders	12,45	5,33	1,184	1,937

With regard to the child's sex, 81,1% of the respondents, namely 506 in number, are boys' parents and the remaining 118 parents (18,9% of the sample) are girls' parents. The average age of the 312 children whose parents participated in the research is $M = 12,45$ years with standard deviation $SD = 5,3$ years. 90,4% of these children, that is to say, 282 in terms of numbers, have been diagnosed with autism, whereas the remaining 30 children, 9,6% of the total number, have been diagnosed with Asperger syndrome. The children's characteristics are summarized in Tables 2 and 3 in the present text.

2.3 Note

The demographic characteristics of the families with dysfunctional children are factors relating directly to the parents' stress levels (Houser & Seligman, 1991; Keller & Honig, 2004). For this reason the questionnaire that was distributed to the participants contained specific fields the completion of which would provide the necessary demographic information on each family, namely on the sex, nationality, religion, education level, annual family income, current family status, family relation to the autistic child, the child's age and sex, as well as his accurate diagnosis.

2.4 Data Collection

The supplying and collection of the questionnaires were realized by the writer from July 2015 to February 2016. The search for parents with children with autistic spectrum disorders was conducted based on the catalogues of the Center for Differential Diagnosis, Diagnosis and Support (KE.D.D.Y.) in the prefectures of the Greek territory, where an archive is kept on the children that receive a diagnosis. The parents were approached via mail sent to their residence address, to which the research questionnaire was attached, as well as an accompanying form that informed them in detail of the purpose and the aims of the research process. Special emphasis was put on the importance of confidentiality and anonymity of the information, namely that the data of the child and of the parents themselves would remain anonymous, whereas the information will be used exclusively for the needs and the purpose of the present research.

Though the accompanying form the parents were informed that they had to complete the entire questionnaire and the duration of its completion should not exceed 60 minutes. The participants were urged to contact the researcher on his mobile phone for the provision of instructions and clarifications about the correct completion of the questionnaire. Moreover, the importance of the completion by every parent separately was specifically pointed out to the participants, without there being an exchange of views among the couples, so that the achievement of the research's aims be possible.

The collection of the completed questionnaires was realized with their return to the researcher, by mail, from the families that had consented to an analysis of their answers. The return of the questionnaires to the researcher was defined to take place within 30 days after the date of their dispatching to these families.

2.5 Data Analysis

For the investigation of the relations that govern the Social Support, Family Resilience and Parental Stress of parents with children with Autism spectrum disorders, the following three data collection tools were used.

***Social Support Index*:** The degree of the social support of parents who have a child with autism spectrum disorders was measured with the widely spread SSI tool (McCubbin, Patterson, & Glynn, 1982) which assesses the family social support as a factor in family resilience (Fischer, Corcoran, & Fischer, 2007). It contained 16 questions the answers to which were given in the 5-point Likert scale (0 up to 4). In every questionnaire statement, the respondents can state the measure of their agreement or disagreement by choosing one of the following answers: "I strongly disagree", "I agree", "I am not sure", "I agree" and "I fully agree", which are ranked on a scale of 0 to 4. In certain answers the scale was reversed so that a common conceptual content could

be achieved. As to the answers' interpretation for the definition of the Social Support degree, the scores of the individual questions are summed, the highest scores indicating a highest Social Support degree. The span of the SSI scale was from 0 to 6 units. The SSI has a high internal validity index with a = 0,82. The Social Support scale was used as an independent variable.

Family Resilience Assessment Scale: The FRAS scale of Tucker Sixbey (2005) was used to measure Family Resilience, based on the theoretical standard of Walsh (2006) on family resilience. It contained 66 closed-type questions which, as in the SSI case, they were answered in the Likert scale, but in a 4-point one, with values varying from 1 to 4, corresponding to the choices: "I strongly disagree", "I disagree", "I agree" and "I fully agree". The scale was reversed in four of these questions, and again for the acquisition of a common conceptual content. There was also an open-ended question. From these questions 54 were assessed, which were grouped together and formed 6 subscales of family resilience, as Tucker Sixbey (2005) suggests. More specifically, the subscales are as follows: 1) *Family Communication and Problem Solving*: here, 27 questions of the data collection tool correspond to it. The result of the subscale is given with Cronbach's alpha coefficient 0,96, whereas the horizontal sum of the individual questions forms the subscale's final rating with a span from 27 to 108 units. 2) *Utilizing Social and Economic Resources*: It is formed by 8 questions. Its rating is calculated by summing the participants' answers and it varies from 8 to 32 units. The subscale's reliability has a Cronbach's alpha index of 0,85. 3) *Maintaining Positive Outlook*: The questions composing the subscale are 6. The internal validity was calculated with the 0,86 Cronbach's alpha coefficient and in the same way the subscale's rating is calculated which varies from 6 to 24 units. 4) *Family Connectedness*: It is composed of 6 questions, among which the four ones in which the scale was reversed for conceptual reasons are also included. The sum of the score of all the questions that compose it, shapes the subscale's rating which it can also vary from 6 as minimal value to 24 as maximum value. Its reliability, measured with the Cronbach's alpha coefficient, was found to be of 0,70. 5) *Family Spirituality*: The subscale is composed of 4 questions. From the sum of the answers' score its rating varies from 4 to 16 units and the measurement of its internal validity gave a Cronbach's alpha coefficient of 0,88. 6) *Ability to Make Meaning of Adversity*: It is formed by 3 questions, its rating is calculated by summing the answers of the respondent parents and it varies from 8 to 32 units. The subscale's reliability has a Cronbach's alpha index of 0,74.

Taking into consideration the exception of 12 questions, it must be noted that the rating for the measurement of the total family resilience results from the horizontal sum of the 6 subscales and may vary from 66 to 264 units. Both for the total family resilience assessment scale and its entire individual subscales, higher scores indicate higher levels of family resilience. The reliability and internal validity in total for the tool used were calculated with the Cronbach's alpha coefficient and was found to be of 0,96. It is noted that the open-ended question was omitted.

Parenting Stress Index-Short Form: The parenting stress degree was measured by using the PSI-SF index (Abidin, 1995), which calculates the stress of the parents with children with autism spectrum disorders, which comes exclusively from their role as parents, without taking into consideration any external stressful factors, apart from the parent-child relation, as well as the child himself. The measurement tool consisted of 36 closed-type questions that were answered based on the 5-point Likert scale (1 to 5 = "I strongly disagree", "I disagree", "I am not sure", "I agree" and "I fully agree"). They were grouped together in three groups equal in number, that shaped the three index subscales as follows: 1) *Parental Distress*: It is made of questions 1-12 of the PSI-SF tool. The subscale rating is calculated by summing the answers and it varies from 12 to 60 units, reflecting the stress that is due to factors that concern the parents and which relate to the child's upbringing. The subscale's reliability has a Cronbach's alpha index of 0,85. 2) *Parent-Child Dysfunctional Interaction*: Questions 13 to 24 compose the second subscale of the Parenting Stress Index which represents the disappointment the parents feel regarding their interactions with their child. The sum of the score of all the questions that compose it, shapes its rating which may also vary from the minimum value of 12 units to the maximum value of 60 units. The subscale's reliability measured with the Cronbach's alpha coefficient was found to be of 0,68. 3) *Difficulty of Child*: It is formed by the twelve last questions in the questionnaire, 25 to 36. Its rating is calculated by summing the parents' answers, it varies from 12 to 60 units and assesses their perception about the self-regulation of their child's behavior. The subscale's reliability has a Cronbach's alpha index of 0,78.

The rating for the measurement of the total Parenting Stress results from the horizontal sum of the 3 subscales and varies from 66 to 264 units. Both for the scale and its subscales, high scores indicate high stress levels, whereas a low rating indicates low stress levels. According to the PSI-SF self-report index, the values between the 15^{th} and 80^{th} percentage point of distribution are considered to be normal stress levels, whereas for the

individuals whose rating varies from values above the 90th percentage point of distribution, it is regarded that they are in the clinical range of high stress levels. The reliability and internal validity in total for the tool used was calculated with the Cronbach's alpha coefficient and was found to be of 0,84.

The *consistency check* was performed via the alpha "coefficient" of Cronbach (Cronbach's a), with the use of which the reliability of the data collection tools and their individual parts is defined. Coefficient values higher than 0,6 are considered satisfactory and they ensure their cohesion and internal validity, functioning as elements of a unified group. For the *description of the quantitative variables* that participated in the statistical analysis, the mean values (Mean), the standard deviations (Standard Deviation = SD), the minimal and maximum values (Min-Max) as well as the third and fourth order moments (Skewness and Kurtosis) of their distributions were used. In the case of the qualitative data, their description was made via the recording of their relevant absolute (n) and percent (%f) frequencies. The *linear correlation check* between the quantitative variables was conducted via the Pearson r correlation coefficient. The r correlation coefficient varies between -1 and 1, whereas the higher it is in absolute value, the higher the correlation between the variables becomes. Even though there are no commonly accepted limits, index values, to an absolute value, lower than 0,3 indicate weak correlations, values between 0,3 and 0,5 indicate medium correlations, whereas values higher than 0,5 mark high and strong correlations. Positive values of the coefficient suggest a positive correlation, whereas negative values, a negative correlation. The statistical significance of the correlations is checked at significance levels $\alpha = 1\%$ and $\alpha = 5\%$. For the *comparison of the quantitative variables* and the drawing of the survey's main conclusions, the Independent Samples t-test and the Paired Samples t-test were used depending on the nature and kind of the variables under examination. Moreover, its generalization for variables with more than two levels, the one-way Analysis of Variance (ANOVA), was used. The further study on the differences in the factors' levels is carried out with the Tukey method for multiple comparisons. The check of the hypothesis on equality of the variances on the factors' levels is performed via the Levene's test, whereas the safeguarding of the basic conditions concerning regularity and independence of the method's errors was checked via the Kolmogorov-Smirnov test and the Runs test, respectively. The aforementioned hypothesis checks are performed at a significance level $\alpha = 5\%$. For the *processing and statistical analysis* of the data the IBM SPSS Statistics 20 data statistic analysis software package was used.

3. Results

3.1 Family Income

The impact of factors, such as the economic soundness and the educational level, on the resilience of the parents of children with autism spectrum disorders was considered possible, thus there was the advisability for these parameters to be investigated. Initially, the impact of the economic soundness of the families with a child with autism spectrum disorders was investigated, at the levels of family resilience, social support and parenting stress of the parents. The results of the Analysis of Variance according to the factor of the annual family income for the measured scales and subscales, which emerged statistically significant at significance level $a = 5\%$, are shown in Table 1. There, the results of the Analysis of Variance per factor for those measured variables for which no statistically significant differentiations emerged, are included.

Table 4. Analysis of Variance of the measurement scales and subscales as to the respondents' annual family income

Scales	Annual family income	Mean	SD	df	F	p-value
SSI	Below 15.000 €	39,38	5,128	2 621	106,814	0,000*
	15.000-20.000 €	43,65	3,472			
	Over 20.000 €	45,83	3,189			
FRAS totally	Below 15.000 €	151,56	9,013	2 621	43,869	0,000*
	15.000-20.000 €	154,04	5,724			
	Over 20.000 €	160,56	9,043			
FCPS	Below 15.000 €	77,27	5,083	2 621	40,894	0,000*
	15.000-20.000 €	78,86	3,199			

	Over 20.000 €	82,19	5,403			
	Below 15.000 €	22,27	1,755			
USER	15.000-20.000 €	22,75	1,157	2 621	40,802	0,000*
	Over 20.000 €	23,92	1,146			
	Below 15.000 €	17,04	1,281			
MPO	15.000-20.000 €	17,42	0,901	2 621	31,234	0,000*
	Over 20.000 €	18,12	1,142			
	Below 15.000 €	11,77	1,511			
FS	15.000-20.000 €	11,39	1,518	2 621	9,664	0,000*
	Over 20.000 €	12,13	1,493			
	Below 15.000 €	8,30	1,095			
AMMA	15.000-20.000 €	8,66	0,685	2 621	29,878	0,000*
	Over 20.000 €	9,13	0,865			
	Below 15.000 €	120,06	12,994			
PSI-SF totally	15.000-20.000 €	115,18	13,806	2 621	53,242	0,000*
	Over 20.000 €	101,97	18,094			
	Below 15.000 €	38,97	4,847			
PD	15.000-20.000 €	36,71	4,824	2 621	62,753	0,000*
	Over 20.000 €	31,87	6,735			
	Below 15.000 €	41,65	4,952			
P-CDI	15.000-20.000 €	40,74	4,829	2 621	29,314	0,000*
	Over 20.000 €	36,79	6,497			
	Below 15.000 €	39,44	5,722			
DC	15.000-20.000 €	37,73	5,919	2 621	34,734	0,000*
	Over 20.000 €	33,30	6,639			

Note. * = $p < .05$.

Memo

SSI: *Social Support Index*
FRAS: *Family Resilience Assessment Scale*
FCPS: *Family Communication and Problem Solving*
USER: *Utilizing Social and Economic Resources*
MPO: *Maintaining Positive Outlook*
FC: *Family Connectedness*
FS: *Family Spirituality*
AMMA: *Ability to Make Meaning of Adversity*
PSI-SF: *Parenting Stress Index – Short Form*
PD: *Parental Distress*
P-CDI: *Parent-Child Dysfunctional Interaction*
DC: *Difficulty of Child*

It is found (Table 4) that higher levels of family income are connected to higher levels of total family resilience FRAS ($F(2,620) = 43,869, p = 0,000$), higher levels of social support SSI ($F(2,620) = 106,814, p = 0,000$) and lower levels of parenting stress ($F(2,620) = 53,242, p = 0,000$). Tukey's multiple comparison method diffuses these differentiations to all the levels of the factor, separating each level of it from the rest. More analytically, for the total FRAS scale, the average rating of parents with annual income below15,000 € amounts to $M = 151,56$, for parents with income between 15,000 € and 20,000 € to $M = 154,04$ and for parents with annual income over 20,000 € to $M = 160,56$. The respective average ratings per income for the SSI social support scale are $M = 39,38$, $M = 43,65$ and $M = 45,83$, while for the total stress index they are formed as $M = 120,06$, $M = 115,18$ and $M = 101,97$.

The results of the check for all the subscales of family resilience are the same, apart from the subscale which concerns family connectedness (FC), the high levels of the annual family income being connected to their high average rating. The value of the statistical function used for FCPS subscale was found to be $F(2,620) = 40,894$ with $p = 0,000$, for USER subscale $F(2,620) = 40,802$ with $p = 0,000$, MPO $F(2,620) = 31,234$ with $p = 0,000$, for FS component it is $F(2,620) = 9,664$ with $p = 0,000$ and for AMMA $F(2,620) = 29,878$ with $p = 0,000$. Tukey's multiple comparison method, as in the case of the total scale, diffuses these differentiations among all the levels of the factor for all the subscales except for family connectedness (FS), for which only the middle incomes are separated from the rest and which show the lowest average rating in the subscale. The value of the average rating per annual family income for each one of the above components is shown, as it has already been mentioned, in Table 4.

Exactly the same image is also crystallized for the individual components of parenting stress. At significance level $a = 5\%$, the differences among the levels of annual family income, emerge statistically significant, both for the values of PD subscale ($F(2,620) = 62,753, p = 0,000$) and for those of the P-CDI ($F(2,620) = 29,314, p = 0,000$) and DC ($F(2,620) = 34,734, p = 0,000$) scales. The higher the annual family income is for the parents with a child with autism spectrum disorders, the lower their average rating is in PD and DC subscales, all the levels of the factor being separated among them. On the contrary, the multiple comparison method at the levels of annual family income for P-CDI subscale, separates only the highest of them from the rest, without the lower and middle ones being differentiated among them.

3.2 Educational Level

The statistical processing of the sample's data revealed, at a significance level $a = 0,05$, statistically significant differences in the values of the measured characteristics in comparison with the higher educational level of the parents with a child with autism spectrum disorders. Table 5 shows the results of the analysis of variance per factor for each one of the variables examined. As a general rule, the higher educational level of the parents is connected to higher levels of family resilience, higher levels of social support and lower levels of parenting stress.

Table 5. Analysis of Variance of the measurement scales and subscales as to the respondents' higher level of education

Scales	Higher education level	Mean	SD	df	F	p-value
SSI	of Primary Education	37,94	5,023	3 620	116,174	0,000*
	Secondary School Graduates	40,58	4,641			
	Lyceum Graduates	43,40	3,316			
	HEI/TEI Graduates	45,18	2,905			
FRAS totally	of Primary Education	152,09	10,841	3 620	8,801	0,000*
	Secondary School Graduates	151,74	6,062			
	Lyceum Graduates	154,30	5,284			
	HEI/TEI Graduates	155,85	8,089			
FCPS	of Primary Education	77,50	6,154	3 620	9,768	0,000*
	Secondary School Graduates	77,55	3,367			
	Lyceum Graduates	78,88	2,973			

	HEI/TEI Graduates	79,83	4,573			
	of Primary Education	22,42	2,037			
	Secondary School Graduates	22,44	1,339	3		
USER	Lyceum Graduates	22,73	1,157	620	5,814	0,001*
	HEI/TEI Graduates	23,03	1,426			
	of Primary Education	17,135	1,346			
	Secondary School Graduates	17,038	1,152	3		
MPO	Lyceum Graduates	17,452	0,881	620	7,091	0,000*
	HEI/TEI Graduates	17,576	1,155			
	of Primary Education	11,88	1,626			
	Secondary School Graduates	11,27	1,458	3		
FS	Lyceum Graduates	11,57	1,383	620	3,318	0,020*
	HEI/TEI Graduates	11,68	1,453			
	of Primary Education	8,28	1,209			
	Secondary School Graduates	8,50	0,886	3		
AMMA	Lyceum Graduates	8,68	0,693	620	9,017	0,000*
	HEI/TEI Graduates	8,75	0,837			
	of Primary Education	120,62	13,624			
	Secondary School Graduates	117,75	12,573	3		
PSI-SF totally	Lyceum Graduates	116,33	13,753	620	19,266	0,000*
	HEI/TEI Graduates	109,49	16,787			
	of Primary Education	39,50	5,442			
	Secondary School Graduates	37,44	4,429	3		
PD	Lyceum Graduates	37,38	4,486	620	29,069	0,000*
	HEI/TEI Graduates	34,46	5,992			
	of Primary Education	41,58	4,964			
	Secondary School Graduates	41,51	4,503	3		
P-CDI	Lyceum Graduates	40,75	5,042	620	7,149	0,000*
	HEI/TEI Graduates	39,26	5,989			
	of Primary Education	39,54	5,678			
	Secondary School Graduates	38,80	5,678	3		
DC	Lyceum Graduates	38,20	6,318	620	13,306	0,000*
	HEI/TEI Graduates	35,77	6,340			

Note. * = p < .05.

(Memo: the memo of table. 4 applies)

More specifically, higher educational levels are connected to high values in the total scale of social support SSI ($F(3,620) = 116,174, p = 0,000$), the multiple comparisons with the Tukey method, at the levels of the factor, diffusing this differentiation among all of the factor. Regarding the total scale of family resilience FRAS, high educational levels are also connected to high values of the scale ($F(3,620) = 8,801, p = 0,000$), the multiple comparisons separating the Higher Education Institute (HEI)/Technical Educational Institute (TEI) graduates from the parents of primary education and secondary school graduates.

Regarding FCPS subscale, the multiple comparison method revealed differentiations among the parents who have completed their primary education and the graduates of Lyceum and Higher Education Institute (HEI)/Technical Educational Institute (TEI), the first ones showing lower average rating. Moreover, secondary school (*Gymnasium)* graduates show statistically significantly, a lower average score in the subscale in comparison with Higher Education Institute (HEI)/Technical Educational Institute (TEI) graduates, while the remaining combinations of the levels are not differentiated statistically significantly at significance level $a = 5\%$. The value of the statistical function for the control of the cases was found to be $F(3,620) = 9,768$ with $p = 0,000$. Higher Education Institute (HEI)/Technical Educational Institute (TEI) graduates present a higher average score in the USER subscale of family resilience in comparison with the parents with levels of primary education and secondary school graduates ($F(3,620) = 5,614, p = 0,001$), the multiple comparisons not showing the differentiations among the remaining levels of the factor to be statistically significant. The average rating of MPO subscale appears statistically significantly higher for the university graduate parents in comparison with the ones of primary education and secondary school graduates, as well as Lyceum graduates with Secondary School graduates ($F(3,620) = 7,091, p = 0,000$), while the same method produced a lower average score for the parents of primary education against the Secondary school graduates in FS component ($F(3,620) = 3,318, p = 0,020$). For AMMA subscale, the differences in the average rating of the parents of primary education with the Lyceum graduates and the Higher Education Institute (HEI)/Technical Educational Institute (TEI) degree holders were found statistically significant, the two last groups showing a higher average score in the subscale ($F(3,620) = 9,017, p = 0,000$).

4. Discussion

The annual family income has a significant impact on the formation of the studied characteristics. The higher the economic soundness of the parents with a child with autism spectrum disorders, the higher the social support they have, the higher the resilience which they develop and the milder the feeling of stress which they experience. The same general conclusion also concerns the individual dimensions of the family resilience apart from the family connectedness, which is not related significantly to the annual family income, but also for all the individual aspects of parenting stress.

As in the case of the educational level, likewise for the family income, while no special emphasis was put in the theoretical part, occasional references highlighted its importance and the findings of this research are in accordance with the significance of the role it plays. It should be noted that the availability of a good income does not necessarily ensure the parents' resilience, because their stress is often due to their weakness to utilize the resources they have in the right way in order to effectively help their child (Batool & Khurshid, 2015). This is an issue of autism management in general. More specifically, the good family income was expected to help combating the stress of the parents, since the economic requirements of the treatment are often major and therefore stressful (Bashir et al., 2014). Moreover, Bhagat, Simbak and Haque (2015) observe that autism is a serious, persistent and dynamic disease, which is often also aggravated by the behavior of the parents towards their children, because they face, among other things, economic problems. Actually, each therapeutic intervention, which also concerns the behavior of the parents towards the problem, should take the economic issues into serious consideration.

The parents' educational level is also significantly related to the social support the parents of the child with autism receive. The higher the parents' higher educational level, the greater the social support they have. The same general principle also governs the relation of the educational level to the parents' resilience as a whole, as well as its different aspects except for the family connectedness, without this being diffused evenly and being differentiated for all the educational levels. On the other hand, its impact is reverse on the formation of the levels of the total stress, the parental distress, the parent-child dysfunctional interaction and child difficulty, lower educational levels being connected to the higher levels of the aforementioned characteristics.

In the theoretical part, the parents' educational level was occasionally discussed, without, however, putting very strong emphasis on this parameter. Here, the conclusion of Samadi and McConkey (2014) that the parents' lower educational level is connected to their less good health, may be retracted, as well as that the greater awareness on autism outweighs the cultural differentiations that might be present in the way the parents take care of their autistic children. Increased awareness may be beneficial because the better informing on the child's management in the house will, potentially, also bring about the support of the extended family and friends. Moreover, Yang et al. (2016) find that the emotional symptoms of autism are significantly related to the parents' educational level, the stress they experience, as well as the characteristics of their personality, such as neuroticism and psychoticism.

Therefore, in this research, too, the parents' education emerges as a determining factor for the parents' wellbeing and for autism management. Furthermore, it should be mentioned that Ammari, Ringel Morris and Yardi Schoenebeck (2016) find the ever-increasing search for information on autism on the internet, to which the parents resort, who, certainly, should be in a position of distinguishing the reliable information from the falsehoods. They should also be in a position of avoiding the downgrading of their personal experiences to general stereotypes and of resisting negative criticism and stigmatization that are scattered over the Internet. Selimoglu et al. (2013) also found that the parents of autistic children in their sample turn to the internet for information about autism, at a smaller percentage though. And many attempt to get the necessary information through reading books on autism. Therefore, the educational level plays an important role, and this is one conclusion of our research, which connects the social support to the parents and the enhancement of their resilience to the education they have received in the past.

5. Methodological Limitations

The geographical distribution of the sample can be regarded as one basic limitation of the research. Despite the fact that as to its size, it is big enough and representative per district, it concerns only seven prefectures in the Greek territory. Consequently, generalizations of the conclusions that are drawn will have to be made with caution, even though it seems that they can be considered as particularly representative. An equally important limitation is that fact that the sample taken is exclusively from parents of a specific family structure. The families chosen are all two-parent families and the parents who participate in the survey have a specific family relation to the child. So, it cannot be assumed that the effects of the family structure and family relation have been adequately explored. Besides, the assessment that was made is based on the self-reports of the parents with a child with autism spectrum disorders, without other reports and information from other important persons of the parents' environment being detected, such as the rest of the families' members and health experts who possibly aid the parents. It must also be added that the survey is synchronic and interrelated, therefore it is not possible to discuss casual links between the factors under study. In addition, in this attempt no other possible parameters and co-morbidities linked to the levels of family resilience were assessed, such as depression, loneliness, the parents' interpersonal relations and social skills. All the aforementioned limitations must be taken into consideration during the study and interpretation of the present research findings.

6. Conclusions

The research highlighted a significant impact of the annual family income on the formation of the levels of the studied characteristics, as the conclusion was drawn that the level of the economic soundness is positively linked to the social support the parents receive and the resilience they develop. On the contrary, the stress they feel is reduced. The image of the individual dimensions of the family resilience is similar, however, the family connectedness, which the family income does not affect significantly, is excluded. Similarly, the educational level is connected to the social support. The former increases when the latter increases, and the same principle also determines the relation of parents' educational level and resilience, both as a whole, and in its different aspects, except for the family connectedness, without, however, this being differentiated for all the educational levels. On the contrary, the educational level affects reversely the levels of total stress, the parental distress, the parent-child dysfunctional interaction and child difficulty. A lower educational level increases their values.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Methods for Reducing Violence in Schools: A Systematic Review

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Received: December 13, 2016 Accepted: January 20, 2017 Online Published: February 15, 2017

doi:10.5539/jedp.v7n1p200 URL: http://doi.org/10.5539/jedp.v7n1p200

Abstract

This systematic review examines programs designed to reduce school violence. The review indicates the lack of definitive results of previous reviews, addresses the gaps in the existing literature, and supports the need for social workers to play an active role in organizing, promoting, and coordinating violence reduction processes. In addition, the review attempts to clarify the effects of violence reduction processes as they relate to school culture change.

Results indicate that programs identified in this systematic review could help to create positive social environments that reduce incidences of violence creating and atmosphere more favorable to learning. Further, identified programs are shown to reduce office referrals, in school suspensions, and out of school suspensions. While these results are notable, it is likely the identified programs are one component of a holistic strategy for changing school culture. Adding other processes could help to sustain a positive social environment over time and reduce incidence of violence, office referrals, and suspensions. Further study is needed to substantiate this hypothesis as this is beyond this study.

Keywords: violence reduction, school violence reduction, school suspension reduction, violence reduction interventions, alternatives to suspension, restorative justice, peer involvement, behavior modification, conflict resolution

1. Introduction

1.1 Rational

The Columbine High School shooting that occurred on April 20, 1999 had a ripple effect across the United States. Since the Columbine massacre schools across the United States have responded with an energized effort to safeguard schools (Heinen, Webb-Dempsey, Moore, McClellan, & Friebel, 2007). These efforts are commendable; however, according to Grisham, Deutsch, and Durando (2014), there have been no less than five mass shootings in elementary and high school settings since Columbine. Mass shootings are defined as having four or more victims. The most notable mass shootings include:

- March 5, 2001, Santana High School, the offender opened fire inside the Santee, Calif. High school, killed two students, and injured 13 others.
- March 21, 2005, Red Lake Senior High School, the shooter kills his grandfather and a companion of his grandfather's, and then heads to a high school on the Red Lake Indian Reservation in Minnesota killing five students, a teacher, and a security guard before taking his own life.
- Feb. 27, 2012, Chardon High School, three students are killed after the shooter opens fire inside the cafeteria of the Chardon, Ohio, school.
- Dec. 14, 2012, Sandy Hook Elementary School, the offender shoots and kills his mother in their home before driving to Sandy Hook Elementary in Newtown, Conn. He kills 26 people at the school, 20 of whom are first-graders, before shooting and killing himself.
- Oct. 24, 2014, Marysville Pilchuck High School, two people, including a gunman who opens fire on fellow students are dead at a high school north of Seattle.

While many schools focus on security utilizing surveillance, metal detectors, and increased police presence, others have suggested that schools should focus on the impact of school culture (Mattaini & McGuire, 2006; Heinen et al., 2007; Coyle, 2008; Bosworth & Judkins, 2014). Creating safe school environments using security techniques help students and faculty feel safe; however, these techniques do little to change the environment that cultivates violent behavior (May, 2014). Further, utilization of punitive measures such as suspensions and loss of privileges may stifle misbehavior in the immediate context; yet, long-term change is small (Chin, Dowdy, Jimerson, & Rime, 2012; Mullet, 2014). According to Mullet (2014), teaching prosocial behaviors, and motivating healthier decision making in the misbehaving students is the key.

Whitted and Dupper (2005) indicate that violence manifests itself in numerous ways. Growing evidence underlying forms of violence such as bullying have a profound effect on the learning environment of the school, and if left unchecked, can lead to more serious forms of violence (Whitted & Dupper, 2005). Preventing low-level forms of violence like bullying requires a comprehensive approach that includes a focus on school climate (Bosworth & Judkins, 2014). Sharkey and Fenning (2012) indicate that punitive measures are ineffective in teaching proactive behaviors and may have the opposite effect of exacerbating undesirable behaviors.

According to Boyd and Anderson (2013), three paradigms are utilized when determining levels of behavioral interventions. Universal (Tier I) interventions are designed to promote pro-social behavior among all students (Boyd & Anderson, 2013). Targeted (Tier II) interventions are intended for students at risk for developing serious problematic behavior and intensive (Tier III) interventions are aim to support students who engage in serious challenging behavior that has not responded to other efforts (Boyd & Anderson, 2013).

Understanding that numerous programs work to reduce violence in schools, this study seeks to answer three questions regarding interventions and methodologies. What are the interventions being used? What interventions seem most effective? What are the research features of the more successful studies? Further, the study sought to identify the general target of the interventions, their measurement of outcomes, and other defining features such as theoretical base and types of assessment tools.

1.2 Objective

As mentioned, this study seeks to identify leading interventions designed to reduce school violence. Further, the study seeks to understand what the interventions try to change, their contribution to overall culture change, the feasibility of generalization to other demographics, methodology, and sample acquisition. As there are is a lack of definitive results in previous reviews, this study seeks to address these gaps in the existing literature. This study identifies the need for social workers to play an active role in organizing, promoting, and coordinating violence reduction processes, identify processes that promote change in school culture, their efficacy, and the role of social workers in sustaining cultural change. While each of the identified interventions show positive results, none appears capable of eliminating violent behavior 100%.

2. Methods

In formulating the scope of the review of reviews, the participants, interventions, comparators, outcomes, and study design are considered. A systematic search strategy was established before commencing the literature search to ensure that the systematic review was comprehensive, thorough, and objective. Search terms included the setting (middle school*, OR high school*), the problem (disorder*, OR violence, OR discipline, OR behavior*), and interventions (alternatives to suspension*, OR school violence prevention, OR violence reduction*, OR violence reduction programs, OR teacher training*, OR restorative justice, OR peer involvement, OR behavior modification*, OR conflict resolution*). In addition, only articles published after the events of the Columbine school shooting on April 20, 1999 were included. To guard against bias, two reviewers must have agreed that the article was fit for inclusion both at initial screening and at full text review.

2.1 Eligibility Criteria

Selected criteria helped to narrow the focus of the study with an emphasis on prevention for those at-risk (selective interventions) and treatment (indicated interventions), which included mentoring as the intervention or one component of the intervention. The study included psychotherapy, behavior modification, and cognitive behavioral interventions that embraced helping services as part of a professional role. Experimental and quasi-experimental designs were included. Further, the review was limited to studies conducted within the United States, as resources for translating reports not reported in English were limited. Eligibility criteria included eleven items: 1) articles published between April 1999 through May 2015; 2) written in English, full-text; 3) in primary and secondary education; 4) children ages 12 years to 17 years; 5) empirical studies; 6)

study sample greater than 3; 7) not a case study; 8) independent studies; 9) reviews of violence reduction methods; 10) not race or gender specific; and 11) study addressed intervention outcomes.

2.2 Search

The study search integrated various databases including EBSCO-Criminal Justice Abstracts with Full Text, Education Abstracts (H. W. Wilson), ERIC, Legal Collection, MEDLINE, PsycARTICLES, Psychology and Behavioral Sciences Collection, PsycINFO, Educational Administration Abstracts, The Campbell Collaboration Library of Systematic Reviews, ProQuest Dissertations and Theses Global (PQDT Global), Doctoral Dissertations, and Google Scholar. Finally, the reference lists of primary studies and reviews in the studies identified from the search of electronic resources were scanned for unidentified studies that related to the systematic review. The same keywords were utilized for all search engines.

2.3 Data Extraction

Only English articles were selected because English was the primary language of the reviewers. Only articles published from December 1999 through August 2015 were utilized as date specific articles were sought to emphasize programs developed to reduce school violence since the Columbine school shooting. The main thrust of the investigation focused on primary and secondary education setting targeting violence intervention programs, concentrating on children ages 12 years to 17 years. This was important because the preschool and college setting was not the object of the study.

Empirical quantitative studies were selected to give the review stronger credibility using study samples of three or greater. The researcher was not interested in case studies, these type studies could not be generalized. For clarity, the researcher sought independent study and not multiple papers from the same research project. Further, articles had to include reviews of violence reduction methods, not race or gender specific, and must have addressed intervention outcomes that were student, or school-based.

3. Results

3.1 Study Selection

The data collection process yielded 2304 references. A title review found 746 studies that were not relevant including 127 Mendeley software duplicates, which were removed from consideration yielding a final sample of 1558 studies suitable for abstract screening. Of the 1558 studies, 1019 studies were excluded after abstract review because they were not relevant. After the initial screening process, 539 were selected for full text review. After full text review, 520 did not meet selection criteria of which 76 studies were reviewed by four reviewers. The final consensus yielded a final sample of 19 studies. Studies were eliminated from consideration at full text review because they were not empirical (n=23, 4%), not peer reviewed (n=9, 2%), a case study (n=18, 8%), studied the wrong population (n=62, 12%), specific to teachers only (n=38, 7%), not relevant (n=43, 8%), conducted in the wrong setting (n=47, 9%), were the wrong study design [qualitative] (n=14, 3%), had the wrong intervention [not a violence reduction intervention] (n=64, 13%), had the wrong outcome [reduce absences, smoking, drug use] (n=99, 20%), were mental health studies (n=53, 11%), were disability studies (n=12, 2%), or had an inadequate sample (n=7, 1%). All included studies were produced between April 1999 and May 2015.

3.2 Study Characteristics

Nineteen studies were selected for the review and contained characteristics for inclusion. Thirteen studies were quasi-experimental, three studies were experimental, one study was exploratory, one study was descriptive, and one study utilized a mixed methods approach. Fourteen studies included multiple schools, four studies utilized one school, and one study used school helping professionals. The included studies involved 287,936 participants.

The selected study samples had a range of demographic characteristics. Most samples comprised a mix of boys and girls with one sample focusing only on boys. Minority children were well represented with most studies having primarily minority youth. Represented school ages ranged from 12 to 17 in primary through secondary education settings. A range of risk levels was also present, from general population students to students already exhibiting aggressive behavior. Several of studies selected youth that demonstrated aggressive or violent behavior. The majority of the studies utilized non-random convenience sampling with samples collected involving as many as 107 schools to as few as one school representing elementary, middle, and high schools. One study focused entirely on three Native American school districts. Sample sizes ranged from 3 to 110,000 students and 46 to 2400 teachers. One study collected data from 762 school social workers, psychologist,

counselors, and psychology interns. Mostly, samples were collected based on availability and willingness to participate.

All study designs assessed interventions for at least one outcome representing either 1) aggressive or violent behavior (e.g., fighting, bullying); 2) disruptive behavior (e.g., behavior problems, conduct disorder); or 3) problem behavior (i.e., internalizing and/or externalizing problems). Most studies applied a quasi-experimental design that compared students exposed to one or more identifiable interventions with one or more control or comparison conditions on at least one outcome. Quasi-experimental studies were most likely to predominate due to feasibility and the ethical responsibilities associated with an at risk population such as children. Those participants not randomly assigned were involved with a pretest and a posttest on at least one qualifying outcome or sufficient demographic for equivalence of the treatment and control groups.

Measurement of outcomes in the selected studies employed a heterogeneous mix of standardized scales. Heterogeneity of scales did not seem to be a problem as most studies exhibited adequate fidelity of intervention effectiveness. The majority of studies sought to reduce incidences of office discipline referrals, suspensions, and problem behavior. Each of the selected studies utilized various standardized tools that were unique to the intervention being utilized. SWPBIS and SS/HS interventions mostly employed the School-wide Evaluation Tool (SET) and the Teacher Observation of Classroom Behavior Checklist (TOCA) (Boyd & Anderson, 2013; Flannery, Fenning, Kato, & McIntosh, 2014; Harris, McFarland, Siebold, Aguilar, & Sarmiento, 2007; Sprague, Nishioka, & Smith, 2007). OBPP used the Olweus Bully Questionnaire (Black & Washington, 2008; Schroeder et al., 2012), and CRE interventions applied the Behavior Assessment Scale (teachers & students) and the Teen conflict Survey (Scheckner & Rollin, 2003; Smith, Daunic, Miller, & Robinson, 2002). These instruments were not used exclusively by these interventions; all of the studies used a wide variety of survey instruments.

According to Flannery, Fenning, Kato, and McIntosh (2014), the SET comprises 28 items distributed into seven subscales measuring whether schools have implemented the essential features of SWPBIS. The TOCA is a nonclinical measure of children's behavior completed by teachers to assess the impact of school-based preventive interventions on teacher's ratings of children's behavior (Bradshaw & Waasdorp, 2015). The OBQ is a 42 item multipart questionnaire that identifies data on bullying problems, attitudes regarding bullying, bystander perceptions of bullying, and general satisfaction with school (Schroeder et al., 2012). The Behavior Assessment Scale is a 109 item pre-intervention tool that measures level of aggression, social skills, problem internalization, and school problems (Scheckner & Rollin, 2003). Finally, the Teen Conflict Survey is a 41-item Likert scale tool that obtains information regarding the participants' demographic and environmental histories. Only the SET, TOCA, and Behavior Assessment Scale were used with multiple intervention programs such as SWPBIS, SS/HS, and CRE.

It should be mentioned that besides the scales and surveys applied in the selected studies, many of the studies also collected school data related to office disciplinary referrals and suspensions. Most interesting is that only one study collected data related to academic results and only one study collected data related to attendance. Considering that academic achievement could be the ultimate goal of any primary or secondary institution, a reasonable person would hope that by reducing violence academic achievement could be maximized. Yet this was a priority in only one study.

Of the included studies, various programs were utilized as interventions for violence reduction in primary and secondary education. Three studies applied the Olweus Bullying Prevention; six studies employed Schoolwide Positive Behavior Intervention and Support; three studies utilized the Safe Schools/Healthy Students; and three schools made use of the Conflict Resolution/Peer Mediation programs. Additionally, one study each utilized Breaks are Better, Solution Focused Therapy, Skill Based Violence Prevention, Too Good for Violence, DARE Plus, Bully Proofing Your School, Students Managing Anger Together, and Positive Behavior Support/Peer Assisted Learning programs were used respectively. Of the included studies, five indicated a reduction in disciplinary referrals, four reported reductions in bullying, seven reported reductions in problem behavior, two studies reported increased use of conflict resolution skills, and one reported students feeling safer.

Of the nineteen selected studies, four intervention programs were prominently used to reduce violence in schools. Six of the included studies identified Schoolwide Positive Behavior Intervention and Support (SWPBIS) as an intervention approach. The SWPBIS program refers to a systems change process for an entire school or district (Boyd & Anderson, 2013; Bradshaw, Waasdorp, & Leaf, 2015; Flannery, Fenning, Kato, & McIntosh, 2014; Nocera, Whitbread, & Nocera, 2014; Sorlie, & Ogden, 2007). The underlying theme is teaching behavioral expectations in the same manner as any core curriculum subject (Nocera, Whitbread, & Nocera, 2014). The

school focuses on three to five behavioral expectations that could include respect for yourself, others, property, relationships, responsibilities, or safety (Sorlie & Ogden, 2007).

Three studies identified the Olweus Bullying Prevention Program (OBPP) as the intervention method. The OBPP is designed to improve peer relations and make schools safer, provide more positive places for students to learn, and reduce existing bullying problems among students (Black & Washington, 2008; Lund, Blake, Ewing, & Banks, 2012; Menard & Grotpeter, 2014; Schroeder, Messina, Schroeder, Good, Barto, Saylor, & Masiello, 2012). Three studies identified Safe Schools/Healthy Schools (SS/HS) as a mode of intervention and three studies identified Conflict Resolution Education (CRE) as a technique for reducing violence.

The SS/HS program works to prevent youth violence and substance use in schools and communities, and promotes and improves student access to mental health services (Harris, McFarland, Siebold, Aguilar, & Sarmiento, 2007; Massey, Boroughs, & Armstrong, 2007; Sprague, Nishioka, & Smith, 2007). The program recognizes that schools alone cannot respond effectively to violence, substance use, untreated mental illness, and a broad range of antisocial behaviors (Massey, Boroughs, & Armstrong, 2007). Therefore, SS/HS works to strengthen the role of schools as healthy learning environments that support the academic, social, and emotional growth of students in a collaborative approach among schools and other youth-serving organizations in the community (Sprague, Nishioka, & Smith, 2007).

The CRE program includes various interventions in areas such as peer mediation, violence prevention, social and emotional learning, conflict resolution education, and anti-bias education. The strategies mentioned above empower students to deal constructively with interpersonal conflicts, cultural differences, and the need for these approaches to be grounded in day-to-day experiences (Scheckner & Rollin, 2003; Smith, Daunic, Miller, & Robinson, 2002; Thompkins, Chauveron, Harel, & Perkins, 2014). When youth experience success with negotiation, mediation, or consensus decision-making in school they are more likely to use conflict resolution processes elsewhere in their lives (Thompkins, Chauveron, Harel, & Perkins, 2014).

3.3 Outcomes

The systematic review shows that school-based violence reduction programs are often effective, and that particular program elements were associated with a decrease in victimization. It is concluded that, on average, victimization decreased when implementing any of the programs in the selected studies. Outcome results tended to be greater in programs that addressed more than one area such as safety, relationship restoration, conflict resolution skills, and mental health services in some combination. The most important program elements associated with a decrease victimization were programs that included all stakeholder systems such as administration, faculty, students, parents, and the community that incorporated a culture of care philosophy.

Each of the studies acquired samples from readily available school district sources. Each study showed reductions in offices referrals, suspensions, bullying reduction, increased feelings of safety, reduced absenteeism, or increased academic achievement depending on the study objective. Further, various Likert scale questionnaires, surveys, or school reporting records were utilized to collect data depending on the preference of the study researchers. The selected studies used various design techniques such as quasi-experimental (12), experimental (4), exploratory (2), and one mixed study.

Future studies should explore the potential utility of conducting multilevel research combining culture change strategy, CRE (Tier I) SWPBIS and/or OBPP (Tier II), and SS/HS (tier III) interventions as a means of reducing violence, reports of violence, suspension reduction, absenteeism, in comparison to academic achievement. Additionally, more research is needed to determine effectiveness across cultures, gender, race, and higher education.

4. Discussion

This study offers a collective look at the programs that help reduce violence in primary and secondary school settings in the United States. The evidence indicates that various strategies are used by professionals such as social workers, psychologist, and counselors to address bullying and victimization in schools. Preliminary findings suggest that collaboration and funding is a strong component in program success and sustainability and intervention systems can assist schools in allocating resources to student need. While the programs mentioned in the selected studies indicate that each intervention can have an effect in reducing Office Disciplinary Referrals (ODR), they also show effectiveness in producing prosocial changes that reduce violence. This should be view with caution as some programs are more widely used and have been tested while others presumably have not been tested extensively. As shown in Table 1, programs with strong evidence are the Olweus Bully Prevention

Program (OBPP); Schoolwide Positive Behavior Interventions & Support (SWPBIS); Safe Schools Healthy Students (SS/HS); Violence Prevention Project (VPP); and the Conflict Resolution Peer Mediation (CR/PM) interventions. Programs with limited research or weak evidence include Breaks are Better (BrB); Solutions Focused Therapy (SFT); Skill Based Violence Prevention Program; Too Good for Violence Prevention Program (TGFV); D.A.R.E Plus; Bully-Proofing your School (BPYS); and Students Managing Anger Resolution Together (SMART). All the selected studies show evidence of effectiveness in reducing violence and antisocial behaviors, demonstrate reduction in problem behavior, and are effective alternatives to punitive, reactive policies. Further, interventions in the studies appear to enhance positive behavior and help to establish the schools as warm, welcoming, and safe.

Table1. Intervention rating chart

Intervention	Evidence
Olweus Bully Prevention Program (OBPP)	Strong/Positive
Schoolwide Positive Behavior Interventions & Support (SWPBIS)	Strong/Positive
Safe Schools Healthy Students (SS/HS)	Strong/Positive
Conflict Resolution Peer Mediation (CR/PM)	Strong/Positive
Skill Based Violence Prevention Program (VPP)	Strong/Positive
Solutions Focused Therapy (SFT)	Limited Research/Weak
Breaks are Better (BrB)	Limited Research/Weak
Skill Based Violence Prevention Program	Limited Research/Weak
Too Good for Violence Prevention Program (TGFV)	Limited Research/Weak
D.A.R.E Plus	Limited Research/Weak
Bully-Proofing Your School (BPYS)	Limited Research/Weak
Students Managing Anger Resolution Together (SMART)	Limited Research/Weak

As this systematic review would suggest, numerous programs work to reduce violence in schools. While all identified programs target problem behaviors and are components to school climate change, none of the interventions appears to address problem behavior at all levels. Many programs seek to educate children in socially acceptable behavior; yet, they do not provide protocols for helping children to change poor behavior. Further, many programs encourage culture change without including all community stakeholders.

The effectiveness that prevention programs have on violent behavior is noteworthy. Across the nineteen studies varying in length, location, implementation, and participants, the interventions increased the participant's awareness of violence and reduced violence in the study environments. Behavior change is important for addressing violence and helping schools establish healthy and safe school environments. An examination of how programs may change behaviors, especially given this is the ultimate goal of many prevention efforts, extends practice knowledge, and broadens understanding of what works to reduce violent behavior. As theories of behavior change indicate that changing attitudes will likely not be enough to lead to changes in actual behaviors and if the goal of prevention programs is to alter behaviors the programs such as those mentioned in this study appear to be on the right track. While an aim of this review was to examine if prevention programs could be effective in reducing violence in schools it does not determine future reductions in victimization behaviors. As the programs in this study appear to be effective at reducing violence, it is likely these programs are only one component of creating and overall change in school culture. It is reasonable to assume that a more holistic approach addressing school culture, behavioral modification for students, social work student counseling, and student involvement to resolve problems in conjunction with programs in this study would have a greater influence in reducing school violence. The results of this study indicated that while prevention programs show promise in decreasing violence, more research is needed.

Limited research investigating the use of multiple interventions of violence reduction in schools was found during this study. Determining the leading interventions in practice is a key contribution. In this systematic review, numerous studies were found that examined the effectiveness programs. Hence, this systematic review

provides a comparative analysis of these programs advancing knowledge and informing school social workers of multiple approaches effective in reducing school violence. Further, while each of the identified interventions is shown to have a singular positive impact, each intervention appears to address violence reduction through education, active student participation, behavioral intervention, mental health services, parent involvement, and/or community involvement. As a lack of literature addresses holistic approaches addressing all of these areas simultaneously, this study advances knowledge and informs school social work practice by deducing that such an approach could work to maximize culture change and reduce violence in schools.

4.1 Limitations

Many studies do not report effect size making it difficult to determine the magnitude of change. Nevertheless, outcome measures used in these studies indicate that positive outcomes were observed. Further, there are problems with fidelity and generalization in many of the studies. It was observed that those responsible for program implementation were often under trained, were not supportive, or unmotivated. This created a problem with consistency and made it unlikely that many results could be generalized. Yet, success in reducing Tier I, II and III levels of violence was evident in most studies; however, no study demonstrated elimination of violent behavior entirely. Additionally, as many studies were non-experimental and non-random, it would be difficult to generalize the results to all school districts in the United States or school systems in other countries. This is not surprising as experimental longitudinal studies can be time consuming, costly, and requires a level of discipline and control that may be too difficult for untrained school personnel.

5. Conclusions

This systematic review examines programs designed to reduce school violence. The researcher indicates the lack studies and explains how the present systematic review addresses the gaps in the existing literature on school violence prevention and the need for social workers to play an active role in organizing, promoting, and coordinating violence reduction processes. Mainly, the study seeks to identify the violence reduction processes that promote change in school culture and the role of social workers in sustaining cultural change.

School violence programs were generally effective at reducing the more common types of aggressive behavior seen in schools including fighting, intimidation, and other negative interpersonal behaviors, especially among higher risk students. It is unknown if interventions like those in this study would be effective in preventing severe incidents of school violence committed by very unstable youth.

Long-term research on the effectiveness of these programs in conjunction with other strategies is needed. The main policy implication of our review is holistic school-based programs approaches to reduce violence. Holistic new programs should be designed and tested based on what is most effective.

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Appendix

Table 2. Intervention support chart

Author(s)	Yr.	N	Study Outcome	Intervention	Study Design	Tier Level	Change Type	Variable Strength
Black & Washington	08	13 Schools 10,269 Students	Reduction Bullying Events	Olweus Bully Prevention Program (OBPP)	Quasi	I & II	Behavior	Reliability
Boyd & Anderson	13	1 School 3 Student	Reduction in Office Discipline Referrals (ODRs)	Breaks are Better (BrB)	Quasi	III	Behavior	Reliability Quality
Bradshaw & Waasdorp	15	37 Schools 11,738 Students	Reduction ODRs	Schoolwide Positive Behavior Interventions & Support (SWPBIS)	Quasi	I & II	System	Reliability Quality Validity
Corcoran & Gingerich	13	1 District 136 Students	Reduction in Impulsivity	Solutions Focused Therapy (SFT)	Quasi	II & III	Skills	Not Determined
de Anda	99	1 HS 157 Students	Feelings of Safety	Skill Based Violence Prevention Program	Quasi	I & II	Skills	Reliability
Flannery, Fenning, Kato, & McIntosh	14	12 HS 36,653 Students	Reduction ODRs	SWPBIS	Quasi	I & II	System	Reliability Validity
Hall & Bacon	05	10 Elem. Schools 46 Faculty 999 Students	Enhanced Communication Skills	Too Good for Violence Prevention Program (TGFV)	Expr.	I & II	Skills	Reliability Quality
Harris, McFarland, Siebold, Aguilar, & Sarmiento	07	3 Native Amer. Schools Districts 900 Students	Decreased Absenteeism, Fighting	Safe Schools Healthy Students (SS/HS)	Quasi	I, II & III	System	Quality

Komro, Perry, Veblen-Mortenson, Stigler, Bosma, Munson, & Farbakhsh	04	24 Middle Schools 6,728 Students	Reduction of Physical and Verbal Violence	D.A.R.E Plus	Expr.	II & III	Behavior	Reliability Validity
Lund, Blake, Ewing, & Banks	12	762 School Clinicians	Use of Antibullying Programs	OBPP	Descript	N/A	Behavior	Reliability Quality
Massey, Boroughs, & Armstrong	07	14 School Districts 110,000 Students	Reduction of Disruptive Behavior	SS/HS	Quasi	I, II & III	System	Reliability Quality
Menard & Grotpeter	14	6 Schools 3,497 Students	Reduction in Bullying	Bully-Proofing your School (BPYS)	Quasi	II & III	Behavior	Reliability Quality Validity
Nocera, Whitbread, & Nocera	14	1 School 300 Students	Reduction ODRs	SWPBIS	Mixed	I & II	System	Quality
Scheckner & Rollin	03	1 Elementary School 40 Students	Use of Nonviolent Strategies	Conflict Resolution Ed (CRE)	Expr.	I & II	Skills	Reliability Quality Validity
Schroeder, Messina, Schroeder, Good, Barto, Saylor, & Masiello	12	107 schools in 49 counties 2,400 teachers 56,137 students	Reductions in Student Reports of Bullying	OBPP	Quasi	I & II	Behavior	Reliability
Smith, Daunic, Miller, & Robinson	02	3 Middle schools 1700 students	Reduction ODRs	CRE	Quasi	I & II	Skills	Quality Validity
Sorlie & Ogden	07	4 Elementary Schools 82 Teachers 735 Students	Reductions in observed problem behavior	SWPBIS	Quasi	I & II	System	Quality Validity
Sprague, Nishioka, & Smith,	07	3 School Districts 53,019 Students	Reduction of Problem Behaviors	SS/HS & SWPBIS	Explore	I & II	System	Reliability Quality Validity
Thompkins, Chauveron, Harel, & Perkins,	14	13 High Schools 1,112 Students	Promoted Conflict resolution skills	CRE	Quasi	I & II	Skills	Reliability Quality Validity

Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Acquiring Piaget's Conservation Concept of Numbers, Lengths, and Liquids as Ordinary Play

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Received: September 30, 2016 Accepted: January 25, 2017 Online Published: February 15, 2017

doi:10.5539/jedp.v7n1p210 URL: http://doi.org/10.5539/jedp.v7n1p210

Abstract

Piaget's influential research on the conservation concept has a wide-reaching impact even in modern-day settings. This study examines Piaget's concept from a perspective that is different from those in existing studies. It focuses on improving the relationship between toddlers and tasks for the acquisition of the conservation concepts of number, length, and liquids. Given that new investigative tasks may be needed to clarify the stage and factors of acquisition, this study examines the possibility of acquisition of the conservation concept by 3-year-olds, with an improved task that is integrated into ordinary conversation and play. The treatment variable was the Piaget task as part of ordinary conversation and play, and the A-B design was adopted because withdrawal is naturally difficult. Results demonstrated the possibility of 3-year-olds' acquisition of Piaget's concept by familiarizing the toddler with the task. Such intervention through the incorporation of Piaget tasks into ordinary conversation or play had clear positive effects, contrary to the results of previous studies that dismiss a 3-year-old's ability to understand the conservation concept.

Keywords: conservation concept, Piaget task, toddler-stage acquisition

1. Introduction

Piaget's research on the conservation concept has been influential at many levels, and investigatory Piaget tasks have clarified the acquisition stage for the conservation concept of numbers, liquids, and lengths as follows (Piaget, 1952; Ginsburg & Opper, 1969; Piaget & Inhelder, 1974; Goswami, 1998; Siegler, DeLoache, & Eisenberg, 2003):

- *Numbers*: Two lines (A1, A2) were shown to children, each accompanied by the same number of marbles. The children were asked to confirm if same number of marbles existed. Then, line A2 was made longer or shorter, and the children were asked if it was the same as A1. After the children answered, researchers confirmed whether it was the same. At this time, the group of 6- to 7-year-olds recognized that the number of marbles was the same.

- *Liquids*: Children were shown two cylindrical containers (A1, A2) of the same size, containing the same quantity of liquid. They were asked to confirm whether, in fact, both contained the same quantity of liquid. Then, the contents of A2 were transferred to a container of a different size from A1. The children were then asked if the quantity of liquid it contained was the same as that in A1. After the children answered, researchers confirmed whether it was the same. The group of 6- to 7-year-olds recognized that the quantities of the liquid were the same; thus, this group had acquired the conservation concept.

- *Length*: Two sticks (A1, A2) of the same length were placed side by side, with their ends coinciding, and the children checked whether the sticks had the same length. Then, A2 was shifted, and the children were again asked if it had the same length as A1. After the children answered, the researchers again confirmed whether it was the same. The group of 6- to 7-year-olds recognized that the two sticks were the same.

In recent years, the advance of science and technology, such as that occurring in neuroscience, has seen discoveries being done from new perspectives (Houdé et al., 2011; Poirel et al., 2012). However, general trends in research, depending on conversations with toddlers (studies done using Piaget tasks), have been solidifying over the past several decades. Currently, the general opinion from subsequent studies is that for Piaget tasks, and

the acquisition stage is 6 years and older (Goswami, 1998; Field, 1987; McEvoy & O'Moore, 1991; Ping & Goldin-Meadow, 2008; Asokan, Surendran, Asokan, & Nuvvula, 2014).

Nevertheless, some critics have also stated that these tasks underestimate children's competence (Orlando & Armando, 1996). In fact, many studies concerning pragmatics relate to this point (Goswami, 1998; Donaldson, 1978; Rose & Blank, 1974; Siegal, 1991; McGarrigle & Donaldson, 1974; Dehaene, 1997). Furthermore, some reports have stated that acquisition can happen sooner, at between 4 and 6 years, if task methods are properly designed or practiced (Siegler, 2016; Gelman, 1969; McGarrigle & Donaldson, 1974; Light, Buckingham, & Robbins, 1979; Hargreaves, Molloy, & Pratt, 1982). However, designing tasks often changes questions' contexts, and some researchers have held that such changed questions do not actually examine Piaget's conservation concept (Miller, 1982; Nakagaki, 1990; Goswami, 1998). Additionally, some studies have shown that the acquisition can happen sooner if final requestioning is not employed (Rose & Blank, 1974; Samuel & Bryant, 1984; Dehaene, 1997). However, other studies have shown that requestioning has little impact (Goswami, 1998).

The studies cited above demonstrate several points of uncertainty regarding Piaget tasks. However, while there is room for disagreement over the conservation concept that can be distinguished with Piaget tasks, for the moment, this study considers it to be the "true conservation concept" because the ability to provide a correct answer via dialogue is certainly important in formal education. Accordingly, if new investigatory tasks are discovered, there will still be research value in ascertaining the stage of acquisition or factors in acquisition.

Potential points of improvement for Piaget tasks are examined below. Others have shown that the greatest potential lies in making the survey content (or context) more familiar; however, when criticism of this is considered, changes appear to be less desirable. Considering the above sentence, the idea of making Piaget study itself into something familiar emerged. In other words, a new notion of integrating the tasks themselves into children's ordinary conversation or play arose. Normal play is defined as any activity that "is (a) pleasurable and enjoyable, (b) has no extrinsic goals, (c) is spontaneous, (d) involves active engagement, (e) is generally engrossing, (f) often has a private reality, (g) is nonliteral, and (h) can contain a certain element of make-believe" (Hirsh-Pasek & Golinkoff, 2008, p. 2). Many reports have found that play in early childhood is important for learning mathematics (Seo & Ginsburg, 2004; Ramani & Siegler, 2008; Gelman, 2006; Hirsh-Pasek, Golinkoff, & Eyer, 2003; Ginsburg, 2006). Moreover, part of ordinary conversation naturally refers to and frequently incorporates mathematical content, and some researchers have reported that such incorporation positively affects young children's mathematical abilities (Klibanoff, Levine, Huttenlocher, Vasilyeva, & Hedges, 2006).

To satisfy the mathematical condition above, conducting the study continuously is important; thus, the subject can first become familiar with the task. Furthermore, it is important to incorporate awareness regarding mathematical ideas other than the conservational concept through conversations on mathematical terms, concepts, sense, questions, perceptions, viewpoints, and thought into ordinary conversations and play as a preliminary step to study conservation tasks. Furthermore, establishing conversation with each young child is equally desirable as having someone whom the child accepts as a play partner conduct the testing.

For Piaget tasks, study subjects can be under 6 years; in fact, some studies have shown that acquisition is possible by 4- to 5-year-olds if tasks are improved. Thus, a 3-year-old was chosen as this study's subject in the hope of producing new results because children begin having basic conversations at the age of 3 years.

This study examines the possibility of acquisition of the conservation concept of numbers, liquids, and lengths by 3-year-olds by improving the given task, that is, integrating the task into the toddler's ordinary conversation and play.

2. Methods

・*Research design*: Single-case research methods were employed (Barlow, Nock, & Hersen, 2009) because these methods are suitable for drawing conclusions about new hypotheses. Additionally, there is the physical difficulty of studying several subjects at once. The treatment variable was the Piaget tasks as a part of ordinary conversation and play, and the A-B design was adopted because withdrawal is naturally difficult.

・*Target*: One 3-year-old toddler (female) (from 3 years, 2 months old to 3 years, 11 months old).

・*Characteristics of the target child*: She was not forced to learn mathematics. To integrate mathematical awareness into ordinary conversation and play, a study was conducted on conversations related to mathematical content (e.g., quantities, geometry, and logic) from the time the child turned 3 years. This study inquired into 70 mathematical items for each month, and it was conducted during play or ordinary conversations (including quizzes). For example, two pencils were shown, and the child was asked, "Which one is longer?" to check the

understanding of the length, or a square piece of cheese was held, and she was asked, “What is this shape?” to check the understanding of the name of a square (cf., Watanabe, 2015).

・*Relationship with the tester*: The target child lived in a three-person household with the tester and spouse (her younger brother was born when she was 3 years and 11 months old). The target child spent most of her time with the tester, having conversations or playing. For example, the tester took her to kindergarten, and the child spent almost all of her time outside kindergarten on weekdays and holidays, including outdoor and indoor playtime, with the tester.

・*Methods*: The study was conducted with Piaget tasks, conducted as part of ordinary conversation and play; they were given as quizzes while the child was playing with blocks or during snack time. Taking breaks or quitting in the middle of a task was acceptable. Correct answers or responses were not pursued.

・*Stages by age in months*: 3 years, 0 months is considered to be any arbitrary day in the 1-month period from the first day (day 0) of being 3 years old through the day before day 0 of being 3 years and 1 month old. The study was conducted with arbitrary timing.

・*Content*: This study’s content was identical with that of Piaget tasks. As a general rule, the final question was asked only once, and no reason for the response was queried.

(1) Numbers

Approximately five spheres were placed in two separate lines (A1, A2), and the child was asked to check whether the two lines were the same. Then, A2 was made longer or shorter (changed at least twice). After each change, the child was asked whether it was the same as A1 by asking, “Which is more?” or “Which number is bigger?” (Figure 1).

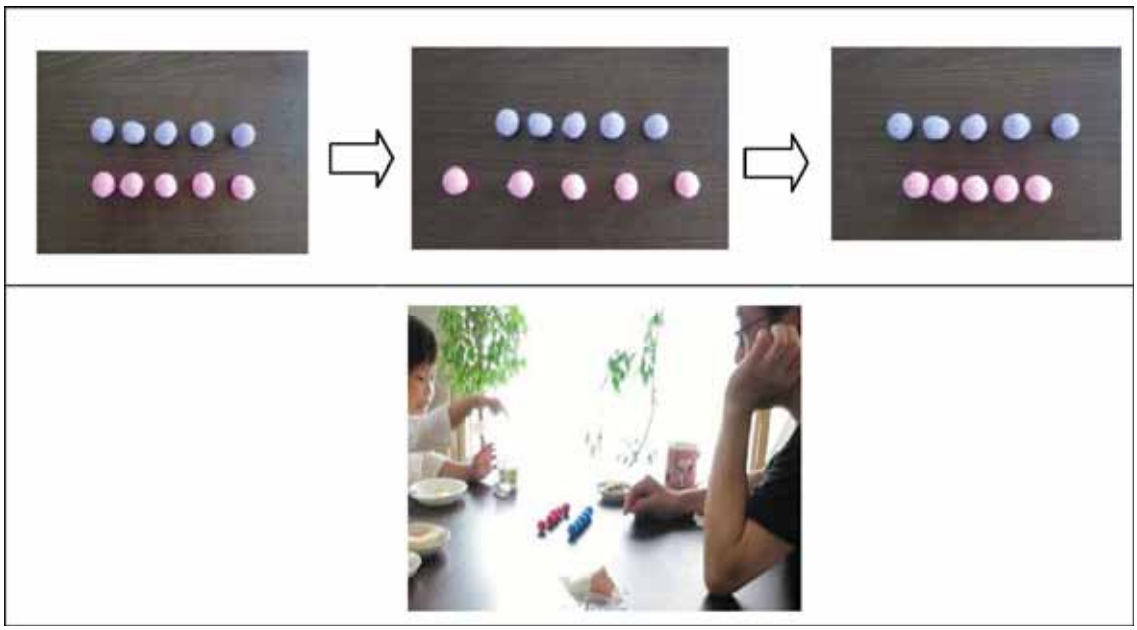

Figure 1. Piaget’s task of number conservation

(2) Liquids

Two congruent cylindrical containers (A1, A2) were placed side by side, water was poured into them, and the child checked whether the containers had the same quantity of liquid. Water from container A1 was transferred to a taller container with a smaller bottom than A1; the child was asked whether the water in the new container had the same quantity as in A2, using questions like “Which has more?” or “Which one contains more water?” (Figure 2).

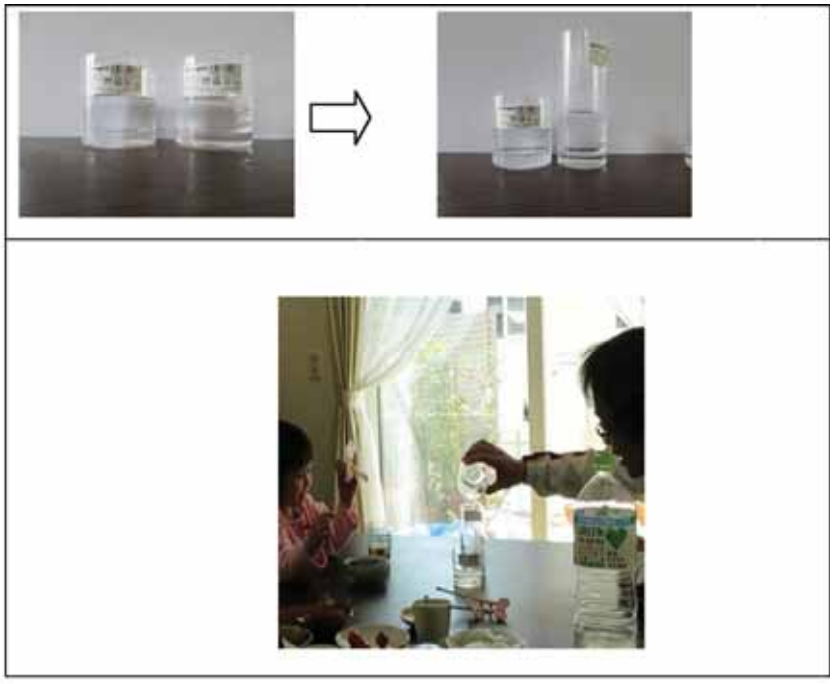

Figure 2. Piaget's task of liquid conservation

(3) Length

Two pens of the same length (A1, A2) were aligned, and the child confirmed whether they had the same length. Then, the position of A2 was off set up or down, and the child was asked whether it was the same as A1: "Which is bigger?" (Figure 3).

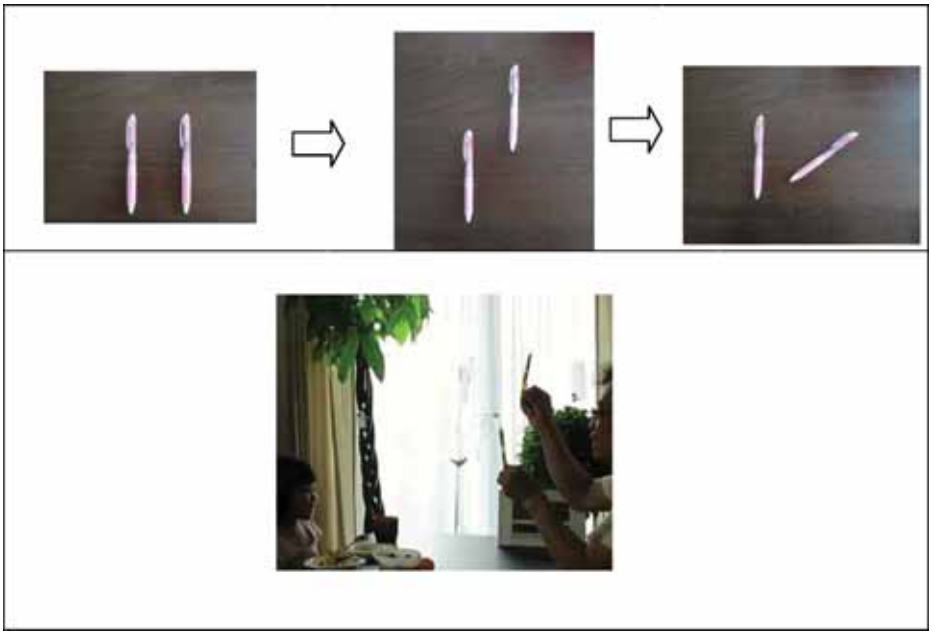

Figure 3. Piaget's task of length conservation

3. Results

Table 1 and Figures 4, 5, and 6 show the study's results. Here, Zero indicates mistaken response, and 1 indicates correct response (the child pointed to the correct option). Typically, the establishment of an original baseline occurs prior to intervention. In this study, however, the task itself was the intervention; thus, if a stable 0 baseline was established after the study, there is no problem in also establishing that the stable 0 baseline continued through the intervention stage. In this study, intervention began when the child was 38 months old, and the baseline was stable at 0 for more than 4 months after the intervention; thus, the study results made it possible to establish a stable 0 baseline prior to the study (before 38 months).

The study's results clarified that the intervention had a positive effect for numbers and liquids at 43 months and for lengths at 42 months (so clear that a statistical test was unnecessary). In other words, lengths attained a value of 1 at 3 years and 6 months; numbers and liquids attained this value at 3 years and 7 months. As this value continued to be stable at 1 for the subsequent 4- to 5-month period, at the very least it can be said that at 3 years and 11 months, the child had acquired the conservation concept of numbers, liquids, and lengths. Additionally, mathematical awareness studies beyond the conservation concept were also conducted from 3 years and 0 months. However, because scores for these remained at 0 for 4 to 5 months after the start of intervention, apparently, no direct relationship to understand the conservation concept could be observed in a study of mathematical awareness that excludes the conservation concept. However, because a study that covered more than 70 items was incorporated into ordinary conversation and play over a 2-month period, the study and its content became part of these activities. One can easily imagine that this would be useful for understanding conservation tasks.

Table 1. Total results by age for Piaget's concept of conservation tasks

Type Age (Months)	Number	Liquids	Length
38	0	0	0
39	0	0	0
40	0	0	0
41	0	0	0
42	0	0	1
43	1	1	1
44	1	1	1
45	1	1	1
46	1	1	1
47	1	1	1

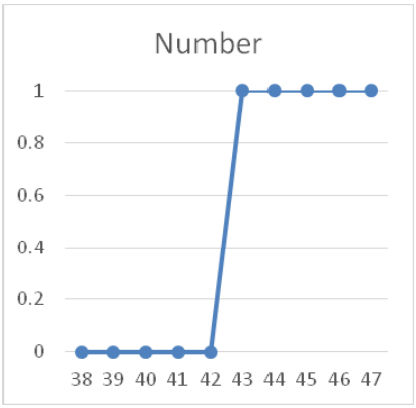

Figure 4. Number results for 3-year-olds on Piaget's conservation tasks

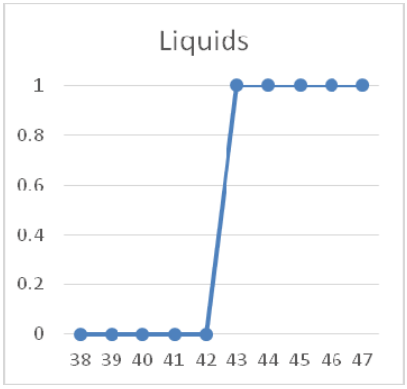

Figure 5. Liquid results for 3-year-olds on Piaget's conservation tasks

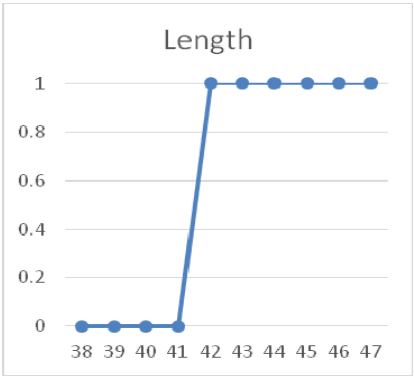

Figure 6. Length results for 3-year-olds on Piaget's conservation tasks

4. Discussion

Prior research has reported that for children aged less than 6 years, Piaget tasks were impossible to understand (Goswami, 1998; Field, 1987; McEvoy & O'Moore, 1991; Ping & Goldin-Meadow, 2008; Asokan et al., 2014). Other reports have stated that acquisition can begin sooner (between 4- and 6-year-olds) if task methods are properly designed or training is conducted (Seigler, 2016; Gelman, 1969; McGarrigle & Donaldson, 1974; Light, Buckingham, & Robbins, 1979; Hargreaves, Molloy, & Pratt, 1982).

With regard to these points, this study has shown that it is possible for a 3-year-old to acquire the conservation concept using Piaget tasks without improving the task content or conducting training merely by incorporating the tasks into a toddler's ordinary conversation or play.

The single-case study was relatively easy to work on, but even with this design, various physical limitations were added (e.g., extensiveness of study content, continuity of the study, establishing play and conversations with the subject, and selecting the tester). This is believed to be the reason that such a study had not been conducted until now.

Many proposals to change the study content have been made; however, it appears that no one had the idea of changing how the study itself was perceived without changing its content.

Clearly, however, increasing the study's scale or the number of opportunities for such a study would be difficult. Therefore, this study became a step in the creation of a research hypothesis, but it lacks generality. Hopefully, many subsequent studies (even repeated undertakings of single-case studies) will be conducted.

Acknowledgments

This work was supported by JSPS KAKENHI Grant Number 16K01043.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Accurate Diagnosis of the Syndrome in Children with Autism Spectrum Disorders and Parents' Resilience

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Received: February 1, 2017 Accepted: February 10, 2017 Online Published: February 15, 2017

doi:10.5539/jedp.v7n1p218 URL: http://doi.org/10.5539/jedp.v7n1p218

Abstract

Autism is considered to be a much more serious syndrome than other developmental disorders and according to studies it affects the resilience of the parents with an autistic child to a larger degree, comparatively. In this article the results of the investigation between the family resilience of the parents and their child's diagnosis of the syndrome are presented, as it was regarded that, taking into consideration the autism syndrome and Asperger syndrome, the difficulties in a row of levels would be particularly more severe in diagnosed cases of autism. The parents of 312 autistic children in Greece, all of them couples, namely 624 men and women constituted the population sample. It was found that compared to Asperger syndrome at least, in cases of an autistic child's upbringing, the parents' resilience is more fragile, their stress higher and certainly the social support they receive is comparatively reduced.

Keywords: resilience, autism, autistic child, developmental disorders, Asperger, down syndrome

1. Introduction

The accurate diagnosis of autism seems to acquire a special significance as a factor affecting the parents' resilience, namely their positive adaptation within the framework of a big change, such as the awareness that they will bring up an autistic child (Hamilton, 2014). The review of the relatively recent surveys led to the study of the findings concerning the diagnosis, and the conclusion that was drawn was that the diagnosis is discussed either under the spectrum of comparing autism to other developmental disorders, or in relation to the parents' adjustment to the unpleasant news of an autistic child's presence in the house, and also of the role of the health experts, the information sources and the sources of the parents' social support. In the research that was conducted by the writer, the diagnosis was dealt with according to all these parameters, however, in this article, measurable data is given regarding the first parameter, namely that of the comparison of the autism problems to the ones deriving from other developmental disorders. Certainly, the theoretical context that follows presents a more overall picture about the treatment of the diagnosis in various studies in the latest years.

Smith et al. (2014) conducted a study on the assessment of parenting stress and the parents' views who face the difficulties in the language development of children with developmental syndromes, such as Down etc. They also refer to autism comparatively, noting that it is indeed a much more difficult situation compared to other ones. That is to say, it seems to have been recorded that the parents of autistic children face more difficulties than those who raise children with Down syndrome, therefore, they experience higher levels of parenting stress, either their children are older or younger. In the survey the population sample included 111 children of the age of 21 up to 48 months and one parent each time or career of the age of 22 to 57 years old. From the children, 29 children suffered from Down syndrome, whereas 82 from other developmental disorders. The research was quantitative and was conducted via a questionnaire. The aforementioned researchers underline that surveys have shown that the parents of children with autism have demonstrated higher stress levels which is rather related to their child's characteristics and not to the more general dimensions of parenting stress. On other specific points, the survey focuses on Down syndrome, however, its suggestions indicate that the accurate diagnosis -and this concerns of course the cases of autism as well- is a crucial differentiation factor for the parenting stress without ignoring the effect of other factors, such as the demographic ones. Nevertheless, the diagnosis remained a crucial factor even

after the results' correction for variables, such as the age of the father and of the mother and the adaptive behavior.

Ewles, Clifford and Minnes (2014) sought to explore the factors that develop the concept of advocation in coping with autism. Their research focuses on the mothers, the role of whose is linked, according to the researchers, to the stressful factors, the resources and the parents' assumptions. The results of a population sample of 28 women reveal that an important factor to determine advocation is the use of dysfunctional care strategies. The mothers' age varied from 30 to 53 years old and 79% of them were married. The rest of them were single, divorced or lived under a legally defined status (common-law). Their children were of the age between 6 to 19 years old. They had been diagnosed with autism, Asperger or permanent developmental disorders, non-defined differently. The initial diagnosis on autism concerned the 28,9% of them. As to advocation, the researchers mention that its role is linked to the stressful factors, the resources and the parents' assumptions. The advocation itself is possibly a management strategy. Perhaps the manner for the parents to practice advocation effectively is also a resilience method of theirs, indeed a productive one. Because the aforementioned researchers note that in order for the parents to be better in this field, they themselves have to be trained to acquire an understanding of the relevant social, economic and political environments, and also to become familiar with the philosophies of the provision of services, legislation and budgetary issues. It is not enough for the parents to advocate, they have to be experts in disabilities, acting as vehicles of strategies and systemic change agents.

Doron and Sharabany (2013) agree that *stress* is a powerful and continuous factor which acts cumulatively and weakens the defence mechanisms that would allow for a more hopeful confrontation when the autistic children were younger. And they observe that the stronger autism symptoms have been connected to higher stress levels, whereas the mothers feel usually better with the positive reactions of their children's functionality. They mention other symptoms, too, such *fear of uncertainty*, due to the possibly long-lasting process for an accurate autism diagnosis. Doron and Sharabany point out that the parents face problems announcing the diagnosis to their wider family and friends, but once they do so, it seems that some regulation of the stress is achieved. Some sense of normality comes from the grandparents who seek after their children's peace of mind and contribute to the practical management of their autistic grandchildren. The nuclear family accepts in certain cases the frequent presence of a relative on a permanent basis who will help together with the siblings of the autistic child. Of course, some imbalances cannot be avoided, which will be dealt with by the parents.

Yarock Rutstein (2014) refers to a previous research focusing on the exploration of the support provided by official services to parents of children with autism, Down syndrome, as well as to neurotypical children. It was found that the mothers of children with autism were those ones having the most difficulties in establishing forms of informal contact based on community, such as the support from religious groups and parent support groups. As it becomes clear, the diagnosis issue is linked to various aspects of coping with autism, either autism is compared to other chronic and serious problems of the children, or it relates to the treatment of the autistic spectrum only.

For instance, Murphy and Tierney (2014) carried out a survey, their population sample consisted of 27 mothers and 11 fathers, in order to explore the needs for information and training they demonstrate after the autism diagnosis of their child. The questions posed concerned the parents' experiences immediately after the diagnosis, to the point where their knowledge and training needs were and had been, their primary information sources, their satisfaction from the quality and quantity of the available information and their own preference for certain information sources. They note certain important data also for the role of the health experts and they find that the way in which the diagnostic process is dealt with by them is directly linked to the difficulties the parents experience. In fact, many parents stated it would be particularly helpful, if the experts informed them on the autism's positive and negative aspects, as well as on the impact it may have not only on the child's growth, but also on the family course. It seems likely that a lot of negative information at this stage would possibly be inappropriate and would add more stress to an already sensitive condition. Likewise, more stress seems to be caused by the parents' contact with more experts and service providers at the same time. Specifically, the lack of agreement between bodies/institutions often leads parents to a personal quest for the specific needs that each service covers. Additionally, the experiences during the diagnosis are of an extreme importance for the future: they can affect the adjustment to autism, the parenting stress, the information and the parents training needs, the quality of their relation to the experts. The diagnostic process is crucial for the views, experiences and enhancement directly and in the long run.

The need for personal information is also examined by Selimoglu et al. (2013) in their research, a research which apart from the internet, as it is the case with other researches, refers to other sources of knowledge about autism that the parents with autistic children look for. This survey aimed at interpreting the attitudes of the parents with autistic children during the stage after the diagnosis. But they also refer to the stage before the diagnosis, and note that then an incomprehensive feeling predominates and a negation for the diagnosis, despite the fact that, regardless of the exact time period during which the parents observe changes in the their child's behavior, already from the first stage of perceiving certain developmental disorders and unexpected behaviors, they seek a diagnostic evaluation from doctors whom they consult together with their autistic children.

The survey by Gena and Balamotis (2013) deals with the autistic child's family and more specifically with his parents. It is about the parents' emotional adaptation to the diagnosis and living together with the autistic child, whereas it points out the factors that enhance this adaptation. The parents are under study and the first stages of their emotional adaptation are described, the adaptation to the burden they receive, and thus the factors that increase it, as well as the counselling and support of the family.

2. Method

2.1 Purpose

This article is part of a wider research which aimed at exploring the way in which the family resilience of parents with a child with autism spectrum disorders interacts with the social context among which the family is placed, as well as with the stress the parents experience during the upbringing of a child with autism spectrum disorders. It was important to investigate how the resilience is affected when the social support the family receives is low and the true stress high, with variables, apart from the level of social support that the parents receive and the stress they suffer from, certain demographic characteristics of the parents and of the child, too, such as the age, sex and the diagnosis of the syndrome the child suffers from. In this article, the results of the investigation of the relation between the parents' family resilience and the diagnosis of the syndrome in their child are presented, as it was considered that, taking into account the autism syndrome and Asperger syndrome, the difficulties in a row of levels would be particularly heavy in diagnosed cases of autism.

2.2 Participants

Table 1. Demographic and other characteristics of the participants in the survey

	n	**%**
Sex		
Men	312	50,0
Women	312	50,0
Nationality		
Greek	609	97,6
Other	15	2,4
Religion		
Christians	586	93,9
Muslims	38	6,1
Prefecture of		
Kavala	52	8,3
Rodopi	80	12,8
Xanthi	72	11,5
Cyclades	74	11,9
Serres	96	15,4
Drama	120	19,2
Evros	130	20,8
Education		
Primary Education	171	27,4

Secondary School Graduates	80	12,8
Lyceum Graduates	168	26,9
HEI/TEI Graduates	205	32,9
Studies in Psychology or in Special Education	0	0,0
Annual Family Income		
Below 15.000 €	266	42,6
15.000 € - 20.000 €	272	43,6
Over 20.000 €	86	13,8
Family Status		
Single	0	0,0
Married	624	100,0
Widower/Widow	0	0,0
Divorced	0	0,0
Family Relation to the Child		
Biological Father	312	50,0
Biological Mother	312	50,0
Step-father	0	0,0
Step-mother	0	0,0

As shown in Table 1, 624 parents of 312 children with autism spectrum disorders participated in the survey. The sample is uniformly distributed as to the parents' sex with 50.0% men and the same percentage of women. 97,6% of the sample, namely 609 parents, are Greeks, whereas 2,4%, namely 15 participants, are of a different nationality. 586 of the participants are Christians, 93,9% of the sample, whereas the remaining 6,1%, that is to say, 38 parents, are Muslims. As far as their place of residence in the Greek territory is concerned, 52 parents (8,3% of the total number) reside in the prefecture of Kavala, 80 parents (12% of the total number) reside in the prefecture of Rodopi, 72 participants (11,5% of the sample) in the Xanthi prefecture, 74 parents (11,9% of the sample) in the prefecture of Cyclades, 96 parents (15,4% of the total number) in the prefecture of Serres, 120 parents (19,2% of the total) in the prefecture of Drama and 130 parents (20,8% of the sample) in the prefecture of Evros.

The total number of the respondents (100,0% of the sample) are married and they are the biological parents of the child with autism spectrum disorders, 312 (50,0% of the sample) are the biological mothers and 312 (50,0% of the sample) the biological fathers.

The highest level of education for 27,4% of the participants (171 parents) is that of the primary education, 12,8% of the participants (80 parents) have received a low secondary education (*gymnasium*), 26,99% (168 parents) have received a high secondary education (*lyceum*), whereas the rest of the participants, that is to say, 32,9% of the sample (205 parents) have received a post-secondary education, as they are graduates of Higher Educational Institutes (HEI) and Technological Educational Institutes (TEI).

Concerning the annual family income, 42,6% of the sample (266 parents) declared an amount below 15.000€, 43,6% of the total number (272 parents) between 15.000€ and 20.000€ and the remaining 13,8% (86 parents), an income over 20.000€.

The children's characteristics are summarized in Table 1 in this text.

Table 2. Sex of the children with autism spectrum disorders and Asperger syndrome

	n	%
Sex		
Boy	253	81,1
Girl	59	18,9
Diagnosis		
Autism	282	90,4
Asperger	30	9,6
I don't know	0	0

Table 3. Characteristic age values of the children with autism spectrum disorders

	Mean Value*	Standard Deviation	Skewness	Kurtosis
The Age of Children with Autism Spectrum Disorders	12,45	5,33	1,184	1,937

With regard to the child's sex, 81,1% of the respondents, namely 506 in number, are boys' parents and the remaining 118 parents (18,9% of the sample) are girls' parents. The average age of the 312 children whose parents participated in the research is $M = 12{,}45$ years with standard deviation $SD = 5{,}3$ years. 90,4% of these children, that is to say, 282 in terms of numbers, have been diagnosed with autism, whereas the remaining 30 children, 9,6% of the total number, have been diagnosed with Asperger syndrome. The children's characteristics are summarized in Tables 2 and 3 in the present text.

2.3 Note

The demographic characteristics of the families with dysfunctional children are factors relating directly to the parents' stress levels (Houser & Seligman, 1991; Keller & Honig, 2004). For this reason the questionnaire that was distributed to the participants contained specific fields the completion of which would provide the necessary demographic information on each family, namely on the sex, nationality, religion, education level, annual family income, current family status, family relation to the autistic child, the child's age and sex, as well as his accurate diagnosis.

2.4 Data Collection

The supplying and collection of the questionnaires were realized by the writer from July 2015 to February 2016. The search for parents with children with autistic spectrum disorders was conducted based on the catalogues of the Center for Differential Diagnosis, Diagnosis and Support (KE.D.D.Y.) in the prefectures of the Greek territory, where an archive is kept on the children that receive a diagnosis. The parents were approached via mail sent to their residence address, to which the research questionnaire was attached, as well as an accompanying form that informed them in detail of the purpose and the aims of the research process. Special emphasis was put on the importance of confidentiality and anonymity of the information, namely that the data of the child and of the parents themselves would remain anonymous, whereas the information will be used exclusively for the needs and the purpose of the present research.

Though the accompanying form the parents were informed that they had to complete the entire questionnaire and the duration of its completion should not exceed 60 minutes. The participants were urged to contact the researcher on his mobile phone for the provision of instructions and clarifications about the correct completion of the questionnaire. Moreover, the importance of the completion by every parent separately was specifically pointed out to the participants, without there being an exchange of views among the couples, so that the achievement of the research's aims be possible.

The collection of the completed questionnaires was realized with their return to the researcher, by mail, from the families that had consented to an analysis of their answers. The return of the questionnaires to the researcher was defined to take place within 30 days after the date of their dispatching to these families.

2.5 Data Analysis

For the investigation of the relations that govern the Social Support, Family Resilience and Parental Stress of parents with children with autism spectrum disorders, the following three data collection tools were used.

***Social Support Index*:** The degree of the social support of parents who have a child with autism spectrum disorders was measured with the widely spread SSI tool (McCubbin, Patterson, & Glynn, 1982) which assesses the family social support as a factor in family resilience (Fischer, Corcoran, & Fischer, 2007). It contained 16 questions the answers to which were given in the 5-point Likert scale (0 up to 4). In every questionnaire statement, the respondents can state the measure of their agreement or disagreement by choosing one of the following answers: "I strongly disagree", "I agree", "I am not sure", "I agree" and "I fully agree", which are ranked on a scale of 0 to 4. In certain answers the scale was reversed so that a common conceptual content could be achieved. As to the answers' interpretation for the definition of the Social Support degree, the scores of the individual questions are summed, the highest scores indicating a highest Social Support degree. The span of the SSI scale was from 0 to 6 units. The SSI has a high internal validity index with a = 0,82. The Social Support scale was used as an independent variable.

***Family Resilience Assessment Scale*:** The FRAS scale of Tucker Sixbey (2005) was used to measure Family Resilience, based on the theoretical standard of Walsh (2006) on family resilience. It contained 66 closed-type questions which, as in the SSI case, they were answered in the Likert scale, but in a 4-point one, with values varying from 1 to 4, corresponding to the choices: "I strongly disagree", "I disagree", "I agree" and "I fully agree". The scale was reversed in four of these questions, and again for the acquisition of a common conceptual content. There was also an open-ended question. From these questions 54 were assessed, which were grouped together and formed 6 subscales of family resilience, as Tucker Sixbey (2005) suggests. More specifically, the subscales are as follows: **1)** ***Family Communication and Problem Solving*:** here, 27 questions of the data collection tool correspond to it. The result of the subscale is given with Cronbach's alpha coefficient 0,96, whereas the horizontal sum of the individual questions forms the subscale's final rating with a span from 27 to 108 units. **2)** ***Utilizing Social and Economic Resources*:** It is formed by 8 questions. Its rating is calculated by summing the participants' answers and it varies from 8 to 32 units. The subscale's reliability has a Cronbach's alpha index of 0,85. **3)** ***Maintaining Positive Outlook*:** The questions composing the subscale are 6. The internal validity was calculated with the 0,86 Cronbach's alpha coefficient and in the same way the subscale's rating is calculated which varies from 6 to 24 units. **4)** ***Family Connectedness*:** It is composed of 6 questions, among which the four ones in which the scale was reversed for conceptual reasons are also included. The sum of the score of all the questions that compose it, shapes the subscale's rating which it can also vary from 6 as minimal value to 24 as maximum value. Its reliability, measured with the Cronbach's alpha coefficient, was found to be of 0,70. **5)** ***Family Spirituality*:** The subscale is composed of 4 questions. From the sum of the answers' score its rating varies from 4 to 16 units and the measurement of its internal validity gave a Cronbach's alpha coefficient of 0,88. **6)** ***Ability to Make Meaning of Adversity*:** It is formed by 3 questions, its rating is calculated by summing the answers of the respondent parents and it varies from 8 to 32 units. The subscale's reliability has a Cronbach's alpha index of 0,74.

Taking into consideration the exception of 12 questions, it must be noted that the rating for the measurement of the total family resilience results from the horizontal sum of the 6 subscales and may vary from 66 to 264 units. Both for the total family resilience assessment scale and its entire individual subscales, higher scores indicate higher levels of family resilience. The reliability and internal validity in total for the tool used were calculated with the Cronbach's alpha coefficient and was found to be of 0,96. It is noted that the open-ended question was omitted.

***Parenting Stress Index—Short Form*:** The parenting stress degree was measured by using the PSI-SF index (Abidin, 1995), which calculates the stress of the parents with children with autism spectrum disorders, which comes exclusively from their role as parents, without taking into consideration any external stressful factors, apart from the parent-child relation, as well as the child himself. The measurement tool consisted of 36 closed-type questions that were answered based on the 5-point Likert scale (1 to 5 = "I strongly disagree", "I disagree", "I am not sure", "I agree" and "I fully agree"). They were grouped together in three groups equal in number, that shaped the three index subscales as follows: **1)** ***Parental Distress*:** It is made of questions 1-12 of the PSI-SF tool. The subscale rating is calculated by summing the answers and it varies from 12 to 60 units, reflecting the stress that is due to factors that concern the parents and which relate to the child's upbringing. The subscale's reliability has a Cronbach's alpha index of 0,85. **2)** ***Parent-Child Dysfunctional Interaction*:**

Questions 13 to 24 compose the second subscale of the Parenting Stress Index which represents the disappointment the parents feel regarding their interactions with their child. The sum of the score of all the questions that compose it, shapes its rating which may also vary from the minimum value of 12 units to the maximum value of 60 units. The subscale's reliability measured with the Cronbach's alpha coefficient was found to be of 0,68. **3) *Difficulty of Child*:** It is formed by the twelve last questions in the questionnaire, 25 to 36. Its rating is calculated by summing the parents' answers, it varies from 12 to 60 units and assesses their perception about the self-regulation of their child's behavior. The subscale's reliability has a Cronbach's alpha index of 0,78.

The rating for the measurement of the total Parenting Stress results from the horizontal sum of the 3 subscales and varies from 66 to 264 units. Both for the scale and its subscales, high scores indicate high stress levels, whereas a low rating indicates low stress levels. According to the PSI-SF self-report index, the values between the 15^{th} and 80^{th} percentage point of distribution are considered to be normal stress levels, whereas for the individuals whose rating varies from values above the 90^{th} percentage point of distribution, it is regarded that they are in the clinical range of high stress levels. The reliability and internal validity in total for the tool used was calculated with the Cronbach's alpha coefficient and was found to be of 0,84.

The ***consistency check*** was performed via the alpha "coefficient" of Cronbach (Cronbach's a), with the use of which the reliability of the data collection tools and their individual parts is defined. Coefficient values higher than 0,6 are considered satisfactory and they ensure their cohesion and internal validity, functioning as elements of a unified group. For the ***description of the quantitative variables*** that participated in the statistical analysis, the mean values (Mean), the standard deviations (Standard Deviation = SD), the minimal and maximum values (Min-Max) as well as the third and fourth order moments (Skewness and Kurtosis) of their distributions were used. In the case of the qualitative data, their description was made via the recording of their relevant absolute (n) and percent (%f) frequencies. The ***linear correlation check*** between the quantitative variables was conducted via the Pearson r correlation coefficient. The r correlation coefficient varies between -1 and 1, whereas the higher it is in absolute value, the higher the correlation between the variables becomes. Even though there are no commonly accepted limits, index values, to an absolute value, lower than 0,3 indicate weak correlations, values between 0,3 and 0,5 indicate medium correlations, whereas values higher than 0,5 mark high and strong correlations. Positive values of the coefficient suggest a positive correlation, whereas negative values, a negative correlation. The statistical significance of the correlations is checked at significance levels $\alpha = 1\%$ and $\alpha = 5\%$. For the ***comparison of the quantitative variables*** and the drawing of the survey's main conclusions, the Independent Samples t-test and the Paired Samples t-test were used depending on the nature and kind of the variables under examination. Moreover, its generalization for variables with more than two levels, the one-way Analysis of Variance (ANOVA), was used. The further study on the differences in the factors' levels is carried out with the Tukey method for multiple comparisons. The check of the hypothesis on equality of the variances on the factors' levels is performed via the Levene's test, whereas the safeguarding of the basic conditions concerning regularity and independence of the method's errors was checked via the Kolmogorov-Smirnov test and the Runs test, respectively. The aforementioned hypothesis checks are performed at a significance level $\alpha = 5\%$. For the ***processing and statistical analysis*** of the data the IBM SPSS Statistics 20 data statistic analysis software package was used.

3. Results

The results that follow are derivatives of that part of the statistical processing of the findings of the population sample under investigation, where effort was made to trace possible differentiations in the values of family resilience assessment scales, of the social support and parenting stress scales, as well as of their components, in relation to the accurate diagnosis of the syndrome in their child. In a total number of 506 boys (81,1%) and 118 girls (18,9%), namely 624 children, 564 (90,4%) have been diagnosed with the autism syndrome, whereas the remaining 64 children (9,6%), with Asperger syndrome. Table 2 presents the sex and the children's diagnosis, whereas Table 4 shows the findings resulting from the aforementioned checks for the statistically important differentiations at significance level $\alpha = 5\%$.

Table 4. Comparison of mean values of the scales and subscales as to the diagnosis

Scales & Subscales	Diagnosis	Mean	SD	df	t	p-value
SSI	Autism	41,92	4,833	622	-3,284	0,001*
	Asperger	44,08	5,063			
FRAS totally	Autism	153,24	7,878	622	-6,101	0,000*
	Asperger	159,90	9,468			
FCPS	Autism	78,29	4,430	622	-5,870	0,000*
	Asperger	81,93	5,719			
USER	Autism	22,61	1,545	622	-5,002	0,000*
	Asperger	23,65	1,448			
MPO	Autism	17,28	1,146	73,421	-5,162	0,000*
	Asperger	18,05	1,096			
FC	Autism	14,95	0,738	622	-0,528	0,598
	Asperger	15,00	0,781			
FS	Autism	11,60	1,487	622	-2,906	0,004*
	Asperger	12,18	1,455			
AMMA	Autism	8,52	0,915	622	-4,487	0,000*
	Asperger	9,08	1,078			
PSI-SF totally	Autism	117,34	12,121	61,690	5,858	0,000*
	Asperger	97,25	26,314			
PD	Autism	37,56	4,750	62,270	4,731	0,000*
	Asperger	31,77	9,363			
P-CDI	Autism	41,28	4,290	61,906	6,190	0,00*
	Asperger	34,03	8,965			
DC	Autism	38,53	5,346	62,862	5,557	0,000*
	Asperger	31,45	9,708			

Note. *= p< .05.

Memo

SSI: *Social Support Index*

FRAS: *Family Resilience Assessment Scale*

FCPS: *Family Communication and Problem Solving*

USER: *Utilizing Social and Economic Resources*

MPO: *Maintaining Positive Outlook*

FC: *Family Connectedness*

FS: *Family Spirituality*

AMMA: *Ability to Make Meaning of Adversity*

PSI-SF: *Parenting Stress Index – Short Form*

PD: *Parental Distress*

P-CDI: *Parent-Child Dysfunctional Interaction*

DC: *Difficulty of Child*

The results above show that statistically there are important differences between the diagnosed syndromes in the children for all three total scales of measurement. As to the total social support index SSI ($t(622) = -3,284, p = 0,001$) the parents of children with Asperger syndrome present a higher average rating $M = 44,08$ in relation to the parents with an autistic child with $M = 41,92$ enjoying higher levels of social support. Likewise, for the total FRAS scale ($t(622) = -6,101, p = 0,000$) the corresponding average ratings vary from $M = 159,90$ to $M = 153,24$, with the parents of children with Asperger syndrome enjoying higher family resilience levels. On the contrary, these parents present lower parenting stress levels in the total scale of PSI-SF ($t(61,690) = 5,858, p = 0,000$) with average rating $M = 97,25$, in contrast to the corresponding one of $M = 117,34$ of the parents with an autistic child.

The same rating as to the two parents' groups corresponding to their child's diagnosis, results both for all the individual parenting stress subscales and for all the components of family resilience, apart from the one which concerns Family Connectedness (FC), for which no important differences have resulted statistically. The average rating in every subscale for the two groups is showed in Table 2 above, in which statistical check results for FC are also included.

4. Discussion

The accurate diagnosis of the syndrome in the wider autism spectrum is a crucial factor in shaping the characteristics under study. Parents the child of whose has been diagnosed with Asperger syndrome experience larger social support, develop higher total resilience and face less stress in total compared to the parents of children with autism. Likewise, the same parents appear to be more able in family communication & problem solving, they utilize better the social and economic resources, they maintain a more positive outlook, they have wider family spirituality and they can make meaning of adversity in relation to the parents with children with autism more easily. Between these parents no differentiation is observed as to their family connectedness. Furthermore, parents with children with Asperger shape lower parental distress levels, lower parent-child dysfunctional interaction and they face the difficulties that their child faces in a better way, compared to the parents of children with autism.

In the specific case, the significance of diagnosis may be examined, both as to its earliness and its seriousness. Certainly the children with Asperger syndrome, or with "functioning autism", are expected to have less difficulties compared to those ones with autism spectrum disorders. Therefore, it is natural for the parents with children that suffer from this syndrome to be overwhelmed with lesser distress and to experience a dysfunctional interaction with their child to a lower degree. Our paper in the theoretical part has not dealt with the said syndrome, nonetheless, it can be said that the findings in the empirical part which concern it are indirectly confirmed by what is written in the theory on the importance of the different degrees of autistic behavior. The seriousness of the symptoms has been reported as being one of the most vital factors causing stress in the family environment, in fact, these act also as causes for physical burden, such as aches on the head and on the back and also myalgiae, whereas they relate to higher fatigue percentages (Van Bourgondien, Dawkins, & Marcus, 2014). Apart from the stress increase, they reduce also the sense of self-effectiveness in the parents and they affect negatively the social connectedness (Batool & Khurshid, 2015). It must be noted that all researchers do not link the parents' unpleasant feelings to the seriousness of the symptoms. For instance, Yang et al. (2016) find no correlation to the parents' depression. More particularly, though, it seems that, for the stress, the correlation is more direct and researchers are looking for ways to treat the symptoms, even through the problem's acceptance and the development of a true will for the care of the autistic child on the part of his parents (Ewles, Clifford, & Minnes, 2014). Here, it is considered justifiable that the research that was conducted is in line as to its conclusions with those ones of the researches that link the seriousness of the autistic symptoms to the more general function of the family environment.

As to the other parameter, that of the earliness of the diagnosis, the research that was carried out does not concern the effect of temporality of the autism diagnosis, but only its seriousness. Possibly, a more early diagnosis brings the family faced with the problem more early, so as to launch the treatment of the relevant

adversities in a more premature stage, thus succeeding more early the proper psychological adjustments. Hamilton (2014) supports this point, even though she accepts that many factors affect the parents' resilience at the same time. The earliness of the diagnosis has a benefit on many levels, such as the timely start of collecting useful information on the part of the parents (Murphy & Tierney, 2014), however, no more can be said about the specific parameter after the completion of this research, because, let it be repeated at this point, the accurate diagnosis of the autism was dealt with in it with data concerning the seriousness of the symptoms and not the earliness of the knowledge about the child's condition.

5. Methodological Limitations

The geographical distribution of the sample can be regarded as one basic limitation of the research. Despite the fact that as to its size, it is big enough and representative per district, it concerns only seven prefectures in the Greek territory. Consequently, generalizations of the conclusions that are drawn will have to be made with caution, even though it seems that they can be considered as particularly representative. An equally important limitation is that fact that the sample taken is exclusively from parents of a specific family structure. The families chosen are all two-parent families and the parents who participate in the survey have a specific family relation to the child. So, it cannot be assumed that the effects of the family structure and family relation have been adequately explored. Besides, the assessment that was made is based on the self-reports of the parents with a child with autism spectrum disorders, without other reports and information from other important persons of the parents' environment being detected, such as the rest of the families' members and health experts who possibly aid the parents. It must also be added that the survey is synchronic and interrelated, therefore it is not possible to discuss casual links between the factors under study. In addition, in this attempt no other possible parameters and co-morbidities linked to the levels of family resilience were assessed, such as depression, loneliness, the parents' interpersonal relations and social skills. All the aforementioned limitations must be taken into consideration during the study and interpretation of the present research findings.

6. Conclusions

It can be considered that the result between the syndromes which the children who have autism spectrum disorders are diagnosed with is expected, autism is a much more difficult condition as to its management, at least in comparison with Asperger. Because the parents' resilience is more fragile, their stress is higher and certainly the social support they receive is comparatively reduced. The difficulties in treating the syndrome are of course important, and the stress caused by the upbringing and dealing with the autistic child's needs is increased, however, the social support parameter may possibly be improved, namely the social support may be intensified and perhaps then lower stress values and higher resilience values will result for the parents who raise children with the autism syndrome.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Exploring Correlates of Business Undergraduates' Closed Versus Open Grading Assessment Learning Perceptions

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Received: February 10, 2017 Accepted: February 27, 2017 Online Published: March 20, 2017

doi:10.5539/jedp.v7n1p229 URL: http://doi.org/10.5539/jedp.v7n1p229

Abstract

Motivated by a lack of scales for measuring business undergraduates' grading assessment learning perceptions (GALP), this research created two three-item GALP scales, closed and open. Two separate samples of senior business undergraduates (fall, 2015, n = 220 and spring, 2016, n = 690) were used. Closed GALP and open GALP were identified via exploratory and confirmatory factor analyses. Subsequent stepwise regression analyses consistently showed that satisfaction/reputation had a positive impact and accounted for the most variance in these two GALP scales across both samples. Research limitations and future research issues are discussed.

Keywords: grading assessment learning perceptions, open/creative assessment, closed/structured assessment

1. Introduction

Grading has been defined as "the process of calculating or measuring a student's work and assigning a letter grade" (Speck & Jones, 1998, p. 18), and is an inherent part of a faculty member's job. Learning is also important in a course, and two types of learning are declarative knowledge and skill acquisition (Noe, 1986). Declarative knowledge is cognitive, while skill-acquisition can involve application. Both components, grading assessment and learning outcomes, are typical components in a course syllabus (Smith & Razzouk, 1993). There are generally different grading assessment items typically detailed in a course syllabus, often including: quizzes, examinations, individual papers, group papers, presentations, participation, and attendance (Holmes & Smith, 2003; Smith & Razzouk, 1993). Across all types of class delivery modes (e.g., face-to-face, hybrid or blended, online), graded assignments can take a variety of forms (e.g., in-class or take-home, individual or group), as well as involve discussion boards or blogs (Comer, Lenaghan, & Sengupta, 2015).

Prior research has generally focused on grading fairness perceptions of specific course components, including: essay versus problem solving (Holmes & Smith, 2003), class participation (Pepper & Pathak, 2008), and quizzes (Bacdayan & Geddes, 2009). However, prior research has not attempted to aggregate specific course grading assessment techniques into broader scales. Given the lack of prior research, this study explored developing distinct grading assessment learning perception (GALP) scales, and their correlates. *The purposes of this study were to: develop reliable grading assessment learning perception (GALP) scales; and to investigate correlates of the GALP scales.*

1.1 Review of the Literature—Grading Fairness Assessment

Holmes and Smith (2003) studied grading fairness perception using a single "open or creative" GALP item, an essay assignment, versus a more "closed or structured" GALP item, quantitative problem solving. For their study, the most common fairness complaint concerning essays was that instructors provided either minimal or no feedback with the essay grade, while for problem solving the highest frequency complaint was instructors not giving partial credit. Pepper and Pathak (2008) found that three aspects of grading, i.e., explicitness of grading criteria, frequency of feedback, and proactive instructor techniques (e.g., opportunities for discussion) positively influenced perceived fairness of classroom participation grading. Bacdayan and Geddes (2009) found that undergraduates' perceptions of quiz fairness were positively influenced by: unbiased grading practices, useful and quick instructor feedback, and students' preparation boosting quiz grades, while quiz fairness was negatively influenced by surprise questions.

Other grading fairness assessment research has been more general. Sabini and Monterosso (2003) used three different scenarios to explore college students' perception of grading fairness, where fairness allowed for deviating from grades being strictly based on performance. The first scenario showed that effort should also be rewarded, the second scenario showed students believed in an exam re-take opportunity if an unforeseen event interrupted study, and the third scenario revealed students' believing that learning disabilities should be accommodated. Stewart Wingfield and Black (2005) used a passive versus active course design to test impact on student outcomes. The passive course design was traditional lecture, while there were two active designs, participative and experiential. Grading evaluation in the passive course design was done via traditional multiple choice exams and in the experiential course design grading evaluation was done using case studies and self-assessments. In the participative course design, students had the greatest input into the grading evaluation criteria, which included group work, presentations, in-class discussions and in-class exercises. Results showed that while students perceived both active course designs to be more useful to their future careers than the passive design, there were no differences in student grades, course satisfaction or perceptions of how each course was conducted.

Across eight potential classroom situations using a sample of business undergraduates, Duplaga and Astani (2010) explored which classroom policy statement within each situation provided the fairest treatment for all students in class. The eight situations were: attendance, collection and grading of homework, extra credit, late assignments, make-up exams, make-up quizzes, sanctions imposed for cheating on a quiz, and sanctions imposed for cheating on an exam. Given the understandable lack of student agreement about fairest treatment within each policy, the authors invited readers to examine student fairness perceptions for each situation to compare to their own classroom policies.

1.2 Measuring GALP

Prior research has measured undergraduates' grading fairness perceptions of specific course components. An unanswered research question, however, is can valid individual GALP items be successfully combined into scales that are reliable? Finding factor analyzed/reliable scales to measure GALP would give more confidence such grading assessment learning perceptions are being accurately measured (Nunnally, 1978). The first research question asked if different valid GALP items could be successfully aggregated into reliable scales.

RQ1—Can reliable GALP scales be developed?

1.3 Explaining GALP Using Successively Added Variable Sets

Given the lack of research focusing on understanding antecedents of student GALP, prior research on general models of student outcomes, such as: perceived learning (Arbaugh, 2005); persistence towards graduation (Reason, 2009, p. 661); and development (Blau & Snell, 2013; Sandoval-Lucero, 2014) were reviewed. These models generally propose an increasing impact of independent variable sets for explaining the dependent variable or outcome. Based on the distal (less impactful) to proximal (more impactful) ordering of variable sets across these models, four variable sets were tested: background; college related; professional development and motivational for their successively increasing impact in explaining GALP. The specific variable examples used within each variable set were primarily adapted from Blau and Snell (2013, p. 693). Based on their model, these were: (1) background variables (i.e., gender, race, highest parent education), then (2) college-related variables (i.e., grade point average or GPA, average hours worked/week, average hours on course work/week), followed by (3) professional development variables (i.e., joining a student professional organization or SPO, SPO

meetings attended, internships completed) and finally (4) motivation variables (i.e., motivation to attend, satisfaction).

Given the exploratory nature of this study, three additional variables were measured: in-state resident; general type of major; and graduate in four years. Whether a student was an in-versus out-of-state resident was collected as a background variable. Since the university receives state funding, out-of-state students have a higher tuition rate, so could this affect GALP? General type of major was measured having either a quantitative versus non-quantitative or qualitative major. This was explored for impact on GALP. Finally, whether the student graduated in four years (Yes/No) was included in the college-related variable set to see if this affected GALP. This leads to the second research question (RQ2):

RQ2—Will the four variable sets of background, then college-based, then professional development and finally motivational account for increasing variance in undergraduates' GALP scales?

2. Method

2.1 Samples and Procedure

The sample of undergraduate business students came from the business school in a large state-supported urban university in the Mid-Atlantic region of the United States. This university had a fall, 2015 total student enrollment of more than 39,000, including 6,661 undergraduate business students. Senior business students were required, as part of their graduation application, to fill out an on-line Senior Student Satisfaction Survey (SSSS). Study measures were part of the SSSS and data were collected twice, first in fall of 2015 for 345 graduating seniors, and then in spring of 2016 for 770 graduating seniors. This difference in sample size is not unusual since most seniors graduate in the spring semester. However, given the linkage to graduation, response rates in each semester were over 85%. Across both samples, 94% of the respondents were full-time students (taking at least 12 credits), and 95% took their courses at the Main Campus, as opposed to smaller satellite campuses. The university institutional review board (IRB) approved the research. A general demographic breakdown of each sample is provided in Table 1. Overall there is consistency between the fall and spring samples. Not surprisingly, the spring sample has a higher "graduate in four years" percentage than the fall sample.

Table 1. Descriptive statistics for background variables—Fall 2015 and Spring 2016

Variable	Fall, 2015, n = 345[a]	Spring, 2016, n = 770[b]
Gender		
Male	n = 207, 60%	n = 450, 58%
Female	n = 138, 40%	n = 320, 42%
Highest Parent Education Level		
Some High School	n = 21, 6%	n = 41, 5%
High School Diploma	n = 62, 18%	n = 103, 13%
Some College	n = 50, 15%	n = 106, 14%
Associate Degree	n = 32, 9%	n = 49, 6%
Four Year Degree	n = 115, 33%	n = 251, 33%
Graduate/Professional Degree	n = 65, 19%	n = 220, 29%
Race		
African American	n = 28, 9%	n = 58, 8%
American Indian	n = 1, 0%	n = 2, 0%
Asian	n = 55, 18%	n = 98, 14%
Hispanic	n = 14, 5%	n = 32, 5%
Multi-racial	n = 6, 2%	n = 22, 3%

Pacific Islander	n = 2, 0%	n = 2, 0%
White	n = 203, 66%	n = 478, 69%
	Missing, n = 36	Missing, n = 78
In-State Resident		
No	n = 65, 19%	n = 141, 18%
Yes	n = 274, 81%	n = 628, 82%
	Missing, n = 6	Missing, n = 1
General Type of Major		
Quantitative	n = 186, 54%	n = 456, 59%
Non-Quantitative	n = 153, 46%	n = 314, 41%
	Missing, n = 6	
Graduate in Four Years		
Yes	n = 99, 29%	n = 424, 55%
No	n = 246, 71%	n = 346, 45%
When Join SPO		
Never	n = 36, 10%	n = 233, 30%
Freshman	n = 80, 23%	n = 27, 4%
Sophomore	n = 93, 27%	n = 181, 23%
Junior	n = 14, 4%	n = 193, 25%
Senior	n = 122, 36%	n = 136, 18%

[a]Fall, 2015 demographic variables sum to n = 345, including missing data.

[b]Spring, 2016 demographic variables sum to n = 770, including missing data.

2.2 Measures

The independent variable measures are broken down into four variable sets: background; college-related; professional development; and motivation.

Student background variables. Four variables were measured: *gender*; *highest parent education level*; *race*; and *in-state resident*. The *race* and *in-state resident* data were based on student records. The response categories and percentages are shown in Table 1 for each sample.

College-related variables. Five variables were measured: *accumulated grade point average (GPA)*; *major*; *average hours worked per week*; *average hours per week spent on course work outside the classroom*; and *four-year graduation* (Yes/No). The *GPA, general type of major* and *four-year graduation* data were based on student records. Each student's primary major was taken from student records. This was then recoded into one of two *general types of major* categories, either *quantitative* or *non-quantitative* based on business school guidelines. A *quantitative* major requires more courses using/applying formulas, statistics and mathematics, while a *non-quantitative or qualitative* major has fewer courses with this emphasis. Using this general distinction, the following six majors were classified as *quantitative*: Accounting, Actuarial Science, Economics, Finance, Management Information Systems, and Risk Management and Insurance. The other majors, i.e., Business Management, Entrepreneurship, Human Resource Management, International Business, Legal Studies, Marketing, and Real Estate, were classified as *non-quantitative or qualitative*.

Professional development variables. Three variables were measured: when did a student first join a student professional organization or SPO (*when join SPO*); how many SPO meetings did a student attend on average

during a semester (*attended SPO meetings/semester*); and how many formal internships or co-ops did a student complete while at the university (*number of internships*). *When join SPO* was measured from 1 = never to 5 = as senior, and the full response category breakdown for each sample is shown in Table 1. *Attended SPO meetings/semester* was measured as: 0 = none, 1 = 1-3 per semester; 2 = 4-6 per semester; 3 = 7-9 per semester; 4 = 10-12 per semester; and 5 = 13 or more per semester. *Number of internships* was measured as 0 = none, 1 = 1, 2 = 2, 3 = 3, 4 = 4, and 5 = 5 or more.

Motivation variables. Two multi-item variables were measured, *academic motivation to attend* and *satisfaction/reputation*. Items were aggregated into a scale and divided by the number of items so that the scale mean reflected the response scale. *Academic motivation to attend* used the general referent, "rate the importance of the following items in regard to why you chose to attend this business school," on a 6-point response scale, where 1 = strongly unimportant to 6 = strongly important. The four items were: specific majors, professors, business school reputation, and job opportunities. The coefficient alpha for this scale was .83 for the fall sample and .79 for the spring sample. Prior research (Blau, Halbert, Atwater, Kershner, & Zuckerman, 2016) supports this scale. *Satisfaction/reputation* was measured by aggregating two items: "overall I am satisfied with the Bachelor of Business Administration (BBA) program," and "the reputation of the business school influences your market value to potential employers". Both items used a 6-point response scale, where 1 = strongly disagree to 6 = strongly agree. The coefficient alpha for this scale was .82 for the fall sample and .79 for the spring sample.

Grading assessment learning perception (GALP) items. Eight items were asked, using the following general referent: please indicate your level of agreement with the following statement: "I find the following testing methods best reflect my course knowledge and skills." A 6-point response scale was used, where 1 = strongly disagree to 6 = strongly agree. The eight items were: multiple choice exams/quizzes; open-ended question exams/quizzes; written assignments (case analyses, essays, journals, etc.); presentations (oral/visual communication, Power Point, etc.); in class exams and quizzes; take home exams/quizzes (online, open book, etc.); online message boards or blogs; and participation/attendance points. These eight GALP items were generated based upon a systematic review of the graded components within quantitative and qualitative (non-quantitative) BBA core (required) course syllabi, to generate full domain coverage of GALP items.

Data analyses. All data analyses were done using SPSS-PC version 22 (SPSS, 2013). Given the lack of prior research on aggregating GALP items, to test RQ1 exploratory factor analysis (EFA) was done using the fall sample, followed by confirmatory factor analysis (CFA) using the spring sample. The goal of RQ1 was to create reliable GALP scales to then use for RQ2. Descriptive statistics (mean, standard deviation) and correlations were reported for continuously measured variables for each sample. Testing for RQ2 was done using stepwise regression analyses. Stepwise regression analyses are appropriate to test the significance of the incremental variance in dependent variables explained by each added independent variable set (Stevens, 1992). Based on prior general theory and research (Arbaugh, 2005; Blau & Snell, 2013; Reason, 2009), the background variables were entered as Step 1, followed by the college-related variables in Step 2, the professional development variables were added to the model in Step 3, and finally the motivation variables were added in Step 4. Race was recoded into a binary variable, i.e., white versus non-white, for the regression analyses (Stevens, 1992). Only the final full regression models will be reported for the fall and spring samples. Regression models were checked for outliers (standardized residuals greater than three). In each sample, one outlier was deleted. It was determined that the assumptions of no multicollinearity, linearity, and homoscedasticity were satisfactorily met (Steven, 1992).

3. Results

3.1 GALP Scale Development

The EFA results for the eight GALP items using the fall sample are reported in Table 2. Due to missing data, the sample size dropped to 257 respondents. Follow-up analysis did not show any significant relationships between student background variables and the eight GALP items, suggesting that the data were missing at random. Using a principal components analysis, along with a scree test (Stevens, 1992) two factors were indicated. There were three factors with eigenvalues over one. However, the third factor could not be interpreted. Using varimax rotation (to maximize factor independence) and the criterion of at least a .60 item loading on a factor, along with no double loading complications, three items cleanly loaded on each of the two factors. The two factors accounted for 54% of the total variance. Inspection of the three items loading on the first factor (i.e., multiple choice question exams/quizzes; in class exams and quizzes; take home exams/quizzes) suggested a

"closed/structured" GALP factor. Inspection of the three items loading on the second factor (i.e., open-ended question exams/quizzes; written assignments, such as case analyses, essays, journals; presentations, including oral/visual, Power Point) suggested an "open/creative" GALP factor. However, two items, online message boards or blogs and participation/attendance points, did not load sufficiently on either factor and could not be used in further scale development. Based on these EFA results, using a three-item "closed GALP" scale, a coefficient alpha of .67 was found, while a coefficient alpha of .72 was found using a three-item "open GALP" scale.

Table 2. Exploratory factor analysis for grading assessment method item loadings with two-factor extraction and varimax rotation

Grading Assessment Method Item[a]	1[b]	2[b]
1. Multiple choice question exams/quizzes	**.74***	.11
2. Open-ended question exams/quizzes	.25	**.73***
3. Written assignments (case analyses, essays, journals, etc.)	.01	**.82***
4. Presentations (oral/visual communication, Power Point, etc.)	.07	**.79***
5. In class exams and quizzes	**.67***	.23
6. Take home exams/quizzes (e.g., online)	**.77***	-.08
7. Online message boards or blogs	.56	.16
8. Participation/attendance points	.44	.47
Eigenvalues	2.18	2.13
Percentage of variance accounted for	27%	27%

Note. N = 257, Fall, 2015 sample.

[a]General referent for all items: "I find the following testing methods best reflect my course knowledge and skills", responses from 1 = strongly disagree to 6 = strongly agree.

[b]Factor 1 = Closed GALP; Factor 2 = Open GALP.

*factor loadings above .60 bolded.

Given these EFA results, for the spring data, confirmatory factor analysis (CFA) was used for these six items, testing that same three items again loaded on each factor. Using CFA, the following fit statistics of the six items to the two GALP constructs, i.e., open and closed, were found: X^2 (7, N = 770) = 116.67, $p < .05$; Adjusted Goodness of Fit (AGFI) = .92; Comparative Fit Index (CFI) = .94; Root Mean Square Residual (RMR) = .06; and Root Mean Square Error of Approximation (RMSEA) = .10. Thresholds for acceptable fit (Bentler, 1990) should be at least .90 (AGFI, CFI) and less than .08 for error measures (RMR, RMSEA). The thresholds are exceeded for three of the four indices. The coefficient alpha for the three-item open GALP scale was .67, and it was .61 for the three-item closed GALP scale. Overall, the EFA and CFA results support creating three-item "open" and "closed" GALP scales.

3.2 Descriptive and Correlation Results for Both Samples

Means, standard deviations and correlations for continuous variables for the fall and spring samples are shown in Table 3. Due to missing data across variables, the fall sample size decreased to N = 238. The variable means are fairly consistent between each sample.

Table 3. Means, standard deviations, and correlations for continuous variables

	Fall, 2015		Spring, 2016										
Measure	M	SD	M	SD	1	2	3	4	5	6	7	8	9
1. Record-based GPA	3.09	.39	3.15	.43	(---)[e]	-.17**	.05	.18**	.24**	-.03	.06	-.01	.10**
2. Average Hours Worked/Week	20.58	13.72	17.81	12.59	-.13*	(---)	.05	-.18**	-.08*	-.01	-.09*	.07	-.04
3. Average Hours/Courses/Week	14.88	8.65	14.64	7.94	.08	-.02	(---)	.09	.04	.13**	.02	-.01	.06
4. Attended SPO Meetings/Semester[a]	1.45	1.73	1.85	1.91	.28**	-.07	.12	(---)	.22**	.11**	.15**	-.13**	.09*
5. Number of Internships[b]	.99	1.11	1.22	1.06	.17*	.06	-.08	.30**	(---)	.09*	.13**	-.13**	.11**
6. Academic Motivation to Attend[c]	4.93	1.01	4.86	.99	-.01	.02	.25**	.14*	.03	(---)	.40**	.20**	.22**
7. Satisfaction/Reputation[d]	5.01	.88	5.06	.88	-.01	.03	.05	.13*	.09	.49**	(---)	.33**	.36**
8. Closed GALP[d]	4.34	.94	4.34	.90	-.05	.09	.03	-.06	-.06	.23**	.27**	(---)	.25**
9. Open GALP[d]	4.65	.82	4.70	.83	.05	.14*	.13*	.01	.05	.32**	.39**	.24**	(---)

Note. Fall, 2015 N = 238. Spring, 2016 N = 691. Spring, 2016. *$\underline{p}$ < .05, **$\underline{p}$ < .01 (two-tail).

[a]*Average SPO Meetings/Semester*, 0 = none, 1 = 1-3/semester, 2 = 4-6/semester, 3 = 7-9/semester, 4 = 10-12/semester, 5 = 13 or more/semester; [b]*Number of Internships*, 0 = none, 1 = 1, 2 = 2, 3 = 3, 4 = 4, 5 = 5 or more; [c]*Academic Motivation to Attend scales*, 1 = Strongly Unimportant, 2 = Unimportant, 3 = Slightly Unimportant, 4 = Slightly Important, 5 = Important, 6 = Strongly Important; [d]*Satisfaction/Reputation*, *Closed GALP*, *Open GALP*, 1 = Strongly Disagree, 2 = Disagree, 3 = Slightly Disagree, 4 = Slightly Agree, 5 = Agree, 6 = Strongly Agree; [e]Correlations below the diagonal divider (----) are for the Fall 2015 sample, correlations about the diagonal (---) are for the Spring 2016 sample.

Looking at the correlations, the fall sample correlations are shown below the diagonal divider (----), while the spring correlations are above the divider. There are more statistically significant correlations for the spring sample since its sample size is almost three times larger than the fall (N = 691 for spring, N = 238 for fall). However, the magnitude of the correlations is generally consistent for the fall versus spring samples. For example, the correlation ($\underline{r}$) between the closed GALP and open GALP scale is .24 for the fall and $\underline{r}$ = .25 for the spring sample. Although statistically significant, the overlap (r^2) between the GALP open and closed scales is only 6% across both samples, further supporting each is distinct and can be used as separate dependent variables in the regression analyses.

3.3 Final Regression Model Results for Both Samples

The final regression models for the fall and spring samples are shown separately in Tables 4 and 5, respectively. Additional missing data in the fall sample lowered the sample size to N = 221, and with one outlier deleted the sample size used was N = 220. Given that the sample size used for the fall regression analyses was less than one-third the size of the spring sample (N = 690), three levels of significance were used for interpreting the results, and indicated as: + $\underline{p}$ < .10, *$\underline{p}$ < .05, and **$\underline{p}$ < .01 (all two-tail).

Table 4. Final stepwise regression models for incrementally testing the contributions of variable sets for explaining closed versus open grading assessment learning perceptions (GALP)

Fall, 2015 Sample	*Closed GALP*				*Open GALP*			
	b	SE	R^2	Chg R^2	*b*	SE	R^2	Chg R^2
Step 1: Background Variables								
Gender[a]	.18	.13			-.14	.12		
Highest Parent Education Level[b]	-.02	.04			.00	.04		
Race[c]	-.29*	.13			-.07	.12		
In-State Resident[d]	-.20	.17			.06	.16		
			.05*				.01	
Step 2: College-Related Variables								
Record-based GPA	-.04	.17			.28+	.16		
General Type of Major[e]	-.21	.13			-.02	.12		
Average Hours Worked/Week	.01	.01			.01	.00		
Average Hours Courses/Week	-.00	.01			.01	.01		
Graduate in Four Years[f]	.04	.13			.13	.12		
			.07+	.02			.04	.03
Step 3: Professional Development Variables								
When Joined SPO[g]	-.01	.05			.06	.05		
Attended SPO meetings/semester	-.06	.04			-.00	.04		
Number of Internships	-.04	.06			.04	.06		
			.08	.01			.05	.01
Step 4: Motivation Variables								
Academic Motivation to Attend	.01	.07			.12+	.07		
Satisfaction/Reputation	.24**	.08			.29**	.08		
			.12*	.04**			.17**	.12**

Note. N = 220. Fall, 2015. *b* is unstandardized regression weight (rounded to nearest hundredth); SE = standard error (rounded to nearest hundredth); + $p < .10$, *$p < .05$,**$p < .01$ (two-tail).

[a]Gender, (1 = male, 2 = female); [b]Highest Parental Education, (1 = some high school, 2 = high school diploma, 3 = some college, 4 = associate degree, 5 = four year degree, 6 = graduate/professional degree); [c]Race (1 = non-white, 2 = white); [d]In-State Resident, (1 = no, 2 = yes); [e]General type of major, (1 = quantitative, 2 = non-quantitative); [f]Graduate in four years, (1= Yes, 2 = No); [g]When Join SPO, (1= never, 2 = as freshman, 3 = as sophomore, 4 = as junior, 5 = as senior).

Table 5. Final stepwise regression models for incrementally testing the contributions of variable sets for explaining closed versus open grading assessment learning perceptions (GALP)

Spring, 2016 Sample	*Closed GALP*				*Open GALP*			
	b	SE	R^2	Chg R^2	*b*	SE	R^2	Chg R^2
Step 1: Background Variables								
Gender[a]	.10	.07			-.14*	.06		
Highest Parent Education Level[b]	.01	.02			.03	.02		
Race[c]	-.30**	.07			-.16*	.07		
In-State Resident[d]	.16	.09			-.15	.09		
			.04**				.01	
Step 2: College-Related Variables								
Record-based GPA	-.02	.09			.29**	.08		
General Type of Major[e]	-.07	.07			.06	.06		
Average Hours Worked/Week	.00	.00			.00	.00		
Average Hours Courses/Week	.00	.01			.01	.01		
Graduate in Four Years[f]	.09	.07			.13*	.07		
			.05**	.01			.04**	.03**
Step 3: Professional Development Variables								
When Joined SPO[g]	-.05	.03			.01	.03		
Attended SPO meetings/semester	-.05*	.02			-.00	.02		
Number of Internships	-.11**	.03			.01	.03		
			.07**	.02**			.05**	.01
Step 4: Motivation Variables								
Academic Motivation to Attend	.08*	.04			.09**	.03		
Satisfaction/Reputation	.37**	.04			.32**	.04		
			.22**	.15**			.18**	.13**

Note. N = 690. Spring, 2016. *b* is unstandardized regression weight (rounded to nearest hundredth); SE = standard error (rounded to nearest hundredth); + p < .10, *p < .05, **p < .01 (two-tail).

[a]Gender, (1 = male, 2 = female); [b]Highest Parental Education, (1 = some high school, 2 = high school diploma, 3 = some college, 4 = associate degree, 5 = four year degree, 6 = graduate/professional degree); [c]Race (1 = non-white, 2 = white); [d]In-State Resident, (1 = no, 2 = yes); [e]General type of major, (1 = quantitative, 2 = non-quantitative); [f]Graduate in Four Years (1 = Yes, 2 = No); [g]When Join SPO, (1 = never, 2 = as freshman, 3 = as sophomore, 4 = as junior, 5 = as senior)

Highlighting key fall sample results in Table 4 first, the background variables set accounted for 5% of the variance, and within this set only race (*b* = -.29, non-white higher) was significantly related to closed GALP. The only other variable related to closed GALP was satisfaction/reputation (*b* = .24) within the motivation variables set. Overall, 12% percent of the variance in closed GALP was explained across all variables. For open GALP, record-based GPA (*b* = .28) had a marginally significant effect. The motivation variables set accounted for 12% of the open GALP variance, satisfaction/reputation (*b* = .29) was significant and academic motivation to attend (*b* = .12) was marginally significant. Overall 17% of the variance was explained in open GALP.

Looking at the spring sample results in Table 5, some results consistent with the fall sample were found. The background variables set accounted for 4% of the variance and again, race (b = -.30, non-white higher) was significantly related to closed GALP. The professional development variables set accounted for an additional 2% of the variance and two variables within this set was negatively significant (attended SPO meetings/semester, b = -.05; and number of internships, b = -.11). The motivation variable set accounted for 15% of the variance in closed GALP and both variables were positively significant (academic motivation to attend, b = .08; satisfaction/reputation, b = .37). Overall 22% of the variance in closed GALP was accounted for. For the spring sample, within the background variables set, gender (b = -.14, males higher) and race (b = -.16, non-white higher) were significantly related to open GALP. The college-related variables set accounted for 3% of the open GALP variance, and both record-based GPA (b = .29) and graduate in four years (b = .13, not graduate higher). Finally, the motivation variables set accounted for an additional 13% of the variance and both variables, academic motivation to attend, b = .09; satisfaction/reputation, b = .32, were significant. Overall 18% of the variance was explained in open GALP.

4. Discussion

To our knowledge, this is the first empirical study of business undergraduate GALP. Two reliable three-item GALP scales were developed, i.e., open and closed, which supported the first research question. For the second research question, variable sets were tested using stepwise regression analyses in separate fall and spring samples. Separate samples allowed for testing whether results could be replicated. More support was found for the second research question using the spring sample, with the caveat that the larger spring sample size allowed for more power to detect relationships. Given the lack of prior research, this study and its findings are best regarded as "exploratory". The most consistent correlate across samples and GALP scales was satisfaction/reputation such that undergraduates with higher perceived satisfaction/reputation had the highest closed and open GALP. However, given the cross-sectional research design, causality cannot be determined so it is also feasible that higher closed and open GALP lead to higher satisfaction/reputation. The positive relationships between satisfaction/reputation and both types of GALP may reflect a general "self-fulfilling prophecy", happy (unhappy) students being more likely to perceive adequate (inadequate) assessment methods.

Race had a significant impact on three of four GALP scales, with white students having lower GALP than non-white students. However, given the discrepancy in sample sizes (the white samples were several times larger than any other racial group), along with the heterogeneous mix of non-white students, further study is needed. For the spring sample, finding that: attending more SPO meetings/semester, and having more internships, were each negatively related to closed GALP is also in need of additional follow-up.

4.1 Study Limitations and Implications for Future Research

Although both types of factor analyses supported the "closed" versus "open" GALP scales, and correlation analyses showed their independence, the scale internal consistency reliability (coefficient alpha) of each three-item scale was less than ideal across the fall and spring samples, i.e., closed -.67 and .61; open -.72 and .67. Ideally, scales should have a reliability of at least .70 (Nunnally, 1978). In addition, two items had to be dropped in the initial EFA, due to insufficient factor loadings, i.e., online message boards or blogs, and participation/attendance. Going forward, separating out class participation, as an "open" GALP item versus class attendance, as a "closed" GALP item may be useful (Stewart Wingfield & Black, 2005). In addition, perhaps separating blogs as an open GALP item versus online message boards may be useful. However, vetted BBA core (required) course syllabi indicated that some message boards were graded pass/fail versus others had a formal grading rubric.

In addition, team assignment GALP items (e.g., group paper, group presentation) were not included. Ideally, adding factor-supported items to both the closed and open GALP scales should strengthen their internal consistencies, and could allow for greater discriminant validity in explaining GALP scales. It is important to note that these GALP scales were generated based upon quantitative and qualitative (non-quantitative) BBA core (required) course syllabi. Sample size permitting, it would be interesting to compare GALP for other types of classes, including major and capstone. If available, student SAT scores might be linked to GALP, for example students with higher SAT math (verbal) scores might prefer closed (open) GALP. Both samples were composed of full-time undergraduate business students at an urban-based public university. Testing the generalizability of these scales using non-business and part-time college students in other college settings, e.g., private, rural, would be beneficial.

4.2 Practical Implications

Perceived fairness of an instructor's grading policies is a typical item asked for in an undergraduate teaching evaluation (Peterson, Berenson, Misra, & Radosevich, 2008). Nargundkar and Shrikhande (2012) studied over 100,000 student evaluations of teaching effectiveness over four years in the business school at a large public university. They found that two factors: grading assignments (fairness and objectivity of grading practices) as well as student motivation (the instructor's ability to motivate students), both superseded instructor presentation ability, in relative importance as indicators of overall teaching effectiveness. The importance of perceived fair grading is consistent with organizational justice research (Colquitt, Greenberg, & Zapata-Phelan, 2005). For professors, an on-going sensitivity to students' closed versus open GALP can help them to improve/revise their course delivery. Offering students opportunities for mid-course GALP item feedback may allow an instructor to revise GALP items. Such revision may improve an instructor's final course teaching evaluation.

Teaching evaluations can also be an important part of student satisfaction with their BBA program (Holmes & Smith, 2003). The consistent positive relationship between satisfaction/reputation to both closed and open GALP scales support an institution's business school continuing to assess undergraduate satisfaction with its programs. However, this consistency of both types of GALP scales to satisfaction/reputation needs to be tested against other school settings, e.g., engineering, liberal arts. In addition, the results support monitoring employer perceptions of student placements, as curriculum changes based on employer feedback may increase the market value of graduating students (Blau et al., 2016). Collectively, these efforts can also positively impact students' motivation to attend a particular business school, as well as an employer's motivation to recruit graduates from this school.

5. Conclusions

Individual business undergraduate GALP items have not been previously aggregated into scales. Marks, Haug and Huckabee (2016) recently suggested that business undergraduate perceptions of their curriculum can influence their satisfaction and have implications for a business school's strategic recruitment and retention efforts. Part of curriculum perception should involve undergraduates' GALP. This study found a consistent positive relationship between satisfaction/reputation and two GALP scales, open and closed. One goal of this study is to stimulate future efforts to measure GALP, and to further understand its antecedents as well as consequences.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

The Construction of Feminine Psychology in Swahili Women's Nuptial Poetry-Unyago

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Received: January 25, 2017 Accepted: February 18, 2017 Online Published: March 20, 2017

doi:10.5539/jedp.v7n1p241 URL: http://doi.org/10.5539/jedp.v7n1p241

Abstract

This article examines the construction of feminine psychology in Swahili women nuptial poetry-*unyago*. *Unyago* poetry is composed and performed by Swahili women. Swahili is a community located along the coastal region of Kenya. This article, therefore, focuses on intersections between psychology and poetry in analyzing and describing how *unyago* poetry reveals the mindsets and emotions of Swahili women. Data for analysis in article is derived from research carried out among women of Swahili decent living at Kisumu using observation and in-depth interviews as data collection methods. *Unyago* poetry is viewed as confessions and revelations of the female self, the marriage institution and that of the marital partner. Worth noting is the fact that the women, whose ancestors originated from the coastal region of Kenya, have preserved the nuptial rituals and teachings therein across time and space. Through *unyago*, the women socialize their girls from children to women and is a deeply rooted practice in their philosophy, psychology, and culture of the Swahili people. Thus, this article contends that *unyago* is both a reflection of group and individual psychological reactions to cultural expression through poetry.

Keywords: unyago poetry, poetichology, women, confessions

1. Introduction

1.1 Introduction to the Problem

Literature, it is known, reflects society and therefore mirrors social experiences. Literature as an art is also a vehicle through which literary artists use various personae to vent their emotions.

Poetry, one of the genres of literature, best expresses deepest feelings by artists. Hence, poetry has been described by William Wordsworth as "the spontaneous overflow of powerful feelings: it takes its origin from emotion recollected in tranquility". Emotions are part and parcel of the human mind. Poetry and Psychology are two concepts found in two different fields of study. However, there is a close connection between poetry and psychology. This connection arises from the fact that the practice of literature, especially poetry, is derived from the creative artist's inner feelings, emotions and inspirations, and can be approached from a psychological perspective.

Robert Wallace (1991, p. 284) observes that, "All poets must learn ... from their own experience, how to court their muse, how to draw from the mysterious source, whatever it is, and deep within themselves". On his part, Plato quoted in Rowe (1986, p. 245) summarizes the relationship between poetry and psychology as:

> "…virgin soul and stimulates it to rapt passionate expression, especially in lyric poetry, glorifying in countless mighty deeds of ancient times for the instruction of posterity. But if any man come to the gates of poetry without the madness of the Muses, persuaded that skill alone will make him a good poet, then shall he and his works of sanity with him be brought to nought by the poetry of madness, and behold, their place is nowhere to be found."

Plato sees poetic inspiration as a sort of "mental instability", a necessary evil for creating lasting works of literature. This is what this article refers to as poetichology. When inspired, poets are viewed as finding their muse. Considered in this light, artistic creativity is viewed as a derivative from mysterious psychic motives and thus a subject for psychology. S. T. Coleridge describes poetry as "the best words in the best order". Poetry represents thoughts, imagination, and awareness, experiences expressed through meaning, sound, and rhythmic language in such a way as to evoke emotional response. On the other hand, psychology is the science of human mind, behavior, soul, consciousness, unconsciousness among others. The study of behavior, includes anything a person does which can be observed. It thus includes feelings, attitudes, thoughts and other mental processes.

Psychology also deals with unconscious thought processes. Modern psychologists consider unconscious processes as being more important than conscious ones. Psychoanalysis, the unconscious processes in literature are considered as impulses that lead the poet and all other artists to produce a poetical work or any other work of art. What psychologists refer to as the unconscious, is what poets label as the abyss, our wilderness or the wild, the muses or even the madness. Thus, through poetics, a rich repository of energy, of imagery, metaphor, paradox, inversion, contradiction, and often enough beauty, psychology is offered as a vehicle through which to reach greater realms of expression and unique unveilings.

1.2 Importance of the Problem and Its Relevance to Scholarship

This article revisits Swahili women's nuptial rites (*Unyago*) poetry. It interprets *Unyago* poetry as psychological expressions (Finnegan, 1987) of Swahili women's understanding of their roles and responsibilities as their culture demands. In this regard, the article looks at how poetic creations and performances experienced during the wedding rituals valorize and embrace the resources of the unconscious of the performers through *Unyago* as a form of confessional poetry Confessional poetry deals with personal and emotional experiences which are generally taboo. In this poetry, we witness a ruthless self-expression and a tone of utter openness. Confessional poetry reveals to its audience the psychological and mental state of its performers. This article, therefore, observes that in the African setting, rituals such as *unyago*, gives space to creativity and psychological release of in depth feelings that are a source of unending friendships to the Swahili womenfolk.

1.3 Assumption of the Study

This article is based on the assumption that *unyago*, the only Swahili women's nuptial rite, provides the best context through which to understand feminine psychology, the veiled personality, and experiences of Swahili-speaking women in relation to their culture and society.

In this regard, this article sought to examine how *unyago* poetry constructs feminine psychology among Swahili-speaking women in Kenya. Thus, this article underscores the centrality of *unyago* in defining, giving identity to, providing consciousness, reality and presence to Swahili women. This in turn brings out a strong psychological and philosophical justification of *unyago* poetry because it plays a big role in the existence of community members as it defines their sense of Being.

2. Methodology

The paper adopted a qualitative research design. It sought to describe the construction of feminine psychology through *unyago* as a natural phenomenon that occurs naturally without the intervention of an experiment or artificially contrived treatment (Seligar & Shohamy, 1989). This is a synchronic study because it describes the phenomenon as it exists at a particular point in time. The study population entailed Swahili Women performers and participants of the *unyago* rite. The informants were elderly Swahili women who by nurture preside over the *unyago* rite. The study utilized observation and in depth interviews as data collection methods. Open-ended questions were utilized during interview sessions to allow for in depth responses which in turn gave insights into feelings, hidden motivation, intuitions, interests and decisions of the respondents (Mugenda & Mugenda, 1999).

Data obtained was presented in Swahili orthography and a translation to the nearest gloss in English provided. The recorded data was transcribed first and thereafter translated. Field notes written during observation and interview sessions were used to supplement the recorded data. This was thereafter followed by translation of the poems from Swahili to English. *Unyago* poetry collected was sorted out and classified into different categories such as *Kilio Kitamu* (bitter-sweet cry) based on related embedded values. During the analysis and interpretation of the findings, the mental pictures, cultural values and pyscho-social experiences that *unyago* poetry created were examined.

3. Discussions of the Findings

3.1 The Confessions

Unyago, women's poetry performed during the Swahili women's nuptial rites, are manifestations of revelations and confessions of its creators' lived experiences, feelings, desires, and thoughts. Mwai (2010, p. 20) observes that these lived experiences are lodged in the persona's linguistic structures which emerge during vocalization, and are realized phonically in voice. The voicing is seen as a symbolic behavior, confession or the reproduction of the inner life, affections and emotions. The environment of this voice is taken to include the para-dynamism of words and communication of intense emotions without speech. Further, Mwai (2010) attests to the fact that the setting of *unyago* is seen as a ritualized display of shared emotions by women. *Unyago* poems are performed by women in various situations and present voices from various female dramatist personae. The performance of these poems enable Swahili women to articulate and confess individual as well as collective feelings, attitudes and beliefs in their culture. They are, therefore, one of the surest ways of understanding Swahili women's world-view and behavior. Through the poems, the younger women are made aware of the life ahead of them and in the process, the positives and the awkward situations of womanhood are disclosed and unveiled to them. Sigmund Freud in psychoanalytic theory (1856-1939) argues that unpleasant and painful feelings of childhood experiences are stored in the unconscious mind and may affect the person's behavior even in adult life. Through *unyago* poems, women seem to follow the Freud concept of expressing feelings through poems instead of suppressing them. Thus, the performance of poems is seen as an unveiling a disclosure of enclosed and unconscious texts.

Gladding (2009) contends that unresolved issues or unfinished business can manifest itself through unexpressed feelings like rage, anger, and hatred and grief guilt. These unexpressed feelings can cause physical symptoms like headaches, stress, depression or even stomach related problems. Psychological counselors therefore encourage clients to express their feelings through talking, journaling either through factual or fictional modes such as writing poems on feelings about life experiences. Venting out feelings is therapeutic and is encouraged in psychological counseling. Therefore, the realization that *unyago* poetry displays shared emotions by women is a psychological aspect that can bring psychological and emotional healing especially if an individual is experiencing some anxiety.

3.1.1 Routes for Confessions

There are various ways in which *unyago* poetry reveal confessions. One such way is through the use of ambivalence. Ambivalence is a psychological state of having simultaneous conflicting reactions, beliefs, or feelings towards some subject or object. Stated another way, ambivalence is the experience of having an attitude towards someone or something that contains both positively and negatively valenced components. The term also refers to situations where "mixed feelings" of a more general sort are experienced, or where a person experiences uncertainty or indecisiveness. Thus, ambivalence and paradox are indicators to the conflicted reality of *unyago* practice in the minds of the Swahili women.

Ambivalence has been utilized in *Kilio Kitamu* (bitter-sweet cry) category of *Unyago* poems. On the one hand, *Kilio* is a cry out of suffering. It is often an expression of pain, anguish or sorrow. On the face value, the dramatis personae in this poetry, appears to be doing exactly this. On the other hand, *Kitamu* refers to sweetness and joy. Thus, *Kilio Kitamu unyago* poems expresses suffering resulting to joy and conquest. During fieldwork, it was established that the context under which *Kilio Kitamu* poems are performed is during the rites of wedding preliminaries. Preliminary rites include betrothal, inspection of spouse, negotiations for dowry, the dowry payment ceremony, fixing the wedding date and the consummation of marriage. In all these days, the pain of not knowing the spouse, the anxiety of having to leave childhood and join a strange household, anxieties that characterise frightening roles of wifehood and motherhood are expressed by the girl. All these are viewed as *kilio* which young women are undergoing preparation. They are now graduating after undergoing the various activities of the rites of transition that take time, energy and space to cultivate. For the girl, as well as the women surrounding her especially her mother and her *somo* (traditional instructor), the wedding is a triumphant moment. Hence, they sing:

Mwanangu bado mdogo	My child is still too young
Mwanangu bado asoma	My child is still at school
Mwanangu bado kipusa	My child is still beautiful
Mwanangu bado mbichi	My child is still unripe

Mwanangu bado mchanga	My child is still too tender.
Tamleaje mwanangu we!	Will you bring up my daughter!

According to the women performers, the girl being initiated into wifehood is too young and, therefore, might require a governess and not a husband. On the wedding day, women cry in pain as they sing and imagine how the encounter will be. This makes them break into song imitating the girl mournfully calling her mother to rescue her from the pain that emanates from all parts of her body. The persona calls to her mother:

Mama Mwanangu Mama-mama!	Mother, my mother, mother-mother!
Mama Mwanangu Mama-mama!	Mother, my mother, mother-mother!
Kiuno-chauma	My waist-it pains
Tumbo-lauma	My stomach-it pains
Kichwa-chauma	My head-it pains
Paja-lauma	My thigh-it pains

Due to her tender age, the young girl experiences pain on her first sexual encounter. But her mother and her *somo* know all too well what this means and therefore, the two recreate painful memories and experiences on behalf of the young girl. The song, further, presents the duality of womanhood in the Swahili community as that of being a member of a group of women and also as an individual within the category of women. This then demonstrates that a woman's humanness and personhood brings a sense of being similar with others within a larger community. The song makes sense of what it means to be a woman in traditional Swahili society. The verse provides a backdrop through which one may configure a representation of a womanhood that mirrors an exteriority of one outside oneself. This analysis concurs with both Weedon (1987) and Alcoff (1995) studies regarding subjectivity in individuals as being mediated by social discourse and cultural practices rather than by individual motivations, intentions or preferences.

During the period of transition, the girl goes through a lot of anxiety. According to Freud, people may turn to defense mechanisms like introjection in order to deal with anxiety. In the same vein, the girl may introject or suppress her feelings out of fear and anxiety. According to Freud, introjection is a defense mechanism which occurs when a person internalizes ideas or voices of other people. Introjection refers to turning the feelings inwardly instead of expressing them. This can cause stress and some maladjusted behaviors. Therefore, the song that the persona sings from the girl to her mother expressing her anxiety, is read as a form of therapy. It also gives her an opportunity to get psychological support from her mother as she transits to marriage life. This confession can only be unwrapped through understanding the joy which these categories of women express in the poetry. Further, the use of words used such as mbichi, *mchanga*, *mdogo*, in the song are all used to describe the girl, enhance the unveiling the retention of the girl's virginal state which is also part of the conquest.

Ambivalence, introspection and the paradox between joy and suffering is further evident in this song in that the bride consummating her marriage is not expected to sing, but the women who are awaiting the consummation do so for her. This is a sign of social support which is therapeutic. Psychologically, the other women acquire the role of cheer leaders which makes the young women feel she is not alone in this new experience. These women configure the pain through reliving their past and wherein they fantasise the pain, yet very soon they will run through the narrow streets carrying the white sheet which is their flag victory, the evidence of the virgin state. Though it is gained through pain, it excites and arouses joy and celebration.

3.1.2 Schadenfreude

Schadenfreude literally means "damage-joy, or satire". It describes the state of pleasure derived by someone from another person's misfortune. The term, as Mwai (2010, p. 47) observes, is a German, equivalent to Schaden (harm) + Freude (joy). During *unyago* performances, women are veiled physically through wearing the *hijab* (Swahili: *Bui bui*) and emotionally since they are not allowed to express their hurts publically, freely and openly. The women, therefore, use imagery and other figures of speech, particularly satire, sarcasm and burlesque as tools to empower them to mask their utterances and express the unspeakable. These tools give the woman a licence to attack, unmask and laugh at the main person who society expects her to hold with extreme submission if not awe-the husband. The women's descriptions of their husbands are with distaste and are at variance with husbands' outward appearance and societal expectations.

Thus, under the veil of subservience, the women evoke pleasure at the weaknesses of their husbands during their interpersonal relations. They derive pleasure and self-satisfaction at their own success and by damaging the self-esteem of their husbands. This experience by the women can best be described through the psychology concept of Schaden-freude which means, pleasure derived from the misfortune of others.

The women-specific rites give the wives an opportunity to express their inner, enclosed selves through song. *Unyago* poems also give them a license to attack, unmask and laugh at issues that touch on interpersonal relationships between couples. To exemplify is this, the person who laughs at her husband's financial incapability and decries:

Mama wee mama wee	My mother, my mother
Nakwambia mama wee	I tell you my mother
Mme huyu hatuwezani.	This husband we cannot cope.

Societal expectations, including his wife's are that the man is the provider and breadwinner for his wife. But he has failed to do so. The wife unmasks this when she declares that he is a beggar which is not masculine in this society. The persona explains that the husband leaves a lot to be desired. He has nothing. All they have in their marital dwelling is borrowed. The bride lists down the borrowed items which include what they have in the marital chamber:

Kitanda-cha kuazima	The bed - it is borrowed
Godoro-la kuazima	The mattress - it is borrowed
Shuka-zakuazima	The sheets - they are borrowed
Mto-wakuazima	The pillow - it is borrowed

Through fieldwork, it was established that nuptial rites have lessons for intimate moments for the women. At such moments, when with their sexual partners, the women are prepared with poetichological skills that enable them to psychologically sing songs that assist them in actual body movements. Besides, they are also taught endearing words to utter to their husband throughout such moments. The women are also taught how to give their bodies to their husbands and not necessarily their souls. These are secrets for the women folk, never to be disclosed or unmasked to her husband. *Unyago* is mostly rendered and perpetuated through generations of womenfolk through esoteric and poetic language that is understood only by the initiated women.

The women have designed songs that are against the male factor in a sexual relationship. It is such songs that the women dance to as they psychologically sing them to help them in their actual body movements and faked pleasure. Men are thus manipulated, but they remain beyond open to public reproach, whether they perform well or not. During initiation, the woman is instructed to feign pleasure through specific rhythmic body movements that should heighten sexual pleasure for herself and her partner. Examples of such songs that yield pleasure and also laugh at the male factor include such as:

Kisu chako hakikati	Your knife does not cut
Kisu chako hakikati	Your knife does not cut
Usiniharibie nyamax2	Do not spoil my meat*x2*
Si sharuti nakwambia	It is not a must I tell
Si lazima	It is not compulsory
Tete -te- naona waniandama	Tete-you I see you are at me
Hakikati	It does not cut
Usiniharibie nyama	Do not spoil my meat

The *unyago* period accorded women an artistic license to verbal ridicule and satirize and laugh at irresponsible men. The persona continues to ridicule and belittle the sexual performance of her male partner and expresses her domination in the entire endeavour:

Ewe mpalianyasi x 2	You brought the grass together (prepared me)
Mbona mambo yakulemea?	How come you cannot manage now?
Hakikati, usiniharibie nyama	It does not cut, do not spoil my meat

Unyago provides an opportune moment for Swahili women to collectively express their inner emotions in situations that society did not provide for in ordinary daily life. Literally, women got away with harsh but veiled assessments of men or husbands during unyago performances. The songs provided a cathartic release of pent-up emotions of pain, anger and the joys that come with womanhood.

During *unyago* performances, it was observed that unveiling women resulted into sensual enjoyment of the inner self. The performers danced and gesticulated to express their innermost relief. They also interjected, ululated and jeered in deep understanding and appreciation of the soloists' words. They thumped their feet as they responded in the chorus with a lot of vigour and excitement. As they performed, the women convey an erotic current through their bodies. It is an ecstatic dance that sees the women loosing themselves and achieving a cathartic level of release of emotions and negative energy. The poems break the tender maternal voices and erupt into an effervescence of repressed sexual energies. By the end of each performance of this poem which was performed over and over again, there is a release of an enclosed hidden force in the women, which evokes voice more than language. In marriage therapy, this kind of preparation of the girl, for positive and negative expectations from the relationship and also from the husband is very important as the girl is helped to understand relationship and intimacy in marriage.

3.1.3 Symbolism

Unyago songs are riddled with two categories of symbols: verbal and physical. The physical symbols are those that cannot be reduced to vocal actions and are observable through various body movements. In this, the women reproduce their life, emotions and affections as they perform. Thus, totality of their physical performances is a reflection of internal empowerment in the performers themselves. The performance of "*Kisu chako hakikati*" (Your knife is too blunt) best exemplifies the use of physical symbols. In this song, the female persona expresses sexual dissatisfaction quite graphically. She sings that her partner's knife is blunt and therefore his attempts at cutting are not only useless, but also destructive to her meat. Psychoanalytically, one cannot fail to notice the heavy borrowing from domestic images. The women draw a clear analogy between a sexual encounter and their cookery.

Kisu chako hakikati	Your knife does not cut
Kisu chako hakikati	Your knife does not cut
Usiniharibie nyamax2	Do not spoil my meat *x2*
Si sharuti nakwambia	It is not a must I tell
Si lazima	It is not compulsory
Tete-te-naona waniandama	Tete-you I see you are at me
Hakikati,	It does not cut,
usiniharibie nyama.	Do not spoil my meat.

"*Usiutie mapengo msumeno wangu*" (Don't break the teeth of my saw) closely relates to the song above as it also employs the use of physical symbols. However, the song borrows its symbols from carpentry. *Msumeno* (saw) when used on a bad and rough surface, its teeth lose their sharp ends. Thus, the saw can no longer be used effectively to cut wood. In this context *msumeno* is used to refer to the sharpened (*kunolewa*) flawless sexual performance of a woman.

The persona goes further to advise her addressee that it is not a must that he cuts her. To the persona, his attempts at cutting are scandalous making him ridiculous. To her, it devalues his maleness. The society and herself believes that he is a sexual hero. The persona suggests that instead of him trying to do something, he is incapable of doing and thus exposing his weakness, he should just refrain from sex completely.

The two songs above are good examples of the use of phallic symbol in *unyago* poetry. In psychoanalysis, the phallus serves as the supreme symbol of masculine power and, concurrently, of feminine lack. Phallocentrism is a term used primarily by feminist theorists to often denote the pervasive privileging of the masculine within the current system of signification. Therefore, the two songs form asexualized representation of male potency, power, and domination over their female counterparts through some object vaguely reminiscent of the penis. Common phallic symbols include sticks, staves, swords, clubs, towers, trees, missiles, and rockets. The contrast of phallus is the yonic symbol. Yonic symbols denote gynocentrism and thus femininity. In the two songs, the knife denotes a phallic symbol while meat denote a yonic symbol. Drawing from Freudian Psychoanalysis, the two

symbols are a representation that replaces the unconscious mental content of the women as they sing. Deviation of the symbols is witnessed when the female persona requests her male partner in sex that:

Mtambaji: Usiutie mapengo msumeno wangu	Solo: Do not break the teeth of my saw
Kiitikio: Aiiye	Response: Oh yes!

In the above scenario, the saw, a phallic symbol, is designated to the female partner. The *unyago* is hereby interpreted as the exertion of feminine power through a cultural institution dominated by women because it accords a sense of belonging, of identity and of being a wholesome woman in Swahili society.

4. Conclusion

This article has attempted to analyse how *unyago* poetry constructs feminine psychology among Swahili women of Kenya showing how their indigenous mode of preparing them for wifehood and motherhood helps them create materials for self-fulfillment. Self-fulfillment is about self-actualization. To this end, *unyago* poetry has been read as representation of multiple Swahiliwomen voices in their culture and that its textual manifestation is such that it conceals conflicts and ambiguities within it. This is due to different authorial voices, hence, multiple psychological undercurrents. The varied voices within the *unyago* text are sub-texts operating within a contested terrain in the sense that what it appears on the surface cannot be understood without reference to the concealments and contextualization of meaning going on simultaneously to mark the text's significance. This particularly reflected in the *unyago* poems cited above such as "*kisu chako hakikati*". *Unyago* performances are restricted to the women's domain and within a secretive codification of meaning and, therefore, women understand its meaning but the men, and uninitiated women, do not.

This article further revealed that *unyago* poetry helps document feminine experiences that is a great women's poetichological tradition. *Unyago* is a poetry that challenges its readers with the complexity of its ambivalences, metaphors, and images, as well as startling and disrupting readers with the force of its insight, self-awareness, and psychological penetration among these women. Unyago poetry can be summarized as "a means for the psychological release of otherwise repressed enmities and tensions through a socially permissible form" (Finnegan, 1987, p. 284).

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

The Relationship between Practicing Knowledge Management Processes and the Effectiveness of Administrative Decisions Made by Schools' Principals in Ma'an Governorate

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Received: March 17, 2016 Accepted: February 5, 2017 Online Published: March 20, 2017

doi:10.5539/jedp.v7n1p249 URL: http://doi.org/10.5539/jedp.v7n1p249

Abstract

This study aims at determining the level of practicing knowledge management processes and the effectiveness level of administrative decisions made by the schools' principals in Ma'an Governorate, as well as determining the nature of the relationship between practicing knowledge management processes and the effectiveness level of making administrative decisions. A sample consisting of 120 school principals was randomly chosen.

The study found that the levels of practicing knowledge management by the school principals in Ma'an Governorate were all high and ranged between 4.28-4.52. The results also showed that the arithmetic means for the effectiveness level of the administrative decisions made by school principals in Ma'an Governorate ranged between 4.33-4.75 with high practicing level. Moreover, there is a statistically significant relationship between the effectiveness level of administrative decision-making on the one hand and the fields of knowledge management processes on the other hand. There are also statistically significant differences between the arithmetic means of the (High Diploma) estimates on the one hand, and the arithmetic means of the (Bachelor degree) estimates on the other hand, regarding the field "transferring and using knowledge" in favor of the (High Diploma). The same goes for the (Bachelor degree) estimates on the one hand, and the (Master degree) estimates on the other hand in favor of the (Master degree).

Keywords: administrative decisions, knowledge management processes, schools principals

1. Introduction

Interest in knowledge management came as a result of several factors: first, the rapid IT developments, which made the exchange of knowledge faster and easier through connecting individuals by electronic networks to help them exchange information and experiences. Second, the striving by the organizations to become learning organizations in which managers seek a particular organizational culture that meets the requirements of finding, providing and exchanging knowledge in the appropriate time and place. Since then, the term "knowledge management" emerged to represent a radical shift in the nature of modern organizations work in terms of the attention given to the human element who is the main permanent producer and interactor with modern technology systems and tools. It was found that the best corporate results can only be achieved through humans who work and interact continuously with it to choose the best procedures and applications (Hansen, 1990).

York (2005) indicates that the human capital is the employee's competency: his capacity inside the organization. This competency is linked to the employees' presence in the organization. If the employees leave the organization temporarily or permanently, the organization loses this competency. The importance of competency increases with the increase in the information and knowledge that the employees posses about their organization. An organization should make use of its employees' competency through establishing positive environment that allows the employees to transfer their information; and through giving the employees the impression that they are reliable and trustworthy.

We can say that the historical roots of knowledge management started since the appearance of scientific management, the most famous pioneers of which were Taylor and Fayol, who laid the basic foundations of scientific management (Arab Forum for Human Resource Management, 2015). A number of management

theorists contributed to the emergence and development of knowledge management, including Peter Drucker and Paul Strassman who stressed the growing importance of explicit information and knowledge as regulatory resources (Al-Thbaity, 2002).

In the mid-nineties, knowledge management initiatives flourished by virtue of the Internet. There was a growing interest in knowledge management especially after many organizations adopted the concept of knowledge management. In 1999 the World Bank allocated 4% of the budget for the development of knowledge management systems (York, 2005).

As a result of the growing interest in studies conducted on the concept of knowledge management, there was no consensus among researchers on a specific concept of knowledge management, which led to the emergence of several definitions of knowledge management, including:

- The systematic and organized process of establishing and using knowledge which requires converting personal knowledge to collaborative knowledge that can be clearly shared through the organization (Al-Kubaisi., 2004, p. 48)
- Converting intellectual assets to work value (Zerger, 1998, p. 16)
- The systematic collection, analyzation and interpretation of information from sources inside and outside the organization, then inferring indicators in order to guide and enrich the processes in the organization; and to achieve improvement in performance and elevating achievement to higher levels (Al-Sawi, 2007, p. 22).

Accordingly, we can define Knowledge Management as: the process of discovering, storing, restoring, distributing and using information, whether that information is implicit or explicit.

Knowledge management consists of several operations, as follows (Al-Ali, 2006):

1) Diagnosing knowledge: this phase begins with defining knowledge; then, searching for knowledge; next, comparing the existing knowledge with the required knowledge.

2) Acquiring knowledge: represents the stage of obtaining knowledge from various internal or external references and sources.

3) Storing knowledge: the process of storing knowledge is considered a bridge linking the process of collecting knowledge and the process of restoring knowledge to meet the opportunities of change in the future.

4) Developing and distributing knowledge: the development of knowledge occurs through increasing the capacity, the skills, and the competencies of employees regarding knowledge.

5) Using knowledge: using knowledge is more important than knowledge itself; the goal and purpose of knowledge management is making use of knowledge available to the organization.

Knowledge management gains its importance through the targets that it seeks to achieve. These targets are manifested by: generating the necessary and sufficient knowledge to carry out the cognitive transformation processes and disseminate knowledge to all relevant parties; developing and updating knowledge continuously; determining the nature of intellectual capital that is required for the organization and determining how to develop and maintain it; controlling and monitoring the processes relevant to knowledge management; and seeking effective leadership capable of building and practicing knowledge management (Holsapple & Singh, 2001).

Wang (2006) pointed out that the relationship between knowledge employment and decision-making is exemplified in the support provided to the decision maker in all levels of management by linking personal decisions with the computerized information. This provides support in all stages of the decision-making process, as it enables the decision maker to solve very complex issues and achieve integration between databases, information systems and the Internet.

The administrative decision is the backbone of management and the decision-making process is one of the basic functions of managers. It is an intellectual process that seeks to choose the most appropriate alternative from several alternatives by means of differentiation between them using standards that are suitable for the internal and external conditions facing the decision maker. Actually, the decision and decision-making are a reflection of a behavior that will occur in the future and the expected results this behavior will have (Al-Aqili, 2005).

The multiplicity and complexity of the organization's goals, and sometimes the existence of conflict between these goals increased the importance of the decisions in the educational administration. The organization no longer seeks to achieve one goal as it was before, but it has to seek to achieve a number of complex and interrelated goals, which requires choosing a lot of decisions to face these problems (Al-Naji, 2011).

Educational institutions guarantee a good life quality for students and personnel through education. This includes participating in an educational system based on a strong foundation of knowledge. It also includes responsibilities for the development of school work and educational services provided for students. Despite the clarity of such issues in the field of education, there were no real opportunities to address these issues through systematic approaches. Hence, came the importance of knowledge management in providing new opinions, ideas, and effective practices to ensure the distinction and quality of educational administration. This places a new responsibility upon the administration; that is, managing organizational knowledge in educational institutions (Beblawi & Hussein, 2007).

2. Literature Review

Newton (2004) conducted a study entitled "Knowledge Management in School Boards". The study aimed at examining knowledge management such as (knowledge database, transferring and processing knowledge) in the departments of education, and the ability to manage knowledge in these departments when facing difficult decisions that must be taken. The study found that there are differences in the databases used by the department of education and the school administration. Those differences appeared in the knowledge itself and its management, and in the activities used in creativity.

The study of (Keeley, 2004) entitled "The Effectiveness of Knowledge Management in the Development of Planning and Decision-making in Higher Education Types" showed a high correlation between the effective institutional and organizational teaching, and the presence of an effective formal program for knowledge management. Moreover, the study revealed that practicing knowledge management by the institutions of higher education through research commissions was moderate. The results also showed that the higher education institutions which provided infrastructures of systems and devices that support knowledge doubled the chances of individuals in knowledge participation.

Glickman study (2004) entitled "What Counts: Education Knowledge Management Practices" aimed at examining the concept of knowledge management in pioneer schools in North Vancouver as exemplified by their practices related to generating, capturing, and disseminating "Knowledge" and promoting informed professionalism. The study indicated that educators found it difficult to foster a culture of collaboration and interaction within and across schools or among teachers; and, they also found it difficult to systematically manage their working knowledge.

Tashkandi study (2006) aimed to explain the importance of employing knowledge management in education administration; and to determine the most important processes of knowledge management and practices that make it active. The study also aimed at studying and analyzing the present situation of knowledge management in education directorates. The results showed that the members of the (study society) know well the importance of knowledge management; and the importance of using knowledge management in education administration.

Al-Khalili Study (2006) entitled "Knowledge Management in the Ministry of Education: An Analytical Study", which aimed to get to know the status of knowledge management at the Ministry of Education in Jordan. The study found that the Ministry of Education was able to consolidate the concept of knowledge management through practicing the activities contained in this concept. The results were high with the exception of storing, disseminating and exchanging of knowledge that showed a medium degree.

Muawiya Study (2008) entitled "Knowledge and Information Management in Higher Education Institutions: International Experiences". The study aimed to shed light on some of the global models of knowledge management and information systems in higher education institutions; and to highlight some of these models that can be adopted by higher education institutions in Jordan in particular, and the Arab world in general. The study found models including virtual, investment and productive higher education institutions that have managed to achieve many successes through the availability of technological environment and infrastructure for knowledge management.

3. The Problem of the Study

Knowledge management represents a fundamental shift in the nature of the work of modern organizations, in terms of interest in the human element which is the main, permanent interacting element with modern technology systems and tools. It was found that the best corporate results can only be achieved through the human who interacts continuously to choose the best procedures and applications. Educational institutions in which the human is the fundamental centerpiece of knowledge are considered one of the main pillars of the development of society, as the educational systems are a source of information and knowledge.

Al-Taweel (2006) indicates that if the transition to knowledge management in the economic and industrial organizations has become a necessity in the age of information and technology, it becomes more urgent in the educational institutions. Such institutions ensure knowledge generation, dissemination and application for today's organizations to assist in administrative decision-making, encourage innovation, increase competitiveness, and to achieve the strategic goals of these organizations.

4. Questions of the Study

This study seeks to answer the following questions:

1) What is the level of practicing knowledge management by school principals in Ma'an Governorate?

2) What is the effectiveness level of administrative decisions made by school principals in Ma'an Governorate?

3) Is there a statistically significant relationship at the level ($\alpha = 0.05$) between the arithmetic means of the study sample estimations regarding practicing knowledge management by school principals in Ma'an Governorate and their estimations regarding the effectiveness of administrative decisions made by the principals?

4) Are there any statistically significant differences at the level ($\alpha = 0.05$) between the arithmetic means of the study sample estimations regarding practicing knowledge management by school principals in Ma'an Governorate attributed to the variables (gender, educational qualification, and administrative experience)?

5) Are there any statistically significant differences at the level ($\alpha = 0.05$) between the arithmetic means of the study sample estimations regarding the effectiveness of administrative decisions made by school principals in Ma'an Governorate attributed to the variables (gender, educational qualification, and administrative experience)?

5. Targets of the Study

This study seeks to achieve the following targets:

1) Determining the level of practicing knowledge management by school principals in Ma'an Governorate.

2) Determining the effectiveness level of the administrative decisions made by school principals in Ma'an Governorate.

3) Determining the nature of the relationship between practicing knowledge management and the effectiveness level of the administrative decisions made by school principals in Ma'an Governorate.

4) Determining the sources of differences between the responses of school principals in Ma'an Governorate regarding the level of practicing knowledge management and the effectiveness level of the administrative decisions.

6. The Importance of the Study

The importance of the study is shown in a number of points, namely:

- The importance of knowledge management which is an administrative approach aims at gathering, arranging, organizing and disseminating knowledge; in order to improve the efficiency of school administration.

- Linking knowledge management with the processes of making administrative decisions, which is a fundamental pillar of administrative work.

- The benefits that the school principals in Ma'an Governorate gain from the results of this study through determining the level of practicing knowledge management and the effectiveness level of administrative decision-making. It is possible that the results serve as a catalyst for the development of knowledge management in schools and for employing it in administrative decision-making processes.

- This study provides a set of recommendations that can contribute to the activation of practicing knowledge management and its role in administrative decision-making processes.

7. The Study Limits

- This study was limited to determining the level of practicing knowledge management; the effectiveness level of the administrative decision-making processes; and determining the relationship between them.
- This study was conducted during the second semester 2014/2015.

- This study was limited to the school principals in Ma'an Governorate which includes the directorates of education in Ma'an, Petra, Al-Shoubak, and Southern Badia.

8. The Study Terms

The procedural definitions for the main terms of the study:

The processes of knowledge of management: a set of processes employed by the school administration to maximize the intellectual capital efficiency, these processes include: the level of knowledge acquisition and development; the level of organizing and assessing knowledge; and transferring and using knowledge.

The effectiveness of administrative decision-making: organized processes employed by school administration to handle all situations and problems during work by providing enough information; seeking suitable alternatives and choosing the most suitable one, for the sake of achieving the required target according to the issue and its conditions.

9. Methodology and Procedures

9.1 The Study Method

To achieve the targets of the study, the correlation method was used to determine whether there is a relationship between practicing the processes of knowledge management and the process of making administrative decisions; and then determining the level of that relationship. A questionnaire based on the theoretical literature and the previous studies was prepared for this purpose. The questionnaire was distributed to the study sample (school managers in Ma'an Govornorate); then, the respondents' data was analyzed using the SPSS statistics.

9.2 The Study Population

The study population included all school principals in Ma'an Governorate, totaling 189 principals, during the academic year 2014/2015.

9.3 The Study Sample

The study sample was randomly selected from the study population. The sample consisted of 120 school principals in Ma'an governorate which made up 63% of the study population. Table 1 shows the distribution of the study sample according to the study variables, namely: gender, education level, and years of experience in administration.

Table 1. Distribution of the study sample according to the variables: gender, education level, years of experience in administration

Variable	***Level***	***Number***	***Percentage***
Gender	Male	40	33.3
	Female	80	66.7
Education level	Diploma	6	5.0
	Bachelor degree	28	23.3
	High diploma	66	55.0
	Master degree	18	15.0
	Doctorate degree	2	1.7
Years of experience in administration	Less than 5 years	28	23.3
	From 5-10 years	41	34.2
	More than 10 years	51	42.5
	Sub total	120	100.0

9.4 The Study Tool

A questionnaire was designed to determine the level of knowledge management and its relationship with the effectiveness level of the administrative decisions made by the school principals in Ma'an Governorate. The questionnaire included 37 items, and consisted of two main domains. The first domain to measure the level of

practicing knowledge management covering three fields, namely: the level of knowledge acquisition and development; the level of organizing and assessing knowledge; and the level of transferring and using knowledge. The second domain for measuring the effectiveness of administrative decision-making.

9.5 The Validity of the Study Tool

To determine the validity of the study tool, it was presented to 10 specialized, expert evaluators from the faculty members in the College of Education at Al-Hussein Bin Talal University. In light of the observations and recommendations of the evaluators, some linguistic amendments were made to some of the questionnaire items.

9.6 The Reliability of the Study Tool

To ensure the reliability of the study tool, the Cronbach's Alpha equation was used on the original sample of the study, to determine the stability of the internal consistency of the instrument as a whole. The reliability coefficient was 94.0 which is a high enough value to conduct the study.

9.7 Scoring the Questionnaire

A Likert-type scale was used as follows: always, often, sometimes, rarely, never and the following numerical values 5, 4, 3, 2, 1 were given respectively to evaluate the relationship of practicing knowledge management with the effectiveness of administrative decisions made by school principals in Ma'an governorate. The following statistical was used for the distribution of the arithmetic means:

First: (1.00-2.49) low evaluation degree

Second: (2.50 - 3.49) medium evaluation degree

Third: (3.50 - 5.00) high evaluation degree

9.8 Statistical Procedures

The following statistical procedures were used: arithmetic means, standard deviations, Pearson's Correlation Coefficient, Multivariate Analysis of Variance (MANOVA), and Scheffe's Test.

9.9 The Study Results and Discussion

To answer the first question: **What is the level of practicing knowledge management by school principals in Ma'an Governorate?** The arithmetic means and standard deviations of the respondents' estimates for each item of the scale, and for the scale as a whole, were calculated as described in the Tables 2-5.

Table 2. The arithmetic means and standard deviations for each item of the scale and for the scale as a whole in descending order (according to arithmetic means)

No.	*field*	*Arithmetic Mean**	*Standard Deviation*	*Agreement Degree*
3	transferring and using knowledge	4.52	0.41	High
1	knowledge acquisition and development	4.29	0.40	High
2	organizing and assessing knowledge	4.28	0.47	High
	Levels as a whole	4.34	0.37	High

*The highest value is 5.

Table 2 shows that the arithmetic means of the scale fields ranged from 4.28-4.52. The highest mean value was for the field of "transferring and using knowledge" with a standard deviation 0.41 and a high evaluation degree. The field of "knowledge acquisition and development" came next with a mean of 4.29 and a standard deviation of 0.40 and a high evaluation degree. The lowest mean value was for the field "organizing and assessing knowledge" with a standard deviation of 0.47 and a high evaluation degree. The arithmetic mean for the fields as a whole was 4.34 with a standard deviation 0.37 and a moderate evaluation degree.

Table 3. The arithmetic means and standard deviations for the respondents' estimates regarding the field: "*knowledge acquisition and development*" in descending order

No.	*Item*	*Arithmetic Mean**	*Standard Deviation*	*Agreement degree*
9	I make sure to inform all school staff of knowledge developments	4.55	0.63	High
5	I seek new methods of administrative work	4.53	0.59	High
11	I develop knowledge of all school staff	4.40	0.60	High
10	I provide mechanisms to receive all opinions and suggestions from school staff	4.39	0.64	High
1	Knowledge transfers from one person to another within the school	4.35	0.64	High
6	I work on bringing knowledge from outside the school	4.33	0.66	High
7	I announce the best knowledge resources available within the school available	4.29	0.76	High
2	I identify the knowledge resources within the school	4.22	0.66	High
4	I identify the ways of storing knowledge within the school	4.22	0.67	High
3	I transfer new knowledge into value	4.12	0.70	High
8	I transfer implicit knowledge into public knowledge	4.08	0.75	High
12	I provide supportive organizational culture for research and development within the school	4.03	0.76	High
	The field as a whole	4.29	0.40	High

*The highest value is 5.

Table 3 shows that the arithmetic means for the items of the field "knowledge acquisition and development" ranged between 4.03-4.55. The highest value was for item number 9, "I make sure to inform all school staff of knowledge developments" with a standard deviation 0.63. Item number 5 "I seek new methods of administrative work" came second with arithmetic mean of 4.53 with a standard deviation 0.59. The lowest arithmetic mean value was for item number 12 "I provide supportive organizational culture for research and development within the school" with a standard deviation 0.67. All items came with high evaluation degree.

Table 4. The arithmetic means and standard deviations for the respondents' estimates regarding the field: "*organizing and assessing knowledge*" in descending order

No.	*Item*	*Arithmetic Mean**	*Standard Deviation*	*Agreement degree*
9	I evaluate the performance of the employees according to their participation in the knowledge management processes.	4.50	0.66	High
3	I store knowledge in a way that makes it easy to be accessed; for example, computerizing data.	4.46	0.67	High
6	I frequently update data to insure sustained successful work.	4.45	0.62	High
7	I review the available knowledge in light of the status quo.	4.34	0.67	High
2	I categorize knowledge in two main categories; one for the teachers, and the other for the students.	4.28	0.72	High

5	I evaluate the validity of the documents used in school activities.	4.27	0.68	High
1	I classify data using special techniques assigned to that purpose.	4.13	0.62	High
8	I provide explanation to the available knowledge.	4.09	0.74	High
4	I provide a manual (guide) for accessing knowledge.	4.07	0.78	High
	The field as a whole	2.28	0.47	High

*The highest value is 5.

Table 4 shows that the arithmetic means for the items of the field "organizing and assessing knowledge" ranged between 4.07-4.50. The highest value was for item number 9 "I evaluate the performance of the employees according to their participation in the knowledge management processes", with a standard deviation (0.66). Item number 3 "I store knowledge in a way that makes it easy to be accessed; for example, computerizing data" came second with arithmetic mean of 4.46 with a standard deviation 0.67. The lowest arithmetic mean value was for item number 4 "I provide a manual (guide) for accessing knowledge" with a standard deviation 0.78.

Table 5. The arithmetic means and standard deviations for the respondents' estimates regarding the field: "*transferring and using knowledge*" in descending order

No.	***Item***	***Arithmetic Mean****	***Standard Deviation***	***Agreement degree***
1	I provide knowledge for all staff working in the school	4.75	0.47	High
2	I provide a supportive climate for exchanging knowledge among school staff	4.67	0.56	High
5	I encourage school staff in to take advantage of the knowledge available at school	4.64	0.53	High
4	I employ different methods to transfer knowledge	4.38	0.65	High
3	I interpret the power of knowledge to operations that can be executed at school	4.37	0.62	High
6	I train the school staff on using and employing knowledge	4.27	0.73	High
	The field as a whole	4.52	0.41	High

*The highest value is 5.

It is clear from Table 5 that the arithmetic means for the items of the field "transferring and using knowledge" ranged between 4.27-4.75. The highest value was for item number 1 "I provide knowledge to all staff working in the school" with a standard deviation 4.75. Item number 2 "I provide a supportive climate for exchanging knowledge among school staff" came second with arithmetic mean of 4.67 with a standard deviation 0.56. The lowest arithmetic mean value was for item number 6 "I train the school staff on using and employing knowledge" with a standard deviation (0.73).

To answer the second question: **What is the effectiveness level of administrative decisions made by school principals in Ma'an Governorate?** The arithmetic means and standard deviations of the study sample estimates for each item of the scale, and for the scale as a whole, as described in Table 6.

Table 6. The arithmetic means and standard deviations for the respondents' estimates regarding the field: "*the effectiveness level of administrative decision-making*" in descending order

No.	***Item***	***Arithmetic Mean****	***Standard Deviation***	***Agreement degree***
7	I explain the content of the decision in order to be implemented properly	4.62	0.55	High
1	I make decisions in light of study and meticulous information	4.57	0.59	High
9	I employ appropriate means of communication for announcing decisions	4.55	0.62	High
4	I declare all decisions made within the school	4.53	0.69	High

6	I notice the impact of the decision on the school staff	4.51	0.64	High
2	I follow the results of implementing decisions so as not to deviate from the target	4.44	0.63	High
10	I take actions against staff who fail to implement the decision	4.43	0.67	High
3	I share decision-making with all parties concerned	4.42	0.67	High
8	I provide a feedback system for decisions taken	4.37	0.67	High
5	I share the authority of decision-making with staff	4.33	0.76	High
	The field as a whole	4.48	0. 43	High

*The highest value is 5.

Table 6 shows that the arithmetic means for the field "the effectiveness level of administrative decision-making" ranged between 4.33-4.62. The highest value was for item number 7 "I explain the content of the decision in order to be implemented properly" with a standard deviation 0.55. Item number 1 "I make decisions in light of study and meticulous information" came second with arithmetic mean of 4.57 with a standard deviation 0.59. The lowest arithmetic mean value was for item number 5 "I share the authority of decision-making with staff" with a standard deviation 0.76.

To answer the third question: **Is there a statistically significant relationship at the level (α = 0.05) between the arithmetic means of the study sample estimations regarding practicing knowledge management by school principals in Ma'an Governorate and their estimations regarding the effectiveness of administrative decisions made by the principals?** We calculated Pearson's correlation coefficient between the level of practicing knowledge management and the effectiveness level of administrative decisions made by the principals, as shown in Table 7.

Table 7. The arithmetic means and standard deviations for the respondents' estimates regarding the field: "*the effectiveness level of administrative decision-making*" in descending order

The Value of Pearson's correlation coefficient	***Knowledge acquisition and development***	***Organizing and assessing knowledge***	***Transferring and using knowledge***	***The scale as a whole***
The effectiveness level of administrative decision-making	0.63*	0.70*	0.65*	0.76*

*Statistically significant at the level α = 0.05.

Table 7 shows the following:

- There is a statistically significant relationship at the level of (α = 0.05) between the effectiveness level of administrative decision-making and the level of knowledge acquisition and development, where the value of Pearson's correlation coefficient was 0.63.

- There is a statistically significant relationship at the level of α = 0.05 between the effectiveness level of administrative decision-making and the level of organizing and assessing knowledge, where the value of Pearson's correlation coefficient was 0.70.

- There is a statistically significant relationship at the level of α = 0.05 between the effectiveness level of administrative decision-making and the level of transferring and using knowledge, where the value of Pearson's correlation coefficient was 0.65.

To answer the fourth question: **Are there any statistically significant differences at the level (α = 0.05) between the arithmetic means of the study sample estimations regarding practicing knowledge management by school principals in Ma'an Governorate attributed to the variables (gender, educational qualification, and administrative experience)?** The arithmetic means and standard deviations of the study sample estimates regarding the study fields were calculated according to the study variables, as follows:

1) According to the "gender" variable

Table 8. The arithmetic means and standard deviations of the respondents estimates regarding the study fields according to the "*gender*" variable

	Male (40		***Female (80)***	
Study Field	***Arithmetic mean***	***Standard deviation***	***Arithmetic mean***	***Standard deviation***
Knowledge acquisition and development	4.20	0.41	4.34	0.39
Organizing and assessing knowledge	4.18	0.56	4.34	0.41
Transferring and using knowledge	4.40	0.41	4.58	0.40
Fields as a whole	4.23	0.42	4.39	0.33

2) According to educational level

Table 9. The arithmetic means and standard deviations of the respondents estimates regarding the study fields according to the "*educational level*" variable

	Bachelor (28)		***High Diploma (66)***		***Master degree (18)***		***Doctoral degree (2)***		***Diploma (6)***	
Study Field	***Arithmetical mean***	***Standard deviation***	***Arithmetical mean***	***Standard deviation***	***Arithmetical mean***	***Standard deviation***	***Arithmetical mean***	***Standard deviation***	***Arithmetical mean***	***Standard deviation***
Knowledge acquisition and development	4.31	0.29	4.18	0.38	4.0	0.52	4.04	0.56	4.21	0.29
Organizing and assessing knowledge	4.11	0.40	4.15	0.52	4.03	0.49	4.23	0.48	4.06	0.24
Transferring and using knowledge	4.39	0.34	4.07	0.61	4.43	0.44	4.51	0.38	4.17	0.24
Fields as a whole	4.26	0.22	4.14	0.38	4.11	0.39	4.21	0.42	4.15	0.26

3) According to administrative experience

Table 10. The arithmetic means and standard deviations of the respondents' estimates regarding the study fields according to the "*years of administrative experience*" variable

	Less than 5 years (28)		***From 5-10 years (41)***		***More than 10 years (51)***	
Study Field	***Arithmetic mean***	***Standard deviation***	***Arithmetic mean***	***Standard deviation***	***Arithmetic mean***	***Standard deviation***
Knowledge acquisition and development.	4.28	0.41	3.82	0.49	4.15	0.46
Organizing and assessing knowledge.	4.30	0.44	4.08	0.48	3.99	0.40
Transferring and using knowledge	4.50	0.43	4.350	0.41	4.27	0.57
Fields as a whole	4.33	0.36	4.02	0.39	4.12	0.35

The Tables 8-10 show the presence of differences between the arithmetic means of the respondents estimates regarding the study fields according to the study variables gender, educational level, and years of administrative experience. To determine the significance levels of the statistical differences, the Multivariate Analysis of Variance (MANOVA) was used, as shown in Table 11.

Table 11. The results summary of (MANOVA) for the significance of differences between the arithmetic means according to the study variables

Variation source	*Field*	*Squares total*	*Degree of freedom*	*Mean Squares*	*F-value*	*Significance level*
Gender	Knowledge acquisition and development	0.416	1	0.416	2.586	0.111
	Organizing and assessing knowledge	0.552	1	0.552	2.465	0.119
	Transferring and using knowledge	0.434	1	0.434	2.720	0.102
Educational level	Knowledge acquisition and development	1.122	4	0.280	1.354	0.254
	Organizing and assessing knowledge	786.0	4	0.197	0.859	0.491
	Transferring and using knowledge	3.688	4	0.922	4.333	0.003
Years of administrative experience	Knowledge acquisition and development	4.171	2	2.085	10.068	0.000
	Organizing and assessing knowledge	1.887	2	0.943	4.122	0.019
	Transferring and using knowledge	1.368	2	0.684	3.21	0.044
Error	Knowledge acquisition and development	23.405	112			
	Organizing and assessing knowledge	25.859	112			
	Transferring and using knowledge	24.046	112			

*Statistically significant at $\alpha = 0.05$.

Table 11 shows that there are no statistically significant differences between the arithmetic means of the respondents regarding the field “practicing knowledge management” attributed to the (gender) variable; the fields “knowledge acquisition and development” and “organizing and assessing knowledge” attributed to the (educational experience) variable. Moreover, the table shows that there are statistically significant differences at the field “transferring and using knowledge” attributed to the (educational level) variable; and at all fields attributed to the (administrative experience) variable. In order to determine the sources of those differences Scheffe’s Test was used as shown in Table 12.

Table 12. The results of applying Scheffe's Test for the post hoc comparisons to the field "transferring and using knowledge" according to the (educational level) variable

Educational level	*Arithmetic mean*	*Diploma*	*Bachelor degree*	*High diploma*	*Master degree*	*Doctoral degree*
Diploma	4.11					
Bachelor	4.15					
High diploma	4.03		0.366			
Mater degree	4.23		0.443			
Doctoral degree	4.06					

*Statistically significant at α = 0.05.

We can see from Table 12 we see that there are statistically significant differences between the arithmetic means of (High Diploma) estimates on one side, and the arithmetic means of (Bachelor) estimates on the other side, regarding the field "transferring and using knowledge"; in favor of the (High Diploma). The same goes for (Bachelor degree) estimates on one side and (Master degree) estimates on the other side in favor of the (Master degree).

Table 13. Results of applying Scheffe's test for the post hoc comparisons to the study fields, according to the (administrative experience) variable

Adm. experience	*Arithmetic mean*	*Less than 5 years*	*From 5 -10 years*	*More than 10 years*
Field of "knowledge acquisition and development"				
Less than 5 year	4.28		0.455*	
From (5-10) years	3.82			
More than 10 years	4.15		0.327*	
Field of "organizing and assessing knowledge"				
Less than 5 year	4.30			0.312*
From (5-10) years	4.08			
More than 10 years	3.99			
Field of "transferring and using knowledge"				
Less than 5 year	4.50			0.33*
From (5-10) years	4.35			
More than 10 years	4.27			

*Statistically significant at α = 0.05.

Table 13 shows that there are statistically significant differences between the arithmetic means of less than 5 years estimates on one side, and the arithmetic means of from 5-10 years estimates on the other side, regarding the field "organizing and assessing knowledge" in favor of less than 5 years. And, there are statistically significant differences between the 5-10 years estimates and more than 10 years estimates in favor of more than 10 years. Moreover, there were differences regarding the field "transferring and using knowledge" between the (less than 5 years) estimates and (more than 10 years) estimates in favor of (less than 5 years).

To answer the fifth question: **Are there any statistically significant differences at the level (α = 0.05) between the arithmetic means of the study sample estimations regarding the effectiveness of administrative decisions made by school principals in Ma'an Governorate attributed to the variables (gender, educational qualification, and administrative experience)?** We calculated the arithmetic means and standard deviations of

the respondents' estimates regarding the effectiveness level of administrative decision-making; according to the study variables, as follows:

1) According to (gender) variable

Table 14. The arithmetic means and standard deviations of the respondents' estimates regarding the effectiveness level according to the (gender) variable

	Male (40)		***Female (80)***	
Field	***Arithmetic mean***	***Standard deviation***	***Arithmetic mean***	***Standard deviation***
Effectiveness level of administrative decision-making	4.38	0.42	4.25	0.42

2) According to (educational level) variable

Table 15. The arithmetic means and standard deviations of the respondents' estimates regarding the effectiveness level according to the (educational level) variable

	Diploma 6		***Bachelor degree 28***		***High Diploma 66***		***Master degree 18***		***Doctoral degree 2***	
Filed	***Arithmetic mean***	***Standard deviation***	***Arithmetic mean***	***Standard deviation***	***Arithmetic mean***	***Standard deviation***	***Arithmetic mean***	***Standard deviation***	***Arithmetic mean***	***Standard deviation***
Effectiveness level of administrative decision-making	4.28	0.38	4.41	0.44	4.53	0.41	4.48	0.46	4.00	00.0

3) According to changes of Adm. experience

Table 16. The arithmetic means and standard deviations of the respondents' estimates regarding the effectiveness level according to the (administrative experience) variable

	Less than 5 years 22		***From 5-10 years 41***		***Less than 10 years 51***	
Filed	***Arithmetic mean***	***Standard deviation***	***Arithmetic mean***	***Standard deviation***	***Arithmetic mean***	***Standard deviation***
Effectiveness level of administrative decision-making	4.53	0.41	4.43	0.42	4.49	0.43

To determine the presence of differences between arithmetical means of the respondents' estimates regarding the effectiveness level of administrative decision-making according to the study variables; the Multivariate Analysis of Variance (MANOVA) was used, as shown in Table 17.

Table 17. The results summary of (MANOVA) for the significance of differences between the arithmetic means according to the study variables

Variable source	*Squares total*	*Freedom degree*	*Mean Squares*	*F-Value*	*Significance level*
gender	0.316	1	0.316	1.763	0.187
Educational level	0.791	4	0.198	1.101	0.360
Administrative experience	0.132	2	0.066	0.369	0.692
Error	20.097	112	0.179		

We see from Table 17 that there are no statistically significant differences between the arithmetic means of the respondents' estimates attributed to the study variables: gender, educational level, and administrative experience.

10. Explanation of the Study Results

- Through the review of the findings on the first question: "What is the level of practicing knowledge management by school principals in Ma'an Governorate?" The arithmetic means of the scale's fields ranged between 4.28-4.52 with a high evaluation degree. This indicates that there is a clear awareness among school principals in Ma'an governorate regarding the importance of practicing knowledge in school administration; due to its role in overcoming many problems and challenges facing the school administration. This is attributed to the educational experiences that the school principals have, and the active role of the Ministry of Education in raising awareness of the concepts of knowledge through conducting training courses and lectures presented to school principals.

- The results related to the second question: "What is the effectiveness level of administrative decisions made by school principals in Ma'an Governorate?" show that the arithmetic means of the field "the effectiveness level of administrative decision-making" ranged between 4.33-4.75 with a high evaluation degree. This supports the result of the first question, as the effectiveness of the decision-making relies heavily on the knowledge and its application. A decision cannot be effective without being based on a solid knowledge base. This result implies that the school principals were selected according to specific criteria such as experience and good performance, and this gives the principal a distinct ability to make effective decisions at school.

- The results of the third question: "Is there a statistically significant relationship at the level ($\alpha = 0.05$) between the arithmetic means of the study sample estimations regarding practicing knowledge management by school principals in Ma'an Governorate and their estimations regarding the effectiveness of administrative decisions made by the principals?" showed that there is a statistically significant relationship between the effectiveness level of administrative decision-making on the one hand, and the fields of knowledge management processes on the other hand. This result is logical, as the effective decision is linked to knowledge acquisition, development, organizing, and transfer.

- As for the fourth question: "Are there any statistically significant differences at the level ($\alpha = 0.05$) between the arithmetic means of the study sample estimations regarding practicing knowledge management by school principals in Ma'an Governorate attributed to the variables (gender, educational qualification, and administrative experience)?" The results showed that there are no statistically significant differences between the arithmetic means of the respondents' estimates on the field "practicing knowledge management" attributed to (gender) variable. This can be justified by the fact that the principals of both genders have similar expertise; and, selecting school principals is subjected to a set of standards that are similar for both genders. Moreover, the school principals undergo training programs contribute to the removal of the differences between genders. The results also showed that there are statistically significant differences between the arithmetic means of (High Diploma) estimates on the one hand, and the arithmetic means of (Bachelor) estimates on the other hand, regarding the field "transferring and using knowledge"; in favor of the (High Diploma). The same goes for (Bachelor degree) estimates on the one hand and (Master degree) estimates on the other hand in favor of the (Master degree). This is attributed to the fact that school principals holding high diploma or master degree have received educational habilitation that helped them to be more competent in transferring and using knowledge in school administration.

Furthermore, there were statistically significant differences between the arithmetic means of the respondents' estimates who had less than 5 years experience on the one hand, and the arithmetic means of (from 5-10 years)

estimates on the other hand, regarding the fields "organizing and assessing knowledge" and "transferring and using knowledge" in favor of less than 5 years. This can be attributed to the fact that school principals who have less than 5 years experience are seeking to develop their performance and be informed of what's new in administration, in order that they could make the appropriate decision in administration. As for those who have more than 10 years of experience, we can see the impact of the experience that contributes to the development of performance and efficiency of school principals, and help them in the organizing and transferring knowledge.

- As for the fifth question: "Are there any statistically significant differences at the level ($\alpha = 0.05$) between the arithmetic means of the study sample estimations regarding the effectiveness of administrative decisions made by school principals in Ma'an Governorate attributed to the variables (gender, educational qualification, and administrative experience)?" The results showed that there are no statistically significant differences between the arithmetic means of the respondents' estimates regarding "the effectiveness of administrative decision-making" according to the study variables: gender, educational level, and administrative experience. This may be attributed to the fact that school principals have similar professional qualities.

11. Recommendations

In light of the results that have been reached, the researchers recommend the following:

- Taking advantage of the qualified personnel at the education directorates to train principals on knowledge management processes.
- Expanding the use of modern communication systems and opening communication channels between the schools, the departments of education, and the Ministry of Education.
- Establishing an electronic portal for each school for easy exchange of knowledge with other schools.
- Establishing "Knowledge Management Unit" at the Ministry of Education and the departments of Education.
- Forming a committee within each school dealing with the issue of knowledge management.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Re(Examining) Relations between CHC Broad and Narrow Cognitive Abilities and Reading Achievement

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Received: January 29, 2017 Accepted: March 20, 2017 Online Published: March 27, 2017

doi:10.5539/jedp.v7n1p265 URL: http://doi.org/10.5539/jedp.v7n1p265

Abstract

Previously, Evans and colleagues (2001) utilized simultaneous multiple regression to examine relations between Cattell-Horn-Carroll (CHC; Schneider & McGrew, 2012) broad and narrow cognitive abilities and reading achievement across the school age span. Although their findings suggest that many broad/narrow abilities had clinically significant effects on reading achievement they failed to account for the potential moderating effects of the general factor. To account for these effects, the current study employed hierarchical multiple regression analysis to reexamine the relationships between CHC dimensions and reading achievement after controlling for the effects of the general factor with 4,722 participants ages 6-18 from the Woodcock Johnson III Psychoeducational Battery (WJ III; Woodcock, McGrew, & Mather, 2001a). Results from the present study indicate that the full scale GIA composite (as a proxy for *g*) consistently accounted for large effects across the school age span for all of the reading achievement variables that were assessed. Among the broad and narrow abilities, only Gc consistently accounted for meaningful proportions of reading scores beyond *g*. As a consequence, researchers are encouraged to give greater consideration to the dimensionality of broad and narrow CHC measures when examining cognitive-achievement relationships or they may risk over-interpreting the predictive effects associated with these indices. Potential implications for clinical application of CHC theory are also discussed.

Keywords: incremental validity, CHC, general intelligence

1. Introduction

In psychology and education, the Cattell-Horn-Carroll (CHC) model of human cognitive abilities has emerged as the consensus psychometric-based model for understanding the structure of human intelligence (McGrew, 2009). CHC theory was developed as a synthesis of the Gf-Gc theory (Horn & Cattell, 1966) and Carroll's (1993) three-stratum model. It conceptualizes cognitive abilities within a hierarchical taxonomy in which elements are stratified according to breadth. The most general ability resides at the apex of the model at Stratum III and is referred to as a general factor of intelligence or *g*. The next level (Stratum II) includes seven to nine *broad* abilities (e.g., Fluid Reasoning [Gf], Crystallized Ability [Gc]). At the bottom of the model are over 70 *narrow* abilities (Stratum I) which are organized according to their mapping onto the Stratum II dimensions.

Intelligence testing research has been significantly impacted over the last 15 years as a result of the rise of the CHC model. Additionally, CHC theory has been used to provide a theoretical and empirical blueprint for understanding cognitive abilities and how they may relate to academic learning (Keith & Reynolds, 2010; McGrew & Wendling, 2010). Although several contemporary cognitive tests reference CHC theory within their technical and interpretive manuals, the Woodcock-Johnson III Tests of Cognitive Abilities (WJ III COG; Woodcock, McGrew, & Mather, 2001c) was the first commercial test to utilize CHC specifically for its structural foundation. Additionally, the WJ III COG was the first test reported to measure all of the proposed broad cognitive abilities in the most recent iteration of the CHC model (Schneider & McGrew, 2012). Accordingly, the WJ III COG has been utilized as the *de facto* reference instrument for making refinements to the CHC model and validating many of the inferences made about potential relationships between broad cognitive abilities and academic achievement in the technical and professional literature over the last 15 years (Dombrowski, McGill, & Canivez, 2016).

With regard to CHC cognitive-achievement relationships, a series of predictive validity investigations (Evans et al., 2001; Floyd, Evans, & McGrew, 2003; Floyd, McGrew, & Evans, 2008) completed shortly after the publication of

the WJ III COG are particularly noteworthy. In sum, these studies provide evidence of differential predictive effects for CHC-related broad abilities for reading, mathematics, and written language achievement across the age span. In addition to being highly cited (~450 citations) across the school, developmental, and educational psychology literatures, these studies have been instrumental in supporting the dissemination of numerous CHC-related technologies in clinical practice (e.g., Fiorello & Primerano, 2005; Flanagan, Ortiz, & Alfonso, 2013; Flanagan, Ortiz, Alfonso, & Dynda, 2006; Hale et al., 2010; McGrew & Wendling, 2010).

With regard to reading achievement, Evans and colleagues (2001) utilized simultaneous multiple regression to examine relations between CHC broad and narrow abilities and various reading abilities across 14 age groups. Their findings suggest that several abilities (i.e., Phonological Awareness, Processing Speed [Gs], and Long-Term Retrieval [Glr]) consistently accounted for significant effects in reading achievement across the age span. As a result, they encouraged primary consideration of these and other related CHC broad and narrow abilities when investigating reading skill development. However, Evans et al. (2001) did not to include an estimate of general intelligence in their prediction models, a variable that has a rich history of accounting for meaningful levels of academic achievement variance (Buckhalt, 2002; Canivez, 2013b; McGhee, 2002; Naglieri & Bornstein, 2003). To wit, Thorndike (1986) noted that 85% to 90% of predictable variance in measures of achievement may be accounted for by a single general score (i.e., FSIQ), that is thought to estimate general intellectual ability. As a consequence of this omission, the unique contributions of CHC broad and narrow abilities in predicting reading abilities above and beyond a more parsimonious general intelligence dimension was unclear.

According to Pedhazur (1997), leaving out variables that are known to have strong predictive effects on dependent variables is a type of specification error that can lead to misleading regression estimates. Additionally, the results produced from structural validity and latent variable modeling studies raise additional concern about the potential impact of this omission. Several of these studies specifically analyzed the WJ III COG (e.g., Dombrowski, 2013, 2014; Dombrowski & Watkins, 2013; Strickland, Watkins, & Caterino, 2015). In these structural validity studies, it was concluded that the WJ III COG was potentially overfactored (i.e., too many factors extracted), was a solid measure of general intellectual ability, but that caution should be heeded when interpreting the broad and narrow ability scores as singular entities as they were saturated with non-trivial proportions of variance attributable to *g* and lacked enough target construct variance for confident clinical interpretation.

Floyd, Keith, Taub, and McGrew (2007) employed Structural Equation Modeling (SEM) with the WJ III COG to examine the latent predictive effects of CHC-related abilities on reading decoding. In contrast, to Evans et al. (2001), the authors chose to model a general intelligence factor and found that its influence on reading was mediated through the Stratum II broad abilities. Utilizing the same methodological approach, Benson (2007) later concluded that *g* had *direct* and significant effects on reading abilities and that the effects associated with the broad and narrow abilities was mostly small. Alternatively, Floyd, Meisinger, Gregg, and Keith (2012) suggested that an integrative model with both direct and indirect effects from *g* best predicted reading comprehension across development. Although researchers may disagree as to whether *g* has a direct or indirect latent influence on reading, the potential influence of this dimension has been accounted for in a host of psychometric studies examining cognitive-achievement relations in educational and developmental psychology (Canivez, 2013a; Carroll, 1993, 1997; Gottfredson, 1997; McDermott, Goldberg, Watkins, Stanley, & Glutting, 2006; McGill, 2016; Watkins, Lei, & Canivez, 2007).

It is also important to note that researchers examining CHC-achievement relationships have increasingly relied upon SEM and other related latent variable modeling techniques to support the primacy of broad ability interpretation in clinical practice. However, Glutting, Watkins, Konold, and McDermott (2006) argued that reliance on SEM can lead to over-interpretation of spurious constructs. Furthermore, they suggested that "psychologists cannot directly apply results from SEM" (p. 111) because latent scores differ from the observed scores used in practice. As a result, Canivez (2013a) suggested that it is necessary to consider the degree to which observed and latent variable investigations converge, with a preference for the former as those results can be more readily applied to clinical decision-making.

Given the multidimensionality inherent in contemporary measures of CHC-related abilities, researchers (e.g., Beaujean, 2015; Brunner, Nagy, & Wilhelm, 2012; Gignac, 2007, 2016; Gustafsson & Aberg-Bengtsson, 2010; Mansolf & Reise, 2016; Reise, Moore, & Haviland, 2010) have consistently recommended that the effects of the higher-order *g*-factor should be partialed out or controlled for prior to making inferences regarding the relative importance of lower-order cognitive variables. Failure to do so, may risk overestimating the effects of lower-order variables at the expense of the higher-order dimension (Carretta & Ree, 2001; Carroll, 1993, 1995; Chen, Hayes,

Carver, Laurenceau, & Zhang, 2012; Gignac, 2007). One of the ways in which this can be achieved at the observed level of measurement is to examine the incremental predictive validity provided by broad ability measures after controlling for the effects of variance already accounted for by the full scale IQ score (as a proxy for *g*).

Hierarchical Multiple Regression Analysis (HMRA) is a well-established statistical procedure for assessing incremental validity in the social sciences. In this procedure, the full scale score is entered first into a regression equation followed by the lower order scores (i.e., factor-level scores, subtests) to predict a criterion achievement variable. This entry technique allows for the predictive effects of the lower-level scores to be assessed while controlling for the effects of the full scale score and operates conceptually in very much the same way as the Schmid and Leiman technique (1957) for residualizing variance in exploratory factor analysis.

Incremental validity studies using HMRA have been conducted previously on the WJ III COG (McGill, 2015a; McGill & Busse, 2015) and other related intelligence tests (e.g., Canivez, 2013a; McGill, 2015b; McGill & Spurgin, 2016). Across these studies, it was consistently demonstrated that the omnibus full scale IQ score accounted for most of the reliable achievement variance that could be predicted in the regression models and that little additional incremental variance was accounted for by the lower-order broad and narrow ability scores after controlling for the predictive effects of the general factor. However, these studies failed to examine predictive effects across a relevant age span. As latent variable modeling studies (McArdle, Ferrer-Caja, Hamagami, & Woodcock, 2002; Tucker-Drob, 2009) have furnished evidence to suggest differential patterns of development for CHC-related broad abilities across the age span, it is possible that some CHC abilities may emerge to account for meaningful portions of variance beyond *g* at specific age points. In fact, it is this evidence that appeared to guide the analytical strategy employed by Evans and colleagues (2001) in their WJ III COG reading analyses across the school age. Unfortunately, such an investigation has yet to be conducted.

Accordingly, the current study sought to examine the incremental validity of narrow and broad CHC scores on the WJ III COG in predicting variance in reading measures from the Woodcock-Johnson III Tests of Achievement (WJ III ACH; Woodcock, McGrew, & Mather, 2001b) across the school age span (ages 6-18). Given the results of previous incremental validity research, it is believed that a reexamination of the data utilized by Evans et al. (2002) using alternative methods (i.e., HMRA) that account for the effects of the General Intellectual Ability composite score (GIA) may provide a different perspective on CHC cognitive-achievement relations specifically as they relate to reading achievement. Additionally, the present study is the first to examine the incremental validity of cognitive-achievement relationships across the school age span. If the results furnished previously by Evans and colleagues (2001) cannot be replicated in the present study, it may suggest a more circumspect appraisal of the relative importance of CHC broad and narrow abilities in predicting achievement in general and specific reading abilities.

2. Method

2.1 Participants

The participants were children and adolescents ages 6-0 to 18-11 (N = 4,722) drawn from the standardization sample for the WJ III (Woodcock et al., 2001a). Demographic characteristics are provided in detail in the WJ-IV Technical Manuals (McGrew, Schrank, & Woodcock, 2007; McGrew & Woodcock, 2001). The standardization sample was obtained using stratified proportional sampling across demographic variables of sex, race, ethnicity, geographic region, community type, and parent educational level. Examination of the tables in the Technical Manual revealed a close correspondence to the 2005 U. S. census estimates across the stratification variables. The present sample was selected on the basis that it permitted direct comparison to the results furnished by Evans et al. (2001).

2.2 Measurement Instruments

The WJ III COG is a multidimensional test of general intelligence for ages 2 to 90 years. The measure is comprised of 20 subtests, 14 of which contribute to the measurement of seven CHC-based Stratum II broad cluster scores: Comprehension-Knowledge (Gc), Fluid Reasoning (Gf), Auditory Processing (Ga), Visual-Spatial Thinking (Gv), Short-Term Memory (Gsm), Long-Term Retrieval (Glr), and Processing Speed (Gs). Additionally, six *clinical* cluster scores (Phonemic Awareness, Working Memory, Broad Attention, Cognitive Fluency, Executive Processes, and Delayed Recall) thought to reflect more narrow CHC dimensions are also available through different configurations of the subtests. All of the CHC clusters are differentially weighted according to their relative *g* loadings and then combined to form the Stratum III GIA composite. All variables on the WJ III COG are expressed as standard scores with a mean of 100 and a standard deviation of 15. Extensive normative and

psychometric data can be found in the WJ III technical manuals (McGrew et al., 2007; McGrew & Woodcock, 2001).

The WJ III-ACH is a comprehensive academic assessment battery designed to measure five academic domains: Reading, Written Language, Mathematics, Oral Language, and Academic Knowledge. The WJ III ACH is comprised of 22 subtests that combine to provide 17 broad clusters and a total achievement composite score. Broad clusters are expressed as standard scores with a mean of 100 and a standard deviation of 15. Mean internal consistency estimates for the included ages in this study ranged from .82 to .96 for the composite and broad scores that were assessed. Additional technical information for the WJ III ACH can be found in the WJ III technical manuals (McGrew et al., 2007; McGrew & Woodcock, 2001).

Table 1. Univariate descriptive statistics for WJ-III cognitive-achievement variables

Variables	M	SD	Skewness	Kurtosis
GIA	100.13	14.27	-0.19	0.46
Comprehension-Knowledge	101.12	13.89	-0.38	0.73
Fluid Reasoning	100.38	14.69	-0.29	0.44
Auditory Processing	100.06	14.43	0.6	0.73
Visual Spatial Thinking	100.13	11.92	-0.13	1.57
Short-Term Memory	100.75	14.35	-0.09	0.82
Long-Term Retrieval	100.31	13.2	-0.04	0.84
Processing Speed	100.33	13.58	-0.14	0.96
Phonemic Awareness	99.05	15.3	-0.11	0.9
Working Memory	99.84	13.9	-0.16	0.99
Broad Attention	99.02	14.41	-0.18	0.85
Cognitive Fluency	100.75	12.94	0.03	1.09
Executive Processes	99.59	13.13	-0.3	0.74
Delayed Recall	99.89	11.09	-0.22	0.74
Broad Reading	100.7	14.89	-0.34	1
Basic Reading Skills	100.66	14.49	-0.33	0.68
Reading Comprehension	100.81	14.79	-0.35	1.11

2.3 Data Analyses

Data analyses for the current study proceeded in several steps. First, participants from the WJ III normative sample ages 6-18 were divided into 13 age brackets. Next, HMRAs were conducted for each age bracket to assess the proportions of WJ III ACH reading cluster score variance accounted for by the observed WJ III COG GIA and CHC broad and narrow cluster scores across the school age. Using, SPSS version 22, the WJ III COG GIA was entered into the first block, and the seven CHC broad and six narrow cluster scores were entered jointly into the second block of the regression equations. Broad and narrow cluster effects also were individually assessed by entering each cluster alone into the second block. The WJ III ACH Broad Reading, Basic Reading Skills, and Reading Comprehension scores were used as criterion variables in the present analyses. The change in the WJ III ACH achievement variance predicted by the broad and narrow cluster scores in the second block of the regression model provided an estimate of the incremental prediction beyond the GIA in the first block of the model. According to Pedhazur (1997), these variance partitioning procedures are appropriate for the goals of the current study.

The results were interpreted using the resulting R^2 statistic as an effect size. Guidelines for interpreting R^2 as an effect size are found in Cohen (1988); they are “small,” .01; “medium,” .09; and “large,” .25. The critical coefficient in HMRA analyses is the incremental squared multiple correlation coefficient (ΔR^2). The ΔR^2 represents the amount of variance that is explained by an Independent Variable (IV) after controlling for the effects

of IVs previously entered into a regression equation. At present, there are no conventional guidelines for interpreting the ΔR^2 coefficient, thus Cohen's interpretive framework for R^2 was applied.

2.4 Power Analysis

Given the fact that HMRA analyses was conducted across 13 different age brackets rather than the normative sample as a whole, an *a priori* power analysis was conducted to determine the minimum number of cases needed to exhibit adequate power for this study. Analyses were conducted utilizing G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009), a software tool for general power analysis. Using a linear fixed model multiple regression design for assessing incremental R^2 increase with seven tested predictors (CHC factors) and eight total predictors (inclusion of the GIA in block one of the regression equation), power equal to .80, and an alpha level of .05, it was determined that a sample size of 153 cases was needed to detect a medium effect size (f^2 = .09; Cohen, 1988). It is expected that this study will yield small to medium effect sizes based upon the results of previous empirical investigations of the incremental prediction beyond the full-scale score provided by various intelligence test part-scores.

3. Results

The means, standard deviations, skewness, and kurtosis statistics for all of the WJ III cognitive and achievement variables are listed in Table 1. The mean (99.05 to 101.12) and standard deviation ranges (11.09 to 14.89) for the cognitive-achievement variables generally reflect values that would be expected for normally distributed standard score variables. Skewness values ranged from -0.38 to 0.60. Additionally, inspection of the residual plots of the data indicated that the regression models utilized in this study met the assumptions for homoscedasticity of the residuals. The distribution of cases across the 13 age brackets are reported in Table 2. HMRA sample sizes ranged from 249 (age 17) to 579 (age 10).

Table 2. Distribution of cases across age level in the school age sample (7-18)

Age	n
6	308
7	335
8	431
9	533
10	579
11	428
12	352
13	324
14	292
15	302
16	308
17	249
18	281

3.1 Broad Reading

Table A.1 presents the results from hierarchical multiple regression analyses for Broad Reading. The GIA accounted for statistically significant ($p < .05$) portions of the Broad Reading scores in all of the age brackets that were assessed. Across the 13 regression models utilized to predict Broad Reading, the GIA accounted for 48% (age 6) to 70% (age 17; M = 59%) of the criterion variance. The R^2 values that corresponded to those variance increments all reflect large effects using Cohen's (1988) interpretive guidelines. As illustrated in Figure 1, the amount of reliable criterion variance accounted for by the GIA was consistently large whereas, the contributions made by the broad and narrow ability clusters were more modest.

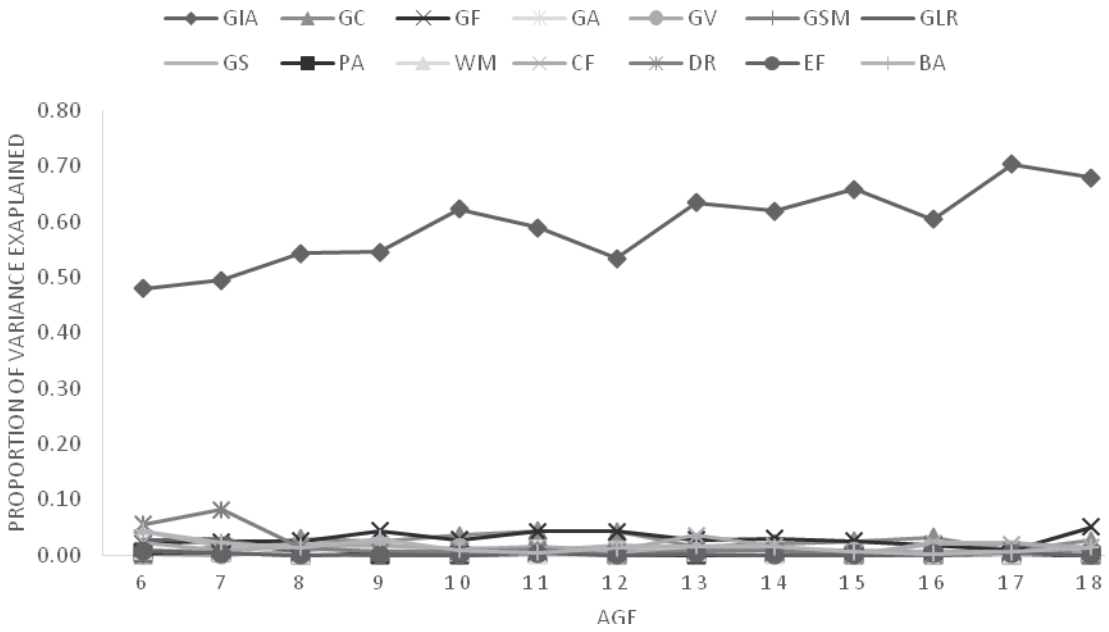

Figure 1. Incremental predictive effects of general and broad/narrow cognitive abilities on Broad Reading

GIA = General Intellectual Ability Composite; GC = Comprehension-Knowledge; GF = Fluid Reasoning; GA = Auditory Processing; GV = Visual-Spatial Thinking; GSM = Short-Term Memory; GLR = Long-Term Retrieval; GS = Processing Speed; PA = Phonemic Awareness; WM = Working Memory; CF = Cognitive Fluency; DR = Delayed Recall; EF = Executive Processes; BA = Broad Attention. Squared multiple correlation coefficient values represents proportion of variance accounted for by variables at their entry point into regression equation after controlling for the effects of the general factor (e.g., $R^2/\Delta R^2$ values multiplied by 100).

Broad clusters entered jointly into the second block of the regression equations accounted for 4% (age 17) to 8% (ages 9, 11, 16; M = 7%) additional variance beyond *g*. The ΔR^2 values that corresponded to those variance increments reflect small effects. The incremental variance coefficients attributed to individual WJ III COG broad clusters ranged from 0% to 5%. Although ANOVA-based tests of significance indicated that the broad clusters on the WJ III COG accounted for significant portions of incremental achievement variance beyond the effects of the GIA, the effect size estimates associated with these indicators were more circumspect.

Narrow clusters entered jointly into the second block of the regression equations accounted for 1% (age 15) to 11% (ages 9, 7; M = 4%) additional variance beyond *g*. The ΔR^2 values that corresponded to those variance increments reflect small to moderate effects. The incremental variance coefficients attributed to individual WJ III COG narrow clusters ranged from 0% to 8% (Delayed Recall, age 7). Although ANOVA-based tests of significance indicated that the narrow clusters on the WJ III COG contributed significant portions of incremental achievement variance beyond the effects of the GIA, effect size estimates were more circumspect.

3.2 Basic Reading Skills

Table A.2 presents the results from hierarchical multiple regression analyses for Basic Reading Skills. The GIA accounted for statistically significant ($p < .05$) portions of the Basic Reading scores in all of the age brackets that were assessed. Across the 13 regression models utilized to predict Basic Reading, the GIA accounted for 40% (age 12) to 63% (age 17; M = 49%) of the criterion variance. The R^2 values that corresponded to those variance increments all reflect large effects using Cohen's interpretive guidelines. As illustrated in Figure 2, the amount of reliable criterion variance accounted for by the GIA was consistently large whereas, the contributions made by the broad and narrow ability clusters were more modest.

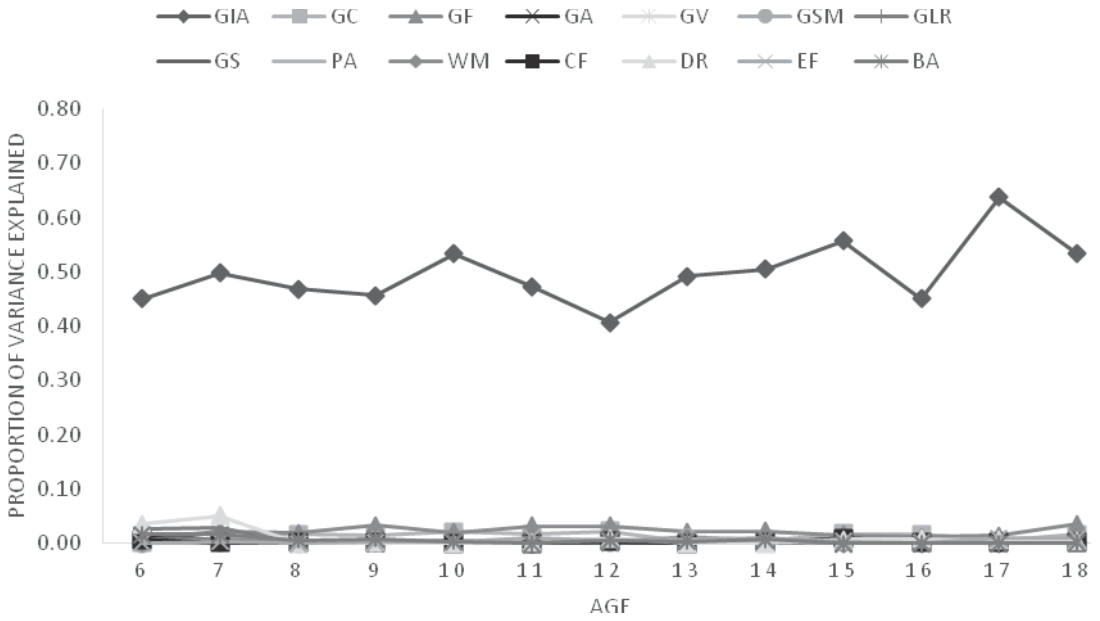

Figure 2. Incremental predictive effects of general and broad/narrow cognitive abilities on Basic Reading

GIA = General Intellectual Ability Composite; GC = Comprehension-Knowledge; GF = Fluid Reasoning; GA = Auditory Processing; GV = Visual-Spatial Thinking; GSM = Short-Term Memory; GLR = Long-Term Retrieval; GS = Processing Speed; PA = Phonemic Awareness; WM = Working Memory; CF = Cognitive Fluency; DR = Delayed Recall; EF = Executive Processes; BA = Broad Attention. Squared multiple correlation coefficient values represents proportion of variance accounted for by variables at their entry point into regression equation after controlling for the effects of the general factor (e.g., $R^2/\Delta R^2$ values multiplied by 100).

Broad clusters entered jointly into the second block of the regression equations accounted for 2% (age 17) to 6% (ages 6; M = 4%) variance beyond g. The ΔR^2 values that corresponded to those variance increments reflect small effects. The incremental variance coefficients attributed to individual WJ III COG broad clusters ranged from 0% to 3%. Although ANOVA-based tests of significance indicated that the broad clusters on the WJ III COG contributed significant portions of incremental achievement variance beyond the effects of the GIA, effect size estimates were not clinically significant.

Narrow clusters entered jointly into the second block of the regression equations accounted for 1% (ages 8-10, 16, 17) to 7% (age 7; M = 2%) additional variance beyond g. The ΔR^2 values that corresponded to those variance increments reflect small effects. The incremental variance coefficients attributed to individual WJ III COG narrow clusters ranged from 0% to 5% (Delayed Recall, age 7). Although ANOVA-based tests of significance indicated that the narrow clusters on the WJ III COG contributed significant portions of incremental achievement variance beyond the effects of the GIA, effect size estimates were more circumspect.

3.3 Reading Comprehension

Table A.3 presents the results from hierarchical multiple regression analyses for Reading Comprehension. The GIA accounted for statistically significant ($p < .05$) portions of the Reading Comprehension scores in all of the age brackets that were assessed. Across the 13 regression models utilized to predict Reading Comprehension, the GIA accounted for 46% (age 6) to 67% (age 17; M = 61%) of the criterion variance. The R^2 values that corresponded to those variance increments all reflect large effects using Cohen's interpretive guidelines. As illustrated in Figure 3, the amount of reliable criterion variance accounted for by the GIA was consistently large whereas, the contributions made by the broad and narrow ability clusters were more modest.

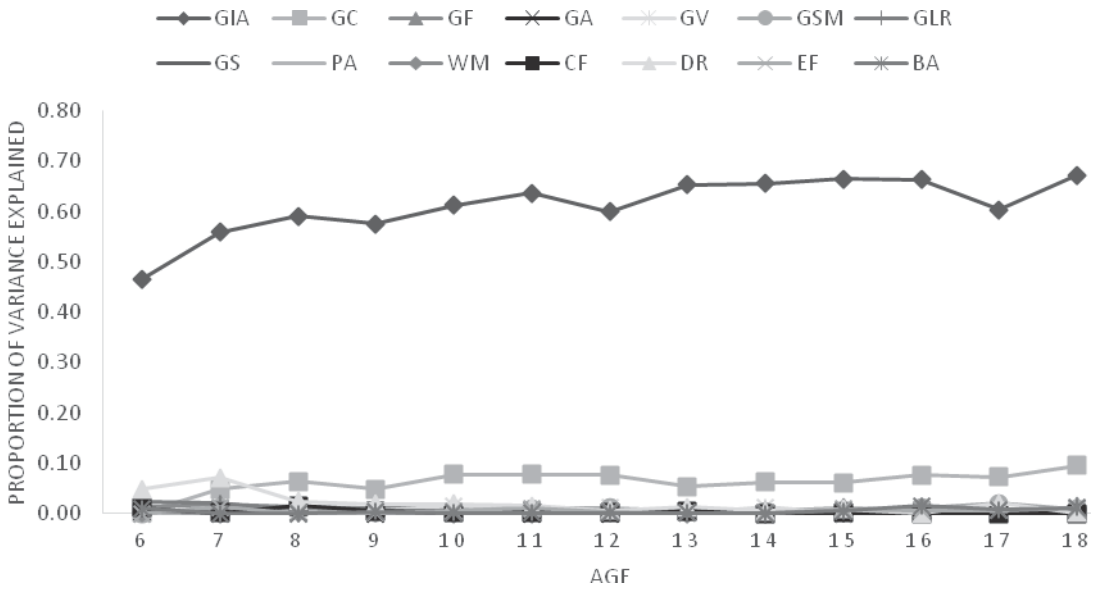

Figure 3. Incremental predictive effects of general and broad/narrow cognitive abilities on Reading Comprehension

GIA = General Intellectual Ability Composite; GC = Comprehension-Knowledge; GF = Fluid Reasoning; GA = Auditory Processing; GV = Visual-Spatial Thinking; GSM = Short-Term Memory; GLR = Long-Term Retrieval; GS = Processing Speed; PA = Phonemic Awareness; WM = Working Memory; CF = Cognitive Fluency; DR = Delayed Recall; EF = Executive Processes; BA = Broad Attention. Squared multiple correlation coefficient values represents proportion of variance accounted for by variables at their entry point into regression equation after controlling for the effects of the general factor (e.g., $R^2/\Delta R^2$ values multiplied by 100).

Broad clusters entered jointly into the second block of the regression equations accounted for 3% (age 6) to 10% (ages 17; M = 8%) additional variance beyond g. The ΔR^2 values that corresponded to those variance increments reflect small to moderate effects. The incremental variance coefficients attributed to individual WJ III COG broad clusters ranged from 0% to 9%. With only the variance coefficient associated with the Comprehension-Knowledge cluster at age 17 (ΔR^2_{Gc} = .09) accounting for meaningful amounts of achievement variance on its own. Although ANOVA-based tests of significance indicated that the broad clusters on the WJ III COG contributed significant portions of incremental achievement variance beyond the effects of the GIA, most of corresponding effect size estimates were mostly small.

Narrow clusters entered jointly into the second block of the regression equations accounted for 0% (age 14) to 9% (age 7; M = 4%) additional variance beyond g. The ΔR^2 values that corresponded to those variance increments reflect small to moderate effects. The incremental variance coefficients attributed to individual WJ III COG narrow clusters ranged from 0% to 7% (Delayed Recall, age 7). Although ANOVA-based tests of significance indicated that the narrow clusters on the WJ III COG contributed significant portions of incremental achievement variance beyond the effects of the GIA, effect size estimates were more circumspect.

3.4 Post-Hoc Power Analysis

A post hoc power analysis revealed that for each of the IVs, moderate $R^2/\Delta R^2$ effect sizes (e.g., $\geq$ .09) could be reliably detected with α set at .05, at a power of greater than .94 in all of the regression models that were estimated in the current study. As a result, the failure to consistently locate meaningful incremental predictive effects for the Stratum I/II variables (as per Evans et al., 2001) in the present study is not likely the result of sampling bias (Nakagawa, 2004).

4. Discussion

The present study reexamined the predictive effects of broad and narrow CHC constructs for reading achievement across the school age span. Although a previous investigation by Evans et al. (2001), posited that several CHC-related abilities on the WJ III COG were clinically significant predictors of reading measures across the same age span, the potential moderating effects of the general factor were not accounted for in their study. As noted by Rodriguez, Reise, and Haviland (2016), "unless all relevant variables are in the predictor space, one cannot know the true unique relation between predictors and the criterion" (p. 233).

Subsequent structural and latent variable modeling studies conducted on the WJ III COG suggest that (a) many of the broad and narrow ability scores contain large portions of variance attributable to *g* (Dombrowski, 2013, 2014; Dombrowski & Watkins, 2013), (b) *g* exerts strong direct or indirect influence on reading achievement (Benson, 2007; Floyd et al., 2007; Floyd et al., 2012; Vanderwood, McGrew, Flanagan, & Keith, 2002), and (c) when the predictive effects *g* are controlled for, the aggregate incremental contributions of broad and narrow abilities may be small (McGill, 2015; McGill & Busse, 2015). As a consequence, the present study sought to reexamine the findings produced by Evans and colleagues (2001) utilizing an alternative analytical scheme (HMRA) to determine the extent to which WJ III COG broad and narrow cluster scores provided meaningful improvements in the prediction of WJ III ACH reading scores *beyond* the GIA composite across the same age range.

Results from the present study indicate that the GIA score consistently accounted for statistically significant and large effects across the school age for all of the reading achievement variables that were assessed (R^2 coefficients ranged from .49 to .61). While the broad and narrow abilities as a whole accounted for moderate increments in prediction beyond *g* for Broad Reading (ages 6-7) and Reading Comprehension (Ages 7, 10, 18), the contributions of individual indicators were mostly trivial. Whereas several broad and narrow abilities accounted for statistically significant effects, the magnitude of these effects was consistently small (.00 to .06) after controlling for *g*. However, meaningful incremental prediction was accounted for by several Stratum I/II variables (e.g., Crystallized Ability, Delayed Recall) for some reading measures (Basic Reading Skills and Reading Comprehension). Additionally, despite evidence suggesting that latent CHC broad and narrow constructs differentiate across the age span, the manifestation of these effects in the current study was less consistent. Whereas, linear increases in prediction was observed for Gc in the Reading Comprehension model, this same effect on other areas of reading was not observed. In contrast, the predictive effects of the GIA score (as a proxy for *g*) increased linearly across school age in all of the regression models that were assessed suggesting that the accumulative effects of general ability may render the GIA a more robust predictor of reading achievement as individual's progress through school.

The present results diverge from those produced from Evans et al. (2001) in several ways. First, although Evans and colleagues suggested that Phonological Awareness, Gs, and Glr were clinically significant predictors of WJ III ACH reading abilities, the unique contributions of those indicators was more modest in the present study. More importantly, the predictive effects associated with broad and narrow dimensions as a whole were manifestly weaker once the effects of the GIA were accounted for. Given the WJ III structural validity findings furnished by Dombrowski (2013, 2014) and Dombrowski and Watkins (2013) indicating that these measures mostly sample general intelligence, the latter finding was not surprising.

The present study is the first to describe the incremental validity of cognitive-achievement relationships across a relevant age span. Whereas, related predictive validity studies with cognitive measures (e.g., Benson, Kranzler, & Floyd, 2016; Canivez, 2013a; McGill, 2015a, 2015b; McGill & Spurgin, 2016) have largely suggested that broad and narrow cognitive abilities account for trivial portions of achievement after controlling for general ability, the present results suggest that this conclusion as a general rule may be overstated. As previously mentioned, although the GIA consistently accounted for large reading effects, lower-order scores accounted for meaningful incremental prediction in several circumstances.

Specifically, the present analyses indicate well that Gc may account for meaningful reading variance beyond the GIA. This finding is consistent with the corpus of latent variable modeling research examining the predictive effects of CHC dimensions on reading achievement (Beaujean, Parkin, & Parker, 2014; Benson, 2007; Floyd et al., 2007; Floyd et al., 2012; Vanderwood et al., 2002) and is consonant with the *investment theory* first proposed by Cattell (1971). Cattell argued that cognitive resources are invested selectively in the environment, resulting in the development of specific broad abilities over others. As a result, when predicting reading achievement, it may be beneficial to go beyond *g*. Nevertheless, the failure to replicate the broader results produced by Evans et al. (2001),

suggest that a more circumspect appraisal of the importance of CHC dimensions in relationship to the development of reading skills may be needed in the professional literature.

4.1 Study Limitations and Future Directions

This study is not without limitations that should be considered when interpreting the results. Most notably, the WJ III has recently been revised and is now currently in its fourth edition (WJ IV; Schrank, McGrew, & Mather, 2014). Nevertheless, the current study utilized data from the previous measurement instrument for several reasons. First, as the stated goal of the study was ostensibly to reexamine the results furnished by Evans et al. (2001), multiple regression analyses with the same sample and measurement instrument were necessary for a direct comparison to these results given the CHC content and structural changes implemented in the WJ IV (see McGrew, LaForte, & Schrank, 2014). Second, over the last 15 years the WJ III has served as the preeminent reference instrument for making refinements to the CHC model (McGrew, 2009; McGrew & Wendling, 2010; Schneider & McGrew, 2012) as well as for understanding broader cognitive-achievement relationships in educational and developmental psychology. While there is no doubt that the WJ IV is poised to take its place, the so-called "reproducibility crisis" (Pashler & Wagenmakers, 2012) in scientific psychology illustrates well that it is sometimes beneficial to reevaluate the evidence-base for widely accepted theories (or recommended application of those theories) in light of new developments by researchers. Relatedly, given the critical role that the WJ battery has played in the development of CHC theory, it is believed that the present results will be important for linking and establishing an *evidentiary chain* with related analyses on the WJ IV and other CHC-related measurement instruments.

As previously noted, structural validity studies on the WJ III COG suggest that the broad and narrow dimensions may not be measured well, if at all, apart from general intelligence across the school-age. Nevertheless, structural validity is necessary but not singularly sufficient for establishing construct validity. As a consequence, additional examinations of concurrent and predictive relationships with external measures are also important elements of scale validation (Canivez, 2013b; Cronbach & Meehl, 1955). According to Schneider, Mayer, and Newman (2016) it is not enough that a factor analysis supports the existence of a latent dimension, that factor should also "predict something that matters, above and beyond the other facets of intelligence" (p. 12). The current results add to a growing literature base suggesting that most of the predictive variance accounted for by broad and narrow CHC dimensions on the WJ and related measures can be sourced to a more global general intelligence dimension. As a consequence, Cucina and Howardson (2016) suggest that even if one accepts the legitimacy of all posited CHC vectors, these findings indicate that these dimensions may not be sampled well by existing measures. As noted long ago by McGhee (2002), "Deconstruction of *g* into more narrowly defined primary abilities does not allow for greater diagnostic interpretation of strengths and weaknesses, but steers away from how these abilities are integrated" (p. 201).

Related research on the WJ IV is presently starting to accumulate however, a recent structural validity study of the WJ IV COG (Dombrowski et al., 2016) failed to locate several posited CHC broad abilities and, like its predecessor, that general intelligence accounted for most of the reliable variance in the lower-order measures. Accordingly, researchers have also begun to update the previous series of cognitive-achievement relations studies (Evans et al., 2002; Floyd et al., 2003, 2008) with the WJ IV. Whereas, Cormier, McGrew, Bulut, and Funamoto (2016) included the general factor in their reading achievement analyses, this variable was not included in a related analyses of writing achievement produced by the same research team (Cormier et al., 2016). As noted long ago by Meehl (1990), one can only have confidence in a theory when it has been subjected to a "risky" empirical test, with due consideration to the specification of appropriate parameters (i.e., *g*) which may obviate the importance of the target variables in question (lower-order CHC variables). Additionally, both studies failed to cite any of the previous research questioning the structural or predictive validity of CHC-related scores on the WJ III which is vital for informing future studies with the WJ IV and other related CHC instruments (Dombrowski et al., 2016).

It is also important to point out that the present study relied upon observed standard scores. In contrast, Evans et al. (2001) assessed the predictive effects of broad and narrow abilities using *W*-scores which are derived from a 1-parameter Rasch measurement model. Nevertheless, it should be noted that WJ III standard scores used in the present study are derived utilizing the same *W* scale as a reference anchor (Jaffe, 2009).

Although conventional guidelines (Cohen, 1988) for interpreting the R^2 statistic as an effect size were employed in the present study, methodologists (Dawes, 1999; Keith, 2015) have cautioned against ridged application of these criteria to make inferences about the relative importance of variables. Schneider and Newman (2015) noted that while broad abilities have historically accounted for modest levels of incremental prediction after accounting for general intelligence, this should not automatically preclude their consideration in practical applications of

intelligence testing. That is, the relative importance of cognitive variables as it relates to prediction remains very much in the eye of the beholder. Whereas some clinicians may find an additional 4% of predicted variance to be beneficial, others may balk at the cost in time and assessment resources needed to obtain these modest increments.

Finally, as in other incremental predictive validity investigations, multicollinearity of the GIA and the broad and narrow cluster scores in the hierarchical multiple regression analyses was observed in the present study due to the linear combination of subtests to produce cluster scores and the GIA. However, it should be noted that multicollinearity is not a threat to validity in regression studies that are limited to interpreting the R^2 statistic (Cohen, Cohen, West, & Aiken, 2003; Pedhazur, 1997; Tabachnick & Fidell, 2013), nor does it invalidate the use of HMRA to detect improvements in R^2 such as those provided by the broad and narrow scores beyond the GIA (Schneider, 2008). Although, it has long been suggested (e.g., Hale, Fiorello, Kavanagh, Holdnack, & Aloe, 2007; Keith, 2015) that the predictive effects of lower-order scores are suppressed because they lack the freedom to vary from global scores such as the GIA, this argument fails to take into consideration that the correlations between broad/narrow dimensions and *g* are far from unitary. As previously mentioned, the GIA composite is differentially weighted based upon the *g* loadings from its constituent measures. To buttress this position, it is worth noting that in the present study the Gs cluster consistently produced some of the weakest residual predictive effects despite having a relatively low *g* loading. In contrast, the Gc cluster consistently produced the largest residual predictive estimates in the despite its relatively large contribution to the overall GIA score.

Relatedly, due to the hierarchical structure of the measurement instrument, the importance of order of entry when utilizing HMRA to assess the incremental effects of IVs must also be considered. Hale, Fiorello, Kavanaugh, Holdnak, and Aloe (2007) demonstrated that by entering the first-order factor scores from a previous iteration of the Wechsler Intelligence Scale prior to entering the FSIQ score, the predictive effects of FSIQ were diminished to the point of being inconsequential. As a result, Hale and colleagues argued that order of entry arbitrarily determines whether scores such as the GIA mean *everything* or *nothing* due to the long established fact that variables entered first into a regression equation capture greater criterion variance than variables entered later (Cohen et al., 2003). However, order of entry is not an arbitrary process and must be determined *a priori* according to the expected theoretical relationships between variables (Pedhazur, 1997). The proposed indirect hierarchical structural model for the WJ III COG (as per CHC theory) support entering the GIA score prior to the broad and narrow clusters due to the fact that these scores are subordinate to the GIA. Further, reverse entry conflicts with CHC theory and constitutes a violation of the scientific law of parsimony.

5. Conclusion

In sum, the current reexamination of previous results for reading achievement, coupled with independent structural and incremental predictive validity investigations of the WJ battery and other CHC-related instruments (e.g., Benson et al., 2016; Canivez, 2008; Canivez & McGill, 2016; Canivez, Watkins, & Dombrowski, 2016a, 2016b; DiStefano & Dombrowski, 2006; McGill & Spurgin, 2015, 2016) coalesce to suggest a more circumspect appraisal of the empirical and practical importance of many broad and narrow abilities within the CHC lexicon as measured by commercial ability tests. Nevertheless, clinical applications of the CHC model (e.g., Fiorelllo & Primano, 2015; Flanagan, Ortiz, & Alfonso, 2013) in education and psychology continue to focus disproportionally on the importance of broad and narrow abilities in isolation, with little regard for *g* despite the influence of Carroll's (1993) treatise on the broader CHC marriage. Although well intentioned, a countering body of scientific literature is presently accumulating to suggest that these practices may not be psychometrically defensible.

Acknowledgments

The WJ-III standard score data utilized in this study was used with permission from the Woodcock-Muñoz Foundation. A preliminary version of this research was presented at the 2015 annual meeting of the International Society for Intelligence Research.

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Appendix A

Table A.1 Incremental contribution of CHC cognitive abilities in predicting broad reading beyond the general factor across the school age

	6	7	8	9	10	11	12	13	14	15	16	17	18	*M*
GIA	0.48*	0.49*	0.54*	0.54*	0.62*	0.59*	0.53*	0.63*	0.61*	0.65*	0.60*	0.70*	0.68*	0.59
CHC (df = 7)[a]	0.07*	0.06*	0.07*	0.08*	0.07*	0.08*	0.10*	0.06*	0.06*	0.05*	0.08*	0.04*	0.07*	0.07
Gc	0.00	0.01*	0.03*	0.02*	0.03*	0.04*	0.04*	0.01*	0.02*	0.02*	0.03*	0.00*	0.02*	0.02
Gf	0.02*	0.02*	0.02*	0.04*	0.02*	0.04*	0.04*	0.02*	0.03*	0.02*	0.01*	0.00*	0.05*	0.02
Ga	0.01*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00*	0.00	0.00	0.00
Gv	0.00	0.00	0.00*	0.00	0.01*	0.00*	0.00	0.00*	0.01*	0.00*	0.00	0.00	0.00	0.00
Gsm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glr	0.02*	0.02*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gs	0.04*	0.01*	0.01*	0.02	0.00	0.00*	0.01*	0.01*	0.01*	0.00	0.02*	0.02*	0.01*	0.01
Clinical (df = 6)[a]	0.10*	0.11*	0.04*	0.05*	0.02*	0.03*	0.03*	0.04*	0.04*	0.01*	0.02*	0.03*	0.03*	0.04
PA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WM	0.00*	0.00	0.00	0.01*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CF	0.02*	0.00*	0.01*	0.01*	0.01*	0.01*	0.00*	0.03*	0.01*	0.00	0.02*	0.01*	0.01*	0.01
DR	0.05*	0.08*	0.01*	0.00	0.00	0.01*	0.00	0.00*	0.00*	0.00	0.00	0.00	0.00	0.01
EF	0.00*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BA	0.04*	0.02*	0.01*	0.02*	0.00*	0.00	0.01*	0.01*	0.01*	0.00	0.00	0.00	0.01*	0.01

Note. GIA = General Intellectual Ability; CHC = Cattell-Horn-Carroll; Gc = Comprehension-Knowledge; Gf = Fluid Reasoning; Ga = Auditory Processing; Gv = Visual-Spatial Thinking; Gsm = Short-Term Memory; Glr = Long-Term Retrieval; Gs = Processing Speed; PA = Phonemic Awareness; WM = Working Memory; CF = Cognitive Fluency; DR = Delayed Recall; EF = Executive Processes; BA = Broad Attention. Coefficients represent the proportion of variance accounted for by variables at their entry point into regression equation. [a]Degrees of freedom reflects controlling for the effects of the GIA. *$p < .05$.

Table A.2 Incremental contribution of CHC cognitive abilities in predicting basic reading skills beyond the general factor across the school age

	6	7	8	9	10	11	12	13	14	15	16	17	18	*M*
GIA	0.45*	0.49*	0.46*	0.45*	0.53*	0.47*	0.40*	0.49*	0.50*	0.55*	0.45*	0.63*	0.53*	0.49
CHC (df = 7)[a]	0.06*	0.05*	0.03*	0.04*	0.03*	0.03*	0.05*	0.03*	0.03*	0.03*	0.04*	0.02*	0.05*	0.04
Gc	0.00	0.01*	0.01*	0.01*	0.02*	0.01*	0.02*	0.00	0.00	0.01*	0.01*	0.00	0.01*	0.01
Gf	0.01*	0.02*	0.01*	0.03*	0.02*	0.03*	0.03*	0.02*	0.02*	0.01*	0.01*	0.01*	0.03*	0.02
Ga	0.01*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00*	0.00	0.00	0.00	0.00	0.00
Gv	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gsm	0.00	0.00	0.00	0.00*	0.00	0.00	0.00	0.01*	0.00	0.00	0.00	0.00	0.00	0.00
Glr	0.02*	0.02*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00*	0.00	0.00	0.00	0.00
Gs	0.01*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Clinical (df = 6)[a]	0.06*	0.07*	0.01*	0.01*	0.01*	0.02*	0.04*	0.02*	0.03*	0.02*	0.01*	0.02*	0.01*	0.02
PA	0.00*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00*	0.00	0.00	0.00	0.00	0.00
WM	0.00	0.00*	0.00	0.00	0.00	0.00	0.00	0.01*	0.00	0.00	0.00	0.00	0.00	0.00
CF	0.00*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00*	0.00	0.00	0.00	0.00
DR	0.03*	0.05*	0.00	0.00	0.00	0.00	0.01*	0.00	0.00	0.00*	0.00*	0.00	0.00	0.00
EF	0.00	0.00	0.00	0.00	0.00	0.01*	0.00	0.00*	0.00*	0.00	0.00	0.00*	0.00*	0.00
BA	0.01*	0.01*	0.00	0.00*	0.00	0.00	0.00	0.00	0.00*	0.00	0.00	0.00	0.00	0.00

Note. GIA = General Intellectual Ability; CHC = Cattell-Horn-Carroll; Gc = Comprehension-Knowledge; Gf = Fluid Reasoning; Ga = Auditory Processing; Gv = Visual-Spatial Thinking; Gsm = Short-Term Memory; Glr = Long-Term Retrieval; Gs = Processing Speed; PA = Phonemic Awareness; WM = Working Memory; CF = Cognitive Fluency; DR = Delayed Recall; EF = Executive Processes; BA = Broad Attention. Coefficients represent the proportion of variance accounted for by variables at their entry point into regression equation. [a]Degrees of freedom reflects controlling for the effects of the GIA. *$p < .05$.

Table A.3 Incremental contribution of CHC cognitive abilities in predicting reading comprehension beyond the general factor across the school age

	6	7	8	9	10	11	12	13	14	15	16	17	18	*M*
GIA	0.46*	0.55*	0.59*	0.57*	0.61*	0.63*	0.60*	0.65*	0.65*	0.66*	0.66*	0.60*	0.67*	0.61
CHC (df = 7)[a]	0.03*	0.07*	0.08*	0.07*	0.09*	0.08*	0.09*	0.07*	0.08*	0.07*	0.08*	0.08*	0.10*	0.08
Gc	0.00	0.04*	0.06*	0.04*	0.07*	0.07*	0.07*	0.05*	0.06*	0.06*	0.07*	0.07*	0.09*	0.06
Gf	0.01*	0.01*	0.01*	0.01*	0.01*	0.01*	0.00*	0.00	0.00	0.01*	0.00*	0.00	0.01*	0.01
Ga	0.00	0.00	0.00	0.00	0.00	0.00	0.00	00.00	0.00	0.00	0.00	0.00	0.00	0.00
Gv	0.00	0.00	0.00	0.00	0.01*	0.00	0.01*	0.00	0.01*	0.00	0.00	0.00	0.00	0.00
Gsm	0.00	0.01*	0.00*	0.00	0.00	0.01*	0.01*	0.00	0.00	0.00*	0.01*	0.02*	0.00*	0.00
Glr	0.02*	0.02*	0.00	0.00	0.00*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gs	0.00*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00*	0.00	0.00	0.01*	0.00
Clinical (df = 6)[a]	0.05*	0.09*	0.03*	0.02*	0.03*	0.03*	0.01*	0.03*	0.00*	0.02*	0.02*	0.04*	0.02*	0.03
PA	0.00	0.00*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01*	0.00	0.00	0.00
CF	0.01*	0.00	0.01*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DR	0.04*	0.07*	0.02*	0.01*	0.01*	0.01*	0.00*	0.01*	0.00	0.00*	0.00	0.02*	0.00	0.02
EF	0.00	0.01*	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00*	0.00*	0.00*	0.01*	0.00

BA	0.01*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01*	0.00*	0.01*	0.00

Note. GIA = General Intellectual Ability; CHC = Cattell-Horn-Carroll; Gc = Comprehension-Knowledge; Gf = Fluid Reasoning; Ga = Auditory Processing; Gv = Visual-Spatial Thinking; Gsm = Short-Term Memory; Glr = Long-Term Retrieval; Gs = Processing Speed; PA = Phonemic Awareness; WM = Working Memory; CF = Cognitive Fluency; DR = Delayed Recall; EF = Executive Processes; BA = Broad Attention. Coefficients represent the proportion of variance accounted for by variables at their entry point into regression equation. [a]Degrees of freedom reflects controlling for the effects of the GIA. *$p < .05$.

Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Family Literacy Programs in Qatar: Teachers' and Parents' Perceptions and Practices

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Received: March 14, 2017 Accepted: April 6, 2017 Online Published: April 12, 2017

doi:10.5539/jedp.v7n1p283 URL: http://doi.org/10.5539/jedp.v7n1p283

Abstract

The importance of the role of the family in the development of children's early literacy has been widely recognized. Therefore, schools have frequently attempted to establish programs that help families promote their children's literacy learning. This study explored early childhood teachers' and parents' perceptions about family literacy programs in which they got involved. It also examined practices used by teachers and parents to promote children's literacy learning as well as to support the role of the family in the development of literacy. The sample included all teachers and parents who participated in the family literacy programs in two independent preschool settings in Qatar. A total of 16 teachers and 156 parents completed the self-reported questionnaires. Moreover, interviews with 10 teachers and 20 parents were conducted. Results indicated that teachers' and parents' perceptions and practices of family involvement programs were ranged from high to fairly moderate. A strong positive correlation was found between parents' perceptions of family literacy programs and their practices, while teachers' perceptions were not correlated with their practices. In light of the study findings, implications for expanding family literacy programs are described.

Keywords: family literacy, literacy development, teachers' perceptions, parental involvement, preschool education

1. Background

The State of Qatar is a small country located in a peninsula in the Arabian Gulf, and bordering only Saudi Arabia. Qatar occupies 11,437 square kilometers (4,416 square miles), including several islands (Ministry of Information and Culture, 1994). The current population of Qatar is approximately 2,659,000, as in March 2017 (Ministry of Development Planning and Statistics, 2017), the majority of whom (about 92 percent of the country's population) live in Doha, Qatar's capital city, which is located in the east on the Arabian Gulf.

Arabs and Muslims represent a large percentage of the population. Non-Qataris constitute the largest proportion of the country's labor force. Recently, Qatar is considered as one of the world's wealthiest countries since it has a high per capita income, derived from oil and liquid natural gas reserves (Al Attiyah & Lazarus, 2007). Like other Gulf countries, Qatar has a strong Arabic culture stemming from Islamic principles and long-practiced social norms and traditions (Al-Kaabi, 2010). Regarding the structure of the Qatari family, it is considered large compared with families in most Western countries. According Al-Kaabi (2010, p. 19), over three quarters of the parents have three or more children in their family; 78% and 21.9% have six children or more in the family.

Over the last decade, improving quality of education has been among the top priorities of the Qatari government's development agendas. In fact, the government of Qatar became alarmed that the educational system was "not producing high-quality outcomes and was rigid, outdated, and resistant to reform" (Brewer et al., 2007, p. iii). Consequently, Qatar initiated a systematic school reform strategy, known as *Education for a New Era (EFNE)*. In 2002, the State of Qatar established the Supreme Education Council (SEC) (converted currently to the Ministry of Education) to head the change. The development of government-funded independent schools took place; these were operated by individuals and fully supervised by the Supreme Education Council (SEC). In

2004, the SEC opened the first twelve independent schools with the goal of transforming Qatar's vision of developing a world-class education system into a reality (Romanowski & Nasser, 2012, p. 69). Currently, there are three types of schools in the Qatari educational system: governmental-funded schools (independent schools), private schools, and international schools. The education system in Qatar comprises a 6-year cycle of primary education, followed by a 3-year cycle of preparatory education, and then a 2-year cycle of secondary education. Primary, preparatory, and secondary cycles are compulsory for everyone and are free of charge at independent schools. In addition, there is a 2-year cycle of preschool education (kindergarten), which is considered as a non-compulsory cycle, serving children aged 4 to 6 before they enter primary school. This cycle includes two preschool educational levels: KG 1 (Level 1), serving children aged 4 to 5, and KG 2 (Level 2), serving children aged 5 to 6.

2. Introduction

Homes are the first social organization that children face from the very early years of childhood. Homes are considered as cultural environments which shape children's behaviors, attitudes, language, emotions, thinking, meanings and even dreams (Al-Momani, Ihmeideh, & Abu-Naba'h, 2010, p. 767). Homes are also deemed as the first place in which literacy emerges and they have a significant effect on children's success or failure in their journey towards how to read and write (National Center for Education Statistics, 2003). The role of the home environment and family context in the development of early literacy has been a focus of scholarly interest for decades, and a substantial body of research has revealed that homes are central to developing children's early literacy skills (Buhs, Welch, Burt, & Knoche, 2011).

An increased and a continuous family involvement during children's early years of schooling has been observed to correlate with higher levels of literacy achievement (Dearing, Kreider, Simpkins, & Weiss, 2006; Harper, Platt, & Pelletier, 2011; Steinera, 2014). Thus, family involvement with young children is extremely vital in developing children's literacy skills. However, this could be difficult without building positive and effective relationships between home and school (Ihmeideh & Oliemat, 2015). Such relationships, as argued by Delgado-Gaitan (1993), require schools to develop comprehensive ways and strategies to support parents and/or family members in developing children's literacy skills.

In recent years, there has been a considerable number of family literacy programs globally. These programs (i.e., Barratt-Pugh & Allen, 2011; Bloome et al., 2000; Hannon, 1998; Morrow, 2011; St. Pierre, Ricciuti, & Rimdzius, 2005; Talan, 2001) were aimed at helping parents to support their children's literacy skills and focused on developing parental literacy skills to support their children's literacy development. The fundamental aim of family literacy programs is to help parents at home and school get involved in literacy practices in an effective way (National Center for Education Statistics, 2003).

This study explores early childhood teachers' and parents' perceptions and practices about family literacy programs after being involved in such programs in Qatar. The programs took place in two independent kindergartens in Doha, and lasted for one year. The programs included training workshops for teachers and parents to increase their awareness of early literacy development, and how to collaborate to build strong partnerships in terms of developing children's literacy skills. Programs also include developmentally appropriate literacy activities for children and parents to be undertaken at home as well as at kindergartens.

2.1 Literature Review

The term "Family Literacy" refers to the interrelated literacy practices used by parents and/or family members and children in homes (Hannon, 2000; Teale, 1986). This term emerged to stress the importance of a partnership between parents and/or family members and children in promoting literacy skills among children (Taylor, 1983). From Sowers' (2000) viewpoint, family literacy refers to beliefs and practices related to reading and writing which are inherent in the people of the child's daily environment. Wasik, Dobbins and Hermann (2001, p. 445) defined family literacy as "a concept that includes naturally occurring literacy practices within the home, family and community and as a formal activity, exemplified by organised instruction usually linked with educational settings". According to Morrow (2011), family literacy includes using drawing or writing to share ideas, composing notes or letters to communicate messages, keeping records, making lists, following written directions, or sharing stories and ideas through conversation, reading and writing.

The literature concerning family literacy reveals that numerous successful programs were initiated, focusing on bringing the family, school, and community together to support children's literacy development and learning (Barratt-Pugh & Allen, 2011; Bloome et al., 2000; Hannon, 1998; Morrow, 2011; St. Pierre et al., 2005; Talan,

2001). For instance, the United States Department of Education established a family program called the "Even Start Program" in 1989. In this program, parents of children were trained in literacy to help their children develop their learning. The target parents enrolled in this program were those who were aged 16 and above, with poor literacy skills (St. Pierre et al., 2005). Another family literacy program was the "Kenan Model Program", which was initiated by the National Center for Family Literacy. This program provided family literacy instruction and extended training to program developers and instructors (Morrow, Tracey, & Maxwell, 1995).

In 2005, the "Better Beginnings Program" was developed by the State Library of Western Australia (Barratt-Pugh & Allen, 2011). This early intervention family literacy program was aimed at providing a large numbers of families across Australia with strategies to support book-sharing from birth, as this is considered vital to promote children's early literacy development. California's Families for Literacy Program was established in 1998/1999. This program included four fundamental family literacy elements: 1) literacy improvement and enrichment for the adult, as needed, 2) emerging literacy activities and opportunities for the child, with emphasis on, but not limited to, the preschool and primary child, 3) Interactive/intergenerational activities for the adult(s) and child(ren), and 4) parenting development and discussion opportunities (Talan, 2001, p. 13). Other family literacy programs were extended to include the community, like neighborhoods, religious settings, and public libraries (Bloome et al., 2000). These programs were offered to families with the aim of helping parents and/or family members to become involved in their children's literacy development and learning.

Family literacy programs vary regarding the activities introduced to parents. Van Voorhis (2003) indicated that most family literacy programs should include interactive activities between parents and children, training and discussion for parents, and high-quality instruction and activities for children, with significant focus on developing the important elements of early literacy (print, phonological awareness, letter names and sounds, etc.).

In the UK, Hannon (1995, 1998) introduced a theoretical framework describing the activities used in family literacy programs. In his ORIM framework model, Hannon emphasized that parents and/or family members might provide children's literacy development in four steps: 1) opportunities, which include providing literacy materials for children, encouraging their play-based literacy activities, sharing storybooks and other written materials, etc., 2) recognition, which includes recognizing children's early literacy achievements, supporting children's early attempts at literacy, 3) interaction, which includes interaction around literacy activities introduced by parents to enable children to move a step further, and 3) Model, which includes the models that children notice in their home environment when they see parents or the members of the family around them using literacy. Within each step of this ORIM model, several activities are provided to help children achieve success in their literacy skills.

Another form of family literacy activities has been illustrated in the work of Morrow (2011) who offered guidelines for family literacy activities. Morrow's model comprised four elements that are considered crucial in helping parents promote their children's literacy activities. These are, 1) materials as provided by parents and other family members to help promote children's literacy skills, 2) literacy activities as practiced by parents and family members, 3) positive attitudes hold by parents and family members towards children's attempts at early reading and writing, and 4) visits made by parents and other family members to schools to work with teachers and provide help in children's literacy learning.

Anderson (1995) indicated that family literacy researchers also studied parents' and teachers' perceptions of literacy learning and development. In their study, Piotrkowski, Botsko, and Matthews (2000) investigated parents' and early childhood teachers' beliefs concerning skills that children should acquire before they enter school. Results showed that early childhood teachers and parents of children hold positive beliefs regarding the importance of children being healthy and socially competent, and are able to comply with teachers' authority. However, parents placed more emphasis on the academically oriented skills as being more important than did teachers.

Parents and/or family members need to be guided by teachers in order to develop their children's literacy. Young (1998) completed a study to compare what parents know about emergent literacy to what is known in the field of children's reading and writing abilities prior to formal schooling. Parents of preschoolers were surveyed to identify relevant areas in which parents could be guided to help children's emergent literacy development. Results indicated that many parents do know generally what they should be doing to promote their children's early literacy skills but are less clear specifically on how to help them. This study advocated that parents need to be guided to interact more effectively with their children in the context of literacy and should routinely employ

written language activities as a part of their daily life routine. Morrow (2011) argued that teachers need to give the parents the opportunity to present their views on what they would like their child to be learning, to express how they feel about what happens in school and to offer suggestions for changes. This is important because these procedures can make parents of children aware of what they are expected to do, so that their work is explained by the teacher. As indicated by Hirst (1998), teachers, in order to work and interact with parents in a successful way, should be aware of the type of literacy experiences which are already occurring at home, and should also have some knowledge of the socio-cultural context in which parents live. This knowledge, however, is beneficial in developing parents' practices at home and building upon those that are already implemented. In the same context, Brady (1999) specified that to improve home-school relationships, teachers should also be aware of parental practices that are already employed at home. A study conducted by Hannon, Morgan, and Nutbrown (2006) assessed a family literacy program from the perspectives of the parents involved in it. Results revealed that parents expressed extremely positive perceptions about the child-focused component of the family literacy program. They felt also that the program had benefited the children.

Despite the interest in relationships between literacy practices implemented at home and school, we have to acknowledge that some parents may be rarely engaged with their children in school-based literacy practices in the home, because of the lack of parents' knowledge on how children learn to read and write (Rodriguez-Brown, 2010). Hence, early childhood teachers have responsibility for raising parents' attention to the importance of their role, bearing in mind that many children come from diverse sociocultural backgrounds where literacy is practiced in different ways, and may come to school with rich experience in books and stories and live in an environment filled with books and other printed materials, while others start their schooling with very little or without any exposure to such literacy experiences (Ihmeideh, 2006).

In Qatar, only the basic and low-level family involvement is observed. Research studies conducted in the Qatari educational context reveal that parents are rarely involved in their children's learning both at home (Al-Maadadi, 2000) and school (Romanowski, Cherif, Al Ammari, & Al Attiyah, 2013). Moreover, schools lack comprehensive plans for partnership with families. Most Qatari independent schools still place the onus on individual parents to discover how to get involved in their children's learning. Likewise, little is known about whether educators and parents are aware of the impact that family literacy programs can have on their children's literacy learning. Little is also known about whether early childhood teachers are prepared to help parents get involved in school and accept them as partners, and whether they have the necessary knowledge, skills, and attitudes to encourage participation. Therefore, a major aim of this exploratory study is to investigate the perspectives of those involved in family literacy programs concerning the effectiveness of these programs after being implemented.

2.2 Aims of the Study

The primary purpose of this study is to examine the effectiveness of family literacy programs implemented in Qatari preschool setting from teachers' and parents' perceptions. Therefore, the study aims to: (1) investigate the perceptions of early childhood teachers and parents of children concerning family literacy programs; (2) explore the practices used by teachers in supporting family' role in the development of children's literacy and the practices used by parents in developing their children's literacy skills; and (3) examine the relationship between teachers' and parents' perceptions of family literacy programs, and their practices in supporting literacy learning.

3. Method

3.1 Participant

The participants comprised all early childhood teachers and parents of children who participated in the family literacy programs that occurred in two independent kindergartens in the Qatari capital, Doha. The sample distribution (teachers and parents) was all female, and included 16 early childhood teachers and 156 parents. Later, follow-up interviews were conducted with a subsample of the selected teachers (N=10) and parents (N=15) who had responded to the questionnaire earlier.

3.2 Research Instruments

The researchers developed self-report questionnaires for both teachers and parents after a thorough review of the related literature (Hannon, 1998; Morrow, 2011; Sowers, 2000; Teale, 1986). The final draft of the questionnaires consisted of three sections. The parents' questionnaire comprised: 1) demographic information, 2) perceptions of family literacy programs, and 3) practices used to promote children's literacy learning. The teachers' questionnaire included: 1) demographic information, 2) perceptions of family literacy programs, and 3)

practices used to support the role of the family in developing children's literacy learning. The second section of both questionnaires' items was rated on a five-point Likert-type scale (5=strongly agree and 1=strongly disagree) while the third section was rated with 5 indicating always and 1 indicating never. For the purpose of the study, both scales were analyzed using three categories as follows: high category (between 3.50 and 5), moderate category (between 2.50 and 3.49), and low category (between 1 and 2.49).

3.3 Validity and Reliability of the Instrument

The study instruments were written first in English and then translated into Arabic because all participants in the study were native speakers of the Arabic language. Then, the Arabic version was sent out to seven referees specializing in early childhood education. These referees were asked to give their comments, thoughts and suggestions regarding the questionnaires. The role of the referees was to determine whether the items of the questionnaire were precise, appropriately worded, and adequate to elicit appropriate responses from the participants. The referees' feedback and comments were noted in designing the final version of the questionnaire. Thus, some items were added, others were deleted, and others were refined.

To determine the scales' internal consistency reliability, Cronbach's alpha for the pilot sample was calculated and reliability analysis revealed that the parents' perceptions scale was reliable at ∞ 0.92 while the parents' practices scale was reliable at ∞ 0.82. Similarly, teachers' perceptions scale was reliable at ∞ 0.90 while the teachers' practices scale was reliable at ∞ 0.97. These results indicate that the reliability coefficients were satisfactory for the purpose of the study.

3.4 Data Collection

This study was based on a project aimed at establishing family literacy programs in preschool settings in Qatar. Following implementation of the family literacy programs in two kindergartens in Doha, the researchers conducted several visits to kindergartens and met with teachers and parents involved in these programs. During these visits, teachers and parents were acquainted with the aim of the study, were encouraged to participate in the study, and were ensured confidentiality and anonymity. In the first semester of the academic year 2016-2017, the researchers hand-delivered the questionnaires to those who had participated in the family literacy programs in these kindergartens. Furthermore, data from the interviews were collected during the second semester of the 2016-2017 academic year. The interviews were individually conducted with both teachers and parents in teachers' rooms at the kindergartens, and were administrated in the Arabic language. These took about 10-15 minutes. In order to protect the participants' anonymity, the researcher did not ask teachers and parents for their actual names as the participants interviewed were given pseudonyms. Moreover, the participants were given the right to withdraw at any time in this research or not to complete particular items in the questionnaire or not to answer a particular question at interview (Cohen, Manion, & Morrision, 2000).

3.5 Data Analysis

The self-reported questionnaire was analyzed quantitatively utilizing the Statistical Package for the Social Sciences (SPSS). The data collected were analyzed and then expressed through means and standard deviations. To examine whether there is a relationship between the overall score of participants' perceptions of family literacy program and their practices in literacy learning development, Spearman correlation coefficient analysis was performed. The data collected from interviews were constructed after reading the data line by line, to separate and categorize the data related to the study's aims.

4. Results

4.1 Teachers' Perceptions about Family Literacy Programs

To examine teachers' perceptions about family literacy programs which were implemented in their kindergartens, descriptive statistics, including means and standard deviations, were used. As shown in Table 1, the mean values of the teachers' perceptions of family literacy programs ranged from 4.37 to 3.00, indicating a high to moderate level of satisfaction of the family literacy programs that they attended and participated in. The highest rated items were "Increasing the involvement of literacy activities in homes", "Developing children's reading skills", and "Developing children's writing skills" (4.37, 4.31, and 4.31, respectively). Furthermore, "Helping parents get appropriate literacy expectation", and "Helping children learn to love books and stories" also received high mean values of 4.18. However, the only items categorized as moderate was "Helping in strengthen the relationship with families" which had a mean value of 3.00.

Table 1. Means and standard divisions for teachers' perceptions of family literacy programs

No	Item		
	The family literacy program contributed to:	Mean	Standard Deviation
1	Developing children's reading skills.	4.31	0.70
2	Developing children's writing skills.	4.31	0.70
3	Supporting my role in the development of children's literacy.	4.06	1.06
4	Increasing family involvement in literacy activities in homes.	4.37	0.88
5	Identifying different types of children's writing.	3.68	0.70
6	Increasing family involvement in literacy activities in kindergarten.	3.56	0.89
7	Helping children learn to love books and stories.	4.18	0.83
8	Improving the relationship with my child.	3.81	0.65
9	Helping me to strengthen the relationship with families.	3.00	1.31
10	Helping parents receive appropriate expectation regarding children's literacy development.	4.18	0.83
	Total	3.97	0.64

Interview results confirmed the results obtained from the questionnaires. The majority of the early childhood teachers interviewed agreed that family literacy programs contributed to developing their children's literacy skills. Almost all teachers indicated that the family literacy programs increased their knowledge and understandings of the role of the family in the development of children's literacy skills. One teacher commented thus:

> *"The family literacy program implemented in our kindergarten was successful and it helped children to develop their literacy skills, especially reading skills. This happened particularly when we encouraged parents to create 'reading time' for their children at home."*

Most of the early childhood teachers interviewed (8 out of 10) agreed that children family literacy programs solve some problems they previously faced before the implementation of family literacy programs; these were lack of parents' interest in reading books and stories to children, parents' inappropriate literacy expectations, and poor relationships with families. As one teacher explained:

> *"Many parents used to complain about their children's level of literacy from the first weeks of the year. After providing parents with the goals of literacy at the beginning of the year, parents' expectations of their children's literacy level become more appropriate."*

Another teacher made the following statement:

> *"Family literacy programs strengthened our relationships with families. Indeed parents start asking us about many issues related to literacy development, and they appreciated our role very much."*

4.2 Parents' Perceptions of Family Literacy Programs

To explore the perceptions of parents concerning family literacy programs, descriptive statistics, including means and standard deviations, were utilized. The data presented in Table 2 indicate that the mean values of the parents' perceptions of family involvement ranged from 4.39 to 3.67, giving an indication that parents' perceptions of family literacy program were high as the values for all the means are high. The highest rated items were "Developing children's reading skills", "Developing children's writing skills", and "Increasing parents' knowledge in literacy teaching and learning" (4.39, 4.21, and 4.02, respectively).

Table 2. Means and standard divisions for parents' perceptions of family literacy programs

No	Item		
The family literacy program contributed to:		Mean	Standard Deviation
1	Developing my child's reading skills.	4.39	0.79
2	Developing my child's writing skills.	4.21	0.79
3	Supporting my role in the development of children's literacy.	3.94	0.76
4	Helping me read books and/or stories to my child.	3.75	0.82
5	Increasing my knowledge regarding my child's early writing.	4.00	0.80
6	Increasing my knowledge in literacy teaching and learning.	4.02	0.76
7	Helping me identify literacy activities as practiced in kindergarten.	3.97	0.83
8	Improving the relationship with my child.	3.88	0.86
9	Helping me to strengthen the relationship with teachers.	3.93	0.89
10	Sharing and exchanging experiences with other families regarding children's literacy development.	3.67	0.94
	Total	3.97	0.64

Interviews with parents revealed that the vast majority of parents 19 out of 20, were satisfied with the family literacy programs since they increased their awareness of literacy development, developed their teaching literacy skills, and most importantly improved their children's literacy skills. One mother explained:

> *"My participation in the program was an amazing experience as we learned very important information about how children learn to read and write. I did not have such information before participating in the program. I implement what I learned with my child and it did work very well."*

More than half of parents interviewed 12 out of 20, agreed that they became more confident with their role in supporting their children's literacy skills. Several indicated that they became aware of their role at home as well as the literacy instruction implemented at kindergartens. The following interview responses express the views of two parents on this:

> *"I now know methods of teaching reading for beginners. I found the whole language approach (top-to-bottom) method is the best for children as it allows them to understand the meaning of what they read."*

> *"Because of the family literacy program I was able to teach literacy not only to my kindergarten-aged child, but also for my baby girl aged 18 months as I often expose her to early literacy experience, such as reading to her and point out to here print as well as singing with her."*

4.3 Teachers' Practices in Supporting the Family's Role

To determine the practices used by teachers in supporting the family's role in the development of children's literacy, means and standard deviations were obtained. As shown in Table 3, the mean values of the items ranged from high to fairly moderate, ranging from 3.93 to 2.50, giving an indication of a high to fairly moderate perceptions of teachers' practices in supporting the family's role in the development of children's literacy. It is notable that 2 of the 14 items had high perceptions, while the rest were ranked moderate. The highest rated items were "Notifying parents about their children's achievement in literacy" and "Explaining to parents their role in the development of children's literacy skills" (3.93, and 3.87, respectively).

Table 3. Means and standard divisions for teachers' practices used to in supporting the family's role in the development of children's literacy

No.	Item	Mean	Standard Deviation
1	I explain to parents their role in the development of children's literacy skills.	3.87	0.95
2	I invite parents to the classroom to observe literacy activities in which their children participate in them.	3.00	1.50
3	I send home notes, brochures, and newsletters to inform parents of topics related to the development of children's literacy.	3.12	0.95
4	I invite parents to kindergarten for informational workshops/meeting about literacy development.	2.62	1.58
5	I invite parents to kindergarten l to help with literacy-related activities in the classroom.	2.50	1.67
6	I invite parents to kindergarten to participate in reading aloud to children.	2.62	1.58
7	I inform parents about the goals to be achieved for children regarding literacy development.	2.93	1.65
8	I send home literacy activities to be completed by children and their parents.	3.18	1.51
9	I invite parents to the classroom to talk about their literacy experiences.	2.50	1.67
10	I include parents in helping to assess their child's progress in literacy learning.	3.13	1.35
11	I encourage parents to read to their children at home, in public libraries and/or at events.	3.37	1.20
12	I notify parents about their children's achievement in literacy.	3.93	0.92
13	I provide lists of literature for parents to share with children.	3.00	1.03
14	I arrange parent and child meetings in which both parties come to kindergarten to work together on projects.	2.62	1.66
	Total	3.01	1.25

The result of the teachers' interviews confirmed the questionnaires' results. Most teachers interviewed, 6 out of 10, indicated that they began offering some family literacy activities in their program after the implementation of a family literacy program in their kindergarten. These activities include inviting parents to literacy events in the classrooms (i.e., reading stories to children, writing with children), communicating with parents through social media regarding literacy development, and informing parents about literacy activities that their children learned at kindergartens, etc. One teacher said in her interview:

> *"In my classroom, parents of children were scheduled in reading time. I invited those who volunteered in my program to participate in reading aloud to children. Parents loved this activity and as did the children."*

Another teacher was keen to talk about her experience in this context:

> *"I created, through What's Up application, a group of parents of children in my class. We share thoughts and ideas about literacy development. I provided them with many useful posts and YouTube videos that could help them develop their children's literacy skills."*

The vast majority of teachers interviewed, 8 out of 10, revealed that they send home literacy activities to be undertaken by children and their parents. As a consequence of the family literacy program, some of them send these activities with a guideline for parents to help them complete the activities with their children. One of the teachers stated:

> *"Before participating in the family literacy program, I did not send home any literacy activities as children do all these activities in the classroom. However, after the implementation of the family literacy program, we found that it is useful to send with the children literacy activities to be done at home with the help of their parents."*

4.4 Parents' Practices of Developing Children's Literacy Development

To examine the practices used by parents in promoting their children's literacy development, descriptive statistics, including means and standard deviations were utilized. Table 4 reveals that the mean values of the parents' perceptions of their practices ranged from 4.17 to 2.35. It is notable that most of the items were ranked high and moderate, with the exception of one item, which ranked low. The highest rated items were "Providing materials for writing, such as crayons, markers, etc.", and "Helping my child with literacy activities at home" (4.17 and 4.14, respectively) while the lowest item was "Writing with my child and talking about what we write", with a mean value of 2.35.

Table 4. Means and standard divisions for parents' practices used to in promoting their children's literacy development

No.	Item	Mean	Standard Deviation
1	I provide stories, books, and magazines for my child.	3.10	1.11
2	I provide materials for writing, such as crayons, markers, pencils and paper in different sizes.	4.17	1.05
3	I read at books, magazines or newspapers with my child and talk about what we read.	2.87	1.15
4	I use the print to talk to my child such as making lists to do things (food lists, lists of errands or lists for shopping).	3.20	1.42
5	I write with my child and talk about what we write.	2.35	1.08
6	I answer my child's questions about reading and writing.	3.49	1.29
7	I help my child with his/her literacy activities at home.	4.14	1.11
8	I point out the print in my home such as words on food boxes or recipes, directions on medicine, etc.	3.51	1.19
9	I visit my child's classroom to observe how my child learns to read and write.	3.32	1.35
10	I visit kindergarten to attend workshops/meetings that are related to the development of children's literacy.	3.43	1.09
11	I visit school to volunteer help in any way (reading to children, etc.).	2.68	1.16
12	I visit kindergarten to learn about how I can help my child at home.	2.89	1.28
13	I visit kindergarten to learn about my child' progress in literacy.	2.97	1.11
14	I visit the public library and take out books and magazine to read at home.	3.00	1.22
	Total	3.22	0.66

The interviews with parents indicated that although the majority of parents are aware of their role regarding supporting their children's literacy skills, their practices were not as high as their knowledge of understanding of literacy. In other words, the majority of parents interviewed indicated that they occasionally read books to their children at home, rarely write with their children or allow them to write, and never use print to communicate with their children. One parent commented on this:

> *"I work with my children on the activities that the kindergartens sends. We do what makes our children's learning better. However, we did not find much time in our house to read stories to children or teach them how to read and write."*

Although all parents interviewed indicated they help their children complete literacy activities sent home, half of them, 10 out of 20, mentioned that that they did not write with their children nor did they encourage early writing behaviors (scribbling, drawings, letter-like forms, etc.). One parent said:

> *"Writing is more difficult than reading and our child has a problem in his fine motor skills so I do not expect him to write better at this stage."*

Most of the parents, 16 out of 20, indicated that they are willing to visit the kindergarten and participate in their children's literacy activities if they were invited. As one parent stated:

"I attend teacher-parent meetings and educational workshops related to literacy activities. I can also come to kindergarten to participate with the children if I have this opportunity in the future."

4.5 The Relationship between the Participants' Perceptions and Practices

To determine whether teachers' and parents' perceptions of family literacy programs correlate with their practices, the overall mean score of the participants' perceptions and practices were summed up separately, after which the Spearman correlation was utilized. The data presented in Table 5 shows that there was a strong positive correlation between parents' perceptions and their practices of learning literacy development (r=.492), while teachers' practices was insignificantly correlated with their perceptions (r=.964).

Table 5. Results of correlation analysis between participants' perceptions of family literacy programs and their practices

Scale	Practices	
	Spearman Correlation	Sig.
Teachers' Perceptions	.012	.964
Parents' Perceptions	.492	.000*

* $p<.01$.

5. Discussion

A growing body of research has documented that establishing family literacy programs is significantly related to the development of children's literacy skills (Buhs et al., 2011; Hannon, 2000; Harper et al., 2011; Morrow, 2011; Steiner, 2014). The success of these programs depends mainly on the partnerships between parents and teachers. Therefore, exploring the perceptions and practices of teachers and parents regarding family literacy programs was the main aim of the current study. Sixteen teachers and 165 parents who participated in family literacy programs completed self-administrated questionnaires. Ten teachers and 20 parents were interviewed after analyzing the questionnaire.

The results indicated that teachers and parents hold moderate to high perceptions of family literacy programs implemented in their kindergarten. This specifies that they are satisfied with the outcomes of these programs in terms of developing their children's literacy skills and supporting their role in literacy development, as well as building a partnership between home and school. This is because the programs comprised the necessary literacy components required for children to develop their literacy skills (i.e., print awareness, phonological awareness, knowing letters and words, and early writing), and were built on the needs of both teachers and parents. This was obvious in the interviews' results because teachers indicated that the program was helpful in supporting school-family relations as it solved the problems related to the lack of parents' interest in reading books to children, and parents' inappropriate literacy expectations. This result is supported by the work of Hannon et al. (2006) who indicated that parents of children expressed positive views about the effect of family literacy programs as they found these programs beneficial for young children. In the same context, Huss-Keeler (1997) established that parents have positive perceptions of being involved in the school. Indeed, success in family literacy programs often depends upon the perceptions of teachers and parents and/or family members.

Furthermore, the results indicated that the practices used by teachers in supporting the family's role in the development of children's literacy ranged from high to fairly moderate. This result could be attributed to the fact that the family literacy programs provided the teachers with skills that are needed to support the family's role in this field. These skills included, but were not limited to, inviting parents to literacy activities events, providing parents with a list of suggested literature to be read to children at home, and encouraging them to participate in children's literacy activities at home. This result is consistent with the views of Levine (2002) who found that teachers provided parents with appropriate strategies to be implemented with their children at home. This is important as parents need support and encouragement from teachers to participate in their children's literacy development (Hannon, 1998).

In addition, the results indicated that parents' practices of supporting their children's literacy development were satisfactory. This is perhaps because family literacy programs were useful for parents in supporting their role as

the programs provide parents with ideas and thoughts that could help promote their children's literacy skills. This finding is consistent with the results obtained from a number of research studies that determined that family literacy programs improves parents' literacy practices at home (Hannon, 1998). Leichter (1984) proposed that families can promote children's emergent literacy skills when they provide a large quantity of literacy material in the home, increase the number of interpersonal interactions during literacy activities, and integrate literacy materials in a social environment within the home. These literacy activities were suggested in the family literacy program in which the participants in the current study were involved.

The results revealed that the teachers' perceptions of family literacy programs were not correlated with their practices. This could be due to the fact that teachers' role in helping family become involved in their children's literacy development, in most independent kindergartens, is still limited. This explanation is supported by teachers' interviews in which they indicated that they do not usually contact parents directly, and if they wanted to do so, it should be done through school counselors. Therefore, teachers may find it difficult to practice what they believe it. Consequently, according to Caplan (2000), lack of communication between teachers and parents may influence teaching practices.

Against this background, parents' perceptions were aligned with their actual practices in the development of children's literacy skills. This implies that the perceptions that parents develop after the implementation of family literacy programs in Qatari preschool settings were beneficial in reflecting these perceptions into practice. That is to say, this result might be attributed to the fact that parents who participated in the family literacy programs found the development of children's literacy skills to be as an important issue requiring each partner to work cooperatively to develop a strong and positive partnership. Participants' perceptions of early literacy programs not only influence their practices but also form young children's perceptions and understandings on early literacy development (Fang, 1996).

6. Conclusion and Implications

In light of the above discussion, it can be concluded that both teachers and parents were satisfied with the family literacy programs implemented in their kindergarten. They found these programs beneficial in developing the children's literacy skills as well as supporting their role and improving home-school relationships. Moreover, a strong correlation was noted between parents' perceptions of family literacy programs and their practices, while teachers' perceptions were not correlated to their practices. Based on these conclusions, several practical and theoretical recommendations are provided. From a practical standpoint, family literacy programs should be expanded in most Qatari kindergartens because they have numerous benefits not only for the child but also for the parents, family, school and community. As the family literacy programs were viewed by teachers and parents as a successful experience, the Ministry of Education should provide professional development programs for other early childhood teachers working in independent kindergartens and schools with the aim of establishing family literacy programs in their settings. This is vital, as parents need to be encouraged, supported, and empowered by teachers in order to involve them in such programs. Finally, it is recommended that teachers are in a direct contact with parents and family members as this could build mature and trustful relationships between them.

Further studies should be undertaken to investigate the effect of family literacy programs on the development of children's literacy skills. Moreover, conducting follow-up studies to investigate the perceptions of parents and teachers in different components of the family literacy programs is also recommended. Another fruitful avenue of research could be to examine the effect of other family programs in different areas (i.e., numeracy, play, technology). Finally, it is anticipated that the current study might pave the way for more research in this particular field.

Acknowledgments

This paper was made possible by NPRP grant # (NPRP 8-921-5-122) from the Qatar national research fund (a member of Qatar foundation). The statements made herein are solely the responsibility of the authors.

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Journal of Educational and Developmental Psychology; Vol. 7, No. 1; 2017
ISSN 1927-0526 E-ISSN 1927-0534
Published by Canadian Center of Science and Education

Reviewer Acknowledgements

Journal of Educational and Developmental Psychology wishes to acknowledge the following individuals for their assistance with peer review of manuscripts for this issue. Their help and contributions in maintaining the quality of the journal are greatly appreciated.

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ISSN 1927-0526