

ISSN 1918-7211 (Print)  
ISSN 1918-722X (Online)

# International Journal of Psychological Studies

Vol. 8, No. 4 December 2016



CANADIAN CENTER OF SCIENCE AND EDUCATION

# Editorial Board

## *Editor-in-Chief*

Klaus Kessler, University of Glasgow, United Kingdom

## *Associate Editors*

Jianghe Niu, Beth Israel Deaconess Medical Center, United States

Julia Penn Shaw, SUNY-Empire State College, United States

Karen Murphy, Griffith University, Australia

Kevin Cheng, Lingnan University, Hong Kong

Mingming Zhou, Nanyang Technological University, Singapore

## *Editorial Assistant*

Barbara Sun, Canadian Center of Science and Education, Canada

## *Reviewers*

Alisdair Taylor

Angelique Anne Scharine

Anjolie Diaz

Ashley Cosentino

Aspa Sarris

Brenda L. Ridgeway

Bruce G Borkosky

Camilla Matera

Chia-huei Tseng

Christine Norman

Chrysanthi Nega

Cristiano Inguglia

Curt A. Carlson

Curtis L. Todd

Daniel Cassenti

Daniel D. Houlihan

Daniel Mateos-Moreno

Duhita Mahatmya

Duston Morris

Elaine P. Rabinovich

Emily Macleod

Fabio Nogueira Pereira

Fan Yang

Giovanna Esposito

Haibin Li

Hasan Belli

Hongfei Du

Igor Sotgiu

Ilmiye Seçer

Jerwen Jou

Jinhua Wu

Joey Man Yee KWOK

Josh Burk

Junhong Cao

Jyoti Gaur

Kartheek R Balapala

Kei Shing NG

Kenneth Feigenbaum

Kevin Autry

Ladislav Volicer

Lalatendu Kesari Jena

Laura L. Neely

Lena Fleig

Lilybeth Fontanesi

Lisa Scherer

Lisandro Kaunitz

Ljiljana Progovac

Luis Manuel Rodriguez Otero

Marcelo Afonso Ribeiro

Marco Aurelio Prado

María Celeste Dávila de León

Maria del Camino Escolar Llamazares

Maria Luisa Martino

Maryam Safara

Mei-chun Cheung

Mei-Hsiang Tsai

Meike Ramon

Michael Woloszyn

Miranda J. Walker

Moahmed Taha Mohamed

Nadia Ayub

Naresh Vempala

Nasrah Ismail

Pilar Rueda

Prachi Saxena

Rajinder Kaur

Raúl Navarro

Richard Paul Conti

Robert Jay Lowinger

Rochelle Suri

Rus Mihaela

Ryan W Schroeder

Sabry Abd-El-Fattah

Samuel Greiff

Sarah Alsawy

Sarita Sood

Siegfried Zepf

Sonia George

Stanislava Stoyanova

Stephen Rice

Surendra Kumar Sia

Tanya Lee Tompkins

Thien Lei Mee

Tsu-chia Julia Hsu

Tuna Uslu

Udoh Felix Uchechukwu

Wan Salwina Wan Ismail

Younsoon Cho

## Contents

The Caring-Uncaring Emotional (CUE) Inventory: A Pilot Study of a New Measure of Affective Psychopathy Traits	1
<i>Robert A. Semel</i>	
Early Nurturing Experiences, Self-Compassion, Hyperarousal and Scleroderma The Way We Relate to Ourselves May Determine Disease Progression	16
<i>Karen G. Kearney &amp; Richard E. Hicks</i>	
Beyond the Debate on Promises and Risks in Digital Health: Analysing the Psychological Function of Wearable Devices	26
<i>Maria del Rio Carral, Pauline Roux, Christine Bruchez &amp; Marie Santiago-Delefosse</i>	
Social Activities Do not Distract Everyone from Work A Diary Study of Work-Related Perseverative Cognition	38
<i>Annie Foucreault &amp; Julie Menard</i>	
Effects of a Transactional Analysis Program on Adolescents' Emotion Regulation	51
<i>Somaye Keshavarzi, Eskandar Fathi Azar, Mir Mahmoud Mirnasab &amp; Rahim Badri Gargari</i>	
Anxiety and Optimal Piano Performance: A Pilot Study on the Application of the Individual Zone of Optimal Functioning (IZOF) Model	60
<i>Zijin Yao</i>	
Speaking with a Happy Voice Makes You Sound Younger	71
<i>Sumi Shigeno</i>	
A Diary Study on Work-Related Perseverative Cognition and Employees' Need for Recovery The Role of Emotional Support from Family and Neuroticism	77
<i>Annie Foucreault, Julie Ménard &amp; Celestine Stevens</i>	
A Study of the Perceived Stress Level of University Students in Hong Kong	91
<i>Joey Man Yee KWOK &amp; Douglas Kei Shing NG</i>	
Understanding Workplace Adaptation as an Acculturation Process: A Qualitative Examination of South Korean Highly Skilled Workers in Japan	107
<i>Geonsil Lee, Joonha Park &amp; Lauren Ban</i>	
Romantic Priming Effects on the Social Desirability and Hireability of Self-Promoting Women	121
<i>Samantha B. Douglas &amp; Juanita Cole</i>	
Predictive Ability of Social Intelligence from Attachment Styles	131
<i>Alghamdi Michael A., Al.Qudah Mohammad F., Albarsan Ismael S., Abduljabbar Adel S. &amp; Bakhiet Salaheldin F.</i>	
Reviewer Acknowledgements for International Journal of Psychological Studies, Vol. 8, No. 4	142
<i>Barbara Sun</i>	

# The Caring-Uncaring Emotional (CUE) Inventory: A Pilot Study of a New Measure of Affective Psychopathy Traits

Robert A. Semel<sup>1</sup>

<sup>1</sup>Brooklyn, New York, USA

Correspondence: Robert A. Semel, Brooklyn, New York, USA. E-mail: robertsemelpsyd@gmail.com

Received: August 8, 2016

Accepted: August 31, 2016

Online Published: September 19, 2016

doi:10.5539/ijps.v8n4p1

URL: <http://dx.doi.org/10.5539/ijps.v8n4p1>

## Abstract

An affective dimension of psychopathy, e.g., callousness, lack of empathy, unemotional responsiveness, is essential to the study and understanding of psychopathy. It may be advantageous to have available brief measures of the affective dimension that may be utilized with adults and/or youths. The current study aims to provide preliminary validation of a new, brief, self-report measure of the affective dimension of psychopathy that may be suitable in the study of both adults and adolescents. A pilot study of the Caring-Uncaring Emotional (CUE) Inventory was conducted with 155 men and women recruited from a community sample. The 23-item CUE Inventory was found to have high internal consistency reliability ( $\alpha = .91$ ) and was found to have high correlations with an expanded, 36-item version of the Levenson Self-Report Psychopathy Scale (LSRP; Levenson, Kiehl, & Fitzpatrick, 1995), especially with the expanded LSRP Callous subscale ( $r = .85$ ), thus supporting preliminary concurrent validity. The CUE was only modestly associated with the Antisocial subscale of the expanded LSRP, further supporting it as a measure of affective rather than behavioral traits. The CUE accounted for an additional 57% of the variance in LSRP total scores after controlling for demographic variables. An Exploratory Factor Analysis suggested a three-factor solution, with the first factor accounting for approximately 37% of the variance in scores and with high to very high loadings on this factor, which appears, tentatively, as a good measure of callousness. In conclusion, the CUE may function as an operational representative of callousness in adults in a community sample. Further study is needed to better clarify the latent structure of this scale and to determine its associations with other similar measures of the affective dimension of psychopathy and with other external correlates. The potential application of this measure in youths remains to be studied.

**Keywords:** psychopathy, affective, callous, uncaring, self-report, psychometric properties

## 1. Introduction

### 1.1 *The Study of Psychopathy in Adults and Youths*

The past two decades have seen the greatly expanded study of psychopathy in adults in both forensic and non-forensic samples (Lilienfeld & Fowler, 2006; Seibert, Miller, Few, Zeichner, & Lynam, 2010; Miller & Lynam, 2015; Miller, Maples-Keller, & Lynam, 2016). Similarly, psychopathic or psychopathic-like traits in youths have been studied extensively in recent years in community, clinical, and adjudicated samples (Frick & Dickens, 2006; Frick & White, 2008; Frick, Ray, Thornton, & Khan, 2014). Psychopathy is generally understood to represent a manifestation of affective, interpersonal, and behavioral traits or dimensions (Cleckley, 1941/1976; Cooke & Michie, 2001; Hare, 1991, 2003; Patrick, Fowles, & Krueger, 2009), as illustrated, for example, by shallow emotions, callous lack of empathy, absence of guilt or remorse, lying/deceitfulness, egocentricity, narcissism, manipulation/exploitation of others, impulsive, irresponsible, reckless behavior, and anti-social behavior including crime and aggression. A comprehensive review of the literature by Frick et al. (2014) on the role of Callous and Unemotional (CU) traits in understanding severe conduct problems in youths concluded that "...children and adolescents with severe conduct problems and elevated CU traits show distinct genetic, cognitive, emotional, biological, environmental, and personality characteristics that seem to implicate different etiological factors underlying their behavior problems relative to other youths with severe conduct problems" (p. 1). An affective dimension, e.g., callousness, lack of empathy, unemotional responsiveness, is essential to the study and understanding of psychopathy. The current study aims to provide preliminary validation of a new, brief,

self-report measure of the affective dimension of psychopathy that may be suitable in the study of both adults and adolescents.

### *1.2 Ongoing Debate about the Construct of Psychopathy*

As discussed in a review of psychopathy by Skeem, Polaschek, Patrick, and Lilienfeld (2011), there continues to be debate as to what exactly constitutes psychopathy and distinguishes it from other disorders (see also Miller & Lynam, 2015; Patrick, Fowles, & Krueger, 2009). A primary unresolved issue concerns whether psychopathy is a unitary construct or a configuration of several distinguishable but overlapping trait dimensions. There also is debate whether antisocial behavior is a core feature of psychopathy and whether so-called positive-adjustment indicators as identified by Cleckley (1941/1976), e.g., emotional stability as suggested by non-neurotic, non-delusional characteristics, are essential to psychopathy. Cleckley (1941/1976) did not describe psychopathic patients as persons who are prone to committing brutal, sadistic, heinous acts of violence and aggression. "Inadequately motivated antisocial behavior", which downplays criminal intention, was one among 16 of Cleckley's diagnostic criteria for psychopathy. Although Hare (1991, 2003) developed a model of psychopathy that was based on Cleckley's criteria, his model emphasizes criminal behavior and de-emphasizes positive-adjustment indicators. Miller and Lynam (2015) note a lack of consensus in the field as to what traits are necessary and sufficient for a person to be considered psychopathic, and what traits are more essential than others. Miller and Lynam do not view low fear and anxiety, or boldness, as necessary features of psychopathy. However, as will be discussed further, they regard disagreeableness/antagonism, based on the Five-Factor Model of Personality (FFM; Costa & McCrae, 1992), as a core feature of psychopathy.

### *1.3 Use of Self-Report Measures in the Study of Psychopathy*

The voluminous body of research on psychopathy and psychopathic traits in non-forensic samples has been accumulating to a significant extent through methodology that employs self-report measures. Generally speaking, psychometrically reliable and valid self-report measures offer certain advantages in comparison to labor intensive measures that require extensive interview and/or record review, e.g., they are time saving and easy to administer and score. With respect to the study of psychopathy, large numbers of persons, recruited from college or community samples, can be studied in an economical fashion, and abbreviated psychopathy measures also lend themselves to epidemiological study (Eisenbarth, Lilienfeld, & Yarkoni, 2015). Lilienfeld and Fowler (2006) note with respect to the assessment of psychopathy that self-report measures may also permit persons to report on the absence of affective states and traits. Lilienfeld and Fowler also note certain disadvantages to the use of self-report measures in the assessment of psychopathy. People who are high on dimensions of psychopathy tend to be dishonest and lack insight, and may be limited in their ability to report their emotional experiences. Response distortion may be particularly problematic with youth in forensic settings (Berkout, Young, & Gross, 2011; Murrie & Cornell, 2002; Vermeiren, 2003).

### *1.4 Conceptualizations Underlying Current Psychopathy Measures*

Given the somewhat different historical and contemporary conceptualizations of psychopathy, it is not surprising that existing self-report measures of psychopathy involve somewhat different operationalizations of psychopathy (Drislane, Patrick, & Arsal, 2014). Several self-report measures developed for adults (e.g., the Levenson Self-Report Psychopathy Scale, LSRP; Levenson, Kiehl, & Fitzpatrick, 1995; the Self-Report Psychopathy Scale-III, SRP-III; Williams, Paulhus, & Hare, 2007) were designed to tap the same constructs of psychopathy as reflected in the Psychopathy Checklist-Revised (PCL-R; Hare, 2003). The PCL-R is the most widely used measure of psychopathy in adults, particularly in forensic and correctional samples. It is also widely used for research purposes. The PCL-R is an intensive, clinician-rated, multisource, validated measure of psychopathy. It is comprised of interpersonal, affective, antisocial, and behavioral features. Similarly, several empirically supported self-report measures for youths (e.g., the Antisocial Process Screening Device, APSD; Frick & Hare, 2001; the Inventory of Callous-Unemotional Traits, ICU; Frick, 2004) were designed to tap dimensions of psychopathy as measured by the Psychopathy Checklist: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003), a modified version of the PCL-R. The ICU may hold promise as a measure of callousness or "meanness" in young adults as well as in youths (Drislane et al., 2014; Kimonis, Branch, Hagman, Graham, & Miller, 2013).

The Psychopathic Personality Inventory-Revised (PPI-R; Lilienfeld & Widows, 2005), which is the most widely used self-report measure of psychopathy in non-forensic and non-clinical samples, is comprised of eight unidimensional subscales and three higher-order factors, i.e., Fearless Dominance, Self-centered Impulsivity, and Coldheartedness. The PPI was developed to operationalize psychopathy in a manner consistent with Cleckley's (1941/1976) conceptualization of psychopathy. Unlike the PCL-R, the PPI-R does not reference criminal or other anti-social behavior.

There have been some efforts to integrate the varied conceptualizations and operational models of psychopathy. The triarchic model of psychopathy (Patrick et al., 2009) is an integrative model of psychopathy based on essential phenotypic components of psychopathy, and is operationalized in the Triarchic Psychopathy Measure (TriPM; Patrick, 2010), which includes the domains Boldness, Meanness, and Disinhibition. Hall et al. (2014) assert that the latter traits may be conceptualized as “open constructs” that can be operationalized by different measures in differing ways. Drislane et al. (2014) demonstrated that alternative self-report measures of psychopathy can index the TriPM scales. The Comprehensive Assessment of Psychopathic Personality (CAPP; Cooke, Hart, Logan, & Michie, 2004, 2012) is another model of psychopathy assessment that was developed through an integrative process. Extensive literature review and interviews of many international scholars and clinicians of diverse theoretical backgrounds resulted in a measure composed of six broad domains (Attachment, Behavioral, Cognitive, Dominance, Emotional, and Self) comprising 33 personality traits that provide a comprehensive representation of the psychopathy construct. As noted by Sellbom, Cooke, and Hart (2015), evidence for the construct validity of the CAPP is rapidly developing. In a recent study that yielded support for the construct validity of the CAPP, Sellbom et al. (2015) obtained results suggesting that “affective-interpersonal” features, meanness, or callous-unemotional traits, as represented by various measures appear to be at the core of the psychopathy disorder.

There has been growing interest and empirical support for understanding psychopathy in reference to the Five Factor Model (FFM; Costa & McCrae, 1992) of personality. Lynam et al. (2011), who developed a measure of psychopathy based on the FFM, the Elemental Psychopathy Assessment, proposed and demonstrated empirically that psychopathy maps onto maladaptive variants of 18 FFM facet traits. Strong empirical support for this proposal was further provided by O’Boyle, Forsyth, Banks, Story and White (2015), whose meta-analytic review of the FFM correlates of the Dark Triad (Machiavellianism, narcissism, and psychopathy) found that the FFM explained “nearly all of the variance in psychopathy.....” (p. 644). O’Boyle et al. (2015) contended that “the Lynam et al. (2011) model maps exceptionally well onto psychopathy” (p. 651). Miller and Lynam (2015) contend that the FFM domain of Agreeableness, i.e., extremely low agreeableness along with very high personal antagonism is most essential to the construct of psychopathy. As per Miller and Lynam, a personality description of psychopathy derived from FFM domains and facets would also include low levels of Conscientiousness (or inhibition/constraint), a mixture of low and high levels of Neuroticism (including low anxiety, low depression, high anger), and a mixture of low and high levels of Extraversion (low warmth, high assertiveness and excitement seeking).

### *1.5 Limitations and Further Directions for Psychopathy Measures*

Various self-report measures of psychopathy have demonstrated differences in their factor structures, problems with convergent or discriminant validity, findings not consistent with the intended parameters of the measure, and problems with internal consistency reliability. Seibert et al. (2010) opined that the use of self-report measures of psychopathy in community settings with adults and youths may be most desirable if such measures can identify similar higher order constructs and if such measures are associated with particular personality traits and external correlates. To that end, Seibert et al. (2010) conducted an exploratory factor analysis using the scales from three different psychopathy measures that yielded a factor consistent with Factor 1 (affective-interpersonal) psychopathy traits on the PCL-R. The psychopathy scales also loaded strongly with the Five-Factor Model (FFM; Costa & McCrae, 1992) indicating that the psychopathy scales can be interpreted in line with a comprehensive measure of personality.

### *1.6 Rationale for Developing Additional Psychopathy Measures*

Given that an affective dimension is considered a primary feature of psychopathy in both youth and adults, it is common to all conceptualizations of psychopathy, it is arguably the most essential dimension in the identification of psychopathy, and it has been associated with externalizing behaviors in adults and in youths (Christian & Sellbom, 2016; Frick & White, 2008; Frick et al., 2014; Kimonis et al., 2014; Salekin, Chen, Sellbom, Lester, & MacDougall, 2014), it may be advantageous to have available brief measures of the affective dimension that may be utilized with adults and/or youths. Among such advantages is developmental, long-term study spanning adolescent and adulthood years utilizing the same measure(s). Such study may shed light on mediating and moderating factors affecting stability of affective psychopathy traits and responsiveness to interventions over the course of adolescence through adulthood. Particularly when researchers are interested in focusing specifically on the affective dimension of psychopathy, brief measures of this dimension may be valuable. Kimonis et al. (2013) noted the shortcomings of various psychopathy measures in indexing the affective dimension of psychopathy, particularly callous and unemotional traits. The ICU as well as some other youth psychopathic traits inventories has had some application with young adults; however, such measures have been utilized primarily with youth.

Drislane et al. (2014) and Kimonis et al. (2013) studied the ICU using samples of college undergraduates (mean age 18.8, and 21.3, respectively). Furthermore, Skeem et al. (2011) recommended the development of measures to specifically index each of the triarchic constructs of boldness, meanness, and disinhibition as separately as possible from one another. As noted earlier, controversies remain as to the precise definition of psychopathy and what are the necessary and sufficient characteristics or traits in order to be considered psychopathic. Within this greater context there also is a need for greater understanding of the affective dimension of psychopathy and its personality and behavioral correlates in community samples of adults and youths.

### *1.7 Purpose of Current Study*

A new scale developed by this author was initially designed with the intention to measure callous and unemotional traits in juvenile offenders. The scale is titled the Caring-Uncaring Emotional Inventory (CUE). However, with a slight modification of the scale, it was decided for pragmatic purposes to conduct a pilot study with a community sample of adults to examine the psychometric properties and convergence of the CUE Inventory with another measure of psychopathy, the LSRP. The LSRP is a 26-item self-report scale of psychopathy designed to measure primary psychopathy (associated with the interpersonal-affective dimension) and secondary psychopathy (associated with the behavioral, anti-social deviance dimension). An expanded, 36-item version of the LSRP was developed by Christian and Sellbom (2016) and was associated with improved internal consistency and construct coverage. This expanded version yielded three factors, identified by the investigators as Egocentric, Callous, and Antisocial. The results were replicated in a second sample. The expanded LSRP correlated significantly with other measures, including the TriPM and measures of empathy, narcissism, temperament, sensation seeking, and antisocial behavior. The Egocentric subscale appeared to measure narcissism, while the Callous subscale appeared to measure lack of affective empathy and meanness. The Antisocial subscale appeared to measure impulsivity, sensation seeking, disinhibition and antisocial behavior. The CUE was designed principally to measure the affective dimension of psychopathy, with consideration also of the interpersonal dimension of psychopathy. It was predicted that the CUE would demonstrate significant association with the 36-item version of the LSRP, with the strongest association being with the Callous subscale of the LSRP. In order to better understand the relationship between the CUE and the LSRP, a hierarchical multiple regression analysis was used to determine if LSRP total scale scores could be predicted from CUE scores after controlling for demographic variables. Additionally, an exploratory approach was conducted to identify the latent structure of the CUE.

## **2. Method**

### *2.1 Participants*

Participants were recruited through Amazon Mechanical Turk (MTurk). MTurk is an online labor market created by Amazon in which “workers” perform Human Intelligence Tasks, or HITs, for “requesters” for the completion of computerized tasks. The MTurk labor market has become a popular source of survey data among social scientists (Paolacci & Chandler, 2014). Participants included 81 men (51.6%) and 76 women (48.4%) between the age ranges of 18-24 and 65-74. Due to incomplete data for three cases, most analyses were performed on a sample of 155 persons. Eighty-one (51.6%) participants were in the 25-34 age category, 37 (23.6%) were in the 35-44 age category, and 19 (12.1%) were in the 45 to 54 age category. Collectively, 12.7% were in the age categories of 18-24, 55 to 64, and 65 to 74. With regard to highest level of education completed, 15.3% completed high school or GED, 29.9% attended some college, 14% completed a 2-year college, 32.5% completed a 4-year college, and 8.3% completed graduate school.

### *2.2 Procedure*

Participants recruited from MTurk were directed to a link at SurveyMonkey to complete the survey. Participants were paid through Mturk for their participation. Following several demographic items, the 36 items of the expanded LSRP were presented first and were followed by the 23 items of the CUE Inventory, thus appearing as a single questionnaire or survey. All participants received the same order of items.

### *2.3 Measures*

The expanded, 36-item version of the Levenson Self-Report Psychopathy Scale as reported by Christian and Sellbom (2016) consists of 11 items comprising the Egocentric subscale, 12 items comprising the Callous subscale, and 13 items comprising the Antisocial subscale. Christian and Sellbom reported internal consistency reliability coefficients (alpha) of .90 for the Total scale, .85 for the Egocentric subscale, .80 for the Callous subscale, and .81 for the Antisocial subscale. Internal consistency reliability was very similar in their replication

study. The response format for the LSRP items utilized a 4-point Likert-type scale that included the choices “Disagree strongly”, “Disagree somewhat”, “Agree somewhat”, “Agree strongly”. Scores ranged from 1 to 4.

The Caring-Uncaring Emotional (CUE) Inventory, developed by this author, in its current form is a 23-item self-report scale designed to assess the construct of callous and insensitive affective and interpersonal traits in youths and adults. Items for the CUE Inventory were developed by a theory-neutral, rational approach. The author initially generated a pool of items with the aims that items attempt to operationalize cold, callous, insensitive feelings and attitudes, utilizing a mixture of phrases that endorse callousness and others that endorse caring, utilizing semantics that may be appealing to youth through blunt and bold expression, and developing some items that incorporate a vernacular that may be more oriented to youth, including unrefined language. None of the retained items utilize expressions that would be unfamiliar to adults or youths. The CUE incorporates some item content that might not suggest an undesirable mode of feeling or rationalizing about situations for some persons who are higher on the dimension of callousness. In this sense, items were developed in a manner similar to items on the Youth Psychopathic Traits Inventory (YPI; Andershed, Kerr, Stattin, & Levander, 2002). The YPI incorporates items that frame psychopathic features as abilities rather than deficits, thus potentially minimizing social desirability bias. As noted, some CUE items incorporate semantics that are blunt and bold. An initial moniker for the CUE considered by the author was the “Bold and Cold Inventory”. Items that were eliminated from the item pool included items that were more generally reflective of angry, reactive, or oppositional attitudes rather than items more specific to callousness and lack of empathy. Other items eliminated were strongly focused on an interpersonal perspective. Some items were considered redundant. An example of items retained include the following: “*I have the power to hear about terrible things happen to people and not let it bother me*”; “*I know it may sound cold, but I’ve got to think about myself first, that’s just the way it is*”; “*I might say I’m sorry, but I really don’t give a ...*”; “*It really doesn’t bother me if someone gets shot or dies, unless it’s my family or friend*”; “*I care about what other people think of me*”. The response format for the CUE items utilized a 4-point Likert-type scale that included the choices “Disagree strongly”, “Disagree somewhat”, “Agree somewhat”, “Agree strongly”. Scores ranged from 1 to 4. All items on the CUE are keyed so that higher scores reflect higher callousness or lack of care.

### 3. Results

#### 3.1 Descriptive Statistics

Descriptive statistics for the CUE and for the LSRP total scale and subscale scores can be seen in Table 1. With the exception of the LSRP Antisocial subscale, men scored significantly higher than women on the LSRP scales and on the CUE scale. Gender differences on most of the LSRP scales may be viewed as consistent with findings by Levenson et al. (1995) and by Salekin et al. (2014) in which men scored significantly higher than women on the LSRP primary psychopathy and secondary psychopathy scales. One-way between-groups analysis of variance was conducted for age and education. Results indicated no significant differences in mean scores between the groups for each of these demographic variables.

Table 1. Descriptive statistics for LSRP and CUE scales

Scale	<i>n</i>	<i>M</i>	<i>SD</i>	$\alpha$
LSRP-Total score	156	62.46	15.46	.927
LSRP-Egocentric	156	19.54	6.56	.899
LSRP-Callous	156	20.64	6.22	.876
LSRP-Antisocial	156	22.48	6.26	.839
CUE	155	41.51	11.47	.911

*Note.* LSRP = Levenson Self-Report Psychopathy total scale, 36-item version. The Egocentric subscale consists of 11 items, the Callous subscale consists of 12 items, and the Antisocial subscale consists of 13 items. CUE = Caring-Uncaring Emotional Inventory, which consists of 23 items.



### 3.2 Reliability

As seen in Table 1, all scales and subscales had high internal consistency coefficients. The reliability coefficients of the LSRP total scale and subscales were slightly higher than those reported by Christian and Sellbom (2016), especially for the Callous subscale. The reliability coefficient for the CUE scale was high (.91) and was very similar to that of the LSRP total scale (.93) for the current sample.

### 3.3 Concurrent Validity

It was expected that the CUE Inventory scale would correlate positively with an existing measure that assesses a similar construct. In particular, it was expected that the CUE Inventory would be highly correlated with the Callous subscale of the expanded 36-item LSRP. Bivariate correlations among the CUE and LSRP total and subscales can be seen in Table 2. In this sample, the CUE was highly correlated with the LSRP Total Score ( $r = .83, p < .001$ ) and with the LSRP Callous subscale ( $r = .85, p < .001$ ), but only moderately correlated with the LSRP Antisocial scale ( $r = .45, p < .001$ ). The correlation of the CUE, particularly with the LSRP Callous subscale, suggests that the same construct is largely being measured by these two scales (Campbell & Fiske, 1959; John & Benet-Martinez, 2000). The correlation between the LSRP Callous and Antisocial subscales in this sample was quite similar to that reported by Christian and Sellbom (2016), while the correlation between the Egocentric and Callous subscales was higher in the current sample. With respect to the correlation between the Egocentric and Antisocial subscales, the current sample displayed a somewhat lower correlation in comparison to that reported by Christian and Sellbom (2016), indicating less convergence in the current sample. In the current sample, the association between both the CUE Inventory and the LSRP Callous subscale with the LSRP Antisocial subscale was moderate, displaying much lower levels of shared variance with the Antisocial subscale.

Table 2. Zero order correlations between the LSRP total scale and subscales and the CUE inventory

Scale	1	2	3	4	5
1. LSRP-Total	—	.87*	.84*	.73*	.83*
2. LSRP-Egocentric	.87*	—	.71*	.46*	.76*
3. LSRP-Callous	.84*	.71*	—	.37*	.85*
4. LSRP-Antisocial	.73*	.46*	.37*	—	.45*
5. CUE	.83*	.76*	.85*	.45*	—

\* $p < .001$

Several partial correlations were performed to explore the relationships between the CUE and LSRP subscales while controlling for other subscales. A strong, albeit decreased relationship remained between the CUE and the LSRP Callous subscale controlling for the Egocentric subscale ( $r = .68, p < .001$ ). A moderate relationship was seen between the CUE and the LSRP Egocentric subscale controlling for the Callous subscale ( $r = .43, p < .001$ ). A low to moderate correlation was found between the CUE and the Antisocial subscale controlling for the Callous subscale ( $r = .27, p = .001$ ).

### 3.4 Multiple Regression Analysis

Hierarchical multiple regression analysis was performed to assess the ability of the CUE to predict scores on the LSRP total scale after controlling for gender, age, and education variables. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Gender, age, and education were entered at Step 1, explaining 13.2% of the variance in LSRP scores. After entry of CUE scores at Step 2, the total variance explained by the model was 70.1%,  $F(4, 150) = 87.86, p < .001$ . The CUE explained an additional 57% of the variance in LSRP scores, after controlling for gender, age, and education,  $R$  squared change = .57,  $F$  change (3, 150) = 285.22,  $p < .001$ . In the final model, only CUE scores were statistically significant ( $\beta = .83, p < .001$ ).

### 3.5 Exploratory Factor Analysis

An exploratory approach was used in an effort to identify the underlying structure of the CUE Inventory. The 23 items of the CUE were subjected to a Principal Axis Factor Analysis (PAF) using SPSS Version 22. An examination of the sampling distribution indicated mild positive skewness for the CUE total score, the distribution being positively skewed in particular for females ( $< 1$ ). All CUE items were within acceptable ranges for skewness according to criteria suggested by Kline (2011) (skewness not exceeding 3) and by Curran, West and Finch (1996) (skewness not exceeding 2). Nevertheless, PAF was selected as a conservative approach with respect to multivariate normality (Costello & Osborne, 2005). PAF “explicitly focuses on the common variance among the items and, therefore, focuses on the latent factor” (Henson & Roberts, 2006, p. 398). Prior to performing PAF, the sample was assessed for its suitability for factor analysis. Examination of the correlation matrix revealed that 22 of the 23 items correlated at least .3 with at least one other item, suggesting reasonable factorability. However, two items were removed due to low communalities ( $< .30$ ); these were the same items whose skewness approached 2. Subsequent EFA analyses were conducted based on 21 items. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .89, which exceeded the recommended value of .6 (Kaiser, 1970, 1974). Guidelines for sampling adequacy provided by Hutcheson and Sofroniou (1999) would describe this KMO measure as falling between the great and superb ranges. Bartlett’s Test of Sphericity (Bartlett, 1954) reached statistical significance, supporting the factorability of the correlation matrix.

Principal Axis Factor Analysis (PAF) revealed four factors with eigenvalues exceeding 1 (eigenvalues were 8.31, 2.29, 1.69, and 1.19) explaining 39.5%, 10.9%, 8.0%, and 5.6% of the variance, respectively. An inspection of the scree plot suggested a break around the third or fourth factor. Results of Parallel Analysis showed only three factors with eigenvalues exceeding the corresponding criterion values for a randomly generated data matrix of the same size (21 variables x 155 respondents), supporting a three-factor solution. Given that the CUE was designed to measure a specific trait, it was an assumed probability that factors would be correlated. Oblique (Oblimin) rotation was performed to aid in the interpretation of these three factors. The three-factor solution explained 51.5% of the variance, with Factor 1 contributing 37.5%, Factor 2 contributing 8.5%, and Factor 3 contributing 5.5%. An examination of the Reproduced Correlation Matrix revealed 31% nonredundant residuals with absolute values greater than .05, suggesting this three-factor model to be an adequate fit of the data.

The first factor had high to very high loadings on 13 items (see Table 3 for items and factor loadings and Table 4 for pattern matrix). Items with factor loadings less than .4 were omitted for interpretation based on Stevens’ (2002) recommendation. An inspection of the content of these items suggested that this first factor may be labeled “Callous”. The items, which are primarily from the perspective of self toward others, relate to particularly cold, unfeeling, self-centered, spiteful qualities, as well as exploitive tendencies. The second factor may be labeled Care/Approval Seeking. The items, which are from the perspective of the concern of others toward self, appear to be associated with a desire for others to like and care about the individual, or the tendency to be absent of such concern. The third factor may be labeled Indifference/Detachment. The items appear to be associated with being strongly disconnected from painful feelings, being impassive, indifferent, and virtually invulnerable to sadness. These items strictly concern feelings, or lack thereof, of self, as opposed to attitude toward others.

As seen in Table 3, the three factors were not highly correlated with one another, but were not independent. Internal consistency for each of the three subscales was examined using Cronbach’s alpha. The alpha coefficient was high for Callous (.93) (13 items) and alphas were moderate for Care Seeking (.70) (3 items), and for Indifference/Detachment (.69) (4 items).

A further examination of the zero-order correlations (not shown here) between the CUE factors, represented as subscales, and the LSRP scales, indicated that the CUE Callous subscale had high correlations with the LSRP Total, Egocentric, and Callous scales ( $r_s = .84, .79, \text{ and } .83$ , respectively, all  $p < .001$ ), but only a moderate correlation with the Antisocial subscale ( $r = .48, p < .001$ ). The CUE Care/Approval Seeking subscale had moderate correlations with the LSRP Total and LSRP Callous scales ( $r_s = .38 \text{ and } .42$ , respectively,  $p < .001$ ), and a low to moderate correlation with the Antisocial subscale ( $r = .29, p < .001$ ). The CUE Indifference/Detachment subscale had a moderate relationship with the LSRP Callous subscale ( $r = .41, p < .001$ ), and nearly a zero correlation with the Antisocial subscale, indicating no relationship between these measures.

Table 3. Items and factor loadings for the Caring/Uncaring Emotional (CUE) inventory

Factor	Callous	Care/Approval Seeking	Indifference/Detachment
	1	2	3
1 Let's be honest, if I don't know you, why should I care about you?	.84		
2 I can act nice to someone just to get what I want, and then I don't think about that person unless I need something again from them.	.78		
3 I can be good at pretending to care about people but most of the time I really don't care.	.77		
4 I might say I'm sorry, but I really don't give a .....	.76		
5 It really doesn't bother me if someone gets shot or dies, unless it's my family or friend	.76		
6 If there is someone I don't like, it would feel good to see them get hurt.	.74		
7 I have the power to hear about terrible things happen to people and not let it bother me.	.72		
8 I know it may sound cold, but I've got to think about myself first, that's just the way life is.	.66		
9 The only thing I might ever cry about is if someone in my family died.	.64		
10 If someone gets me really mad, I have great ways to get even.	.61		
11 I am able to know that I did something wrong, but not really care about it.	.59		
12 I can act real cool and nice if it works to get what I want.	.57		
13 I don't spend my time worrying about people's feelings getting hurt.	.57		
14 I care about what other people think of me.		.78	
15 I want others to like me.		.68	
16 If people tell me I did something wrong, I will probably listen and think about if what they said is true.		.53	
17 I am very good at not letting myself get hurt emotionally.			.66
18 I am the type of person who worries sometimes.			.60
19 Nothing much bothers me.			.58
20 I basically never feel sad.			.41
21 Maybe it sounds cold, but I have the power to just not care about what anyone thinks of me.			
Correlations among factors			
Factor2	.25	—	.21
Factor3	.29	.21	—

Note. Factor loadings < .4 are suppressed.

Table 4. Pattern matrix for PAF with oblimin rotation of three factor solution of CUE items

Items	Pattern coefficients			Communalities
	Factor			
	1	2	3	
Let's be honest...	<b>.837</b>	.004	-.023	.692
I can act nice...	<b>.778</b>	-.033	.007	.596
I can be good...	<b>.767</b>	.105	.007	.642
I might say...	<b>.764</b>	.196	-.080	.661
It really doesn't bother...	<b>.758</b>	.078	-.033	.595
If there is someone...	<b>.735</b>	.027	-.192	.506
I have the power...	<b>.715</b>	.005	.281	.706
I know it may sound...	<b>.659</b>	-.049	.145	.493
The only thing I might...	<b>.635</b>	-.031	.251	.544
If someone gets me	<b>.606</b>	-.095	.006	.350
I am able to know...	<b>.589</b>	.230	-.055	.447
I can act real cool...	<b>.573</b>	-.197	.079	.337
I don't spend my time...	<b>.573</b>	.348	.172	.658
I care about what other...	-.071	<b>.781</b>	.134	.643
I want others to...	-.037	<b>.676</b>	.189	.532
If people tell me...	.187	<b>.528</b>	-.174	.335
I am very good at...	.106	-.132	<b>.664</b>	.466
I am the type of person...	-.205	.178	<b>.599</b>	.390
Nothing much bothers...	.198	.033	<b>.582</b>	.456
I basically never feel...	.190	.075	<b>.407</b>	.271
Maybe it sounds cold...	.337	.281	.365	.486

Note. Factor loadings greater than .40 are shown in boldface.

As seen in Table 5, an examination of the structure matrix revealed that four items were complex variables, with two items ("I don't spend my time worrying about people's feelings getting hurt."; "Maybe it sounds cold, but I have the power to just not care about what anyone thinks of me.") having high loadings (coefficients) on all three factors.

Table 5. Structure matrix for PAF with oblimin rotation of three factor solution of CUE items

Items	Structure coefficients		
	Factor		
	1	2	3
Let's be honest...	<b>.831</b>	.206	.215
I can act nice...	<b>.771</b>	.160	.219
I can be good...	<b>.795</b>	.296	.246
I might say...	<b>.790</b>	.368	.177
It really doesn't bother...	<b>.767</b>	.258	.198
If there is someone...	<b>.688</b>	.168	.021

I have the power...	<b>.796</b>	.241	<b>.484</b>
I know it may sound...	<b>.688</b>	.144	.321
The only thing I might...	<b>.698</b>	.179	<b>.424</b>
If someone gets me	<b>.584</b>	.056	.157
I am able to know...	<b>.631</b>	.364	.160
I can act real cool...	<b>.547</b>	-.039	.200
I don't spend my time...	<b>.707</b>	<b>.526</b>	<b>.407</b>
I care about what other...	.159	<b>.791</b>	.278
I want others to...	.183	<b>.707</b>	.320
If people tell me...	.268	<b>.537</b>	-.010
I am very good at...	.261	.034	<b>.667</b>
I am the type of person...	.008	.253	<b>.578</b>
Nothing much bothers...	.371	.204	<b>.645</b>
I basically never feel...	.324	.208	<b>.477</b>
Maybe it sounds cold...	<b>.510</b>	<b>.441</b>	<b>.520</b>

Note. Factor loadings greater than .40 are shown in boldface.

#### 4. Discussion

An affective dimension of psychopathy, e.g., callousness, lack of empathy, lack of remorse, unemotional responsiveness, is essential to the study and understanding of psychopathy in youth and adults. An affective dimension is considered a primary dimension of psychopathy in both youth and adults, it is common to all conceptualizations of psychopathy, it is arguably the most essential dimension in the psychopathy construct, and it has been associated with externalizing behaviors in adults and in youths (Christian & Sellbom, 2016; Frick & White, 2008; Frick et al., 2014; Kimonis et al., 2014; Salekin et al., 2014). Brief, validated, self-report measures of psychopathy or psychopathic traits may be advantageous for basic research purposes, for epidemiological study, and may also have potential for applied interventional uses. Particularly when researchers are interested in focusing specifically on the affective dimension of psychopathy, brief measures of this dimension may be valuable. A pilot study was conducted of a new measure intended to index affective traits associated with the construct of psychopathy. The current study presented preliminary validation of a new measure by study of its psychometric properties and relation to a recently expanded version of the Levenson Self-Report Psychopathy Scale (LSRP). Results indicated that, with this initial sample, the CUE had high internal consistency and was highly correlated with the LSRP Total, Egocentric, and Callous scales, the highest correlation being with the Callous subscale. CUE scores accounted for a substantial portion of the variance in LSRP scores after controlling for demographic variables. The most robust factor identified in the CUE Inventory appears to be associated with callousness, which is consistent with the research literature on the affective dimension of psychopathy. The bivariate and partial correlations and EFA indicated that with respect to the current sample the CUE may well tap into the construct of callousness which is a prime feature of psychopathy. Thirteen of 21 items (two items were removed due to low communalities) had high to very high loadings on this first factor. The items comprising this factor appear to be associated with particularly cold, unfeeling, self-centered, spiteful qualities, as well as exploitive tendencies. Tentatively speaking, the CUE may function as an operational representative of callousness in adults in a community sample.

A second factor identified in the CUE appeared to be associated with the relative desire or absence of desire to be cared about and approved of by others. This factor had only modest association with the other two CUE factors and with the LSRP scales. This factor was composed of only three items; however, none of these items cross-loaded with other factors, suggesting it may represent a separate factor with respect to the current sample. The relevance of such a factor to affective or interpersonal psychopathic traits remains to be further studied.

A third factor, tentatively labeled Indifference/Detachment, is composed of items that appear to be associated with being strongly disconnected from painful feelings, being impassive, indifferent, and virtually invulnerable to sadness. These items concern feelings, or the relative lack of feelings, with respect to self, as opposed to

attitude toward others. However, the structure matrix revealed that some items in the third factor cross-loaded particularly with the first factor. Thus, it is not clear to what extent this factor might represent an affective trait overlapping with, but somewhat distinct from callousness or coldness.

It is noteworthy that there was a moderate relationship between the CUE and the LSRP Egocentric subscale while controlling for the Callous subscale, suggesting that the CUE may overlap with the interpersonal dimension of psychopathy, and particularly as operationalized in the expanded LSRP. The overlap between affective and interpersonal dimensions of psychopathy found in this study is quite consistent with the literature on psychopathy, including the finding of a moderate correlation between the Egocentric and Callous subscales of the expanded LSRP as reported by Christian and Sellbom (2016).

An interesting finding was that the CUE demonstrated only a moderate zero-order correlation with the Antisocial subscale of the modified LSRP. The partial correlation was in the low range while controlling for the LSRP Callous subscale. This suggests that the CUE is tapping primarily into an affective dimension of coldness, and also tapping into an interpersonal dimension, and that the CUE may be significantly but at best modestly associated with impulsive, irresponsible, antisocial behavior as operationalized by the LSRP Antisocial subscale when considering overlapping variance among these scales.

This study found that, with the exception of the LSRP Antisocial subscale, men scored significantly higher than women on the LSRP scales and on the CUE scale. Gender differences on most of the LSRP scales may be viewed as consistent with the findings by Levenson et al. (1995) and by Salekin et al. (2014) in which men scored significantly higher than women on the LSRP primary psychopathy and secondary psychopathy scales. However, to the extent that the Antisocial subscale of the expanded LSRP represents a measure of secondary psychopathy in the original LSRP, one would have expected men in this sample to have scored significantly higher than women on the Antisocial subscale. It is not clear why this was not the case. In a review of the study of psychopathy, Skeem et al. (2011) reported that researchers generally agree that men display higher levels of psychopathy than women do and that such pattern has been observed on the PCL-R and the PPI. Thus, the present findings are generally consistent with the literature on psychopathy.

An advantage of this study is that it sampled a broad age-range of adults in a community sample. Approximately 20 % of the sample included adults of middle age years (45-64). On the other hand, slightly more than half of the sample was comprised of young adults (ages 25-34). Additionally, the sample was a convenience sample obtained via a particular source, i.e., MTurk.

Another advantage of this study is that it may be the first, or among the first studies to utilize the expanded LSRP as devised by Christian and Sellbom (2016). For the current sample, internal consistency reliability was excellent for the LSRP Total scale and good for each of the LSRP subscales. The reliability coefficients were slightly higher than those reported by Christian and Sellbom. The current study thus supports validation for the internal consistency reliability of the expanded LSRP.

#### *4.1 Limitations*

There were several limitations of this study that included sample size with respect to conducting an Exploratory Factor Analysis, albeit, Factor 1 of the CUE can be considered reliable regardless of sample size given there were more than four item loadings greater than .6 (Guadagnoli & Velicer, 1988). Additionally, there is restricted generalization from the current sample based on use of principal axis factoring (Field, 2013). Generalization of the results would require cross-validation. The CUE and the expanded LSRP are both self-report measures that utilized the same response choice format. Shared method variance may have artificially inflated the correlations between these measures. All participants responded first to the LSRP items so there was no control for any potential order effects. There is a certain degree of subjectivity on the part of the researcher in conducting an EFA, albeit EFA decisions were reported in this study. The current study is a pilot study; at this juncture the latent structure of the CUE and its relationship with any meaningful external correlates remain to be further studied. Although initially designed for study of youths, it has been piloted with adults, albeit, a large segment of the current sample were young adults. No statements can be made at this time as to how youth might respond to this measure.

#### *4.2 Future Directions*

Future study of the CUE may focus on its relationship with other measures of related constructs and external correlates. It could be posited that the CUE would be strongly associated with the Meanness scale of the TriPM in adults, with the Coldheartedness scale of the PPI-R, with the self-report form of the CAPP, and with the ICU in youths. Previous studies of the ICU found a three-factor bifactor model with the three subscales (Uncaring,

Callousness, and Unemotional) being related to a common general factor of CU traits (Essau, Sasagawa, & Frick, 2006; Fanti, Frick, & Georgiou, 2009; Kimonis et al., 2008; Pihet, Etter, Schmid, & Kimonis, 2015). However, it was recently reported by Ray, Frick, Thornton, Steinberg, and Cauffman (2016) that the factor structure of the ICU may reflect method variance associated with positively and negatively worded items. As noted earlier the ICU also has demonstrated promise as a measure of CU traits with young adults. It is particularly interesting that the CUE was found to have what appear to be three factors similar to those identified with the ICU. The CUE may also be studied in relation to the FFM where its strongest association may be with the Agreeableness dimension of personality. As noted earlier, Miller and Lynam (2015) contend that the FFM domain of disagreeableness/antagonism is most essential to the construct of psychopathy. Therefore, it would be particularly useful to study the CUE in relation to this dimension of the FFM. Future study of the CUE might also benefit from adding one or more items to the second factor which was composed of only three items. This might aid in the understanding of this factor as it relates to psychopathic traits.

In sum, this pilot study of a new measure of affective traits of psychopathy suggests that further study of this scale is warranted. The scale demonstrated high internal consistency, strong convergence with a modified, established self-report measure of psychopathy, and a first factor that appeared to be a robust measure of the trait of callousness.

### Acknowledgements

The author expresses appreciation to Dr. Martin Sellbom for his constructive review of the manuscript. The author expresses appreciation to Dr. Marc J. Diener for his review of the manuscript concerning the exploratory factor analysis.

### References

- Andershed, H., Kerr, M., Stattin, H., & Levander, S. (2002). Psychopathic traits in non-referred youths: A new assessment tool. In E. Blaauw, & L. Sheridan (Eds.), *Psychopaths: Current international perspectives* (pp. 131-158). The Hague: Elsevier.
- Bartlett, M. S. (1954). A note on the multiplying factors for various chi square approximations. *Journal of the Royal Statistical Society*, *16*(Series B), 296-298.
- Berkout, O. V., Young, J. N., & Gross, A. M. (2011). Mean girls and bad boys: Recent research on gender differences in conduct disorder. *Aggression and Violent Behavior*, *16*, 503-511. <http://dx.doi.org/10.1016/j.avb.2011.06.001>
- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, *56*, 81-105. <http://dx.doi.org/10.1037/h0046016>
- Christian, E., & Sellbom, M. (2016). Development and validation of an expanded version of the three-factor Levenson Self-Report Psychopathy Scale. *Journal of Personality Assessment*, *98*, 155-168. <http://dx.doi.org/10.1080/00223891.2015.1068176>
- Cleckley, H. (1941). *The mask of sanity*. St. Louis, MO: Mosby.
- Cleckley, H. (1976). *The mask of sanity* (5th ed.). St. Louis, MO: Mosby.
- Cooke, D. J., Hart, S., Logan, C., & Michie, C. (2004). *Comprehensive Assessment of Psychopathic Personality-Institutional Rating Scale (Capp-IRS)* (Unpublished manuscript). Glasgow Caledonian University, Glasgow, UK.
- Cooke, D. J., Hart, S. D., Logan, C., & Michie, C. (2012). Explicating the construct of psychopathy: Development and validation of a conceptual model, the Comprehensive Assessment of Psychopathic Personality (CAPP). *International Journal of Forensic Mental Health*, *11*, 242-252. <http://dx.doi.org/10.1080/14999013.2012.746759>
- Cooke, D. J., & Michie, C. (2001). Refining the construct of psychopathy: Towards a hierarchical model. *Psychological Assessment*, *13*, 171-188. <http://dx.doi.org/10.1037/1040-3590.13.2.171>
- Costa, P. T. Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual*. Odessa, FL: Psychological Assessment Resources.
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment Research and Evaluation*, *10*, 1-9.

- Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods*, *1*, 16-29. <http://dx.doi.org/10.1037/1082-989X.1.1.16>
- Drislane, L. E., Patrick, C. J., & Arsal, G. (2014). Clarifying the content coverage of differing psychopathy inventories through reference to the Triarchic Psychopathy Measure. *Psychological Assessment*, *26*, 350-362. <http://dx.doi.org/10.1037/a0035152>
- Eisenbarth, H., Lilienfeld, S. O., & Yarkoni, T. (2015). Using a genetic algorithm to abbreviate the Psychopathic Personality Inventory-Revised (PPI-R). *Psychological Assessment*, *27*, 194-202. <http://dx.doi.org/10.1037/pas0000032>
- Essau, C. A., Sasagawa, S., & Frick, P. J. (2006). Callous-unemotional traits in community sample of adolescents. *Assessment*, *13*, 454-469. <http://dx.doi.org/10.1177/1073191106287354>
- Fanti, K. A., Frick, P. J., & Georgiou, S. (2009). Linking callous-unemotional traits to instrumental and non-instrumental forms of aggression. *Journal of Psychopathology and Behavioral Assessment*, *31*, 285-298. <http://dx.doi.org/10.1007/s10862-008-9111-3>
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Los Angeles, CA: SAGE.
- Forth, A. E., Kosson, D. S., & Hare, R. D. (2003). *The Psychopathy Checklist: Youth Version manual*. Toronto, Ontario, Canada: Multi-Health Systems.
- Frick, P. J. (2004). *Inventory of callous-unemotional traits: Unpublished rating scale*. University of New Orleans, New Orleans, LA.
- Frick, P. J., & Dickens, C. (2006). Current perspectives on conduct disorder. *Current Psychiatry Reports*, *8*, 59-72. <http://dx.doi.org/10.1007/s11920-006-0082-3>
- Frick, P. J., & Hare, R. D. (2001). *The Antisocial Process Screening Device*. Toronto, Canada: Multi-Health Systems.
- Frick, P. J., Ray, J. V., Thornton, L. C., & Kahn, R. E. (2014). Can callous-unemotional traits enhance the understanding, diagnosis, and treatment of serious conduct problems in children and adolescents? A comprehensive review. *Psychological Bulletin*, *140*, 1-57. <http://dx.doi.org/10.1037/a0033076>
- Frick, P. J., & White, S. F. (2008). Research review: The importance of callous-unemotional traits for developmental models of aggressive and antisocial behavior. *Journal of Child Psychology and Psychiatry*, *49*, 359-375. <http://dx.doi.org/10.1111/j.1469-7610.2007.01862.x>
- Guadagnoli, E., & Velicer, W. F. (1988). Relation of sample size to the stability of component patterns. *Psychological Bulletin*, *103*, 265-275. <http://dx.doi.org/10.1037/0033-2909.103.2.265>
- Hall, J. R., Drislane, L. E., Patrick, C. J., Morano, M., Lilienfeld, S. O., & Poythress, N. G. (2014). Development and validation of triarchic construct scales from the Psychopathic Personality Inventory. *Psychological Assessment*, *26*, 447-461. <http://dx.doi.org/10.1037/a0035665>
- Hare, R. D. (1991). *The Hare Psychopathy Checklist-Revised*. Toronto, Ontario, Canada: Multi-Health Systems.
- Hare, R. D. (2003). *The Hare Psychopathy Checklist-Revised* (2nd ed.). Toronto, Ontario, Canada: Multi-Health Systems.
- Henson, R. K., & Roberts, J. K. (2006). Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. *Educational and Psychological Measurement*, *66*, 393-416. <http://dx.doi.org/10.1177/0013164405282485>
- Hutcheson, G., & Sofroniou, N. (1999). *The multivariate social scientist*. London, UK: SAGE. <http://dx.doi.org/10.4135/9780857028075>
- John, O. P., & Benet-Martinez, V. (2000). Measurement: Reliability, construct validation, and scale construction. In H. T. Reis, & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 339-369). New York, NY: Cambridge University Press.
- Kaiser, H. F. (1970). A second-generation little jiffy. *Psychometrika*, *35*, 401-415. <http://dx.doi.org/10.1007/BF02291817>
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, *39*, 31-36. <http://dx.doi.org/10.1007/BF02291575>



- Kimonis, E. R., Branch, J., Hagman, B., Graham, N., & Miller, C. (2013). The psychometric properties of the Inventory of Callous-Unemotional Traits in an undergraduate sample. *Psychological Assessment, 25*, 84-93. <http://dx.doi.org/10.1037/a0029024>
- Kimonis, E. R., Fanti, K., Goldweber, A., Marsee, M. A., Frick, P. J., & Cauffman, E. (2014). Callous-unemotional traits in incarcerated adolescents. *Psychological Assessment, 26*, 227-237. <http://dx.doi.org/10.1037/a0034585>
- Kimonis, E. R., Frick, P. J., Skeem, J., Marsee, M. A., Cruise, K., Munoz, L. C., ... Morris, A. S. (2008). Assessing callous-unemotional traits in adolescent offenders: Validation of the Inventory of Callous-Unemotional Traits. *International Journal of Law and Psychiatry, 31*, 241-252. <http://dx.doi.org/10.1016/j.ijlp.2008.04.002>
- Kline, R. B. (2011). *Principles and practice of structural equation modeling* (5th ed.). New York: Guilford Press.
- Levenson, M. R., Kiehl, K. A., & Fitzpatrick, C. M. (1995). Assessing psychopathic attributes in a noninstitutionalized population. *Journal of Personality and Social Psychology, 68*, 151-158. <http://dx.doi.org/10.1037/0022-3514.68.1.151>
- Lilienfeld, S. O., & Fowler, K. A. (2006). The self-report assessment of psychopathy: Problems, pitfalls, and promises. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 107-132). New York, NY: Guilford Press.
- Lilienfeld, S. O., & Widows, M. R. (2005). *Psychopathic Personality Inventory-Revised (PPI-R) professional manual*. Odessa, FL: Psychological Assessment Resources.
- Lynam, D. R., Gaughan, E. T., Miller, J. D., Miller, D. J., Mullins-Sweatt, S., & Widiger, T. A. (2011). Assessing the basic traits associated with psychopathy: Development and validation of the Elemental Psychopathy Assessment. *Psychological Assessment, 23*, 108-124. <http://dx.doi.org/10.1037/a0021146>
- Miller, J. D., & Lynam, D. R. (2015). Psychopathy and personality: Advances and debates. *Journal of Personality, 83*, 585-592. <http://dx.doi.org/10.1111/jopy.12145>
- Miller, J. D., Maples-Keller, J. L., & Lynam, D. R. (2016). An examination of the three components of the Psychopathic Personality Inventory: Profile comparisons and tests of moderation. *Psychological Assessment, 28*, 692-710. <http://dx.doi.org/10.1037/pas0000221>
- Murrie, D. C., & Cornell, D. G. (2002). Psychopathy screening of incarcerated juveniles: A comparison of measures. *Psychological Assessment, 14*, 390-396. <http://dx.doi.org/10.1037/1040-3590.14.4.390>
- Paolacci, G., & Chandler, J. (2014). Inside the Turk: Understanding Mechanical Turk as a participant pool. *Current Directions in Psychological Science, 23*, 184-188. <http://dx.doi.org/10.1177/0963721414531598>
- Patrick, C. J. (2010). *Operationalizing the triarchic conceptualization of psychopathy: Preliminary description of brief scales for assessment of boldness, meanness, and disinhibition* (Unpublished manual). Tallahassee, FL: Department of Psychology, Florida State University.
- Patrick, C. J., Fowles, D. C., & Krueger, R. F. (2009). Triarchic conceptualization of psychopathy: Developmental origins of disinhibition, boldness, and meanness. *Development and Psychopathology, 21*, 913-938. <http://dx.doi.org/10.1017/S0954579409000492>
- Pihet, S., Etter, S., Schmid, M., & Kimonis, E. R. (2015). Assessing callous-unemotional traits in adolescents: Validity of the Inventory of Callous-Unemotional Traits across gender, age, and community/institutionalized status. *Journal of Psychopathology and Behavioral Assessment, 37*, 407-421. <http://dx.doi.org/10.1007/s10862-014-9472-8>
- Ray, J. V., Frick, P. J., Thornton, L. C., Steinberg, L., & Cauffman, E. (2016). Positive and negative item wording and its influence on the assessment of callous-unemotional traits. *Psychological Assessment, 28*, 394-404. <http://dx.doi.org/10.1037/pas0000183>
- Salekin, R. T., Chen, D. R., Sellbom, M., Lester, W. S., & MacDougall, E. (2014). Examining the factor structure and convergent and discriminant validity of the Levenson Self-Report Psychopathy Scale: Is the two-factor model the best fitting model? *Personality Disorders: Theory, Research, and Treatment, 5*, 289-304. <http://dx.doi.org/10.1037/per0000073>
- Seibert, L. A., Miller, J. D., Few, L. R., Zeichner, A., & Lynam, D. R. (2010). An examination of the structure of self-report psychopathy measures and their relations with general traits and externalizing behaviors. *Personality Disorders: Theory, Research, and Treatment, 2*, 193-208. <http://dx.doi.org/10.1037/a0019232>

- Sellbom, M., Cooke, D. J., & Hart, S. D. (2015). Construct validity of the Comprehensive Assessment of Psychopathic Personality (CAPP) concept map: Getting closer to the core of psychopathy. *International Journal of Forensic Mental Health, 14*, 172-180. <http://dx.doi.org/10.1080/14999013.2015.1085112>
- Skeem, J. L., Polaschek, D. L. L., Patrick, C. J., & Lilienfeld, S. O. (2011). Psychopathic personality: Bridging the gap between scientific evidence and public policy. *Psychological Science in the Public Interest, 12*, 95-162. <http://dx.doi.org/10.1177/1529100611426706>
- Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Hillsdale, NJ: Erlbaum.
- Vermeiren, R. (2003). Psychopathology and delinquency in adolescents: A descriptive and developmental perspective. *Clinical Psychology Review, 23*, 277-318. [http://dx.doi.org/10.1016/S0272-7358\(02\)00227-1](http://dx.doi.org/10.1016/S0272-7358(02)00227-1)
- Williams, K. M., Paulhus, D. L., & Hare, R. D. (2007). Capturing the four-factor structure of psychopathy in college students via self-report. *Journal of Personality Assessment, 88*, 205-219. <http://dx.doi.org/10.1080/00223890701268074>

### Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

# Early Nurturing Experiences, Self-Compassion, Hyperarousal and Scleroderma

## *The Way We Relate to Ourselves May Determine Disease Progression*

Karen G. Kearney<sup>1</sup> & Richard E. Hicks<sup>1</sup>

<sup>1</sup> School of Psychology, Bond University, Robina, Queensland, Australia

Correspondence: Richard E. Hicks, School of Psychology, Faculty of Society and Design, Bond University, Robina, Queensland-4229, Australia. E-mail: rhicks@bond.edu.au

Received: July 29, 2016

Accepted: September 2, 2016

Online Published: October 12, 2016

doi:10.5539/ijps.v8n4p16

URL: <http://dx.doi.org/10.5539/ijps.v8n4p16>

### Abstract

Scleroderma is a rare, painful and complex autoimmune connective tissue disease that can lead to death. The physiology of symptom onset and progression and the psychological aspects of living with this chronic disease have been studied fairly extensively. However, there is limited knowledge about scleroderma and negative physiological arousal (hyper-arousal: linked to immune dysfunction resulting in autoimmunity in the face of stressful events) and how levels of hyper-arousal are related to stress experienced at an early age; to emotion regulation coping strategies such as self-compassion; and to when scleroderma is experienced (earlier or later onset). Knowledge about these relationships may be important information for the treatment of scleroderma and related illnesses. This study addressed these relationships for scleroderma by examining how hyper-arousal was linked to these psychosocial experiences of stress, to coping strategies, and to age of disease onset.

A within group design was utilized. A total of 122 participants were recruited from Australia (39) the United Kingdom (81) and country not specified (2) and invited to complete an online or a hard copy survey. Lower positive early life experiences, lower levels of self-compassion and an earlier onset of disease were all related to elevated levels of hyper-arousal in individuals diagnosed with scleroderma. A regression equation showed all three contributed significantly to the experienced hyper-arousal. The findings suggest that greater self-compassion may be a determining factor in how earlier emotional experiences are managed and in predicting lower hyper-arousal in terms of this disease.

**Keywords:** scleroderma, autoimmune, self-compassion, early-nurturing, emotion, hyper-arousal

### 1. Introduction

The incidence of those suffering from scleroderma is higher in countries such as the USA (276/million Chiffrot, Fautrel, Sordet, Chatelus, & Sibilia, 2008) than in Australia (233/million) or in Europe e.g., France (158/million) and England (88/million) and is growing apace (Chiffrot et al., 2008). With the growth it is likely there will be a corresponding rise both in terms of societal level health cost and personal and pain cost. New knowledge that might help alleviate the personal stress and the burden on families and the broader community is likely to be welcomed. Our study examined some important aspects associated with scleroderma and draws conclusions about how an individual's early emotional experiences and access to self-compassion as a way of coping may impact on the development of hyper-arousal, strongly associated with scleroderma. We indicate the importance of developing positive emotional coping strategies in people diagnosed with scleroderma.

#### *1.1 Hyper-Arousal, the Immune System and Scleroderma*

Hyper-arousal is described as physical or emotional tension produced by hormones during the fight-or-flight response and is associated with specific psychological conditions and the development of autoimmunity (Schore, 1994) (where the individual's immune system attacks its own healthy cells and tissues). The intensity of the fight and flight reaction is generally dependent on an individual's response to a stressor (e.g., Every & Lating, 2002; Selye, 1976) and ability to adapt to stress exposure (Hammad, Barsky, & Regestein, 2001). Exposure to unexpected stimuli may produce excessive arousal reactions and increased cortisol (a stress hormone) levels. Individuals with irregular cortisol arousal may be unable to distinguish between physically harmless and

threatening stimuli, frequently engaging the fight and flight response in non-threatening situations. This condition may overwhelm an individual's resources to accurately process information, decreasing selective attention abilities, resulting in ambiguous meaning and difficulty discriminating between meaningful and insignificant stimuli (Hammad et al., 2001).

### *1.2 Background to Scleroderma and Its Impacts*

The pathogenesis of scleroderma is very complex; genetic variables influence collagen, vascular and immune function and are further complicated by environmental factors (Smith & Kalhaleh, 2008; Steen, 2008). Antibodies explain differences between presenting symptoms for different scleroderma subsets such as diffuse and limited sclerosis; however, what initiates and perpetuates this disease is still unclear (Smith & Kalhaleh, 2008). Much is known about scleroderma and the relationship with psychological aspects such as coping, depression and anxiety (e.g., Angelopoulos, Drososet, & Moutsopoulos, 2001; Richards, Herrick, Griffin, Gwilliam, & Fortune, 2004; Roca, Wigley, & White, 1996). However, the relationship of personal experiences of stress and levels of physiological arousal related to disease onset have received less attention. A study conducted in 1983 by Freedman and Ianni, identified differences in stress reactions between individuals diagnosed with scleroderma and those without scleroderma. Those with scleroderma had a heightened stress response. Research has also explored stress experienced by individuals diagnosed with scleroderma. A few studies found that stress events, emotional stress and recurrent infections were reported before or during onset of scleroderma (Hui, Johnston, Brodsky, Tafur, & Kim Ho, 2007). Stress events were also reported by individuals in the year before onset of scleroderma, with scleroderma patients reporting significantly greater scores on measures of stress experiences, than non-scleroderma participants (Chen, Huang, Qiang, Wang, & Han, 2008).

Research suggests that arousal is influenced by genetic factors and is higher in individuals who are more physiologically and emotionally reactive (Pfaff, 2005). Virtually any stressor whether physical or psychological will result in a rapid increase in the **hormone adrenocorticotropic** (Rice, 1999). The adrenals respond to stress by secreting a number of hormones including epinephrine (adrenaline), norepinephrine (noradrenaline) and glucocorticoids that include the hormone cortisol (Rice, 1999). High levels of the stress hormone cortisol can have negative effects on the immune system, while epinephrine and norepinephrine affect the sympathetic nervous system (SNS; Rice, 1999). Research suggests hyper-arousal is associated with a number of biopsychosocial stress related factors. It forms part of the fight and flight response that functions to protect an individual from threat, however over-reactive protection defences that create excessive arousal reactions are a risk factor in the development of autoimmunity (e.g., Schore, 1994). It has been suggested that individuals diagnosed with scleroderma have a heightened stress response, when compared to individuals without scleroderma (Freedman & Ianni, 1983). Hyper-arousal is involved in the stress response and autoimmunity (e.g., Every & Lating, 2002) and is higher in individuals who are more physiologically and emotionally reactive (Pfaff, 2005).

The factors that may contribute to heightened levels of physiological arousal in individuals diagnosed with scleroderma require investigation. The factors studied in the current study were early life experiences of stress or lack of warmth in early relationships, inadequate emotion regulation strategies, and the relationship to age of disease onset.

### *1.3 Early Memories of Warmth and Safeness*

Research suggests negative early childhood experiences can have detrimental effects on the social functioning, psychological and physical health of individuals. Gilbert (2007) suggests early life experiences influence gene expression and the biological and psychological functioning of the brain. These early life experiences are expressed as different types of emotion regulation and social communications that reflect cognitive and behavioural patterns of threat and safety. Positive early experiences that engender warmth and safety have been associated with well-being (Schore, 1994), while negative experiences with low self-kindness and/or the development of self-criticism (Brewin, Firth, Cozens, Furnham, & McManus, 1992; Neff, Kilpatrick, & Rude, 2007), are associated with poorer psychological outcomes (Irons, Gilbert, Baldwin, Baccus, & Palmer, 2006). Gilbert and colleagues (2008) suggested that feeling safe and content is a determinant of psychopathology, attachment style and self-evaluation.

Positive nurturing experiences that foster feelings of warmth (such as tenderness, kindness and concern) and safeness (feeling safe rather than safety seeking) are associated with a lower risk of developing psychopathology (Mikulincer & Shaver, 2007). Negative rearing environments where perceptions of parents as being non-caring (Finzi-Dottan & Karu, 2006) are seen as being associated with an increase in negative affect and a vulnerability to psychopathology (Heit, Graham, & Nemeroff, 1999; Schore, 1994). Gilbert et al. (2008) proposed that when early environments are experienced as threatening and fail to provide feelings of safety and warmth, a lack of

stimulation of the positive affect and warmth systems and an over-activation of the threat/defence/protective systems may occur. Psychosocial stress, particularly early threat experiences have the potential to impact on immune and psychological functioning. These suggestions provide support for exploring these aspects in relation to scleroderma onset.

Gilbert and colleagues developed the Early Memories of Warmth and Safeness scale (EMWS) to measure negative childhood experiences. The EMWS scale was selected for this study as it was designed to measure the recall of feelings associated with warmth and safety as a child and may be a better indicator of early negative life experiences than recalling specific negative event(s) in childhood (Richter, Gilbert, & McEwan, 2009). Richter and colleagues suggest that how an individual responds to an event (both physiologically and emotionally) may be a better indicator of threat than recalling the stressful event itself, as some individuals may recall parents as kind and available but still feel fearful and lack a sense of belonging. Others may have experienced negative events but felt they managed and coped well (Richter et al., 2009). The recall of positive or negative feelings associated with early rearing experiences generally relies on the recollection of an individual's own inner experiences, rather than recalling events related to other's behaviour, as an indicator of stress experienced. Recall of affect in relation to childhood memories may therefore explain feelings of threat not accounted for by the recall of any particular stressful event. [This view of exploring an individual's experience of threat was utilised in this study to measure scleroderma participant's reporting of early life exposure to warmth and safety-using the scale by Richter, Gilbert, and McEwan (2009), as an individual's capacity to regulate arousal early in life influences immune responses and future immune functioning]. Early adverse experiences may influence vulnerability in numerous areas of functioning involving threat/arousal, including regulating emotions and arousal or hyper-arousal-accentuating the experience of stress (Schoore, 1994).

#### *1.4 Self-Compassion: Biopsychosocial Implications*

Self-compassion is an emotion regulation strategy (Neff, 2003a) that involves not avoiding or suppressing negative experiences. This process may engage chemicals such as cortisol, implicated in the fight and flight/threat system (Gilbert, 2002). Self-compassion involves kindness and understanding toward the self (Neff, 2003a; Neff et al., 2007), through an awareness of the distressing feelings but also through treating oneself with kindness and understanding rather than engaging in self-judgement. Self-compassion involves recognising that suffering and disappointment are part of being human and that people including self are worthy of kindness and compassionate care (Neff, 2003a). When compassion is applied to the self, it requires a kind openness to one's own suffering and pain, allowing an accepting kindness toward less favourable attributes and inadequacies, when not managing a situation as well as expected. Experiencing failure as part of a shared human condition helps reduce feelings of isolation and the likelihood of becoming immersed in the negative emotional experience associated with the situation (that is, in rumination; Gilbert, 2007). Self-compassion allows an individual to view the experience from an outside perspective, disengaging from the exaggerated experience of over identifying with the subjective content and providing kindness to the self from the self (that is, a mindful and more balanced view: Neff, 2003a). Self-compassion involves developing the ability to become mindfully aware of these experiences, rather than over-identifying with them, lessening the impact of the negative experience and enabling opportunities to develop a more holistic view of one's situation (Neff, 2003a). Gilbert (2007) saw this mindful self-kindness as reducing rumination and lessening the impact of negative affective experiences, by providing opportunities to reduce heightened threat responses resulting from a threat processing deficit. Self-compassion has not been examined in any other studies to the authors' knowledge, in relation to scleroderma and its onset. This factor was explored as it was hypothesised that self-compassion may act as a protective factor for immune functioning (reducing hyper-arousal trends) and therefore would provide more positive health outcomes for individuals who engage in this emotion regulation strategy.

Neff developed the self-compassion scale (2003b), that has been widely used to measure this construct. This scale utilized in the current study, constitutes the three major aspects of self-compassion discussed above: self-kindness, common humanity and mindfulness. Self-kindness refers to treating oneself with warmth and care without engaging in self-judgment. Common humanity indicates an ability to understand one's suffering or inadequacies as part of shared human experiences, rather than feeling alone or isolated. Mindfulness describes a capacity to employ a balanced view rather than over-identifying with the experiences and is a protective behaviour for experiences of anxiety (Neff, 2003b).

Research has demonstrated a link between the benefits of self-compassion and psychosocial aspects; however, only a few studies have investigated self-compassion and physiological factors (e.g., Pace et al., 2009; Wren et al., 2011). Compassion has been investigated in relation to psychosocial stress and physiological reactions of the neuro-endocrine and innate immune systems. Pace and colleagues (2009) found that people who engaged in more

compassion focused meditation and reflection when compared to people with less engagement, scored lower on physiological responses (such as cortisol levels) and psychological measures (such as of distress and anxiety); suggesting that stress induced immune and behavioural responses (arousal) may be moderated by compassion focused meditation (Pace et al., 2009). Therefore strategies high in self-compassion are likely to produce positive physical and psychological health outcomes (Neff, 2003a; Pace et al., 2009). We sought to examine this relationship in regard to hyper-arousal in scleroderma. Self-compassion provides a solution for threat processing difficulties, and is negatively associated with depression, anxiety, self-criticism and thought suppression and positively associated with life satisfaction (e.g., Gilbert, 2007; Neff, 2003a; Neff et al., 2007), stress reduction (Sharpiro, Astin, Bishop, & Cordova, 2005) and lower cortisol levels (Pace et al., 2009). Self-compassion is significantly related to adaptive functioning and positive health outcomes (Neff et al., 2007). As self-compassion is associated with wellbeing (e.g., Neff, 2003a), the development of inner (self) compassion may therefore provide physiological and psychological health benefits (Gilbert, 2002) to individuals with compromised psychological and immune functioning. Self-compassion strategies are theorised to act as a protective factor (Neff, 2003a), with greater experience of self-compassion likely to be associated with lower physiological arousal and a later onset of scleroderma symptoms.

Risk factors in the development of autoimmunity have been explored in the literature; however, factors that may protect an individual from elevated (threat-related) arousal and the onset and/or development of disease have not previously been explored in relation to scleroderma. Self-compassion is one emotion regulation strategy that may be a protective factor as it provides an individual with the capacity to self-soothe and calm the ensuing physiological reactions. Neff (2003a; 2003b) suggested that self-compassion increases the capacity for self-care: it reduces feelings of isolation by increasing feelings of connectedness to the suffering of other human beings. Self-compassion reflects an ability to positively regulate emotions that lead to increased feelings of autonomy and the capacity to provide care and compassion for both self and others that are associated with positive health outcomes (Reyes, 2011). Individuals diagnosed with scleroderma tend to have a heightened stress response (Freedman & Ianni, 1983), when compared with individuals without scleroderma. This response is likely to be linked to feelings associated with fear or threat and the ability to self-soothe; and may reflect an inability to regulate emotions through insufficient self-compassion. Low self-compassion may invoke a stress response (hyper-arousal); but we found no previous studies that linked self-compassion with scleroderma and its alleviation. We have added *experiences of stress before diagnosis of scleroderma* as a factor of interest, as such experiences have been identified as relevant but scarcely investigated in other studies. The current study explored whether hyper-arousal is associated with childhood experiences of warmth and safety, levels of self-compassion and how the disease is experienced, i.e., earlier or later onset.

### 1.5 Hypothesis

Stress experiences can occur at any age and may influence how emotions are regulated and whether physiological arousal responses occur that can affect immune system functioning. Early *nurturing* experiences whether positive or negative may influence how individuals experience and manage stress. Strategies such as self-compassion that provide an individual with the capacity to reduce arousal may therefore reduce this impact on the immune system by delaying the onset of disease. This study therefore hypothesised that greater levels of negative physiological arousal would be predicted from lower experiences of warmth and safety as a child, lower levels of self-compassion, and an earlier diagnosis of scleroderma. The regression equation used physiological (hyper-) arousal as the DV; and EMWS (early memories of warmth and safety), self-compassion, and early vs late onset of disease as IVs.

## 2. Method

### 2.1 Procedure

Several scleroderma organisations internationally were involved in promoting this study to members diagnosed with scleroderma. These organisations included the Queensland and the Australian Scleroderma Associations and the United Kingdom Scleroderma Society. These non-profit organisations work to provide education and support for members with scleroderma and their families. Approval was received from the various associations' committees responsible for scleroderma research once the survey and explanatory letter had been sighted and discussed. Participants in Australia were recruited through newsletters published by the Australian, and Australian State Scleroderma Associations, such as Queensland and Victoria and by the primary researcher within South East Queensland (Sunshine Coast, Brisbane and Gold Coast) at scleroderma meetings to complete an online or hardcopy version of the survey. Australian participants who had no online access received a hardcopy version of the questionnaire. These participants were recruited from phone enquires and emails as a result of advertisements

in scleroderma newsletters and magazines or at scleroderma meetings. A questionnaire with a stamped addressed envelope (to the supervisor of this project in Australia) was forwarded to interested participants by mail or handed to participants at meetings. A written explanatory letter containing information about the purpose, procedure, where questions/complaints could be directed, risks and benefits of the research project and confidentiality of participants was attached as a cover page to the online and hardcopy versions. Completion of the survey required approximately 50-60 minutes of the participants time.

In the United Kingdom information about the study and the survey including a written explanatory letter from both the researcher and the United Kingdom Scleroderma Society itself was forwarded by the trustee of the Society to 231 of their members who had been diagnosed with Scleroderma. The project was approved by the University's Human Research Ethics Committee and received approval from the Scleroderma Society Ethics Committee in the United Kingdom and the Queensland and Australian Scleroderma Associations.

## 2.2 Participants

Male and female adults aged 18 years and over diagnosed with scleroderma were invited to participate in this research project. Participants were asked a number of demographic and health questions, such as the country resided in, gender, current age and age diagnosed with scleroderma. Males were recruited with regard to the scleroderma prevalence rates for females and males. Similar to other connective tissue diseases, scleroderma has a greater incidence in females with predominance of 3-5:1, and up to 14:1 in some female populations (Chiffot et al., 2008). A similar proportion of males were recruited for this project. Approximately 6:1 (Females 105, Males 17).

## 2.3 Measures

### 2.3.1 Psychosocial Stress: Warmth and Safeness

Early Memories of Warmth and Safeness Scale. The EMWS scale is a 21 item self-report, 5 point Likert scale (e.g., 0 = no, never, 2 = yes sometimes and 4 = yes most of the time). Items include, "I felt safe and secure". "I felt a sense of belonging", "I felt cared for". This scale assesses emotional memories of an individual's childhood as a measure of preverbal or nonverbal experiences of stress. The EMWS scale focuses on recall of one's own emotional experiences while most other measures focus on recall of others behaviours; recall of positive emotions (or deficits) was found to be a better predictor of psychopathology and styles of self-criticism than recall of parental behaviour. The EMWS has good psychometric properties (high Cronbach's alpha, retest reliability, divergent and predictive validity). "Recall of parental behaviour and recall of positive emotional memories were highly related, but recall of positive emotional memories was a better predictor of psychopathology, styles of self-criticism/self-reassurance and disposition to experience positive affect, than recall of parental behaviour" (Richter et al., 2009).

### 2.3.2 Self-Compassion: Self-Compassion Scale

The Self Compassion Scale (Neff, 2003b) is a 26 item, self-report, emotion regulation measure that employs a 5 point Likert scale (e.g., 1 = almost never to 5 = almost always) that contains three components. Self-kindness/Self-judgment (being kind and understanding toward oneself rather than judgmental or critical); Common humanity/Isolation (viewing one's negative experiences as a normal part of the human condition rather than experiencing suffering in isolation); and Mindful acceptance/Over-identifying (being open to and accepting of one's situation rather than over-identifying with painful thoughts and feelings). Examples of items include, "When things are going badly for me, I see the difficulties as part of life that everyone goes through". "When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world". "I try to be loving towards myself, when I'm feeling emotional pain". "When I fail at something important to me, I become consumed by feelings of inadequacy". "When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people". This scale has good psychometric properties (construct, content, convergent and discriminant validity; test-retest reliability) and is a valid theoretical measure of self-compassion (Neff, 2003b). Self-compassion is thought to be an adaptive process that increases psychological resilience and well-being (Neff, 2003a).

### 2.3.3 Arousal: Hyper-Arousal Scale

The Hyper-arousal Scale (Hammond, Barsky, & Regestein, 2001) is a 26 item self-report 5 point likert scale that measures tendencies to introspect or think about feelings by responding intensely to unexpected stimuli and other behaviours that involve cortisol arousal. The scale contains items such as "Bright lights, crowds, noise or traffic bother me.", "I think a lot about feelings.", "My mind is always going.", "I take things personally.", "I am overly conscientious.". This scale has good psychometric properties (predictive and construct: Hammond et al., 2001). Participants recorded responses to 26 questions related to how they would respond in certain situations (e.g., 0 =

not at all true to 5 = completely true). Hyper-arousal scale scores correlate with several EEG measures of arousal including frequency spectral and evoked potential measures (Hammond et al., 2001). Hyper-arousal scores signify increased general cerebral responsiveness but decreased selective attention, indicating openness to stimuli and difficulty distinguishing between physiologically harmless and threatening sensations. This situation may create an information overload and result in difficulty adapting to recurring stimuli. A decrease in selective attention may create ambiguity as to the meaning attributed to the perceived experience resulting in the development of an adversity management system (Hammond et al., 2001).

### 2.3.4 Age of Onset

Participants were asked to indicate the age at which the onset of scleroderma was diagnosed. The question asked was at what age (indicating years and months) were you diagnosed with scleroderma.

## 3. Results

### 3.1 Overview of Analysis

Analysis was performed using SPSS version 20. Descriptive statistics for each of the continuous variables were obtained (please see Table 1 for Ms and SDs for the main variables in the study). Pearson's product-moment correlation coefficients were calculated for the scales (please see Table 1 for details), to establish the relationships between the dependent variable (hyper-arousal) and the independent variables [Early Memories of Warmth and Safeness (EMWS), Self-Compassion (SC) and age of scleroderma onset]. Multiple regression assumptions were explored as these analyses were considered appropriate to meet the initial hypotheses.

### 3.2 Statistical Analysis

Pearson's bivariate correlation coefficients demonstrated significant relationships between Hyper-arousal and Self-compassion ( $r = -.43, p = .000$ ), Age diagnosed with scleroderma ( $r = -.35, p = .002$ ) and EMWS ( $r = -.31, p = .006$ ).

Table 1. Significant bivariate correlations and means and standard deviations for hyper-arousal and self-compassion age diagnosed with scleroderma and EMWS

	1	2	3	4	M	SD
1	1				73.64	15.93
2	-.43***	1			83.15	17.95
3	-.35**	.16	1		46.90	11.60
4	-.31**	.34**	-.02	1	70.03	23.94

\* $p < .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$ . 1 = Hyper-arousal, 2 = Self-Compassion, 3 = Age diagnosed 4 = EMWS

Multiple regression analysis demonstrated the variables significantly accounted for 54.9% (Adjusted  $R^2 = 27.1\%$ ) of the variance,  $F(3, 70) = 10.04, p = .000$ , in Hyper-arousal. The regression coefficients demonstrated that Hyper-arousal was significantly predicted by Self-compassion ( $\beta = -.30, p = .007, sr^2 = .09\%$ ), EMWS ( $\beta = -.22, p = .046, sr^2 = .05\%$ ) and Age diagnosed with scleroderma ( $\beta = -.30, p = .004, sr^2 = .09\%$ ).

Table 2. Summary of the multiple regression analysis for hyper-arousal—predictor variables self-compassion age diagnosed with scleroderma and EMWS

Variable	<i>B</i>	<i>SEB</i>	$\beta$
Hyper-arousal			
Age Diagnosed Scleroderma	-.42	.14	-.30**
Self-Compassion	-.27	.10	-.30**
EMWS	-.14	.07	-.22*
Total R2			.27***

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$



Results demonstrated that early life experiences low in warmth and safety and low Self-compassion contributed to elevated levels of Hyper-arousal. Receiving a diagnosis of scleroderma at a younger age was also related to elevated levels of Hyper-arousal. Results indicated that those Scleroderma participants who report fewer experiences of warmth and safety, fewer experiences of Self-compassion and an earlier onset of Scleroderma, experienced greater levels of Hyper-arousal than those with the opposite trends. Therefore greater Self-compassion predicted lower experiences of negative arousal. Results also demonstrated that individuals diagnosed with Scleroderma who reported greater experiences of EMWS also reported lower levels of arousal; and lower negative arousal was also related to a later diagnosis of Scleroderma.

Multiple regression analysis also demonstrated a link between self-compassion and early life experiences of nurturing and hyper-arousal. The variables significantly accounted for 47.8% (Adjusted  $R^2 = 20.7\%$ ) of the variance,  $F(2, 73) = 10.80, p = .000$ , in Self-Compassion. The regression coefficients demonstrated that Self-Compassion was significantly predicted by Hyper-arousal ( $\beta = -.35, p = .002, sr^2 = .12\%$ ), and EMWS ( $\beta = -.23, p = .037, sr^2 = .05\%$ ).

Table 3. Summary of the multiple regression analysis for self-compassion—predictor variables EMWS and hyperarousal

Variable	<i>B</i>	<i>SEB</i>	$\beta$
Self-Compassion			
Hyper-arousal	-.40	.12	-.35**
EMWS	.17	.08	.23*
Total R2	.23***		

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

The results demonstrated that greater self-compassion is related to greater nurturing experiences in early life and lower hyper-arousal in individuals with scleroderma.

#### 4. Discussion and Conclusions

The results show that negative early life experiences and the development of certain cognitions and emotions low in self-compassion are associated with increased arousal levels. Such levels impact on the immune system; and may partially contribute to the development or earlier onset of scleroderma. Results also demonstrated that negative early nurturing experience and elevated levels of negative arousal predicted lower self-compassion. Early life experiences that provide limited experiences of warmth and feelings associated with safety, may impact on an individual's subjective evaluation of stress/threat experiences, and the capacity to self-soothe and reduce negative arousal. These experiences may reflect a reliance on inadequate emotion regulation resources low in self-compassion that may impact on the level and duration of negative arousal or hyper-arousal, an individual may experience.

Hyper-arousal in the current study was related to the commencement of scleroderma and to lower self-compassion and may be a consequence of negative early rearing experiences lacking in adequate opportunities to feel safe and calm. Negative rearing experiences may impact on the development of self-compassionate emotion regulation strategies, reducing the capacity to be kind to oneself and therefore the capacity to self-soothe. This way of engaging with the self is likely to elevate negative physiological arousal and may, as a consequence, influence when scleroderma develops.

These findings for scleroderma development are consistent with related findings from other immune related physical and psychological health studies. For example in 2009, Pace and colleagues found that stress/arousal induced immune and behavioural responses may be moderated by compassion focused meditation (Pace et al., 2009). In 2013, Przewdziceki and colleagues found self-compassion to be a protective factor for psychological distress in women experiencing body changes resulting from breast cancer treatment (Przewdziceki et al., 2013). Positive outcomes have been found for individuals who engage in self-compassion in relation to stress/arousal and health. The findings in this study on scleroderma suggest that self-compassion may be an effective strategy for individuals with scleroderma as this group may generally be prone to elevated arousal (Freeman & Ianni, 1983) whatever the cause of this arousal. The utilization of self-compassion as a strategy to manage emotions and reduce the threat experience may help decrease arousal and return the individual's body to a state of equilibrium.

In conclusion, the absence of compassionate soothing and nurturing experiences and the presence of internalisation of early external threat (early life experiences low in warmth and safety) appear likely to impede the development of effective coping strategies. The development and utilization of self-compassion strategies could promote emotional and subsequently physiological calming responses that would be beneficial to individuals with scleroderma. The implications for clinical and counselling professionals are strong: helping clients or patients including children develop self-compassion strategies should assist them to manage more effectively their emotional and stress responses and may delay disease onset and development.

#### 4.1 Health and Family and Financial Implications

Engaging in effective emotion regulation strategies such as self-compassion may not only provide personal benefits to the individual but also financial benefits to the health system. A delay in onset may also lessen the burden on families as children would be older and therefore the disease would be less likely to impact on the responsibilities associated with caring for a young family, managing a career and general life activities associated with these factors. Individuals predisposed to immune related diseases may have a better quality of life for a longer period of time (having the disease later in life) and would most likely require fewer visits for medical treatment, than if diagnosed with the disease at a younger age. The benefits of engaging in self-compassionate emotion regulation strategies would therefore provide advantages not only for the individual afflicted by the disease and their family but would also reduce the financial cost to the health system and the general community.

Improving understanding that some coping styles are not helpful in reducing physiological and psychologically stress and providing individuals with opportunities to become mindfully aware of difficult thoughts and memories without using over-identification techniques; while managing these experiences with mindful self-kindness, rather than self-judgment would almost certainly assist many individuals with scleroderma to live more relaxed, happier and healthier lives. Improving how we relate to ourselves, with self-compassion or self-criticism, can influence our own disease experience and our health and wellbeing.

#### 4.2 Limitations

Reporting of early childhood experiences in the current study required the recollection of past events. Recounting these events may be impeded by individuals' ability to accurately remember how they felt at a very early time in their life.

#### Acknowledgements

The researchers express their gratitude to participants and organizations who assisted in this research (the Scleroderma Association of Queensland, Scleroderma Australia and the Scleroderma Society in the United Kingdom), and to Dr Dee Bartrum for her support particularly during the early stages of the research.

#### References

- Angelopoulos, N. V., Drosos, A. A., & Moutsopoulos, H. M. (2001). Psychiatric symptoms associated with scleroderma. *Psychotherapy and Psychosomatics*, *70*(3), 145-150. <http://dx.doi.org/10.1159/000056240>
- Brewin, C. R., Firth-Cozens, J., Furnham, A., & McManus, C. (1992). Self-criticism in adulthood and recalled childhood experience. *Journal of Abnormal Psychology*, *101*(3), 561-566. <http://dx.doi.org/10.1037/0021-843X.101.3.561>
- Chen, Y., Huang, J., Qiang, Y., Wang, J., & Han, M. (2008). *Journal of Zhejiang University: Science B*, *9*(11), 853-856. <http://dx.doi.org/10.1631/jzus.B0820069>
- Chiffot, H., Fautrel, B., Sordet, C., Chatelus, E., & Sibilia, J. (2008). Incidence and prevalence of systemic sclerosis: A systematic literature review. In *Seminars in Arthritis and Rheumatism* (Vol. 37, No. 4, pp. 223-235). WB Saunders. <http://dx.doi.org/10.1016/j.semarthrit.2007.05.003>
- Every, G. S., & Lating, J. M. (2002). The link from stress arousal to disease. In D. A. Meichenbaum (Ed.), *Clinical guide to treatment of the human stress response* (2nd ed.). New York, NY: Springer.
- Finzi-Dottan, R., & Karu, T. (2006). From emotional abuse in childhood to psychopathology in adulthood: A path mediated by immature defense mechanisms and self-esteem. *The Journal of Nervous and Mental Disease*, *194*(8), 616-621. <http://dx.doi.org/10.1097/01.nmd.0000230654.49933.23>
- Freedman, R. R., & Ianni, P. (1983). Role of cold and emotional stress in Raynaud's disease and scleroderma. *British Medical Journal (Clinical research ed.)*, *287*(6404), 1499. <http://dx.doi.org/10.1136/bmj.287.6404.1499>

- Gilbert, P. (2002). Evolutionary approaches to psychopathology and cognitive therapy. *Journal of Cognitive Psychotherapy: An International Quarterly*, 16(3), 263-294. <http://dx.doi.org/10.1891/jcop.16.3.263.52515>
- Gilbert, P. (2007). *Psychotherapy and Counselling for Depression* (3rd ed). London, UK: Sage. <http://dx.doi.org/10.4135/9781446279830>
- Gilbert, P., McEwan, K., Mitra, R., Franks, L., Richter, A., & Rockliff, H. (2008). Feeling safe and content: A specific affect regulation system. Relationship to depression, anxiety, stress and self-criticism. *The Journal of Positive Psychology*, 3(3), 182-191. <http://dx.doi.org/10.1080/17439760801999461>
- Hammad, M., Barsky, A., & Regestein, Q. (2001). Correlation between somatic sensation inventory scores and hyper-arousal scale scores. *Psychosomatics*, 42(1), 29-34. <http://dx.doi.org/10.1176/appi.psy.42.1.29>
- Heit, S., Graham, Y., & Nemeroff, C. B. (1999). Neurobiological effects of early trauma. *The Harvard Mental Health Letter*, 16(4), 4-6.
- Hui, K. K., Johnston, M. F., Brodsky, M., Tafur, J., & Kim Ho, M. (2007). Scleroderma stress and CAM utilization. *eCAM*, 142, 1-4.
- Irons, C., Gilbert, P., Baldwin, M. W., Baccus, J. R., & Palmer, M. (2006). Parental recall, attachment relating and self-attacking/self-reassurance: Their relationship with depression. *British Journal of Clinical Psychology*, 45(3), 297-308. <http://dx.doi.org/10.1348/014466505X68230>
- Mayes, M. D., Lacy Jr., J. V., Beebe-Dimmer, J., Gillespie, B. W., Cooper, B., Laing, T. J., & Schottenfeld, D. (2003). Characteristics of systemic sclerosis in a large US population. *Arthritis and Rheumatism*, 48(8), 2246-2255. <http://dx.doi.org/10.1002/art.11073>
- Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure dynamics and change*. New York: The Guilford Press.
- Neff, K. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, 2(2), 85-101. <http://dx.doi.org/10.1080/15298860309032>
- Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity*, 2(3), 223-250. <http://dx.doi.org/10.1080/15298860309027>
- Neff, K. D., Kilpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality*, 41(1), 139-154. <http://dx.doi.org/10.1016/j.jrp.2006.03.004>
- Pace, T., Negi, L. T., Ademe, D., Cole, S., Sivilli, T., Brown, T., ... Raison, C. L. (2009). Effect of compassion meditation on neuroendocrine, innate immune and behavioural responses to psychosocial stress. *Psychoneuroendocrinology*, 34(1), 87-98. <http://dx.doi.org/10.1016/j.psyneuen.2008.08.011>
- Pfaff, D. W. (2005). *Brain arousal and information theory: Neural and genetic mechanisms*. New York, NY: Harvard University Press.
- Przedzicki, A., Sherman, K. A., Baillie, A., Taylor, A., Foley, E., & Stalgis Bilinski, K. (2013). My changed body: Breast cancer, body image, distress and self-compassion. *Psycho-Oncology*, 22(8), 1872-1879. <http://dx.doi.org/10.1002/pon.3230>
- Reyes, A. (2011). Self-compassion: A concept analysis. *Journal of Holistic Nursing*, 30(2), 81-89. <http://dx.doi.org/10.1177/0898010111423421>
- Rice, P. L. (1999). *Stress and health* (2nd ed.). California: Brookes/Cole.
- Richards, H. L., Herrick, A. L., Griffin, K., Gwilliam, P. D. H., & Fortune, D. G. (2004). Psychological adjustment to systemic sclerosis: Exploring the association of disease factors, functional ability, body related attitudes and fear of negative evaluation. *Psychology Health and Medicine*, 9(1), 29-39. <http://dx.doi.org/10.1080/13548500310001637733>
- Richter, A., Gilbert, P., & McEwan, K. (2009). Development of an early memories of warmth and safeness scale and its relationship to psychopathology. *Psychology and Psychotherapy: Theory, Research and Practice*, 82(2), 171-184. <http://dx.doi.org/10.1348/147608308X395213>
- Roca, R. P., Wigley, F. M., & White, B. (1996). Depressive symptoms associated with scleroderma. *Arthritis Care & Research*, 39(6), 1035-1040. <http://dx.doi.org/10.1002/art.1780390623>
- Schore, A. N. (1994). Affect regulation and the origin of the self: The neurobiology of emotional development. *Australian and New Zealand Journal of Psychiatry*, 36(1), 9-30. <http://dx.doi.org/10.1046/j.1440-1614.2002.00996.x>

- Selye, H. (1976). Forty years of stress research: Principal remaining problems and misconceptions. *Canadian Medical Association Journal*, *115*(1), 53-56.
- Sharpiro, S. L., Astin, J. A., Bishop, S. R., & Cordova, M. (2005). Mindfulness-based stress reduction for health care professionals: Results from a randomised trial. *International Journal of Stress Management*, *12*(2), 164-176. <http://dx.doi.org/10.1037/1072-5245.12.2.164>
- Smith, E. A., & Kahaleh, B. (2008). Systemic sclerosis: Etiology and pathogenesis. In M. C. Hotchenbergm, A. J. Silman, J. S. Smollen, M. E. Weinblatt, & M. H. Weisman (Eds.), *Rheumatology* (4th ed., Vol. 2, pp. 1387-1398). London, UK: Mosby Elsevier.
- Steen, V. D. (2008). Epidemiology and classification of scleroderma. In M. C. Hotchenbergm, A. J. Silman, J. S. Smollen, M. E. Weinblatt, & M. H. Weisman (Eds.), *Rheumatology* (Vol. 2, 4th ed., pp. 1361-1366). London, UK: Mosby Elsevier.
- Wren, A., Somers, T. J., Wright, M. A., Goetz, M. C., Leary, M. R., Fras, A. M., ... & Keefe, F. J. (2011). Self-compassion in patients with persistent musculoskeletal pain: Relationship of self-compassion to adjustment to persistent pain. *Journal of Pain and Symptom Management*, *43*(4), 759-770. <http://dx.doi.org/10.1016/j.jpainsymman.2011.04.014>

### Copyrights

Copyright for this article is retained by the author, with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

# Beyond the Debate on Promises and Risks in Digital Health: Analysing the Psychological Function of Wearable Devices

Maria del Rio Carral<sup>1</sup>, Pauline Roux<sup>1</sup>, Christine Bruchez<sup>1</sup> & Marie Santiago-Delefosse<sup>1</sup>

<sup>1</sup> Institute of Psychology, University of Lausanne, Lausanne, Switzerland

Correspondence: Maria del Rio Carral, Institute of Psychology, University of Lausanne, Mouline, 1015, Lausanne, Switzerland. E-mail: maria.delriocarral@unil.ch

Received: August 19, 2016

Accepted: September 12, 2016

Online Published: October 12, 2016

doi:10.5539/ijps.v8n4p26

URL: <http://dx.doi.org/10.5539/ijps.v8n4p26>

## Abstract

In the past years, the recording and collection of physical and physiological data from the body through wearable devices has become an increasingly common health-related practice in contemporary Western societies. The rapid development of digital self-tracking technologies has given rise to the production of different scientific discourses. The analysis of 200 published articles has led to the definition of a continuum between “technophile-promises” and “technocritical-risks” representations. However, these representations include different views of corporeality and sociality. Beyond this debate, we propose an alternative theoretical framework that links corporeality and sociality. It interrogates the psychological function that wearable devices may take (or not) for subjects to which these “tools” are addressed. We argue that such psychological function must be embraced by taking into consideration of activity done by the users of these technologies, which engages meaning: It is not the device, but the user him/herself who is confronted to the interpretation of biometric data linked to his/her own body functions on the basis of concrete lived experience. Moreover, we discuss that the activity of users can only be analysed in the sociocultural context to which the associated practices relate (health, sports, play, medicalisation). The conclusion highlights the need to further study the appropriation process of new personal experimentation instruments as to better understand the potential collaborations, risks or resistances that users may develop.

**Keywords:** quantified self, e-health, m-health, quantified body, self-tracking, self-monitoring, wearable devices, digital health

## 1. Introduction

By the mid-2000s, Internet accessibility and, more recently, the mainstreaming of mobile phone applications, fostered the rapid evolution of digital health technologies used to measure indicators linked to body conditions. Since 2010, the process of self-monitoring health activity has spread significantly to improve the management of certain chronic diseases, but also among pit-run motivated, interested or simply curious individuals. To date, there are more than 100,000 applications, including more than 30,000 developed in the health and medical information field, both by Apple Store and Google Play (Jahns, 2014; Lupton, 2015; Payne, Lister, West, & Bernhardt, 2015).

Most of these technologies involve Internet-connected wearable devices (e.g., smartwatches, wristbands, smartwatches, biomonitors, etc.) that provide advanced functionality, typically via a smartphone. The use promoted by developers is supposed to help users follow, monitor and even control their own behaviour and body, and with this, their health (Swan, 2013). To do this, devices have increasingly powerful sensors to collect physical and physiological data from the body, almost automatically and without any effort from users. Various related functions can now be “captured”, such as: number of steps, number of calories consumed, oxygen level and breathing rate, blood pressure and weight. These indicators are quantified and later classified according to scales developed by the promoters of these technologies, targeting different consumer audiences. The data collected can then be shared online within communities or social networks with other people. Moreover, these wearable devices give users feedback on the body condition measured and the level of performance compared to that of others. The sharable and retroactive nature of these applications is an unprecedented core dimension that takes the form of an “interactive loop” not only between users, but also between users and application developers. In fact, the latter can gather quantified information among any user (Swan, 2013). Indeed, the exchange of data

on private practices (e.g., sleep, nutrition, sexual activity, physical activity), closely linked to the proliferation of health applications on phones, constitutes a new social practice, promoted by key stakeholders through their advertisement. This component foreshadows potential increased sharing of biometric measures to the public health field.

Generally speaking, and regardless of the types of applications, digital health technologies follow two specific guidelines: one is the “screening of body conditions” of users and their quantification through a number of variables regarding their individual practices. This guideline mobilises a particular view of *corporeality*. The other one, which remains “optional” as of yet, includes a significant *social aspect* through the introduction of a collective level, where biometric data are compared and shared with other social networks. This collective dimension is mostly made through the confrontation of averages of other users, thus conveying a specific view of *sociality* (Ranck, 2012).

The purpose of this article is to analyse representations of corporeality and sociality conveyed in scientific literature (Santiago-Delefosse, 2011, 2015) in the specific field of digital health. Beyond these representations, we propose an alternative theoretical framework to study the link between corporeality and sociality. It thus also interrogates a third entity: the psychological one. In other words, we explore the potential psychological functions which could take these “new” digital health devices produced within the current biotechnological culture and under what conditions. The first section of the article briefly describes the methodological approach used. The second part outlines the results of this analysis of the representations in the literature of the last few years. It highlights a continuum between “technophile” and “technocritical” representations. The first group is characterised by its certainty that the promises accompanying wearable devices will be kept and profit the future of humanity. The second group of representations, more heterogeneous, is characterised by a critical look that questions the socio-economic implications of these technologies. This criticism can lead to “techno-scepticism”, or a warning against the risks of data manipulation and widespread surveillance. The third section questions the possible “psychological function(s)” of these wearable devices as they are at crossroads between “technical tools” and “self-transformation tools”. We hence conclude on the need to study the psychological stance of the uses and to analyse the psychological contributions, and obstacles or risks, linked to these uses.

## 2. Method

We conducted a bibliographical research on the scientific literature published in the field of digital health between the turn of the 21st century, when the first articles were published on the topic, and 2015, the year during which we conducted our study. During the months of September and October 2015, we searched databases that were representative of scientific research in psychology, human sciences and health sciences: PsychInfo, Web of Science, Science Direct. More generally, we used Google Scholar after having identified digital health professional journals. The keywords used as part of the searches were: quantified self, e-health, m-health, quantified body, self-tracking, self-monitoring, wearables and digital health, as well as: santé digitale, objets connectés and corps connecté.

Our analysis corpus was built on the basis of the following inclusion criteria: a) published in a recognised journal and subject to a peer evaluation; b) article in English or French, c) theoretical and/or empirical research on wearable devices, mobile applications and/or their uses. In all, 200 articles were selected, stemming from social and human sciences: sociology, anthropology, psychology, education sciences, information and communication sciences, and philosophy; or other fields: medicine, public health, nursing sciences, and engineering and technology design.

The articles selected were sorted by discipline and publication date. A thematic content analysis was conducted by three authors from this study. This analysis helped to identify a number of representations conveyed by these articles in each discipline, as well as their evolution over time. This analytical approach was applied while taking into account the problem raised by each selected article, its methodology, results and conclusions. The analyses conducted by each researcher were then the subject of consensus among the group composed of the four authors of this study.

## 3. Results: Continuum between “Technophile” and “Technocritical” Representations

The thematic content analysis enabled us to identify two major trends regarding promises in the digital health field: the first one fosters the use of wearable devices in an almost unconditional way and the second one takes a more critical stand. Within each trend we then identified representations dealing, on the one hand, with specific conceptions of corporeality, apparently defined by a biomedical view of the body, and on the other hand, with specific conceptions of sociality, mainly considered in terms of competitive relationships (that can be more or less “friendly”).

### 3.1 Representations That Foster the Use of Wearable Devices for Health Monitoring

A major part of the articles that were analysed reflect the underlying “hope” of improving the health and well-being of individuals through the incorporation of digital health technologies in daily life. As part of this trend, the ultimate goal is self-improvement by a better understanding of one’s body through physiological measurements. This quantification is deemed to become more successful than perception, introspection or language, because it is supposed to be less subjective than the latter (Gicquel & Guyot, 2015). Wearable devices would provide the benefit of an objective measurement, having become the topic of an internal debate on the validity and precision of these measurements.

First, generally speaking, this trend of “technophile representations” is based on one of the main concerns of contemporary societies: health improvement. To do this, they put forward a specific conception of health promotion. According to these representations, better health could be obtained through the educational virtues fostered by wearable sensor-based systems to screen and monitor body conditions. Many applied studies examine various patient populations and different types of conditions. Most of them focus on improving the management of chronic diseases by using wearable devices to monitor them (Note 1). This part of the literature insists on the gain of connected practices compared to the more traditional “pen and paper” type disease monitoring practices. Pre-existing practices are thus transposed to more electronic behavioural follow-ups. Although medical uses lead to expected behaviour changes among patients, the recommendations also deal with, to a lesser extent, promoting the health of healthy lay people. Regardless the case, the project seems to remain the same: that of hoping for a positive impact on the efficiency of existing health programs, and a sustainable change to individual health behaviours (Swan, 2009, 2012, 2013). This trend of representations conveys the idea that the measurements related to wearable devices enable and enhance behavioural change.

Given that these objectives are linked to body-condition measurements, they lead to specific representations of corporeality. In this respect, the indicators selected depend on the possibilities of the technique, so indicators are reduced to physiological signs (e.g., heart rate, electro-dermal response, etc.). Other than the issue of the measurement accuracy, the meanings given to these indicators are rarely straightforward and stable, as they emerge from the context where the measuring process takes place. Out of this context, it is indeed very difficult to ascribe causal links between measurement and behaviour. Yet, the representations of corporeality identified in our corpus of articles seldom seem to take into account the context, nor definitions about corporeality and related psychological implications. The body is designed as a machine with a set of information that can be modified by changing one’s behavioural programming.

While there seems to be a certain acknowledgement of the context across technophile representations, it seems defined by the network of social ties determined by the wearable technology. Therefore, in terms of sociality, technophile representations foster the systematic sharing of biometric data collected. Many authors examine this data sharing on social networks, online communities and discussion forums on sites such as *Patients Like Me* or *Cure Together* (Salamati & Pasek, 2014). Exchanges between users, either cooperatively, but more often competitively or comparatively, are fostered to influence behavioural changes in a positive way (Chib, 2013; Donner & Mechael, 2012; Kaplan & Stone, 2013; Kratzke & Cox, 2012).

Technophile representations mainly focus on behavioural changes by linking the concept of self-tracking to that of individual empowerment. Wearable devices are presented as preferred tools for better self-monitoring, whether it is chosen in the health promotion field, or rather incurred in the case of a chronic disease needing monitoring. Nevertheless, in both cases, the focus is on the positive value placed on the individual aspect of control. These devices are deemed to improve the patient’s empowerment by fostering better compliance with treatment (Dennison, Morrison, Conway, & Yardley, 2013; Samoocha, Bruinvels, Elbers, Anema, & van der Beek, 2010; Yardley, Ainsworth, Arden-Close, & Muller, 2015a).

Paired with the high hopes linked to the promises of well-being and disease treatment through self-tracking, this group of representations also contains an affirmation of the potential of wearable devices to reduce health costs at a social level (Note 2).

It is interesting to note that a certain number of beliefs are conveyed by these technophile representations. First, there is the belief in long-term health behaviour changes at the individual level. Although psychologists are aware of the well-known obstacles to these changes in the health field (Dennison, Morrison, Conway, & Yardley, 2013; Yardley et al., 2015a), they still hope that wearable devices will be the sought-after solution to this problem. Second, there is a belief in the ongoing interest and sustainable motivation of individuals, while it has been shown that the latter actually get bored with wearable devices rather quickly (Ledger & McCaffrey, 2014; Gadenne, 2014). Finally, there is a belief in the passivity of users toward a certain standardization of behaviours.

Yet, this belief minimises the subjective ability to develop forms of individual and/or collective resistance to the attempt to standardise health conducts.

Furthermore, this mainstream hardly mobilises any representations that question the potential psychological implications resulting from the use of digital health technologies. For example, such representations are scarcely permeable to the possibility of an increase in health costs rather than a reduction, through an increase in medical consultations and cases of hypochondria for instance. Also, the literature does not take into account the possible cost linked to disorders stemming from the primacy of the comparative approach, for example psychological consequences among more fragile populations such as teenagers. The reduction made through the simplification of health or disease through quantification within technophile representations makes it difficult to interrogate the complexity of the corporeality experienced, the consequences in sociality of being reduced to comparative human ties or finally, the psychological processes involved.

### *3.2 Representations That Are More Critical toward Promises*

Alongside technophile representations, there is a smaller movement that distances itself from the mainstream trend. This group of representations, especially present in sociology, anthropology and philosophy, can be defined by a critical attitude toward the widespread promotion of wearable devices to monitor health and illness. This group of representations, although non-homogenous, is presented as a “mirror” that questions technophile representations. These “technocritical representations” interrogate socio-political issues introduced by the use of wearable devices, as well as the consequences of this technology on the definitions of health, disease and well-being. This critical look is mobilised via notions of: monitoring, surveillance, healthism, and empowerment.

Technocritical representations question the absence of a unified psychosocial theory that is likely to guide developments in digital health to bring about an efficient behavioural change (Yardley et al., 2015a; Yardley, Morrison, Bradbury, & Muller, 2015b). In the absence of a complete theoretical model on human experience and human conduct, technophile representations tend to reduce the complexity affecting corporeality, sociality and subjectivity, according to certain authors (Rice & Katz, 2001; Yardley et al., 2015a, 2015b). Similarly, the practical and material aspects, linked to ethical issues, are slowly becoming the subject of research efforts in the field of wearable devices: their funding, accessibility, long-term management and underuse or the reliability of the data (Becker, Miron-Shatz, Schumacher, Krocza, Diamantidis, & Albrecht, 2014; Byrne, 2014; Ranck, 2012; van Velsen, Beaujean, & van Gemert-Pijnen, 2013).

Another major group of critical issues concerns representations dealing with the monitoring of populations. Self-tracking practices are analysed as part of biopowers (Foucault, 2004a, 2004b) involving political objectives to discipline individuals and bodies (Beer, 2009; Casper & Morrison, 2010; Cheney-Lippold, 2011; Mort, Finch, & May, 2009; Nettleton, 2004). Empowerment stemming from technophile literature has thus been strongly questioned. Following these authors, the concept of empowerment cannot be reduced to an individual conception of self-control for normative purposes, imposed by the objectives of health policies. Such definition would lead to the ideological policy of healthism, imposing standardised lifestyles to promote health as a common and universal good (Buse, 2010; Crawford, 2006; Crawford, Lingel, & Karppi, 2015; Maturro, 2014).

Moreover, technocritical representations include a distrust of the individualistic culture fostered by technophiles, as it may lead to the normalization of life (Besnier, 2012; Buin, 2003; Rouvroy, 2014). “Good health” defined by the internalization of prevention messages would lead to a simplistic definition of life and human practices. Self-tracking health behaviours valuing performance and efficiency would largely contribute to such normalization. Thus, technocritical representations are opposed to the technophile vision according to which the individual is solely responsible for his health, at the expense of a more community-based and global vision and a contextualised conception of health (Pharabod et al., 2013).

At present, the theoretical framework that best articulates these various issues is proposed by Lupton (2012, 2013a, 2013b, 2014a, 2014b, 2015) who criticises the lack of distance regarding the ways in which digital health technologies are mobilised in mainstream literature (technophile). She problematises the human being as a “man-machine” (cyborg) in relation to such devices, which give rise to unprecedented modifications of corporeality and sociality. In terms of corporeality, quantifying bodily functions would lead to a new set of reference values linked to the production of biometric data, where the standard would be defined by algorithms, arbitrarily and vaguely. Defining wearable devices as technological extensions of the body stresses the blurring of boundaries between the technique of a quantified body and that of a lived human body (Freund, 2004; Lupton, 1995, 2013a, 2014; Kapitan, 2009). Within this framework, users of these technologies become actors who are caught in complex power relationships (Mort & Smith, 2009; Rich & Miah, 2009; Casper & Morrison, 2010).



To conclude our literature analysis and further study the implications related the digital health phenomenon, we believe that it is extremely important to examine the existing literature and to interrogate technophile and technocritical representations. To do this, we suggest to consider underlying beliefs and technoscientific promises: it is true that on the one hand, technophile representations begin to include more moderate statements where accessibility of these technologies and confidentiality and reliability of data are being questioned (Barcena, Wueest, & Lau, 2014; Eysenbach, 2001). Nevertheless, their representations tend to show a consistent proselytism to encourage users, since authors seem convinced of the potential of such devices to improve health. On the other hand, we note that the most critical representations, despite the reluctance voiced, also seem to support the belief according to which digital technologies constitute a true “revolution” to improve health, with feared consequences and risks. Thereofre, our literature review suggests that both trends adhere to the promises made by promoters of health-related mobile digital technologies. In both identified trends, the latter represent unprecedented body and self-control devices in the health field, either to bring about behavioural changes for health improvement, or to monitor and discipline individuals, giving rise to societal risks of surveillance, “normopathy”, and over-responsabilisation of individuals to the detriment of institutional forms of health care.

Yet opposed to one another, both identified trends refer to a same mirror image: the technocritical representations question the basis of technophile enthusiastic beliefs, and question the “negative” aspects of digital health technologies. Yet, little work has examined the concrete scope of these promises and their robustness: is what is promised achievable, and to what extent, in addition to questioning what is desirable or needed by different populations or communities. Beyond the promises, it becomes necessary to focus mainly on the “subjects” to which they are addressed (Audétat, 2015) and the reasons underlying their acts (or not). This is why it has become imperative to move beyond the existing debate. We intend to introduce an alternate way of considering wearable devices, from the standpoint of their psychological function(s) to subjects who accept, buy and use them, and to those who resist to adopt them. We suggest to envisage these devices simply as tools invented by human civilisation to make lives easier (or more complicated).

#### **4. Discussion: Beyond Technophilia and Technocritical Discourses in Digital Health, the Psychological Function of Wearable Devices**

Through their operating methods, digital health technologies seek to externalise body and physiological states to observe, monitor and even control them. Data produced can be shared and compared to standards generated by algorithms. Yet, such an externalisation of body functions corresponds to a particular version of corporeality which does not succeed to provide the acces to subjectivity and experience. On the contrary, it gives simplified information based on numerical criteria defined by engineers and designers. Behind these indicators underlies a specific vision of corporeality, and consequently of health, reduced to these measurements. Thus, it can be argued that while wearable devices work by quantifying physiological and physical functions, it is not the device but rather the user him/herself, who is confronted to the interpretation of such data. Furthermore, this interpretation is undertaken according to his/her own lived experience and in a specific sociocultural and historical context. Aside from the return of the social aspect through the feedback loop that digital technologies allow, it is according to the meaning given by each user that the latter will respond or take a given action (or not). Faced with the biometric data collected, the subject adopts a specific and singular use of wearable devices, based on emotional and affective tones, depending on the specific living environments in which he evolves and his culture, personal history and life course. To better understand the digital health “phenomenon”, it therefore becomes essential to understand what special psychological function(s) they may play in our contemporary Western culture. To do so, we consider a historical and cultural perspective of wearable devices as psychological instruments (Note 3).

Following Vygotsky (1930, 1986), psychological instruments are a mediation between the individual and the world. Their nature is neither organic nor individual, but rather societal. They are “artificial developments” that make up complex systems mobilising various sets of signs. Furthermore, psychological instruments are used to manage and control processes regarding one’s own behaviour or that of others, just like the technique is used to control processes of nature (Rabardel, 1999; Rivière, 1990; Wertch, 1985). The most prominent examples of this specific type of tool are: language, art, mathematics, mnemonic means, etc. (Vygotsky, 1930, 1986).

Yet, it seems to us that wearable devices are destined, by their promoters, to control processes of one’s own behaviour or that of others (increased activity, change in eating habits, control of different physiological indicators, exchanges and comparisons on social networks, etc.). On these bases, we question whether these devices can be considered psychological instruments, and if so, under what conditions. Indeed, this is how many designers and promoters present them to us: they must change the way in which psychic functions are carried out (during the course of a given activity, the individual stops to control a physiological indicator, or analyses his/her

activity in a differed mode) and create a new instrumental act on this basis (for instance, change the behaviour according to the interpretation of such measurement).

The representations highlighted in our analysis, however, seem to generate confusion in terms of their underlying perspectives, confusion that is not without consequences. It concerns two notions that should be distinguished: the “technical tool” and “psychological instrument”. The technical tool is an intermediate component between human activity and an external object; the individual can act on the world by working on this object with the help of a tool (through an action on the physical world). On the other hand, the psychological instrument acts as a mediator aimed at both, behaviour and the psyche; psychological instruments allow the individual to act on his/her own transformation, but also on the psychology and behaviours of others (an action that is conducted upon psychological and behavioural processes) (Vygotsky, 1930, 1986).

We believe that this distinction is useful to better grasp the ways in which wearable devices have been problematised so far. In scientific literature, this device is presented as a technical tool, but whose goal would be to change an internal stance: the body and/or behaviour. It seems that this process takes place through an activity defined by “the work” done by the user: number of steps, exercise, etc. Nevertheless, if the goal is to change an internal process (behaviour), the device is no longer a mere technical tool, unless the body and behaviour are perceived as physical objects that are “external” to the user. With no distinction made between the two types of tools (technical vs. psychological), there is a great deal of confusion in the analysis of the functions of these objects.

As psychologists, we would be wrong to consider these objects as technical tools “only” (that need to be approved or criticised). In fact, these objects do not enable direct change. They are designed with the intent to influence the psyche and behaviour by using the “measurement” as a mediator that can bring about a specific change in behaviour (or not). Their use is expressed by an instrumental act by the user through a given activity mobilising the wearable device, activity which the individual carries out within him/herself (through thought, will, or representation), and not on his body as an “object” that is external to him. As underlined by Vygotsky (1930, p. 43): “As part of the instrumental act, man controls himself from the outside, using psychological instruments”. It would thus be necessary to study wearable devices as special forms of the instrumental act to better understand their psychological specificity (Santiago-Delefosse, 2004). These acts stem from historical and human development. Controlling psychological instruments may transform the operating methods and structure of superior psychic functions. This process raises a given function (observable behaviour, for example) to a higher level (changing what has been experienced, for example) and enhances the ability to act (Wertch, 1985; Vygotsky, 1986, 1999). Therefore, a new thought structure and mechanism can be integrated.

This is why the study of wearable devices is of main interest. Yet, existing research has overlooked the study of changes in relationships that the subject may develop with regard to the device, or the conflicting thoughts that its use may entail. Also, until now, little attention has been given to the meaning given to the data collected, the interest in sharing data and the constituents of this sharing mode. This type of research would namely help to better understand an observation made by a number of designers: the rapid weariness of users toward these devices. More than 40% of users no longer use them passed a trial period of approximately 3 to 6 months (Beatty, Fukuoka, & Whooley, 2013; Dennison et al., 2013). This abandonment can indicate the object’s return to the state of technical object, “with no psychological value added”, which may thus put most technophile hopes and technocritical fears into perspective.

We feel that the activity of wearable device users can only be analysed in the sociocultural context to which their practices relate: sports, play, medicalisation, etc. Their psychological functions seem inseparable from the latter: fun, preventive, curative. The meaning of the users’ activity also depends on the stakeholders participating in this context. At this time, these are engineers who make wearable devices, the insurers and the medical world that propose incentives. Within these major actors from the political and economical world, it is important to analyse how “subject users” will collaborate, resist, divert and act on the rules or grow weary. A study on wearable devices that only takes into account behavioural change seems reductive. Human activity must be considered in relation to a more complex system in which the sequence of actions takes on meaning and not in a way that is focused solely on observable behaviour.

With wearable devices thus emerge a new field of study in social and human sciences. This new phenomenon will help to better understand the development and integration of new psychological instruments, via the historical experience (transmission of information), social experience (sharing with others) and redoubled experience (form of creative adaptation to these new devices). This is how we interpret the (relative) interest of a number of subject users. Far from being just a “passion for the quantitative evaluation of oneself”, the goal is to

better understand this appropriation of new personal experimentation instruments and their psychological function(s).

## 5. Conclusion

Our analysis of 200 scientific literature articles on wearable devices used to screen body conditions revealed two major sets of representations. One contains technophile representations fostering the use of these devices and promising improvements in health promotion, wellbeing, and disease monitoring. The other, a minority in our corpus, contains technocritical representations that mostly deal with reflections on the possible negative social, economic and ethical impacts of digital health technology uses. These two representation trends share a common characteristic: their adherence to biotechnological promises, either to promote them or to be concerned about them. As of yet, little interest has been shown in the real uses and the particular psychological function(s) that these devices may acquire for users. Similarly, few avenues provide a way out of the biotechnological design of human beings reflected by the designers' program, which leads to human-machine criticism. But do users accept this design and how do they perceive it, how do they create alternative uses of this tool, etc.

Our theoretical and epistemological positioning differs from the literature analysed. We assert that current research only rarely questions the bases underlying the operational methods and uses of wearable devices aimed at screening body conditions. The relationship between the user and the data produced and collected, in the subjective meanings assigned to it, or, to the way in which this data can be transformed into self-action, remain very little known, given the limited empirical research currently available (Lupton, 2014b).

This is why future research could study the psychological implications of digital health technologies examined as objects provided by civilization, and that could very well remain "technical tools" instead of becoming "psychological instruments". This status remains to be determined according to users, contexts and moments of life. Our future questioning will concern the role and functions of wearable devices in relation to their concrete uses and will try to move beyond the debate between the two major representation groups identified. Inseparable from social and cultural repercussions for digital health, it is essential to study the psychological functions of these devices. This study must be closely linked to subjective health and disease theories that users co-construct within tensions between corporeality and sociality. Given that individuals are always embedded in a specific social and historical context, the thorough analysis of the conditions giving rise to the psychological functions of these devices is also necessary.

By carefully examining the mirror promises within scientific debates, we propose to shift to an alternative theoretical perspective in order to look at how users actually use these devices: what meanings are ascribed to these technologies, what meanings are given to their actions or what uses will subjects develop, create or curb. In this perspective, no device or related application is provided with intentional actions capable of giving meaning to these measurements, regardless of their performance level. This is a similar observation as the one made by Searle (1980, p. 417) regarding artificial intelligence (AI) (Note 4):

*"Could a machine think?" On the argument advanced here only a machine could think, and only very special kinds of machines, namely brains and machines with internal causal powers equivalent to those of brains. And that is why strong AI has little to tell us about thinking, since it is not about machines but about programs, and no program by itself is sufficient for thinking.*

## References

- Appelboom, G., LoPresti, M., Reginster, J. Y., Connolly, E. S., & Dumont, E. P. L. (2014). The quantified patient: A patient participatory culture. *Current Medical Research & Opinion*, 30(12), 2585-2587. <http://dx.doi.org/10.1185/03007995.2014.954032>
- Audétat, M. (Dir.). (2015). *Sciences et technologies émergentes: Pourquoi tant de promesses* [Sciences and emerging technologies: Why so many promises]. Paris: Hermann.
- Barcena, M. B., Wueest, C., & Lau, H. (2014). Security Response. How safe is your quantified self? In *Symantec*. Mountain View, CA: USA.
- Barrett, M. A., Humblet, O., Hiatt, R. A., & Adler, N. E. (2013). Big data and disease prevention: From quantified self to quantified communities. *Big data*, 1(3), 168-175. <http://dx.doi.org/10.1089/big.2013.0027>
- Beatty, A. L., Fukuoka, Y., & Whooley, M. A. (2013). Using mobile technology for cardiac rehabilitation: A review and framework for development and evaluation. *Journal of the American Heart Association*, 2(6), e000568. <http://dx.doi.org/10.1161/JAHA.113.000568>

- Becker, S., Miron-Shatz, T., Schumacher, N., Krocza, J., Diamantidis, C., & Albrecht, U. V. (2014). mHealth 2.0: Experiences, possibilities, and perspectives. *JMIR mHealth and uHealth*, 2(2). <http://dx.doi.org/10.2196/mhealth.3328>
- Beer, D. (2009). Power through the algorithm? Participatory web cultures and the technological unconscious. *New Media & Society*, 11(6), 985-1002. <http://dx.doi.org/10.1177/1461444809336551>
- Belknap, R., Weis, S., Brookens, A., Au-Yeung, K. Y., Moon, G., DiCarlo, L., & Reves, R. (2013). Feasibility of an ingestible sensor-based system for monitoring adherence to tuberculosis therapy. *PloS one*, 8(1), e53373. <http://dx.doi.org/10.1371/journal.pone.0053373>
- Besnier, J. M. (2012). *L'homme simplifié. Le syndrome de la touche étoile*. Paris : Fayard.
- Buin, Y. (2003). Normopathie. Le Passant Ordinaire. *Revue Internationale de Création et de Pensée Critique*, 45-46.
- Burke, L. E. et al. (2011). The effect of electronic self-monitoring on weight loss and dietary intake: A randomized behavioral weight loss trial. *Obesity*, 19, 338-344. <http://dx.doi.org/10.1038/oby.2010.208>
- Buse, C. E. (2010). E-scaping the ageing body? Computer technologies and embodiment in later life. *Ageing and Society*, 30(6), 987-1009. <http://dx.doi.org/10.1017/S0144686X10000164>
- Byrne, M. D. (2014). Engaged: The potentially rocky marriage of patients and their digital data. *Journal of PeriAnesthesia Nursing*, 29(3), 242-245. <http://dx.doi.org/10.1016/j.jopan.2014.03.003>
- Cafazzo, J. A., Casselman, M., Hamming, N., Katzman, D. K., & Palmert, M. R. (2012). Design of an mHealth app for the self-management of adolescent type 1 diabetes: A pilot study. *Journal of medical Internet research*, 14(3), e70. <http://dx.doi.org/10.2196/jmir.2058>
- Casper, M., & Morrison, D. (2010). Medical sociology and technology: Critical engagements. *Journal of Health and Social Behavior*, 51(S), S120-S132. <http://dx.doi.org/10.1177/0022146510383493>
- Cheney-Lippold, J. (2011). A new algorithmic identity: Soft biopolitics and the modulation of control. *Theory, Culture & Society*, 28(6), 164-181. <http://dx.doi.org/10.1177/0263276411424420>
- Chiauzzi, E., Rodarte, C., & DasMahapatra, P. (2015). Patient-centered activity monitoring in the self-management of chronic health conditions. *BMC medicine*, 13(1), 77. <http://dx.doi.org/10.1186/s12916-015-0319-2>
- Chib, A. (2013). The promise and peril of mHealth in developing countries. *Mobile Media & Communication*, 1(1), 69-75. <http://dx.doi.org/10.1177/2050157912459502>
- Cole, M., & Engeström, Y. (1993). A cultural-historical approach to distributed cognition. In G. Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations*. New York: Cambridge University Press.
- Crawford, R. (2006). Health as a meaningful social practice. *Health*, 10(4), 401-420. <http://dx.doi.org/10.1177/1363459306067310>
- Crawford, K., Lingel, J., & Karppi, T. (2015). Our metrics, ourselves: A hundred years of self-tracking from the weight scale to the wrist wearable device. *European Journal of Cultural Studies*, 18(4-5), 479-496. <http://dx.doi.org/10.1177/1367549415584857>
- Dennison, L., Morrison, L., Conway, G., & Yardley, L. (2013). Opportunities and challenges for smartphone applications in supporting health behavior change: Qualitative study. *Journal of medical Internet research*, 15(4), e86. <http://dx.doi.org/10.2196/jmir.2583>
- Donner, J., & Mechael, P. (Eds.). (2012). *mHealth in Practice: Mobile technology for health promotion in the developing world*. A&C Black.
- Engeström, Y., Miettinen, R., & Punamäki, R. L. (Eds.). (1999). *Perspectives on Activity Theory*. New York: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511812774>
- Eysenbach, G. (2001). What is e-health? *J Med Internet Res*, 3(2). <http://dx.doi.org/10.2196/jmir.3.2.e20>
- Foucault, M. (2004a). *Sécurité, territoire, population. Cours au Collège de France (1977-1978)* [Security, territory, population. Lecture at Collège de France. France (1977-1978)]. Paris: Seuil.
- Foucault, M. (2004b). *Naissance de la biopolitique. Cours au Collège de France (1978-1979)* [The Birth of Biopolitics. Lecture at Collège de France (1978-1979)]. Paris: Seuil.

- Freund, P. (2004). Civilised bodies redux: Seams in the cyborg. *Social Theory & Health*, 2(3), 273-289. <http://dx.doi.org/10.1057/palgrave.sth.8700031>
- Gadenne, E. (2014). *Le quantified self: Pour une meilleure connaissance de soi... et des autres* [Quantified self: toward a better knowledge of the self... and of others]. CNIL, Cahiers IP: Le corps, nouvel objet connecté.
- Gicquel, C., & Guyot, P. (2015). *Quantified self, Les apprentis sorciers du "moi connecté"* [Quantified self, sorcerer's apprentice of the "connected self"]. Limoges: Editions FYP.
- Handel, M. J. (2011). mHealth (Mobile Health) Using apps for health and wellness. *EXPLORE: The Journal of Science and Healing*, 7(4), 256-261. <http://dx.doi.org/10.1016/j.explore.2011.04.011>
- Jahns, R. G. (2014). The 8 drivers and barriers that will shape the mHealth app market in the next 5 years. *Research guidance*. Retrieved from <http://mhealtheconomics.com/the-8-drivers-and-barriers-that-will-shape-the-mhealth-app-market-in-the-next-5-years/>
- Kane, J. M., Perlis, R. H., DiCarlo, L. A., Au-Yeung, K., Duong, J., & Petrides, G. (2013). First experience with a wireless system incorporating physiologic assessments and direct confirmation of digital tablet ingestions in ambulatory patients with schizophrenia or bipolar disorder. *The Journal of clinical psychiatry*, 74(6), e533-540. <http://dx.doi.org/10.4088/JCP.12m08222>
- Kapitan, L. (2009). Introduction to the special issue on art therapy's response to techno-digital culture. *Art Therapy*, 26(2), 50-51. <http://dx.doi.org/10.1080/07421656.2009.10129737>
- Kaplan, R. M., & Stone, A. A. (2013). Bringing the laboratory and clinic to the community: Mobile technologies for health promotion and disease prevention. *Annual Review of Psychology*, 64, 471-498. <http://dx.doi.org/10.1146/annurev-psych-113011-143736>
- Katz, R., Mesfin, T., & Barr, K. (2012). Lessons From a Community-Based mHealth Diabetes Self-Management Program: "It's Not Just About the Cell Phone". *Journal of health communication*, 17(sup1), 67-72. <http://dx.doi.org/10.1080/10810730.2012.650613>
- Kratzke, C., & Cox, C. (2012). Smartphone technology and apps: Rapidly changing health promotion. *International Electronic Journal of Health Education*, 15, 72.
- Kumar, S., Nilsen, W. J., Abernethy, A., Atienza, A., Patrick, K., Pavel, M., & Swendeman, D. (2013). Mobile health technology evaluation: The mHealth evidence workshop. *American journal of preventive medicine*, 45(2), 228-236.
- Labrique, A., Vasudevan, L., Chang, L. W., & Mehl, G. (2013). Hope for mHealth: More "y" or "o" on the horizon? *International Journal of Medical Informatics*, 82(5), 467-469. <http://dx.doi.org/10.1016/j.ijmedinf.2012.11.016>
- Ledger, D., & McCaffrey, D. (2014). *Inside Wearables. How the Science of Human Behavior Change Offers the Secret to Long-Term Engagement*. Endeavour Partners LLC.
- Lupton, D. (1995). The embodied computer/user. *Body & Society*, 1(3-4), 97-112. <http://dx.doi.org/10.1177/1357034X95001003006>
- Lupton, D. (2012). M-health and health promotion: The digital cyborg and surveillance society. *Social Theory & Health*, 10(3), 229-244. <http://dx.doi.org/10.1057/sth.2012.6>
- Lupton, D. (2013a). Quantifying the body: Monitoring and measuring health in the age of mHealth technologies. *Critical Public Health*, 23(4), 393-403. <http://dx.doi.org/10.1080/09581596.2013.794931>
- Lupton, D. (2013b). The digitally engaged patient: Self-monitoring and self-care in the digital health era. *Social Theory & Health*, 11(3), 256-270. <http://dx.doi.org/10.1057/sth.2013.10>
- Lupton, D. (2014a). The commodification of patient opinion: The digital patient experience economy in the age of big data. *Sociology of health & illness*, 36(6), 856-869. <http://dx.doi.org/10.1111/1467-9566.12109>
- Lupton, D. (2014b). Health promotion in the digital era: A critical commentary. *Health Promotion International*, 30(1), 174-183. <http://dx.doi.org/10.1093/heapro/dau091>
- Lupton, D. (2015). Quantified sex: A critical analysis of sexual and reproductive self-tracking using apps. *Culture, health & sexuality*, 17(4), 440-453. <http://dx.doi.org/10.1080/13691058.2014.920528>
- Maturo, A. (2014). Fatism, Self-Monitoring and the Pursuit of Healthiness in the Time of Technological Solutionism. *Italian Sociological Review*, 4(2), 151-171.

- Mort, M., Finch, T., & May, C. (2009). Making and unmaking telepatients: Identity and governance in new health technologies. *Science, Technology & Human Values*, 34(1), 9-33. <http://dx.doi.org/10.1177/0162243907311274>
- Mort, M., & Smith, A. (2009). Beyond information: Intimate relations in sociotechnical practice. *Sociology*, 43(2), 215-231. <http://dx.doi.org/10.1177/0038038508101162>
- Moy, M. L., Weston, N. A., Wilson, E. J., Hess, M. L., & Richardson, C. R. (2012). A pilot study of an Internet walking program and pedometer in COPD. *Respiratory medicine*, 106(9), 1342-1350. <http://dx.doi.org/10.1016/j.rmed.2012.06.013>
- Naslund, J. A., Aschbrenner, K. A., Barre, L. K., & Bartels, S. J. (2015). Feasibility of popular m-Health technologies for activity tracking among individuals with serious mental illness. *Telemedicine and e-Health*, 21(3), 213-216. <http://dx.doi.org/10.1089/tmj.2014.0105>
- Nettleton, S. (2004). The emergence of e-scaped medicine? *Sociology*, 38(4), 661-679. <http://dx.doi.org/10.1177/0038038504045857>
- Neuhauser, L., & Kreps, G. L. (2003). Rethinking communication in the e-health era. *Journal of Health Psychology*, 8(1), 7-23. <http://dx.doi.org/10.1177/1359105303008001426>
- Norris, A. C., Stockdale, R. S., & Sharma, S. (2009). A strategic approach to m-health. *Health informatics journal*, 15(3), 244-253. <http://dx.doi.org/10.1177/1460458209337445>
- Payne, H. E., Lister, C., West, J. H., & Bernhardt, J. M. (2015). Behavioral functionality of mobile apps in health interventions: A systematic review of the literature. *JMIR mHealth and uHealth*, 3(1). <http://dx.doi.org/10.2196/mhealth.3335>
- Pharabod, A. et al. (2013). La mise en chiffres de soi: Une approche compréhensive des mesures personnelles. In *Réseaux* (pp. 97-129). Paris: La Découverte. <http://dx.doi.org/10.3917/res.177.0097>
- Quinn, C. C., Shardell, M. D., Terrin, M. L., Barr, E. A., Ballew, S. H., & Gruber-Baldini, A. L. (2011). Cluster-randomized trial of a mobile phone personalized behavioral intervention for blood glucose control. *Diabetes care*. <http://dx.doi.org/10.2337/dc11-0366>
- Rabardel, P. (1999). Eléments pour une approche instrumentale en didactique des mathématiques [Elements for an instrumental approach in didactics for mathematics]. In M. Bailleul (Ed.), *Ecole d'été de didactique des mathématiques* [Summer school on didactics for mathematics] (pp. 202-213). Houlgate : IUFM de Caen.
- Ranck, J. (2012). *The quantified self: Hacking the body for better health and performance*. GigaOM Pro. Retrieved from <http://pro.gigaom.com>
- Rice, R. E., & Katz, J. E. (2001). The Internet and health communication. In *The Internet and health communication: Experiences and expectations* (pp. 5-46).
- Rich, E., & Miah, A. (2009). Prosthetic Surveillance: The Medical Governance of Health Bodies in Cyberspace. *Surveillance & Society*, 6(2), 163-177.
- Riley, W. T., Rivera, D. E., Atienza, A. A., Nilsen, W., Allison, S. M., & Mermelstein, R. (2011). Health behavior models in the age of mobile interventions: Are our theories up to the task? *Translational behavioral medicine*, 1(1), 53-71. <http://dx.doi.org/10.1007/s13142-011-0021-7>
- Rivière, A. (1990). *La psychologie de Vygotski* [Vygotsky's psychology]. Bruxelles: Mardaga.
- Rouvroy, A. (2014). Avant-propos. In *CNIL, Cahiers IP: Le corps, nouvel objet connecté* [Foreword. CNIL. White Papers IP: The body, a new connected object] (pp. 4-5).
- Salamati, F., & Pasek, Z. J. (2014). Personal Wellness: Complex and Elusive Product and Distributed Self-services. *Procedia CIRP*, 16, 283-288. <http://dx.doi.org/10.1016/j.procir.2014.02.016>
- Samoocha, D., Bruinvels, D. J., Elbers, N. A., Anema, J. R., & van der Beek, A. J. (2010). Effectiveness of web-based interventions on patient empowerment: A systematic review and meta-analysis. *Journal of medical Internet research*, 12(2). <http://dx.doi.org/10.2196/jmir.1286>
- Santiago-Delefosse, M. (2004). Activité et émotions: Une perspective développementale des émotions comme instruments psychologiques [Activity and emotions: A developmental perspective of emotions, psychological instruments]. *Bulletin de psychologie*, 57, 29-36.
- Santiago-Delefosse, M. (2011). An Embodied-Socio-Psychological Perspective in Health Psychology? *Social and Personality Psychology Compass*, 5(5), 220-230.

- Santiago-Delefosse, M. (2015). The Need for an “Embodied-Societal-Psychological” (ESP) Model of Illness Experience. In M. Murray (Eds.), *Critical Health Psychology* (pp. 36-54). London: Palgrave.
- Searle, J. R. (1980). Minds, brains, and programs. *Behavioral and Brain Sciences*, 3(3), 417-457. <http://dx.doi.org/10.1017/S0140525X00005756>
- Smith, R., Menon, J., Rajeev, J. G., Feinberg, L., Kumar, R. K., & Banerjee, A. (2015). Potential for the use of mHealth in the management of cardiovascular disease in Kerala: A qualitative study. *BMJ Open*, 5(11), e009367. <http://dx.doi.org/10.1136/bmjopen-2015-009367>
- Swan, M. (2009). Emerging patient-driven health care models: An examination of health social networks, consumer personalized medicine and quantified self-tracking. *International Journal of Environmental Research and Public Health*, 6(2), 492-525. <http://dx.doi.org/10.3390/ijerph6020492>
- Swan, M. (2012). Sensor Mania! The Internet of Things, Wearable Computing, Objective Metrics, and the Quantified Self 2.0. *Journal of Sensor and Actuator Networks*, 1, 217-253. <http://dx.doi.org/10.3390/jsan1030217>
- Swan, M. (2013). The Quantified Self: Fundamental Disruption in Big Data Science and Biological Discovery. *Big Data*, 1(2), 85-99. <http://dx.doi.org/10.1089/big.2012.0002>
- Tozzi, A. E., Carloni, E., Gesualdo, F., Russo, L., & Raponi, M. (2015). Attitude of Families of Patients with Genetic Diseases to Use m-Health Technologies. *Telemedicine and e-Health*, 21(2), 86-89. <http://dx.doi.org/10.1089/tmj.2014.0080>
- van Velsen, L., Beaujean, D. J., & van Gemert-Pijnen, J. E. (2013). Why mobile health app overload drives us crazy, and how to restore the sanity. *BMC Medical Informatics and Decision Making*, 13(1), 23. <http://dx.doi.org/10.1186/1472-6947-13-23>
- Vygotsky, L. S. (1930). Imaginación y creatividad del adolescente [Imagination and creativity in adolescence]. In L. S. Vygotski, *Obras Escogidas IV* [L.S. Vygotsky, Selected Works IV] (pp. 205-224). Madrid: Visor.
- Vygotsky, L. S. (1986). *Thought and Language*. UK: MIT Press.
- Vygotsky, L. S. (1999). *The Historical Meaning of the Crisis in Psychology*. Lausanne-Paris: Delachaux and Niestlé.
- Wertsch, J. V. (1985). *Vygotsky and the social formation of mind*. Cambridge, MA: Harvard University Press.
- Williams, V., Rutter, H., Christy, T., Tarassenko, L., & Farmer, A. (2013). Exploring patients’ perspectives of an mHealth application: A qualitative study as part of EDGE COPD. *International Journal of Integrated Care*, 13(7). <http://dx.doi.org/10.5334/ijic.1447>
- Yardley, L., Ainsworth, B., Arden-Close, E., & Muller, I. (2015a). The person-based approach to enhancing the acceptability and feasibility of interventions. *Pilot and Feasibility Studies*, 1(1), 1-7. <http://dx.doi.org/10.1186/s40814-015-0033-z>
- Yardley, L., Morrison, L., Bradbury, K., & Muller, I. (2015b). The Person-Based Approach to Intervention Development: Application to Digital Health-Related Behavior Change Interventions. *Journal of Medical Internet Research*, 17(1), e30. <http://dx.doi.org/10.2196/jmir.4055>

## Notes

Note 1. Existing research has looked at diabetes (Cafazzo, Casselman, Hamming, Katzman, & Palmert, 2012; Katz, Mesfin, & Barr, 2012; Quinn, Shardell, Terrin, Barr, Ballew, & Gruber-Baldini, 2011), cardiovascular diseases (Smith, Menon, Rajeev, Feinberg, Kumar, & Banerjee, 2015), genetic diseases (Tozzi, Carloni, Gesualdo, Russo, & Raponi, 2015), tuberculosis (Belknap, Weis, Brookens, Au-Yeung, Moon, DiCarlo, & Reves, 2013), Chronic Obstructive Pulmonary Disease (COPD) (Moy, Weston, Wilson, Hess, & Richardson, 2012; Williams, Rutter, Christy, Tarassenko, & Farmer, 2013), mental disorders (Kane, Perlis, Di Carlo, Au-Yeung, Duong, & Petrides, 2013; Naslund, Aschbrenner, Barre, & Bartels, 2015) and obesity (Burke et al., 2011).

Note 2. For example: Appelboom, LoPresti, Reginster, Connolly, & Dumont, 2014; Barrett, Humblet, Hiatt, & Adler, 2013; Becker et al., 2014; Byrne, 2014; Chiauzzi, Rodarte, & DasMahapatra, 2015; Handel, 2011; Kumar et al., 2013; Labrique, Vasudevan, Chang, & Mehl, 2013; Neuhauser & Kreps, 2003; Norris, Stockdale, & Sharma, 2009; Payne, Lister, West, & Bernhardt, 2015; Riley et al., 2011; van Velsen, Beaujean, & van Gemert-Pijnen, 2013.

Note 3. We propose a theoretical historical and cultural framework (Vygotsky, 1986, 1999; Engeström, Miettinen, & Punamäki, 1997) that helps to study wearable devices according to their material and concrete dimension within specific contexts, by bringing them back to what they are: objects designed by the civilisation and culture. This framework looks at the developing man, anchored in his daily life. It defines human activity as always being publicized and established in a historical, cultural and social context (Wertsch, 1985). Activity is therefore both individual and collective. It is always geared toward devices, in other words, publicized by artefacts such as signs, tools and instruments, provided by culture (Cole & Engeström, 1993).

Note 4. AI and the debate that followed seems paradigmatic of the promises made about the capacities of new technologies and the big data.

### **Copyrights**

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).



# Social Activities Do not Distract Everyone from Work

## *A Diary Study of Work-Related Perseverative Cognition*

Annie Foucreault<sup>1</sup> & Julie Menard<sup>1</sup>

<sup>1</sup> Department of Psychology, Université du Québec à Montréal, Montréal, Québec, Canada

Correspondence: Annie Foucreault, Department of Psychology, Université du Québec à Montréal, C.P. 8888, Succ. Centre-Ville, Montréal, Québec, H3C 3P8, Canada. Tel: 1-514-987-3000. E-mail: foucreault.annie@courrier.uqam.ca

Received: September 20, 2016

Accepted: September 30, 2016

Online Published: October 13, 2016

doi:10.5539/ijps.v8n4p38

URL: <http://dx.doi.org/10.5539/ijps.v8n4p38>

### Abstract

Work-related perseverative cognition (WPC) involves rumination about the past and worry about the future regarding workplace issues. Such cognition impedes workers' daily recovery and well-being as it fosters prolonged activation of psychological stressors during leisure time. Considering these detrimental effects, it is important, for both theoretical and practical considerations to highlight coping strategies that individuals can use to reduce daily WPC. Previous studies have led to contradictory results regarding the potential of social activities to decrease daily WPC. The aim of this study was to bring new insights on these results by examining how the benefits from time spent on social activities (i.e., reducing WPC) vary according to an individual's level of neuroticism. A total of 48 daytime workers from a Canadian university completed evening diaries on 10 days during two consecutive workweeks (316 data points). Participants recorded the number of minutes spent on social activities after each workday and the extent to which a series of WPC had crossed their mind during the evening. Results from Hierarchical Linear Modeling (HLM) analyses revealed that time spent on social activities was associated to a daily decrease of WPC for workers low in neuroticism but to an increase of WPC for those high in neuroticism. This study suggests that workers high in neuroticism may be less likely to benefit from social activities. The discussion focuses on why potentially protective mechanisms associated with social activities may not be helpful to them. Practical implications based on individuals' level of neuroticism are offered.

**Keywords:** neuroticism, social activities, work-related perseverative cognition, workers, diary study

### 1. Introduction

Daily Work-related Perseverative Cognition (WPC) involves rumination about the past and worry about the future regarding workplace issues (Flaxman, Ménard, Kinman, & Bond, 2012). This condition drains cognitive and emotional energy as they promote prolonged activation of psychological stressors during respite periods (Brosschot, Pieper, & Thayer, 2005). This prolonged activation may eventually lead to health problems such as cardiovascular disorders and depression (Brosschot et al., 2005; Nepon, Flett, Hewitt, & Molnar, 2011; Nolan, Roberts, & Gotlib, 1998; Roelofs, Huibers, Peeters, Arntz, & van Os, 2008). To prevent these, it is important to find concrete coping strategies that workers can use to reduce WPC on a daily basis. Research has shown that pursuing some types of daily activities after work can help workers to disengage from work-related issues (Sonnentag & Bayer, 2005). For instance, physical activities such as endurance and fitness training can be an effective distraction from work-related issues (e.g., Feuerhahn, Sonnentag, & Woll, 2014; Ten Brummelhuis & Bakker, 2012). However, studies have found conflicting evidence regarding the benefits of time spent on social activities (e.g., speaking with a friend on the phone). On the one hand, the amount of time spent on social activities during the evening and on the weekend has been positively related to workers' psychological detachment from work (e.g., Mojza, Lorenz, Sonnentag, & Binnewies, 2010; Ten Brummelhuis & Bakker, 2012). However, other studies have failed to confirm such benefits (Mojza, Sonnentag, & Bornemann, 2011; Sonnentag & Bayer, 2005). In spite of those inconsistent results, social activities are commonly seen as attenuating the stress-ill health relationship (Iso-Ahola & Park, 1996) because they may increase opportunities for social support (Sonnentag, 2001) and distract from stressful issues in general (Nolen-Hoeksema, Parker, & Larson, 1994). To

understand these conflicting results other variables such as individual differences should be taken into consideration.

In an effort to address this caveat, the present study posits that the beneficial effects of daily time spent on social activities on WPC differ according to workers' degree of neuroticism (Martin & Tesser, 1989). This assumption is based on numerous studies that have shown that neuroticism, the tendency to experience emotional distress and instability, is positively related to the frequency of worry and rumination (Conway, Csank, Holm, & Blake, 2000; Keogh, French, & Reidy, 1998; Muris, Roelofs, Rassin, Franken, & Mayer, 2005; Roelofs et al., 2008). Thus, since individuals high in neuroticism are more prone to worry and rumination, they are less likely to be distracted by social activities and to experience a contingent reduction of WPC. As those high in neuroticism may focus on and verbalize worries through negative conversations with friends and relatives (Zellars & Perrewé, 2001), they are likely to report more WPC when engaging in social activities.

The aim of this study was to reconcile previous conflicting findings regarding the influence of daily time spent on social activities on WPC by challenging the common assumption that social activities potentially benefit all workers no matter their personal characteristics. A diary study was conducted among a sample of office support staff to investigate the daily association of time spent on social activities and WPC while accounting for individuals' level of neuroticism. The reasons behind the choice of population for this study are threefold. First, in order to study evening social activities, it is necessary to study a population that has fixed schedules and enough time after work to devote to social activities. Second, office support staff represents a large proportion of the Canadian work force (Government of Canada, 2016). Thus, conclusions from this study could apply to an important number of workers. Third, perceived control and job stressors (e.g., workload) experienced by this population are recognized as predictors of workers' negative reactions (e.g., lower job satisfaction; Spector, 1987), that are strongly related to perseverative cognition (Kirkegaard Thomsen, 2006). As for the method, diary studies allow gathering data in workers' natural life contexts and to observe relationships between stable variables (i.e., neuroticism) with transient experiences and states (i.e., daily WPC; Ohly, Sonnentag, Niessen, & Zapf, 2010).

### *1.1 Theoretical Perspectives on Work-Related Perseverative Cognition*

Perseverative cognition refers to recurrent and chronic activation of cognitive representations of psychological stressors through rumination about the past and worry about the future over a prolonged period of time (Brosschot, Gerin, & Thayer, 2006). One of the most recognized antecedents of perseverative cognition is the number of stressors (e.g., workload) faced by the individual, as stressors foster distress and generate issues to ruminate (Nolen-Hoeksema et al., 1994). According to Brosschot et al. (2006), individuals tend to sustain perseverative cognition since they believe it is a useful strategy for problem-solving. Three functions of perseverative cognition have been established (Tallis & Eysenck, 1994). First, worry has an alarm function, as it interrupts current behaviors to allow a response to an urgent problem or threat. Second, worry has a prompting function, as it sustains attention on an unresolved and threatening situation. Third, worry has a preparatory function, as it prepares the organism to respond to the threatening situation. Individuals who face multiple stressors (e.g., time pressure and workload) are often too cognitively overwhelmed to engage in coping strategies that could help them reduce perseverative cognition (Nolen-Hoeksema et al., 1994). Therefore it fosters prolonged activation of psychological stressors and may lead to negative outcomes such as impaired concentration, negatively biased thinking, decreased recovery and depressive symptoms (Flaxman et al., 2012; Papageorgiou & Siegle, 2003).

The Conservation of Resources Theory (COR; Hobföll, 1989) helps to explain why perseverative cognition leads to such negative outcomes. According to COR people strive to preserve and gain resources. Wellness and well-being comes from resources gain and accumulation and ill-health and stress comes from resources' loss and deprivation. Working may be stressful as it calls upon resources (Westman, Hobföll, Chen, Davidson, & Laski, 2004). In order to recover and remain healthy, workers need to regain resources between workdays (Binnewies, Sonnentag, & Mojza, 2010). Worrying and ruminating when the workday is over call for even more resources from workers and prevent them from regaining resources before the next work period (Sonnentag, Binnewies, & Mojza, 2010).

To prevent the detrimental effects of WPC on workers' health and well-being, efficient coping strategies to reduce WPC need to be found. The next section focuses on how time spent on social activities may reduce WPC among workers.

### *1.2 Theoretical Perspectives on Daily Time Spent on Social Activities*

Findings from previous studies suggest that engaging in leisure activities is one strategy that individuals may choose to adopt in order to reduce WPC between work periods (Mojza et al., 2010; ten Brummelhuis & Bakker, 2012). Social activities, defined as actions involving interactions with others (e.g., speaking on the phone, meeting people or going out with friends; Nakahara, 2013), can enhance the ability to cognitively detach from work-related issues (Sonnetag & Bayer, 2005). According to Martin and Tesser (1996), one explanation why social activities may reduce perseverative cognition is that they help distract individuals from current disturbing issues. Another explanation may be that the interpersonal contact involved in social activities provides opportunities for receiving support (Sonnetag, 2001). Social support has been shown to buffer stress (Cohen & Wills, 1985) and relieve the effects of stressors (Viswesvaran, Sanchez, & Fisher, 1999). According to Greenhaus and Powell's (2006) theory of work-family enrichment, individuals can use their social capital (i.e., goodwill resulting from social relationships that has the capacity to motivate action) gained during off-job activities to solve problems at work. For instance, family and friends offering tips and recommendations necessary for overcoming a given problem at work might prevent or mitigate a work-related stress response. However, while social activities provide both opportunities for distraction and support, some studies have failed to confirm the protective function of such activities on daily WPC (e.g., Mojza et al., 2011; Sonnetag & Bayer, 2005). Considering the role of neuroticism in this equation will shed new light on these conflicting results.

### *1.3 Theoretical Perspectives on Neuroticism*

Neuroticism is a personality trait defined as the tendency to be emotionally unstable (Watson & Clarke, 1984). This trait is associated with the feeling of not being able to cope with life adversities and therefore to be more vulnerable to psychological distress (David, Green, Martin, & Suls, 1997; Watson & Clarke, 1984). Those high in neuroticism are known to be more likely to interpret life events negatively, to worry, to display emotionally charged behaviors and to report more negative thoughts than those low in neuroticism (Bishop & Jeanrenaud, 1976; Watson & Clarke, 1984).

Neuroticism is strongly correlated to perseverative cognition (Hervas & Vazquez, 2011; Muris et al., 2005). Roberts, Gilboa and Gotlib (1998) have suggested that as individuals high in neuroticism tend to focus on their dysphoric experiences, perseverative cognition may be the most frequent cognitive manifestation of this personality trait. In fact, perseverative cognition may be the pathway through which neuroticism impairs psychological health (Barnhofer & Chittka, 2010; Muris et al., 2005; Nolan et al., 1998; Roberts et al., 1998; Roelofs et al., 2008).

Robinson (2007) suggested that the relationship between neuroticism and perseverative cognition is based on a difference in executive cognitive function. Thus, a low level of executive cognitive function among those high in neuroticism may restrict their ability to control their cognition, leading to perseverative cognition. Furthermore, Robinson et al. (2006) proposed that cognitive persistence alter the ability of individuals high in neuroticism to adopt new and adaptive action patterns, thereby increasing their vulnerability to stress-related diseases. Consistent with this explanation, Zellars and Perrewé (2001) stated that as people higher in neuroticism seek more reassurance and are more likely to express statements of victimization than their stable counterparts they tend to have more work-related and negative conversations over the course of social interactions with their relatives. Accordingly since individuals high in neuroticism use such ineffective coping strategies during social interactions, they may fail to benefit from the distracting potential of social activities.

Studies have shown that neuroticism also influences how much one perceives social support (Procidano & Heller, 1983; Swickert, Hittner, & Foster, 2010). Comparisons between received (actual) support and perceived support revealed that individuals high in neuroticism report being less supported than they actually are (Bolger & Eckenrode, 1991). According to Bolger and Eckenrode (1991), those high in neuroticism tend to have a more negative mood. Consequently, they are more prone to negative bias in social judgments and tend to report dissatisfaction with the social support they receive during social interactions. Accordingly, individuals higher in neuroticism are less likely to benefit from the buffering effect of social support during interpersonal activities (Cohen & Wills, 1985).

### *1.4 This Study*

In sum, the current state of knowledge suggests that the interaction between neuroticism and social activities leads to divergent outcomes on daily WPC but this has not yet been tested and could be of considerable importance when counseling individuals on efficient ways to deal with WPC. Thus, the following moderation hypothesis was posited:

Hypothesis 1: Devoting more time than one's personal average to social activities will lead to lower daily WPC but only for individuals with low levels of self-reported neuroticism. Thus, participants low in neuroticism will report less daily WPC when they spent more time than their own personal average on social activities, while those high in neuroticism will report more daily WPC on days when more time is spent on social activities after the workday.

## 2. Method

### 2.1 Participants

Following the recommendations of Sheble and Wildemuth (2009), an evening diary study was conducted over a 10-day period (two consecutive workweeks from Monday to Friday) to test the hypothesis. Participants were office support staff from a Canadian university. Inclusion criteria were the following: (a) intending to work on a majority of days during the two weeks in which the diaries were to be completed, (b) being at least 18 years old, and (c) having Internet access at home, in order to complete the electronic surveys. A total of 61 workers volunteered for the diary study and received the questionnaires through their personal email address. Among the 61 workers who volunteered, 55 completed the initial questionnaire and 48 completed both the initial questionnaire and electronic diaries. A total of 316 (out of a maximum of 480) data points were obtained. Little's MCAR test (Little, 1988) indicated that data were missing completely at random,  $\chi^2 = 4.11$  ( $df = 3$ ,  $p = .250$ ). Most participants were female (70.8%) and their average age was 41.5 years ( $SD = 11.06$ ). Most had children (64.2%), were married or had a partner (66.7%) and worked full-time (93.8%) for an average of 39 hours ( $SD = 7.8$ ) per week. Descriptive statistics are presented in Table 1.

### 2.2 Procedure

The Institutional Review Board of Université du Québec à Montréal's Human Sciences Faculty approved this project. The research team sent an email to office support staff using the university's official email list. The email presented the major goals of the research project. Volunteers were asked to provide their email address to the research assistant in order to receive access to the initial questionnaire and the diaries on the online software Survey Monkey. The first page of the initial questionnaire informed participants about confidentiality and anonymity measures. Participants were also instructed to complete the initial questionnaire during the first weekend of the study and daily diaries before going to bed on work days of two consecutive weeks, from Monday to Friday. Time of completion was automatically recorded by the web-based questionnaire platform. Each completed daily diaries gave a chance to win a prize (2 X 50\$). Control variables and neuroticism were assessed in the initial questionnaire. The diaries were completed at bedtime in order to assess participants' level of WPC after the workday and the amount of time spent on social activities.

### 2.3 Measures

#### 2.3.1 Self-Reported Neuroticism

Neuroticism was assessed using the Neuroticism-Anxiety (N-Anx) subscale from Zurkerman-Kuhlman's Personality Questionnaire (ZKPQ; Aluja et al., 2006). It consists of ten items rated on a four-point Likert scale ranging from 1 ("Totally disagree") to 4 ("Totally agree"), for example: "I often feel restless for no apparent reason". The Cronbach's alpha of this subscale ( $\alpha = .89$ ) was similar to that in the original study ( $\alpha = .83$ ; Aluja et al., 2006).

#### 2.3.2 Daily Work-Related Perseverative Cognition (WPC)

The five-item Work-related Worry and Rumination Scale (WWRS; Flaxman et al., 2012) was used (e.g., "I worried about things to do with work."). Each evening before sleep over two consecutive workweeks, participants had to indicate the extent to which a series of work-related thoughts had crossed their mind after their workday on a five-point Likert scale ranging from 1 ("Not at all") to 5 ("A great deal"). The original scale had a Cronbach's alpha of .86, and the current diary study revealed alphas varying from .66 to .97 across all ten measurement occasions.

#### 2.3.3 Daily Time Spent on Social Activities

Following the procedure used by Sonnentag (2001), participants were provided with a list of three prototypical social activities (i.e., speaking with someone on the phone, speaking with someone face-to-face and intimacy/affection with one's partner). Each evening before sleep over two consecutive workweeks, participants recorded the amount of time (in minutes) spent on each type of activities after their workday (i.e., in the evening until bedtime) for a total of ten daily scores.

### 2.3.4 Control Variables

Heavy workload is defined as having to do a great amount of work in a short period of time and is a job strain often experienced as general time pressure (Sonnentag & Krueger, 2006). Chronic workload is defined as a more permanent level of workload that is experienced every day (Sonnentag & Bayer, 2005). Heavy workload has been shown to be one of the job stressors with the most detrimental consequences on WPC (e.g., Cropley, Dijk, & Stanley, 2006; Cropley & Millward Purvis, 2003; Sonnentag & Bayer, 2005; Sonnentag & Krueger, 2006; Steptoe, Cropley, & Joeke, 1999). Thus, chronic workload was controlled in the analyses. It was assessed in the initial questionnaire using the workload subscale from the Job Content Questionnaire (JCQ) developed by Karasek et al. (1998). A sample item is: "My job requires working very hard". Response scale ranged from 1 ("Strongly disagree") to 4 ("Strongly agree"). Reliability was good (Cronbach's alpha = .79), and similar to that of the original (Cronbach's alpha = .84; Niedhammer, 2002).

Demographic variables may also have an influence on individuals' level of thoughts about work-related issues (Sonntag & Bayer, 2005; Sonntag & Krueger, 2006). Therefore, age, gender, number of children, hours of work per week, and contract working hours (i.e., full-time or part-time) were included in the analyses.

## 2.4 Data Analyses

### 2.4.1 Correlation Analyses

Preliminary analyses were performed using SPSS v.23 (IBM Corp., 2015). Correlation analyses were conducted in order to assess the strength of the relationships between variables. Spearman's correlation coefficients were used for ordinal data (i.e., gender and contract working hours) and Pearson's correlation coefficients were used for interval variables (i.e., age, number of children, hours of work/week, workload, neuroticism, social activities, and perseverative cognition). Scores obtained on the 10 measurement occasions were aggregated for each Level 1 variable to compute correlations between Level 1 and Level 2 variables.

### 2.4.2 Hierarchical Linear Models

A series of hierarchical linear models (HLM) were constructed using HLM 7 (Raudenbush, Bryk, & Congdon, 2011) to evaluate the extent to which data supported the hypothesis. This type of analytical model is the most common in diary studies (Ohly et al., 2010). HLM control for missing data at the group-level and take into account dependence between measurement occasions making it possible to assess the fluctuations between days for the same individual (Field, 2009; Reis & Gable, 2000). Following Ohly et al.'s (2010) recommendations when intra-individual variance (Level 1) is of primary interest in a moderation hypothesis, daily time spent on social activities (predictor) was centered to the group mean (within-person level of analysis) and neuroticism (moderator) was centered to the grand mean (between-person level). The control variables were centered to the grand mean (between-person level). In doing so, all between-person variance was removed. The estimation method used was restricted maximum likelihood (e.g., Trougakos, Hideg, Cheng, & Beal, 2014). The random effect of the intercept and slopes were included in the analyses. Equations were tested in a two-tailed manner. The following equations were used:

$$\text{Level 1: Daily WPC}_{ij} = \beta_{0j} + \beta_{1j}(\text{Daily Time Spent on Social Activities})_{ij} + r_{ij}$$

$$\text{Level 2: } \beta_{0j} = \gamma_{00}(\text{Chronic Workload}) + \gamma_{01}(\text{Neuroticism}) + u_{0j}$$

## 3. Results

### 3.1 Correlation Analyses

Zero-order correlations and descriptive statistics are presented in Table 1. The coefficient above the diagonal is the day-level correlation between social activities and WPC. The pattern of correlations was in line with expectations. Social activities were not related to WPC at the between level ( $r = -.02, p = \text{n.s.}$ ) and at the day-level ( $r = -.04, p = \text{n.s.}$ ). Also, neuroticism was positively related to WPC ( $r = .41, p = .004$ ). Age ( $r = -.39, p = .009$ ) and gender ( $r = .32, p = .034$ ) were significantly related to time spent on social activities, with younger, and male office support workers devoting more time to them. Workload was marginally correlated to daily WPC ( $r = .28, p = .058$ ). Since workload was related (although marginally) to daily WPC, it was decided to include it in the hierarchical linear models.

Table 1. Cronbach alpha, means, standard deviations, and zero-order correlations

Variables	$\alpha$	$M$	$SD$	1	2	3	4	5	6	7	8	9
Socio-demographic variables												
1. Age		41.49	11.03	–								
2. Gender		1.29	.46	.07	–							
3. Number of children		1.06	1.17	.15	.17	–						
4. Part-time / full-time		1.06	.24	-.22	.02	-.26	–					
5. Hours of work / week		38.98	7.79	.17	.32*	.24	-.23	–				
Control variable												
6. Workload	.79	2.57	.55	-.07	-.07	.16	-.15	.05	–			
Model's variables												
7. Neuroticism	.90	2.13	.63	-.15	-.23	-.18	-.07	-.02	.26	–		
8. Daily WPC	.66 to .97	1.31	.38	.01	-.00	.01	-.15	.05	.28	.41**	–	-.04
9. Daily time spent on social activities		66.94	44.58	-.39**	.32*	-.18	.14	-.08	.00	-.04	-.02	–

Notes.  $\alpha$  = Cronbach's alpha variation across the 10 days of the study. Gender = woman (1), man (2). Full-time/part-time = part-time employment (0) full-time employment (1). Daily time spent on social activities is in minutes. \* = significant at  $p < .05$ . \*\* = significant at  $p < .01$ . Correlations below the diagonal are at the person-level (average across 10 days;  $n = 48$ ). Correlation above the diagonal is at the day-level ( $n = 316$ ).

Table 2. Results from the HLM analyses of daily WPC before going to bed over 2 consecutive weeks

Variables	Null model			Model 1			Model 2			Model 3			Model 4		
	Coef.	$t$	$p$	Coef.	$t$	$p$	Coef.	$t$	$p$	Coef.	$t$	$p$	Coef.	$t$	$p$
Intercept	1.32	24.28	<.001	1.32	25.22	<.001	1.32	25.24	<.001	1.32	27.14	<.001	1.32	27.13	<.001
Workload				0.11	2.35	.023	.11	2.28	.027	0.08	1.78	.081	.08	1.81	.077
Daily time spent on social activities							.01	0.45	.653				.01	0.41	.681
Neuroticism										.13	2.42	.020	.13	2.41	.020
Daily time spent on social activities X Neuroticism													.04	2.56	.014

Notes. Coef. = Coefficient. Daily time spent on social activities is in minutes.  $n$  at Level 1 = 316.  $n$  at Level 2 = 48.

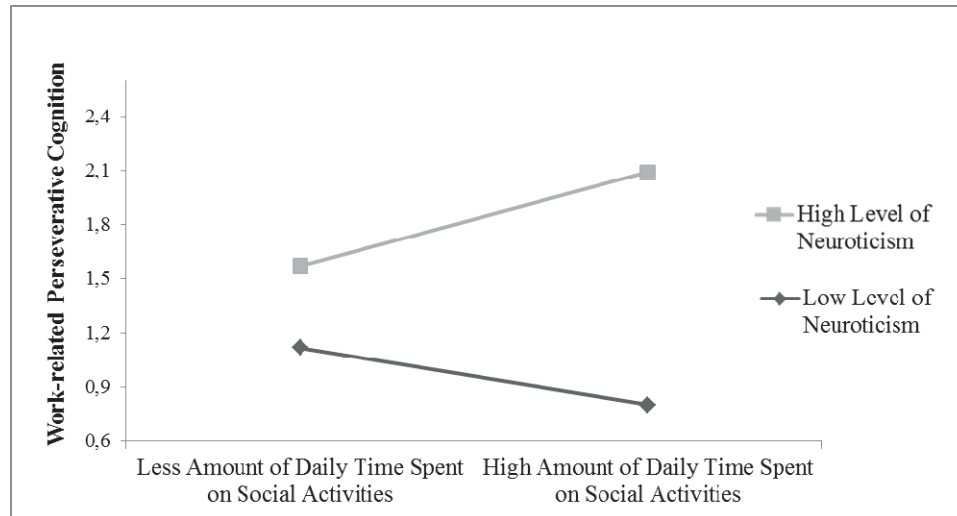


Figure 1. Impact of daily time spent on social activities on daily WPC as a function of neuroticism

### 3.2 Hierarchical Linear Models

Hierarchical linear models were used in order to verify Hypothesis 1 which posits that spending more time than one's personal average to daily social activities will lead to lower daily WPC but only for individuals low in neuroticism. As hypothesized, neuroticism significantly moderated the relation between daily time spent on social activities and daily WPC ( $\gamma_{11} = .04, p = .014$ ). Results are presented in Table 2 and in Figure 1 (with high and low scores at one standard deviation above and below the mean; Aiken & West, 1991). For participants high in neuroticism, each unit increase in time invested in social activities led to a .52 increase in daily WPC, in comparison to a decrease of .32 units for those low in neuroticism. Analysis of the simple effects of this interaction at high (+1 SD) and low (-1 SD) levels of neuroticism showed that daily number of minutes spent on social activities significantly predicted daily WPC, both for individuals high in neuroticism ( $\gamma_{11} = .04, p = .014$ ) and low in neuroticism ( $\gamma_{11} = .04, p = .014$ ). Results are discussed in detail in the next section.

## 4. Discussion

This diary study extends previous findings on perseverative cognition by examining relations between time spent on social activities and perceived daily perseverative cognition about work-related issues in light of individual's level of self-reported neuroticism. This approach illustrates the importance of taking into account both individual strategies that help to distract oneself from work (i.e., through social leisure activities) and personal characteristics (i.e., neuroticism) to understand daily WPC. As predicted, social activities amplified the neuroticism/WPC relationship, exacerbating the tendency of those with high levels of neuroticism to report WPC when spending more time than their personal average on social activities after the workday whereas it decreased among those low in neuroticism. This shows that devoting extensive time to social activities during leisure hours could help workers low in neuroticism manage daily WPC, but could also increase the tendency to experience WPC among those high in neuroticism.

This study sheds new light on previous findings by bringing new insight on why social activities may have been both effective (e.g., Mojza et al., 2010; Ten Brummelhuis & Bakker, 2012) and ineffective (Mojza et al., 2011; Sonnentag & Bayer, 2005) in reducing WPC and promoting resource recovery after work. Results from this study indicate that engaging in social activities does not divert internal reflection from work-related issues in individuals high in neuroticism. This provides empirical support that the effects of leisure activities are influenced by individual characteristics (Sonnentag & Bayer, 2005; Sonnentag & Fritz, 2007). As individuals high in neuroticism tend to engage in conversations about stressful events more frequently and with a more negative outlook than those low in neuroticism, it is likely that the former tend to worry and ruminate during social activities. This may explain why those high in neuroticism fail to take advantage of the social support extended to them (Demerouti, Bakker, Geurts, & Taris, 2009; Zellars & Perrewé, 2001).

Sonnentag and Fritz (2007) suggested that recreational activities are beneficial through the "sense of control" individuals experience when they choose to devote time to an activity, rather than through any inherent benefit. Social activities are less likely to provide a sense of control about work-related issues than working after the

workday, since working may help to reduce the perception of workload for the subsequent workday. The “Zeigarnik effect” (Zeigarnik, 1927) states that individuals recall unfinished tasks more than those that have been completed. Accordingly, working during the evening may help reduce WPC among neurotic workers as it allows them to exert an actual control over their workload. Thus, working after hours may be more beneficial to those high in neuroticism, as they tend to worry and ruminate more about work-related issues than their emotionally stable counterparts (Rusting & Larsen, 1997). However, workers high in neuroticism may sometimes feel pressured to devote time to friends and family members, thereby leaving less time and control for working during the evening.

#### *4.1 Strengths, Limitations and Future Research*

Using diaries over two workweeks allowed observing the variability of participants’ WPC in its real context of occurrence (Reis & Gable, 2000). Also, by asking participants to report both activities and WPC shortly after the activities were performed (i.e., in the evening before sleep), potential retrospective bias was reduced (Stone et al., 1998).

Although relevant results were obtained in this diary study, it is important to mention a few limitations. First, because the study has a correlational and longitudinal design, causality cannot be established between the tested variables. Some questions are yet to be answered such as do people who ruminate more engage in more or less social activities depending on their personality? Do people high in neuroticism engage in more social activities on days they ruminate more while people low in neuroticism do not engage in more social activities?

Second, there is a potential bias due to the self-reported nature of the data. At the end of their workday, individuals can experience difficulties to estimate the time spent doing social activities. In future studies, it would be appropriate to use other data collection approaches such as experience sampling method (ESM; see Larson & Csikszentmihalyi, 1983). For instance, researchers can use smartphones based ESM platform and ask participants to stop their activities at certain times and log their experience in real time. In order to triangulate the data, information could also be collected from third parties such as friends or relatives.

Third, sample size may appear as small. However, Ohly et al. (2010) reported that, in a diary studies, a sample size comprised of more than 30 individuals helps to reduce the possibility of biased results and current sample was 316 data points amongst 48 participants.

Fourth, 36.25% of daily diaries (174 out of a maximum of 480) were not completed. However, the neurotic and stressed workers with young children, and also the socially active ones are more likely to omit diary data. Sending a reminder on participants’ smartphone could probably help mitigate such effect.

Fifth, other personal characteristics that have not been considered in the present study could also have influenced the ability of office support staff to take advantage of social activities. Researchers are encouraged to examine some variables such as other big five traits that could influence the function and benefits of activities performed after work. For instance, Trougakos and Hideg (2009) posit that individuals’ level of extraversion (i.e., the extent to which individuals are energetic, assertive, and enthusiastic) may influence the benefits of time spent on social activities during break periods. In comparison to individuals low in extraversion (i.e., introverted individuals), those high in extraversion may prefer to spend time on social types of activities as they perceived them as attractive and as a way to secure social support on which they can rely on during demanding times. According to Hotard et al. (1989) and Lynn and Steel (2006) there may also exist an interactive effect of extraversion and neuroticism on individuals’ level of well-being. Introverts are recognized to interpret social arousal negatively and are thus more likely to avoid social interactions than extroverts. Since individuals high in neuroticism are known to interpret life events, including social activities, more negatively than their stable counterparts (Watson & Clarke, 1984), they may amplify the negative reactions of introverts during social interactions. Neurotic introverts may thus report anxiety when they spent time on social activities during off-job periods, while neurotic extroverts may attribute their arousal during social activities to attraction (Lynn & Steel, 2006).

#### *4.2 Implications and Conclusion*

Findings suggest that engaging in social activities does not help all individuals to decrease WPC, known to be detrimental to individuals’ health and well-being (Nepon et al., 2011; Nolan et al., 1998; Roelofs et al., 2008). For workers low in neuroticism, social activities can be beneficial, whereas for workers high in neuroticism, devoting more time to social activities may lead to an increase in WPC. This supports Sonnentag and Fritz’s (2007) statement that no specific leisure activity can consistently generate recovery, because the type of activities experienced as restorative varies among individuals. This study goes further in explaining the absence of direct relation of time spent on social activities observed in previous studies (e.g., Mojza et al., 2011;



Sonnentag & Bayer, 2005), suggesting that some individuals (those high in neuroticism) may be less likely to take advantage of protective mechanisms associated with social activities, thereby failing to improve their well-being.

One practical implication is that the design of interventions aimed at reducing WPC should take into account the individuals' level neuroticism or not. Since workers high in neuroticism have more daily perseverative cognition about work-related issues when devoting more time to social activities, workers should pay particular attention to the nature (positive or negative) of conversations with relatives during their leisure activities. To benefit from the distraction social activities can offer, workers should avoid or at least minimize engaging in negative conversations in this context. Also, previous studies have highlighted other strategies that may reduce WPC among individuals high in neuroticism. For instance, cognitive and behavioural therapies based on mindfulness have been shown to be effective for this purpose (Bond, Flaxman, van Veldhoven, & Biron, 2010). Martin and Tesser (1996) suggested that goal attainment and disengagement from the goal (along with distraction through off-job activities) help individuals reduce their level of WPC. Cropley and Millward Purvis (2009) proposed that goal attainment may be facilitated by splitting work-related tasks into smaller steps that can be performed on a daily basis, while disengagement from job-related issues may be improved with strong and clear boundaries between work and home domains. Once workers have been educated about the detrimental effects of WPC, those who are more prone to engage in such type of thinking should be encouraged to try the proposed strategies.

### Acknowledgments

This work was supported by the Social Sciences and Humanities Research Council of Canada (SSHRC; 430-2013-000731).

### References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Aluja, A., Rossier, J. R. M., García, L. F., Angleitner, A., Kuhlman, M., & Zuckerman, M. (2006). A cross-cultural shortened form of the ZKPQ (ZKPQ-50-cc) adapted to English, French, German, and Spanish languages. *Personality and Individual Differences, 41*(4), 619-628. <http://dx.doi.org/10.1016/j.paid.2006.03.001>
- Barnhofer, T., & Chittka, T. (2010). Cognitive reactivity mediates the relationship between neuroticism and depression. *Behaviour Research and Therapy, 48*(4), 275-281. <http://dx.doi.org/10.1016/j.brat.2009.12.005>
- Binnewies, C., Sonnentag, S., & Mojza, E. J. (2010). Recovery during the weekend and fluctuations in weekly job performance: A week level study examining intra individual relationships. *Journal of Occupational and Organizational Psychology, 83*(2), 419-441. <http://dx.doi.org/10.1348/096317909X418049>
- Bishop, D., & Jeanrenaud, C. (1976). End-of-day moods on work and leisure days in relation to extraversion, neuroticism, and amount of change in daily activities. *Canadian Journal of Behavioural Science, 8*(4), 388-400. <http://dx.doi.org/10.1037/h0081964>
- Bolger, N., & Eckenrode, J. (1991). Social relationships, personality, and anxiety during a major stressful event. *Journal of Personality and Social Psychology, 61*, 440-449. <http://dx.doi.org/0022-3514/91>
- Bond, F. W., Flaxman, P. E., van Veldhoven, M. J. P. M., & Biron, M. (2010). The impact of psychological flexibility and acceptance and commitment therapy (ACT) on health and productivity at work. In J. Houdmont, & S. Leka (Eds.), *Contemporary occupational health psychology: Global perspectives on research, education, and practice*. Chichester, UK: Wiley-Blackwell.
- Brosschot, J. F., Gerin, W., & Thayer, J. F. (2006). The perseverative cognition hypothesis: A review of worry, prolonged stress-related physiological activation, and health. *Journal of Psychosomatic Research, 60*(2), 113-124. <http://dx.doi.org/10.1016/j.jpsychores.2005.06.074>
- Brosschot, J. F., Pieper, S., & Thayer, J. F. (2005). Expanding stress theory: Prolonged activation and PC. *Psychoneuroendocrinology, 30*(10), 1043-1049. <http://dx.doi.org/10.1016/j.psyneuen.2005.04.008>
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*(2), 310-357. <http://dx.doi.org/10.1016/j.psyneuen.2015.10.005>
- Conway, M., Csank, P. A., Holm, S. L., & Blake, C. K. (2000). On assessing individual differences in rumination on sadness. *Journal of Personality Assessment, 75*(3), 404-425. [http://dx.doi.org/10.1207/S15327752JPA7503\\_04](http://dx.doi.org/10.1207/S15327752JPA7503_04)

- Cropley, M., & Millward Purvis, L. (2003). Job strain and rumination about work issues during leisure time: A diary study. *European Journal of Work and Organizational Psychology, 12*(3), 195-207. <http://dx.doi.org/10.1080/13594320344000093>
- Cropley, M., & Millward, L. J. (2009). How do individuals “switch-off” from work during leisure? A qualitative description of the unwinding process in high and low ruminators. *Leisure Studies, 28*(3), 333-347. <http://dx.doi.org/10.1080/02614360902951682>
- Cropley, M., Dijk, D. J., & Stanley, N. (2006). Job strain, work rumination, and sleep in school teachers. *European Journal of Work and Organizational Psychology, 15*(2), 181-196. <http://dx.doi.org/10.1080/13594320500513913>
- David, J., Green, P. J., Martin, R., & Suls, J. (1997). Differential roles of neuroticism extraversion, and event desirability for mood in daily life: An integrative model of top-down and bottom up influences. *Journal of Personality and Social Psychology, 73*, 149-159. <http://dx.doi.org/0.1177/1754073913477512>
- Demerouti, E., Bakker, A. B., Geurts, S. A., & Taris, T. W. (2009). Daily recovery from work-related effort during non-work time. *Current Perspectives on Job-Stress Recovery: Research in Occupational Stress and Well-being, 7*, 85-123. [http://dx.doi.org/10.1108/S1479-3555\(2009\)0000007006](http://dx.doi.org/10.1108/S1479-3555(2009)0000007006)
- Feuerhahn, N., Sonnentag, S., & Woll, A. (2014). Exercise after work, psychological mediators, and affect: A day-level study. *European Journal of Work and Organizational Psychology, 23*(1), 62-79. <http://dx.doi.org/10.1080/1359432X.2012.709965>
- Field, A. (2009). *Discovering statistics using SPSS*. London, UK: Sage publications.
- Flaxman, P. E., Ménard, J., Kinman, G., & Bond, F. W. (2012). Academic’s experiences of a respite from work: Effects of self-critical perfectionism and PC on post-respite well-being. *Journal of Applied Psychology, 97*(4), 854-865. <http://dx.doi.org/10.1037/a0028055>
- Government of Canada. (2016). *Canadian Occupational Projection System (COPS)*. Retrieved from <http://occupations.esdc.gc.ca/sppc-cops/.4cc.5p.1t.3.4ns.5mm.1ryd.2t.1.3l@-eng.jsp?tid=53>
- Greenhaus, J. H., & Powell, G. N. (2006). When work and family are allies: A theory of work-family enrichment. *Academy of Management Review, 31*(1), 72-92. <http://dx.doi.org/10.5465/AMR.2006.19379625>
- Gunthert, K. C., Cohen, L. H., & Armeli, S. (1999). The role of neuroticism in daily stress and coping. *Journal of Personality and Social Psychology, 77*(5), 1087-1100. <http://dx.doi.org/10.1037/0022-3514.77.5.1087>
- Hervas, G., & Vazquez, C. (2011). What else do you feel when you feel sad? Emotional overproduction, neuroticism and rumination. *Emotion, 11*(4), 881-895. <http://dx.doi.org/10.1037/a0021770>
- Hobföll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513-524. <http://dx.doi.org/10.1037/0003-066X.44.3.513>
- Hotard, S. R., McFatter, R. M., McWhirter, R. M., & Stegall, M. E. (1989). Interactive effects of extraversion, neuroticism, and social relationships on subjective well-being. *Journal of Personality and Social Psychology, 57*(2), 321-333. <http://dx.doi.org/10.1037/0022-3514.57.2.321>
- IBM Corp. (2015). *IBM SPSS Statistics for Windows, Version 23.0*. Armonk, NY: IBM Corp.
- Iso-Ahola, S., & Park, C. J. (1996). Leisure-related social support and self-determination as buffers of stress-illness relationship. *Journal of Leisure Research, 28*(3), 169-187. <http://dx.doi.org/10.3402/qhw.v9.23517>
- Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., & Amick, B. (1998). The Job Content Questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics. *Journal of Occupational Health Psychology, 3*(4), 322-355. <http://dx.doi.org/10.1037/1076-8998.3.4.322>
- Keogh, E., French, C. C., & Reidy, J. (1998). Predictors of worry. *Anxiety, Stress, and Coping, 11*(1), 67-80. <http://dx.doi.org/10.1080/10615809808249314>
- Kirkegaard Thomsen, D. (2006). The association between rumination and negative affect: A review. *Cognition and Emotion, 20*(8), 1216-1235. <http://dx.doi.org/10.1080/02699930500473533>
- Larson, R., & Csikszentmihalyi, M. (1983). The experience sampling method. In H. T. Reis (Ed.), *Naturalistic approaches to studying social interaction. New directions for methodology of social and behavioral sciences* (pp. 41-56). San Francisco, CA: Jossey-Bass.

- Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83(404), 1198-1202. <http://dx.doi.org/10.1080/01621459.1988.10478722>
- Lynn, M., & Steel, P. (2006). National differences in subjective well-being: The interactive effects of extraversion and neuroticism. *Journal of Happiness Studies*, 7(2), 155-165. <http://dx.doi.org/10.1007/s10902-005-1917-z>
- Martin, L. L., & Tesser, A. (1989). Toward a motivational and structural theory of ruminative thought. In J. Uleman, & J. A. Bargh (Eds.), *Unintended thought* (pp. 306-326). New York, NJ: Guilford Press.
- Martin, L. L., & Tesser, A. (1996). Some ruminative thoughts. In Robert S. Jr. W. (Ed.), *Ruminative thoughts. Advances in social cognition* (pp. 1-47). Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.
- Mojza, E. J., Lorenz, C., Sonnentag, S., & Binnewies, C. (2010). Daily recovery experiences: The role of volunteer work during leisure time. *Journal of Occupational Health Psychology*, 15(1), 60-74. <http://dx.doi.org/10.1037/a0017983>
- Mojza, E. J., Sonnentag, S., & Bornemann, C. (2011). Volunteer work as a valuable leisure-time activity: A day-level study on volunteer work, non-work experiences, and well-being at work. *Journal of Occupational and Organizational Psychology*, 84(1), 123-152. <http://dx.doi.org/10.1348/096317910X485737>
- Muris, P., Roelofs, J., Rassin, E., Franken, I., & Mayer, B. (2005). Mediating effects of rumination and worry on the links between neuroticism, anxiety and depression. *Personality and Individual Differences*, 39(6), 1105-1111. <http://dx.doi.org/10.1016/j.paid.2005.04.005>
- Nakahara, J. (2013). Effects of social activities outside the home on life satisfaction among elderly people living alone. *International Journal of Psychological Studies*, 5(1), 112-120. <http://dx.doi.org/10.5539/ijps.v5n1p112>
- Nepon, T., Flett, G. L., Hewitt, P. L., & Molnar, D. S. (2011). Perfectionism, negative social feedback, and interpersonal rumination in depression and social anxiety. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, 43(4), 297-306. <http://dx.doi.org/0008-400X/11>
- Niedhammer, I. (2002). Psychometric properties of the French version of the Karasek Job Content Questionnaire: A study of the scales of decision latitude, psychological demands, social support, and physical demands in the GAZEL cohort. *International Archives of Occupational and Environmental Health*, 75(3), 129-144. <http://dx.doi.org/10.1007%2Fs004200100270>
- Nolan, S. A., Roberts, J. E., & Gotlib, I. H. (1998). Neuroticism and ruminative response style as predictors of change in depressive symptomatology. *Cognitive Therapy and Research*, 22(5), 445-455. <http://dx.doi.org/10.1023%2FA%3A1018769531>
- Nolen-Hoeksema, S., Parker, L. E., & Larson, J. (1994). Ruminative coping with depressed mood following loss. *Journal of Personality and Social Psychology*, 67(1), 92-104. <http://dx.doi.org/0022-3514/94>
- Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research: An introduction and some practical recommendations. *Journal of Personnel Psychology*, 9, 79-93. <http://dx.doi.org/10.1027/1866-5888/a000009>
- Papageorgiou, C., & Siegle, G. J. (2003). Rumination and depression: Advances in theory and research. *Cognitive Therapy and Research*, 27(3), 243-245. <http://dx.doi.org/10.1023/A:1023918331490>
- Procidano, M. E., & Heller, K. (1983). Measures of perceived social support from friends and from family: Three validation studies. *American Journal of Community Psychology*, 11(1), 1-24. <http://dx.doi.org/10.1007/BF00898416>
- Raudenbush, S. W., Bryk, A. S., & Congdon, R. (2011). *HLM 7 for Windows* [Computer software]. Lincolnwood, IL: Scientific Software International, Inc.
- Reis, H. T., & Gable, S. (2000). Event-sampling and other methods for studying everyday experience. In H. T. Reis, & C. M. Judd (dir.), *Handbook of research methods in social and personality psychology* (pp. 190-222). United Kingdom: Cambridge university press.
- Roberts, J. E., Gilboa, E., & Gotlib, I. H. (1998). Ruminative response style and vulnerability to episodes of dysphoria: Gender, neuroticism, and episode duration. *Cognitive Therapy and Research*, 22(4), 401-423. <http://dx.doi.org/10.1023/A:1018713313894>

- Robinson, M. D. (2007). Personality, affective processing, and self-regulation: Toward process-based views of extraversion, neuroticism, and agreeableness. *Social and Personality Psychology Compass*, 1(1), 223-235. <http://dx.doi.org/10.1111/j.1751-9004.2007.00019.x>
- Robinson, M. D., Wilkowski, B. M., Kirkeby, B. S., & Meier, B. P. (2006). Stuck in a rut: Perseverative response tendencies and the neuroticism-distress relationship. *Journal of Experimental Psychology: General*, 135(1), 78-91. <http://dx.doi.org/10.1037/0096-3445.135.1.78>
- Roelofs, J., Huibers, M., Peeters, F., Arntz, A., & van Os, J. (2008). Rumination and worrying as possible mediators in the relation between neuroticism and symptoms of depression and anxiety in clinically depressed individuals. *Behaviour Research and Therapy*, 46(12), 1283-1289. <http://dx.doi.org/10.1016/j.brat.2008.10.002>
- Rusting, C. L., & Larsen, R. J. (1997). Extraversion, Neuroticism, and susceptibility to positive and negative affect: A test of two theoretical models. *Personality and Individual Differences*, 22(5), 607-612. [http://dx.doi.org/10.1016/S0191-8869\(96\)00246-2](http://dx.doi.org/10.1016/S0191-8869(96)00246-2)
- Sheble, L., & Wildemuth, B. (2009). Research diaries. In B. Wildemuth (Ed.), *Applications of social research methods to questions in information and library science* (pp. 211-221). Santa Barbara, CA: Libraries Unlimited.
- Sonnentag, S. (2001). Work, recovery activities, and individual well-being: A diary study. *Journal of Occupational Health Psychology*, 6(3), 196-210. <http://dx.doi.org/10.1037/1076-8998.6.3.196>
- Sonnentag, S., & Bayer, U. V. (2005). Switching off mentally: Predictors and consequences of psychological detachment from work during off-job time. *Journal of Occupational Health Psychology*, 10(4), 393-414. <http://dx.doi.org/10.1037/1076-8998.10.4.393>
- Sonnentag, S., & Fritz, C. (2007). The Recovery Experience Questionnaire: Development and validation of a measure for assessing recuperation and unwinding from work. *Journal of Occupational Health Psychology*, 12(3), 204-221. <http://dx.doi.org/10.1037/1076-8998.12.3.204>
- Sonnentag, S., & Krueger, U. (2006). Psychological detachment from work during off-job time: The role of job stressors, job involvement, and recovery-related self-efficacy. *European Journal of Work and Organizational Psychology*, 15(2), 197-217. <http://dx.doi.org/10.1080/13594320500513939>
- Sonnentag, S., Binnewies, C., & Mojza, E. J. (2010). Staying well and engaged when demands are high: The role of psychological detachment. *Journal of Applied Psychology*, 95(5), 965-976. <http://dx.doi.org/10.1037/a0020032>
- Spector, P. E. (1987). Interactive effects of perceived control and job stressors on affective reactions and health outcomes for clerical workers. *Work & Stress*, 1(2), 155-162. <http://dx.doi.org/10.1080/02678378708258497>
- Steptoe, A., Cropley, M., & Joeekes, K. (1999). Job strain, blood pressure, and responses to uncontrollable stress. *Journal of Hypertension*, 17, 193-200. <http://dx.doi.org/10.1097/00004872-199917020-00003>
- Stone, A. A., Schwartz, J. E., Neale, J. M., Shiffman, S., Marco, C. A., Hickcox, M., ... Cruise, L. J. (1998). A comparison of coping assessed by ecological momentary assessment and retrospective recall. *Journal of Personality and Social Psychology*, 74(6), 1670-1680. <http://dx.doi.org/0022-3514/98>
- Swickert, R. J., Hittner, J. B., & Foster, A. (2010). Big Five traits interact to predict perceived social support. *Personality and Individual Differences*, 48(6), 736-741. <http://dx.doi.org/10.1177/1359105314547244>
- Tallis, F., & Eysenck, M. W. (1994). Worry: Mechanisms and modulating influences. *Behavioural and Cognitive Psychotherapy*, 22(1), 37-56. <http://dx.doi.org/10.1017/S1352465800011796>
- ten Brummelhuis, L. L., & Bakker, A. B. (2012). Staying engaged during the week: The effect of off-job activities on next day work engagement. *Journal of Occupational Health Psychology*, 17(4), 445-455. <http://dx.doi.org/10.1037/a0029213>
- Trougakos, J. P., & Hideg, I. (2012). Momentary work recovery: The role of within-day work breaks. In P. Perrewé, D. Ganster, & S. Sonnentag (Eds.), *Research in occupational stress and wellbeing* (pp. 37-84). US: JAI Press/Elsevier.
- Trougakos, J. P., Hideg, I., Cheng, B. H., & Beal, D. J. (2014). Lunch breaks unpacked: The role of autonomy as a moderator of recovery during lunch. *Academy of Management Journal*, 57(2), 405-421. <http://dx.doi.org/10.5465/amj.2011.1072>

- Viswesvaran, C., Sanchez, J. I., & Fisher, J. (1999). The role of social support in the process of work stress: A meta-analysis. *Journal of Vocational Behavior*, *54*(2), 314-334. <http://dx.doi.org/10.1006/jvbe.1998.1661>
- Watson, D., & Clarke, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin*, *96*, 465-490. <http://dx.doi.org/10.1037/0033-2909.96.3.465>
- Westman, M., Hobföll, S. E., Chen, S., Davidson, O. B., & Laski, S. (2004). Organizational stress through the lens of conservation of resources (COR) theory. *Research in Occupational Stress and Well-being*, *4*, 167-220. [http://dx.doi.org/S1479-3555\(04\)040](http://dx.doi.org/S1479-3555(04)040)
- Wheeler, L., & Reis, H. T. (1991). Self-recording of everyday life events: Origins, types, and uses. *Journal of Personality*, *59*, 339-354. <http://dx.doi.org/10.1111/j.1467-6494.1991.tb00252.x>
- Zeigarnik, B. (1927). Über das Behalten von erledigten und unerledigten handlungen. *Psychologische Forschung*, *9*(1), 1-85. <http://dx.doi.org/10.1093/jcr/ucv018>
- Zellars, K. L., & Perrewé, P. L. (2001). Affective personality and the content of emotional social support: Coping in organizations. *Journal of Applied Psychology*, *86*(3), 459-467. <http://dx.doi.org/10.1037/0021-9010.86.3.45>

### Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

# Effects of a Transactional Analysis Program on Adolescents' Emotion Regulation

Somaye Keshavarzi<sup>1</sup>, Eskandar Fathi Azar<sup>1</sup>, Mir Mahmoud Mirnasab<sup>1</sup> & Rahim Badri Gargari<sup>1</sup>

<sup>1</sup> Department of Education, Faculty of Education and Psychology, University of Tabriz, Tabriz, Iran

Correspondence: Somaye Keshavarzi, Department of Education, Faculty of Education and Psychology, University of Tabriz, Tabriz, Iran. E-mail: keshavarzi.somaye@gmail.com

Received: September 11, 2016

Accepted: September 30, 2016

Online Published: October 25, 2016

doi:10.5539/ijps.v8n4p51

URL: <http://dx.doi.org/10.5539/ijps.v8n4p51>

## Abstract

Most adolescents are susceptible to exhibit emotional disorders due to rapid changes that occur during adolescence (Rudolph, 2002). To cope with such an issue, it is required to apply intervention programs in order to develop their competencies (Viner et al., 2012). In this study, the effect of transactional analysis on emotion regulation of 10th-grade female high school students has been examined by utilizing a quasi-experimental research (pre-test, post-test, and a control group design). Two classes have been chosen by cluster sampling and randomly assigned as the experimental and control groups. The Regulation of Emotion Questionnaire (Phillips & Power, 2007) was administered. The transactional analysis program has been held in eight sessions for the experimental group. Both groups were reexamined for follow-up a month later. The collected data were analyzed by Multivariate Analysis of Covariance (MANCOVA) indicates a significant increase in the functional emotion regulation strategies as well as a marked decrease in the dysfunctional emotion regulation strategies. The follow-up test also revealed an adequate stability. The implications of transactional analysis program will be discussed.

**Keywords:** adolescence, emotion regulation, transactional analysis

## 1. Introduction

### 1.1 Emotional Development in Adolescents

Emotional aspect is an essential component of adolescents' development. Some scholars believe that adolescents experience more negative emotions (such as stress, anxiety and depression) compared to their childhood (Newman, Moffitt, Caspi, Magdol, Silva, & Stanton, 1996; Rudolph, 2002). Problems, conflicts, and negative emotions are a natural part of everyone's life; however, prolonged negative emotions can have a profound effect on physical and psychological health of an individual and impact his relationship with others (Diehl, Hay, & Chui, 2012). Emotion regulation is a process comprised of recognition, monitoring, evaluation and modification of emotional reactions (Phillips & Power, 2007). It is generally divided into functional (adaptive or healthy) and dysfunctional (maladaptive or unhealthy) strategies (Phillips & Power, 2007; John & Gross, 2004; Southam-Gerow & Kendall, 2002). Functional emotion regulation is the ability to identify specific emotions and select the relevant strategy to regulate them (Eastbrook, 2013). Dysfunctional emotion regulation includes the strategies that reject or block emotional experiences and is recognized as a risk factor associated with emotional disorders such as anxiety and depression (Cole, Michel, & Teti, 1994). Absence of functional strategies and also presence of dysfunctional strategies put individuals in a high emotional risk (Aldao, Jazaieri, Goldin, & Gross, 2014; Phillips & Power, 2007).

### 1.2 Transactional Analysis Intervention

According to the above findings, adolescents need special attention to develop their competencies. Intervention programs can improve their skills (Viner et al., 2012). Morris (2006) noted that adolescence is an opportune time to provide transactional analysis programs. TA was introduced by Berne in 1957. It is a theory concerning personal growth and also for improving interpersonal relationships (Riggall, Churches, & Elwick, 2014; Morris, 2006). According to Berne, personality is made up of three ego states called Parent, Adult, and Child. Each ego state is recognized by a set of behaviors, thoughts, and feelings (Solomon, 2003). The Parent ego state is a set of behaviors, thoughts and feelings learned from parents or other characters. It can be divided to Nurturing and

Critical Parents. The Adult ego state is the part of personality that processes data based on facts. The Child ego state is the part of personality based on the emotions and thoughts from childhood. It is broken down into Adapted and Natural (Free) Child (Solomon, 2003) (Figure 1).

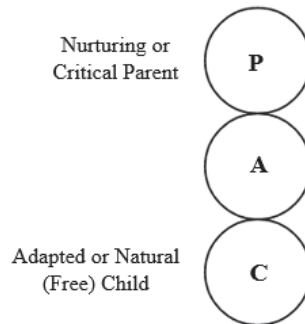


Figure 1. The ego state model

Transaction (another concept of TA) is defined as communications of people based on their ego state. It is divided to complementary, crossed, and ulterior components (Johnson, 2011; Solomon, 2003). In a complementary transaction, the communication between the initiator and the respondent are from the same ego state. As long as they remain in the same transactions, the communication may continue (Figure 2.1). In a crossed transaction a break occurs in the communication and may cause anger, frustration, or argument. In order to reestablish the communication, one or both of the individuals will need to shift their ego-states (Figure 2.2). In ulterior transaction, communication is based on a hidden meaning and can represent dishonest and unproductive communication (Johnsson, 2011; Solomon, 2003) (Figure 2.3).

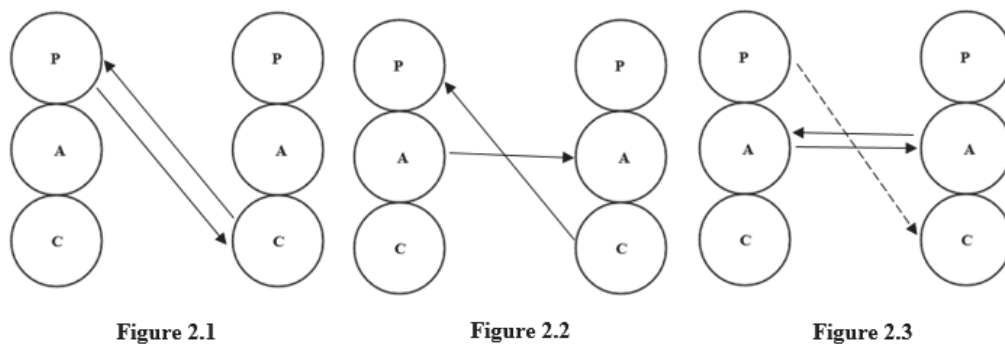


Figure 2. Transaction models

1.3 Review of Literature

So far, a lot of the transactional analysis studies have been executed on pathology (Chiesa, 2014; De Graaf & Rosseau, 2015; Eusden & Pierini, 2015; Tseng, Kawabata, Gau, & Crick, 2014; Horn et al., 2015; Pierini, 2014; Van Rijn & Wild, 2016). Transactional analysis was originally developed in psychotherapy; yet, it is deployed in education, counseling, and organizations (Corey, 2009; Morris, 2006; Vinella, 2013). Veiga (2004) and Emmerton and Newton (2004) stated that TA can be applied for the people with no clinical background. There are some studies that are devoted to the examination of TA in education (Barrow, 2007; Bastianelli, 2014; Hay & Widén, 2015; McKimm & Forrest, 2010; Morris, 2006; Newton & Napper, 2007; Shotton, 2009; Stuart & Alger, 2011). Helping students promote control over their actions, thoughts, and feelings and also acting more as an adult are important goals of transactional analysis in education (York, 2015; Veiga, 2004). There are also a dearth of empirical studies investigating the effect of TA in adolescence (Veiga, 2004; York, 2015). York (2015) developed a set of prevention and intervention programs (What’s in Your Back Pack?) to assist secondary

education students (9th, 10th, 11th, and 12th grades) in developing their communication skills and abilities in order to create changes in their behaviors. Findings revealed that the transactional analysis program can help adolescents make better decisions and reduce negative risk factors during their lifetime. Veiga (2004) carried out a transactional analysis intervention program around 18 school weeks on thirty-eight 8th-grade students in an experimental (n=17) and a control (n=21) group in Lisbon, Portugal. The TA program improved the high school students' behavioral adequacy in the experimental group compared with the control group. In brief, a lot of the TA studies were about pathology rather than development. In addition to lack of research in adolescents' development, there are also a lack of empirical studies investigated the effect of TA in adolescence. As such, we aimed to investigate the effect of transactional analysis training on emotion regulation strategies in adolescents.

#### 1.4 Hypotheses

On the basis of literature review and the related theories, the following hypotheses were stated:

- Transactional analysis training increases the mean score of the functional strategies and decreases the mean score of the dysfunctional strategies in emotion regulation.
- Training transactional analysis has stability in the follow-up phase.

## 2. Materials and Methods

### 2.1 Participants and Sampling Procedures

The current study applied a quasi-experimental research design, with a pre-test, post-test and a control group. The population of this research is consisted of all the 10th-grade female high school students (16 year-old) in 2016 in Tabriz, Iran. The participants were chosen by multistage cluster random sampling method. The participants were selected from one of the five Educational Districts in the city of Tabriz. A school was randomly selected in this district. Then, two classes were selected from that school. The experimental and the control groups were 20 and 21 students respectively. The students who were absent more than a session or did not answer the questionnaire completely were omitted. Thus, each group consists of 19 students. Then they were randomly assigned to the experimental and the control groups. The pre-test was conducted one week before the intervention program for both the experimental and the control groups. The experimental group received 8 sessions of transactional analysis program (once a week, 90-minutes per session) and the control group did not receive any intervention. The post-test was performed one week after the last intervention session for both groups. Additionally, a follow-up test was carried out one month later to examine the lasting effects of TA training.

### 2.2 Experimental Intervention

The intervention program in this research was based on the pivotal tenets of transactional analysis, specifically the ego states and transaction. The researchers of this study designed the transactional analysis program grounded in Berne's theory and the findings of Morris (2006), Veiga (2004), and York (2015).

Table 1. A brief description of the TA intervention program sessions

Sessions	Contents
Session 1	Establishing group rules-developing a contract to support the rules-discussing the goal of the program-performing Regulation of Emotion Questionnaire (REQ) as the pre-test.
Session 2	Discussing about three types of ego state: Parent, Adult, Child (PCA)-discussing verbal and non-verbal cues (e.g., facial expressions, body language, body temperature) to recognize ego states-giving some tasks* to the students to ascertain they are able to distinguish different ego states.
Session 3	Overviewing the contents of the previous session-checking the students' homework regarding the ego states-discussing different types of parents (Critical-Nurturing) and children (Adapted-Natural) ego state-training the students to draw egogram (egogram helps students understand their personality according to their functional ego state).
Session 4	Overviewing the contents of the previous session-checking the students' homework regarding egogram-discussing structural pathology (Contaminations and Exclusions).
Session 5	Overviewing the contents of the previous session-checking the students' homework concerning structural pathology-discussing the first type of transaction: complementary transaction-discussing the cons and pros of this kind of transaction.
Session 6	Overviewing the contents of the previous session-checking the students' homework concerning complementary



---

	transaction-discussing the second type of transaction: crossed transaction-discussing the problems of using this type of transaction.
Session 7	Overviewing of the contents of the previous session-checking the students' homework concerning crossed transaction-discussing the third type of transaction: hidden transaction- discussing the problems of employing this transaction.
Session 8	Carrying out REQ tests as post-test-summing up the subjects presented during the course-answering the students' questions about the program-expressing gratitude to student for their participation.

---

\*The tasks were related to the content of each session. For example the content of the second session was about "types of ego state". The students were asked to think back over the past 24 hours of their lives and write the thoughts and activities that they had. Then, they specified in which activities they acted like a child, their parents, or process data based on the facts.

### 2.3 Instruments

Regulation of Emotion questionnaire (REQ): this self-report questionnaire was developed and validated by Phillips and Power (2007) for adolescents aged 12 to 19. This inventory (with no total score) contains 19 items in 4 factors named internal-functional, external-functional, internal-dysfunctional and external-dysfunctional. Factor analysis was used for measuring the construct validity of REQ. Principle Components Analysis (PCA) with varimax rotation was performed. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.59, and Bartlett's test of sphericity was significant ( $\chi^2(171) = 260.56, P < 0.001$ ). Items with factor loadings less than 0.3 were omitted (12 and 18). The result obtained two factors, called function (1, 3, 4, 6, 8, 9, and 16) and dysfunction (2, 5, 7, 10, 13, 14, 15, 17, and 19) that suggests a total of 35.85% of the variance in the data (see Table 2). Participants were asked to rate the items on 5-point Likert-type scales ranging from point one "not at all" to point five "always". Internal consistencies (alpha Cronbach's coefficients) for each strategy of function and dysfunction were 0.60, and 0.81, respectively.

Table 2. Factor analysis of items relating to emotion regulation

Dimensions Items	Dysfunction	Function
17	0.77	
5	0.74	
19	0.74	
10	0.69	
2	0.67	
15	0.62	
14	0.60	
13	0.42	
7	0.36	
9		0.75
3		0.67
4		0.55
8		0.50
11		0.48
1		0.46
6		0.43
16		0.35
Initial Eigenvalues	4.34	2.46
Extraction Sums of Squared Loading	22.89	12.96

---

### 3. Result

The means and standard deviations of the variables are presented in Table 3. The findings revealed that the mean score of the dysfunctional emotion regulation strategies decreased, while, the mean score of the functional emotion regulation strategies augmented in the experimental group from pre-test to post-test. It should be noted that there were just slight changes between the post-test and the follow-up.

Table 3. Means and standard deviations of the emotion regulation strategies in the experimental, control, and follow-up groups

Strategies		Pre-test		Post-test		Follow-up	
		Experiment	Control	Experiment	Control	Experiment	Control
Function	M	31.05	32.05	35.42	32.94	35.57	32.63
	SD	3.15	2.75	2.89	3.71	4.50	3.56
Dysfunction	M	27.57	27.36	22.57	26.36	23.15	26.94
	SD	5.93	7.25	4.23	4.47	5.50	4.41

Before conducting the parametric test of multivariate analysis of covariance (MANCOVA) to test the hypotheses, tests of Box's M, and Levene's were used. According to Box's M test which was not significant ( $P \leq .001$ ) for any variables, the assumption of homogeneity of covariance matrices ( $P = .60$ ,  $F = .62$ ,  $\text{Box} = 1.98$ ) was met.

Wilke's lambda test indicated that there was a significant difference between the experimental and the control groups considering at least one strategy of emotion regulation ( $F(2, 33) = 9.60$ ,  $P = .001$ ,  $\text{Wilk's } \Lambda = 0.63$ ,  $\eta_p^2 = 0.37$ ).

Levene's test was not significant for emotion regulation strategies (see Table 4). Thus, the assumption of equality of error variances was met.

Table 4. Levene's test of equality of error variances<sup>a</sup> dependent variable: emotion regulation

	F	df1	df2	Sig.
Function	1.04	1	36	0.32
Dysfunction	0.72	1	36	0.40

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + pre-test + group

The results of multivariate analysis of covariance for emotion regulation strategies (see Table 5), revealed a significant decrease in the mean score of the dysfunctional emotion regulation strategy ( $F(1, 34) = 14.43$ ,  $p = .001$ ,  $\eta_p^2 = 0.30$ ), while, a significant increase was observed in the mean score of the functional emotion regulation strategy ( $F(1, 34) = 8.08$ ,  $p = .008$ ,  $\eta_p^2 = 0.19$ ) in the experimental group in comparison with the control group. In other words, transactional analysis had a positive effect on students' emotional competencies via decreasing the dysfunction and increasing the function strategies.

Table 5. The MANCOVA\* of the means emotion regulation strategies in the experimental and control groups

Source of variation	Sum of squares	Df	Mean square	F	Sig.	Partial Eta Square
Function	76.30	1	76.30	8.08	0.008	0.19
Dysfunction	146.22	1	146.22	14.43	0.001	0.30

\*MANCOVA: Multivariate Analysis of Covariance.

### 3.1 Follow-Up

The results of MANCOVA for emotion regulation strategies (see Table 6), revealed a significant decrease in the mean score of the dysfunctional emotion regulation strategy ( $F(1, 34) = 5.03, p = .03, \eta_p^2 = 0.13$ ), while, a significant increase is noted in the mean score of the functional emotion regulation strategy ( $F(1, 34) = 5.50, p = .02, \eta_p^2 = 0.14$ ) in the experimental group in comparison with the control group.

Table 6. Results of covariance analysis the follow-up scores of emotion regulation strategy

Source of variation	Sum of squares	Df	Mean square	F	Sig.	Partial Eta Square
Function	90.58	1	90.58	5.50	0.02	0.14
Dysfunction	130.99	1	130.99	5.03	0.03	0.13

The result of MANCOVA in the follow-up test revealed that transactional analysis intervention on female high school students had a fairly good stability after a month.

## 4. Discussion

We investigated the impact of the transactional analysis program on emotion regulation strategies among 10th-grade female high school students during 2016 in Tabriz, Iran. The findings of this contribution revealed that the transactional analysis program had a fairly logical effect on emotion regulation strategies. It should be noted that we found a fairly good stability in the follow-up test.

The findings revealed that the transactional analysis intervention initiated a significant decrease in the mean score of the dysfunctional emotion regulation strategies. In other words, maladaptive emotion regulation can be reduced by transactional analysis instruction. It is in line with the findings of Van Rijn and Wild (2016) and Widdowson (2012). Dysfunctional emotion regulation strategies reject or block emotional experiences and is considered as a risk factor associated with anxiety and depression (Cole, Michel, & Teti, 1994). Aldao et al. (2007) also pointed out that dysfunctional emotion regulation strategies lead to a high emotional risk. Lack of awareness and understanding of emotions may cause problems and difficulties in emotion regulation (Buckholdt, Weiss, Young, & Gratz, 2015; Gratz & Roemer, 2004). Transactional analysis instruction can develop students' self-awareness (Van Rijn, Wild, Fowlie, Sills, & van Beekum, 2011). Awareness, monitoring, and recognition of emotions allows individuals to modify the intensity and quality of their emotions (Gross, 1998). Furthermore, transactional analysis intervention can moderate emotional disorders such as anxiety (Van Rijn & Wild, 2016; Van Rijn & Wild, 2013; Widdowson, 2012).

The intervention also significantly increased the mean score of the functional emotion regulation strategies in the experimental group. It is congruent with the findings of Stuart and Alger (2011) and Morris (2006). Transactional analysis seems to be a valuable skill in functional emotion regulation. Functional emotion regulation strategies help individuals identify specific emotions and select the relevant strategy to regulate them (Eastbrook, 2013). Students with high transactional analysis skills have better self-awareness (Stuart & Alger, 2011). Gratz and Roemer (2004) also focused on the importance of the awareness and understanding of emotions in functional emotion regulation. Barrow, Bradshaw and Newton (2001) and Morris (2006) mentioned that transactional analysis can be effective in the emotional well-being of students.

## 5. Limitations

There are a number of limitations that should be taken into account. In this study we had to choose both the experimental and the comparison groups from one school, therefore, the comparison group might have been aware of the program. Moreover, all schools in Iran are single-sex, therefore, the participants of this study were limited to female students.

## 6. Suggestions for Further Research

Although adolescents spend a large amount of their time with peers, the influence of their parents are undeniable. Future studies would benefit from teaching TA to parents. Moreover, this study was limited to female high school students. As a result, investigation of this research on male students can be conducted in future researches to examine the role gender differences on the obtained results.

## 7. Conclusions

The findings revealed that transactional analysis instruction is important to empower adolescents' emotional skills. Such skills can help adolescents to evaluate, modify, and assert their emotions in an adaptive way. Findings of the study also allows adolescents to recognize and alter their ego state and transaction when it is needed. It can improve students' intrapersonal (self-awareness) and interpersonal (relationships with others) factors. It can also help students reduce negative risk factors in their lives.

## Acknowledgements

The first author is grateful to Prof. Dr. Dietrich Albert & Prof. Dr. Roswith Roth who provided insight that assisted the research.

## References

- Aldao, A., Jazaieri, H., Goldin, P. R., & Gross, J. J. (2014). Adaptive and maladaptive emotion regulation strategies: Interactive effects during CBT for social anxiety disorder. *Journal of Anxiety Disorders*, 28, 382-389. <http://dx.doi.org/10.1016/j.janxdis.2014.03.005>
- Barrow, G. (2007). Transactional analysis, pastoral care and education. *Pastoral Care in Education*, 25(1), 21-25. <http://dx.doi.org/10.1111/j.1468-0122.2007.00396.x>
- Barrow, G., Bradshaw, E., & Newton, T. (2001). *Improving behavior and raising self-esteem in the classroom: A practical guide to using transactional analysis*. London: David Fulton.
- Bastianelli, L. (2014). An Italian team uses transactional analysis to help children in Brazil. *Transactional Analysis Journal*, 44, 87-95. <http://dx.doi.org/10.1177/0362153714529089>
- Buckholdt, K. E., Weiss, N. H., Young, J., & Gratz, K. L. (2015). Exposure to violence, posttraumatic stress symptoms, and borderline personality pathology among adolescents in residential psychiatric treatment: The influence of emotion dysregulation. *Child Psychiatry & Human Development*, 46, 884-892. <http://dx.doi.org/10.1007/s10578-014-0528-5>
- Chiesa, C. (2014). On the seashore of an endless world, children play: Using transactional analysis in play therapy with children. *Transactional Analysis Journal*, 44, 128-141. <http://dx.doi.org/10.1177/0362153714539916>
- Cole, P. M., Michel, M. K., & Teti, L. O. (1994). The development of emotion regulation and dysregulation: A clinical perspective. *Monographs of the Society for Research in Child Development*, 59(2-3), 73-100. <http://dx.doi.org/10.2307/1166139>
- Corey, G. (2009). *Transactional analysis*. Retrieved from <http://www.acadiau.ca/~rlehr/Transactional%20Analysis%20ch%20Corey%202013.pdf>
- De Graaf, A., & Mil, R. (2015). Transactional analysis and conflict management: Embracing conflict as an opportunity for growth and learning. *Transactional Analysis Journal*, 45(4), 250-259. <http://dx.doi.org/10.1177/0362153715606172>
- Diehl, M., Hay, E. L., & Chui, H. (2012). Personal risk and resilience factors in the context of daily stress. *Annual Review of Gerontology and Geriatrics*, 32(1), 251-274. <http://dx.doi.org/10.1891/0198-8794.32.251>
- Eastbrook, J. M. (2013). *Emotional awareness and alexithymia: Emotional processing and regulation in adolescence* (Doctoral dissertation). Queen's University, Kingston, Ontario, Canada. Retrieved from [https://qspace.library.queensu.ca/bitstream/1974/8061/1/Eastbrook\\_Jennifer\\_M\\_201305\\_PHD.pdf](https://qspace.library.queensu.ca/bitstream/1974/8061/1/Eastbrook_Jennifer_M_201305_PHD.pdf)
- Emmerton, N., & Newton, T. (2004). The journey of educational transactional analysis from its beginnings to the present. *Transactional Analysis Journal*, 34(3), 283-291.
- Eusden, S., & Pierini, A. (2015). Exploring contemporary views on therapeutic relating in transactional analysis game theory. *Transactional Analysis Journal*, 45(2), 128-140. <http://dx.doi.org/10.1177/0362153715588300>
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41-54. <http://dx.doi.org/10.1023/B:JOBA.0000007455.08539.94>
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, 2(3), 271-299. <http://dx.doi.org/10.1037/1089-2680.2.3.271>

- Hay, J., & Widén, U. (2015). The Transactional analysis proficiency awards: A social action initiative. *Transactional Analysis Journal*, 45(3), 204-216. <http://dx.doi.org/10.1177/0362153715601399>
- Horn, E. K., Verheul, R., Thunnissen, M., Delimon, J., Soons, M., Meerman, A. M., ... Busschbach, J. J. (2015). Effectiveness of short-term inpatient psychotherapy based on transactional analysis with patients with personality disorders: A matched control study using propensity score personality disorders. *Journal of Personality Disorders*, 29(5), 663-683. [http://dx.doi.org/10.1521/pedi\\_2014\\_28\\_166](http://dx.doi.org/10.1521/pedi_2014_28_166)
- John, O. P., & Gross, J. J. (2004). Healthy and unhealthy emotion regulation: Personality processes, individual differences, and lifespan development. *Journal of Personality*, 72(6), 1301-1334. <http://dx.doi.org/10.1111/j.1467-6494.2004.00298.x>
- Johnsson, R. (2011). *Transactional analysis psychotherapy: Three methods describing a transactional analysis group therapy* (Doctoral dissertation). Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.461.4838&rep=rep1&type=pdf>
- McKimm, J., & Forrest, K. (2010). Using transactional analysis to improve clinical and educational supervision: The drama and winner's triangles. *Postgraduate Medical Journal*, 86, 261-265. <http://dx.doi.org/10.1136/pgmj.2009.093310>
- Morris, G. L. (2006). *Altered states: Using transactional analysis education to prevent conflict escalation and violence* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database.
- Newman, D. L., Moffitt, T. E., Caspi, A., Magdol, L., Silva, P. A., & Stanton, W. R. (1996). Psychiatric disorders in a birth cohort of young adults: Prevalence, comorbidity, clinical significance, and new case incidence from ages 11 to 21. *Journal of Consulting and Clinical Psychology*, 64, 552-562. <http://dx.doi.org/10.1037/0022-006X.64.3.552>
- Newton, T., & Napper, R. (2007). The bigger picture: Supervision as an educational framework for all fields. *Transactional Analysis Journal*, 37, 150-158.
- Phillips, K. F. V., & Power, M. J. (2007). A new self-report measure of emotion regulation in adolescents: The regulation of emotion questionnaire. *Clinical Psychology and Psychotherapy*, 14(2), 145-156. <http://dx.doi.org/10.1002/cpp.523>
- Pierini, A. (2014). Being a transactional analysis child therapist: How working with children is different. *Transactional Analysis Journal*, 44, 103-117. <http://dx.doi.org/10.1177/0362153714538937>
- Pinquart, M. (2009). Moderating effects of dispositional resilience on associations between hassles and psychological distress. *Journal of Applied Developmental Psychology*, 30(1), 53-60. <http://dx.doi.org/10.1016/j.appdev.2008.10.005>
- Riggall, A., Churches, R., & Elwick, A. (2014). *Action research for school improvement: Studies on able, gifted and talented learners, homework and white working-class pupils*. CfBT Education Trust (online). Retrieved from <http://files.eric.ed.gov/fulltext/ED546810.pdf>
- Rudolph, K. D. (2002). Gender differences in emotional responses to interpersonal stress during adolescence. *Journal of Adolescent Health*, 30, 3-13. [http://dx.doi.org/10.1016/S1054-139X\(01\)00383-4](http://dx.doi.org/10.1016/S1054-139X(01)00383-4)
- Shotton, P. (2009). Transactional analysis training, postmodernism, and education. *Transactional Analysis Journal*, 39(4), 293-297. <http://dx.doi.org/10.1177/036215370903900404>
- Solomon, C. (2003). Transactional analysis theory: The basics. *Transactional Analysis Journal*, 33(1), 15-22. Retrieved from [http://www.carolsolomonphd.com/web\\_pdfs/Transact.pdf](http://www.carolsolomonphd.com/web_pdfs/Transact.pdf)
- Southam-Gerow, M. A., & Kendall, P. C. (2002). Emotion regulation and understanding. Implications for child psychopathology and therapy. *Clinical Psychology Review*, 22, 189-222. [http://dx.doi.org/10.1016/S0272-7358\(01\)00087-3](http://dx.doi.org/10.1016/S0272-7358(01)00087-3)
- Stuart, K., & Alger, A. (2011). The use of transactional analysis in secondary education: A case study. *Teian Journal*, 3(1). Retrieved from <http://194.81.189.19/ojs/index.php/TEAN/article/viewFile/89/163>
- Tseng, W., Kawabata, Y., Gau, S. S., & Crick, N. R. (2014). Symptoms of attention-deficit/hyperactivity disorder and peer functioning: A transactional model of development. *Journal of Abnormal Child Psychology*, 42(8), 1353-1365. <http://dx.doi.org/10.1007/s10802-014-9883-8>

- Van Rijn, B., & Wild, C. (2013). Humanistic and integrative therapies for anxiety and depression: Practicebased evaluation of transactional analysis, gestalt, and integrative psychotherapies and person-centered counseling. *Transactional Analysis Journal*, 43, 150-163. <http://dx.doi.org/10.1177/0362153713499545>
- Van Rijn, B., & Wild, C. (2016). Comparison of transactional analysis group and individual psychotherapy in the treatment of depression and anxiety. *Transactional Analysis Journal*, 46(1), 63-74. <http://dx.doi.org/10.1177/0362153715615115>
- Van Rijn, B., Wild, C., Fowlie, H., Sills, C., & Van Beekum, S. (2011). Impact of transactional analysis psychotherapy training on self-awareness and ability for contact. *International Journal of Transactional Analysis Research*, 1(2), 3-11. Retrieved from [http://www.acissydneyn.com.au/uploads/2/5/0/0/25007734/2010\\_research\\_artikel\\_ijtar.pdf](http://www.acissydneyn.com.au/uploads/2/5/0/0/25007734/2010_research_artikel_ijtar.pdf)
- Veiga, F. H. (2004). *Promotion of rights and behavioral adequacy of students in school: Effects of a transactional analysis program*. Paper presented at the XXVth International School Psychology Colloquium—News: School Psychology: Whose needs? Whose benefit?
- Vinella, P. (2013). Transactional analysis counseling groups: Theory, practice, and how they differ from other TA groups. *Transactional Analysis Journal*, 43(1), 68-79. <http://dx.doi.org/10.1177/0362153713486111>
- Viner, R. M., Ozer, E. M., Denny, S., Marmot, M., Resnick, M., Fatusi, A., & Currie, C. (2012). Adolescence and the social determinants of health. *The Lancet*, 379(9826), 1641-1652. [http://dx.doi.org/10.1016/S0140-6736\(12\)60149-4](http://dx.doi.org/10.1016/S0140-6736(12)60149-4)
- Widdowson, M. D. J. (2013). *The process and outcome of transactional analysis psychotherapy for the treatment of depression: An adjudicated case series* (Doctoral dissertation). Retrieved from <https://lra.le.ac.uk/bitstream/2381/28382/1/2013WIDDOWSONMDJPhD.pdf>
- York, B. E. (2015). *What's in your back pack? Validation of a transactional analysis intervention program Southwestern college* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database.

### Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

# Anxiety and Optimal Piano Performance: A Pilot Study on the Application of the Individual Zone of Optimal Functioning (IZOF) Model

Zijin Yao<sup>1</sup>

<sup>1</sup> Mead Witter School of Music (University of Wisconsin-Madison), Wisconsin, United States

Correspondence: Zijin Yao, Mead Witter School of Music (University of Wisconsin-Madison), Wisconsin, United States. Tel: 1-702-273-9650. E-mail: seraph917@hotmail.com

Received: August 19, 2016

Accepted: September 12, 2016

Online Published: October 25, 2016

doi:10.5539/ijps.v8n4p60

URL: <http://dx.doi.org/10.5539/ijps.v8n4p60>

## Abstract

Music Performance Anxiety (MPA) is a common problem for musicians. Many musicians struggle with performance anxiety and rely on traditional de-arousal interventions to reduce performance anxiety before public performance. However, research in sports psychology suggests that anxiety reduction may not be the most appropriate strategy for intervention (Chamberlain & Hale, 2007). According to the Individual Zone of Optimal Functioning (IZOF) model proposed by Hanin, an athlete's performance is successful when his or her pre-competition anxiety is within or near the individual's optimal zone (Hanin, 2000). Based on the application of the IZOF theory in the context of piano performance, anxiety plays an important role in optimizing performance in music as well. This pilot study identified participants' IZOFs with the Competitive State Anxiety Inventory (CSAI-2). Support was found for Hanin's IZOF theory with respect to the SA (somatic anxiety) and SC (self-confidence) dimensions for both of the participating pianists, as well as the CA (cognitive anxiety) dimension of pianist A but not for the CA dimension of pianist B. Piano performances associated with anxiety of an intensity that fell within the IZOF were observed to be significantly better than piano performances associated with anxiety intensity outside the IZOF. All the peak performances were presented within the IZOFs. The study verified that the IZOF model can be applied in MPA management and may help pianists be more aware of in-zone/out-zone states and rethink their attitudes toward performance anxiety. With this pilot study as a foundation, larger scale research can be conducted to clarify the correlation between anxiety and optimal piano performance.

**Keywords:** performance anxiety, IZOF model, optimal performance

## 1. Introduction

### 1.1 The Problem

Music Performance Anxiety (MPA) is a common issue for musicians spanning musical genres and levels of artistry from amateur to professional. Many high-profile professional classical musicians like Maria Callas, Luciano Pavarotti, Glenn Gould, Vladimir Horowitz, Arthur Rubinstein, Frederic Chopin, Sergei Rachmaninoff, as well as pop singers such as Donny Osmond, Carly Simon and others (Oswald, 1994; Schonberg, 1963; Valentine, 2002; Kenny, 2006; Juslin & Sloboda, 2011; LeBlanc, Jin, Obert, & Siivola, 1997) have reported suffering from performance anxiety. MPA can, to a large extent, affect performance, and is often unrelated to a performer's technical readiness. Ironically, performers and audiences easily ascribe an unsatisfying performance to MPA, but ignore the positive function MPA may contribute to a satisfying performance. Not surprisingly, MPA has always been regarded as a negative and debilitating psychological phenomenon in musicians (Fishbein, Middlestadt, Attati, Strauss, & Ellis, 1988; Kenny, 2006; Steptoe, 2001). Therefore, many musicians are ashamed of admitting to suffering from performance anxiety (Brugués, 2009; Bodner & Bensimon, 2008).

With a negative preconceived cognition of MPA, de-arousal interventions are widely used to control the physical responses to performance anxiety, such as deep relaxation, breathing exercises, physical exercise, taking beta-blockers and so on (Kenny, 2005; Sweeney & Horan, 1982). A common assumption is that the lower the performance anxiety level, the greater likelihood of achieving peak performance. On the other hand, a more recent wave of studies shows that desensitization strategies increase tolerance of uncertainty and anxiety (Kenny,

2005; Kendrick, Craig, Lawson, & Davidson, 1982; Kim, 2005). Moreover, other paradoxical viewpoints suggest that anxiety is necessary and indeed, inevitable, in intense performance scenarios (Wolfe, 1989). Many great musicians and teachers insist that they must experience pre-performance anxiety or they will not perform at their best level (Nideffer & Hessler, 1978). Conflicting MPA related theories and treatments have emerged in the 21st century, which leads to confusion on the relationship between anxiety and optimal performance.

### *1.2 Why the IZOF Model?*

In an effort to prevent future confusion and provide a theoretical framework for explaining the correlation between MPA and optimal performance, this study explores participants' anxiety intensity and optimal performance with the help of the Individual Zone of Optimal Functioning (IZOF) model.

As anxiety occupies a central place in most psychological disorders and performance-related emotions, it has been researched extensively in many performance-related areas, such as performing arts medicine and sports psychology. There are various representative theories explaining the relationship between performance and anxiety (reflecting upon mental and physical arousal). Sport psychologists increasingly agree that a uni-dimensional approach to the arousal- or anxiety-performance relationship is ineffective and simplistic (Hanin, 2000). Thus, an approach that uses a single cumulative score of anxiety to demonstrate the relationship between performance and emotions, such as a linear or Inverted-U hypothesis, is inappropriate for examining a process that demands complex emotions and motor skills like music performance. There is a need for a more multidimensional approach in anxiety-related research. The IZOF model is a typical multidimensional approach of describing, predicting, explaining, and regulating performance-related bio-psycho-social states affecting individual and team activity (Hanin, 2000). The IZOF theory claims that an athlete's performance is successful when his or her pre-competition anxiety is within or near the individual's optimal zone. It is both a theoretical framework and a practical approach that enables qualitative and quantitative analysis of the functional relationship between anxiety and performance (Hanin, 2000).

Sports psychology researchers and practitioners have done a great deal of research on exploring anxiety in sports and individual optimal zone. Unfortunately, far less research is published on the application of these theories and treatments specifically to MPA (McGinnis & Milling, 2005). With the application of the IZOF model, musicians can describe, predict, explain and regulate MPA and performance results. Pianists can define their optimal performance zone in a quantified way, which may help them be more aware of in-zone/out-zone states and rethink their attitudes towards performance anxiety.

### *1.3 Applications of IZOF and Limitation*

Compared to studies that claim MPA is a negative emotion, far fewer studies have been conducted to observe both the facilitating and debilitating effects of MPA and the relationship between situational emotions and music performance. Moreover, few studies of MPA are associated directly with the model (theory) of IZOF, though studies aimed at extending and testing IZOFs in non-athletic performance domains have been called for by scholars in the field of sport psychology (Gould & Tuffey, 1996). On the other hand, in sports, the IZOF model has been widely used for describing, predicting, explaining, and regulating performance-related psycho-bio-social states affecting individual and team activity, such as soccer, ice hockey, cricket and karate (Hanin & Syrjä, 1995a; Hanin & Syrjä, 1995b; Ruiz & Hanin, 2003; Hanin, 2000).

The IZOF model also has its limitations. For instance, recollection might be inaccurate in some situations (Gould, Tuffey, Hardy, & Lochbaum, 1993; Krane, 1993). Anxiety assessing instrumentation varies in different studies, which leads to confusion. Since any sport-specific anxiety measure is unlikely to adequately encompass the variability in all conditions (Raglin & Hanin, 2000), the results from assessing music anxiety with methods based in sports psychology assessments may not be convincing enough. In addition, the model divides the performance related state into functional (optimal) zone and dysfunctional zone and ignores moderate situations (Flett, 2015). The overlap between these zones needs more explanation.

### *1.4 Research Questions and Hypotheses*

To verify that the IZOF model can be applied to define a pianist's optimal performance zone, it is necessary to answer the following questions: Do pianists also have a "zone" of optimal performance? Will the location and width of the zone differ from person to person? What is the relationship between the zone of optimal functioning and subjective experience of anxiety? If the hypotheses that pianists have different types of "zones" is true, anxiety reduction therapies (Sweeney & Horan, 1982) or exposure therapies (systematic desensitization) (Kendrick, Craig, Lawson, & Davidson, 1982; Kim, 2005) without knowing the musician's zone of optimal



functioning would be inappropriate. Biased coping strategies may not work for everyone, for example a pianist whose zone locates at a high-arousal region or another pianist who may have relatively narrow zone.

## 2. Method

The IZOF model is both a theoretical framework and a practical approach that enables qualitative and quantitative analysis of the functional relationship between anxiety and performance (Hanin, 2000). The theory has usually been tested by having performers recall previous personal performances and self-report corresponding feelings about the performances (Hanin, 1986, 1989). Based on the retrospective result, the zone of optimal functioning can be measured and defined. With the zone defined, it is then possible to predict the quality of upcoming performance with respect to the pre-performance emotional and physical state of the performer. The zone may guide performers to cultivate an optimal physical and psychological state for peak performances through further training.

To find the zone of optimal functioning, this research employs the Competitive State Anxiety Inventory-2 (CSAI-2; Martens et al., 1990) to evaluate pianists' multidimensional anxiety level. The CSAI-2 is a performance-specific self-reporting instrument that provides separate categories for the cognitive anxiety state, the somatic anxiety state, and the state of self-confidence values (Krane, 1993).

### 2.1 Participants

The pilot study consisted of two advanced adult pianists, both in their third year of studies at a music conservatory. As females are two to three times more likely to experience anxiety than males (American Psychiatric Association, 1994; Lewinsohn, Gotlib, Lewinsohn, Seeley, & Allen, 1998), both of the participants were female pianists. Pianist A is 20 years old and began learning piano at age of 5. She is a junior student in a conservatory in Beijing, China. She practices approximately 40 hours per week and recalled her pre-performance memory of 4 midterms and 5 final juries from the past two and a half years. Pianist B is 22 years old and began learning piano at age of 8. Pianist B is also a junior student in a conservatory in Beijing, China. She practices approximately 24 hours per week and recalled her pre-performance memory of 3 midterms and 3 final juries over the past two years. As this is a pilot study as well as a feasibility study, the group of pianists is smaller so that the observer can analyze data within each subject in a qualitative way. By estimating variability in outcomes, it is possible to determine sample size in future larger-scale studies. Moreover, by assessing the proposed data on a small-scale version of the pilot study, potential problems can be uncovered and revised in the plan for further research.

Consent forms were sent to the participants, as the results will be used for this research. This project has no risk associated with physical or psychological state of the participants. After comparing score and anxiety level, participants may benefit by becoming more aware of the correlation between music performance anxiety and self-regulation of emotion. This may then affect their future musical performance in a positive way. Moreover, when the data are collected and analyzed, the participants will know their individual zone of optimal functioning, which will in turn help them to anticipate their future performance anxiety and make adjustments in order to fit into the optimal zone. The benefits will be observed in the upcoming research.

### 2.2 Instrumentation and Measurement

**Performance Scoring:** The performances were evaluated by seven professional college level teachers. Four of them are associate professors in the conservatory. One is a professor in the conservatory. The other two are assistant professors. Each of them evaluated performances after the midterm or final on a 1-100 scale, where 1 = worst possible performance and 100 = best possible performance. Judges were told that their scoring is based on performance regardless of how the students presented in the practice room or piano class. The score was to represent an overall impression of the midterm and final jury performances. The highest and lowest scores were not counted in the final grading, which means the other five scores were valid. An average score was calculated as the final performance result. This procedure of calculating a pianist's score is ruled as a tradition in this conservatory to minimize errors and bias. The evaluation criterion can be found in Appendix I.

**State Anxiety Level:** The Competitive State Anxiety Inventory-2 (CSAI; Martens et al., 1990) is used to measure the pre-performance anxiety state. The CSAI-2 is mainly used in sports research and also works closely with the IZOF model. It is a self-report inventory that has 27 simple questions and takes about 5 minutes to complete for each performance evaluation. It shows the anxiety level of three different dimensions (subscales): cognitive, somatic, and self-confidence. Participants answered questions using a scale ranging from 1 = not at all to 4 = very much so. The subscales of each of the three dimensions range from 9-36.

Data were collected to identify the optimal functioning zone for each pianist on all three anxiety state subscales. According to Hanin (1986, 1989), the zone is established by adding and subtracting four anxiety units (i.e., one-half standard deviation) from the anxiety score obtained prior to the personal best performance. The study identifies the optimal zone for each subscale (cognitive, somatic and self-confidence). Standard deviations were calculated based on individuals' CSAI-2 subscale scores.

### *2.3 Research Procedure*

Hanin has developed two methods to identify an athlete's optimal of state anxiety range: in the first method, the zone was established by adding and subtracting four anxiety units (i.e., one-half standard deviation) from the anxiety score obtained prior to the personal best performance (Raglin & Hanin, 2000). Therefore, the pre-competition anxiety level needs to be assessed repeatedly until an athlete has an outstanding performance. This can be a long process, and it is sometimes difficult to identify which performance is the best one. The second method is based on retrospective study. Athletes need to recall their best past performance. Hanin used the Spielberger State Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970) in order to calculate the athlete's precompetitive state anxiety score. However, the accuracy of recollection is in doubt (Gould, Tuffey, Hardy, & Lochbaum, 1993; Krane, 1993). Therefore, several studies claimed that the multidimensional measurement such as Competitive State Anxiety Inventory-2 (Martens, Burton, Vealey, Bump, & Smith, 1990) was more effective (Gould, Tuffey, Hardy, & Lochbaum, 1993). Meanwhile, the multidimensional anxiety approach can reflect not only the athlete's emotional readiness, but also cognitive and somatic anxiety level. This study intends to combine both methods to save time testing the best performance as well as accurately determine the optimal zone. In addition, it provides more data for correlation analysis on in-zone and out-zone performances. The study keeps track of a series performances of each pianist, while also having them recall their performance-related memories.

Two junior advanced piano major students were required to recall their previous memory of their pre-performance states and then fill out several files: 1) The subjects offered the observer some general personal information, like age, gender, nationality, grade and so on; 2) The subjects provided a list of the repertoire and the score result of all the performances they recalled; 3) The subjects filled up the Competitive State Anxiety Inventory (CSAI-2) for every performance according to their recollection. Pianist A took 45 minutes to recall her memory and filled up the form 9 times based on her experience of each performance. Pianist B took 35 minute to recall her memory and filled up the form 6 times based on her experience of each performance. Seven judges made their assessments immediately after the piano exams. The files were translated into Chinese and sent through email. The CSAI-2 form was presented as an online questionnaire. The data were collected for further comparison and analysis.

### **3. Results**

An analysis was conducted to test whether performance values within the subscale-based optimal zone were higher than performance values outside of the zone. In pianist A's case, the corresponding Cognitive Anxiety (CA) score of the best performance score was 13.  $SD = 5.83$ . The range of IZOF for CA is from 10.09 to 15.91. Two of her performances fit into the zone, the mean of which was 91.9. Based on the Mann-Whitney test,  $p = 0.029$ . A significant difference ( $p < 0.05$ ) was found for pianist A on the cognitive anxiety dimension.

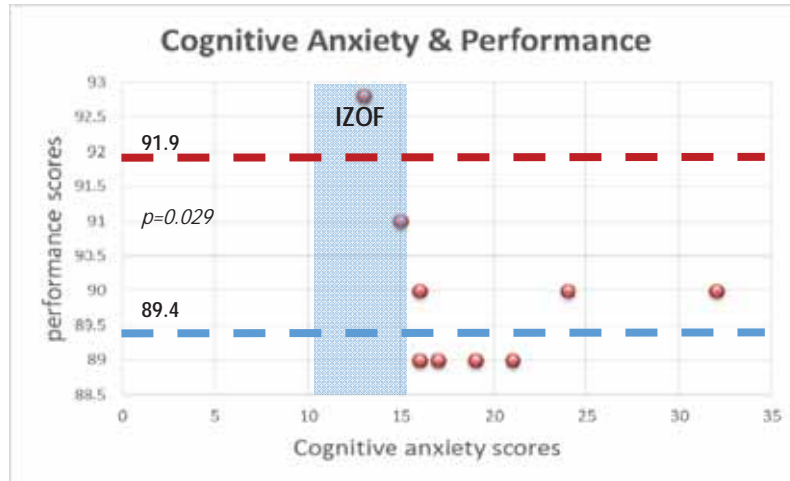


Figure 1. In-zone/out-of-zone CSAI-2 subscale score (cognitive anxiety) and corresponding performance scores for pianist A

In the somatic anxiety subscale, four performances fit into the zone, the mean of which was 91. The mean of the out-zone performance score was 89.2. Only one performance in the self-confidence subscale fit into the zone. The highest score was 92.8. The mean of the other performance score was 89.6. By using T test and One-Sample T test, significant differences ( $p < 0.05$ ) were also found for pianist A on her Somatic Anxiety (SA) dimension ( $p = 0.026$ ) and Self-Confidence (SC) dimension ( $p = 0.01$ ).



Figure 2. In-zone/out-of-zone CSAI-2 subscales scores (somatic anxiety and self-confidence) and corresponding performance scores for pianist A

In pianist B's case, the corresponding Cognitive Anxiety (CA) score of the best performance score was 10.  $SD = 8.64$ . The anxiety state CA subscale score of pianist B was wider compared to pianist A. However, this does not necessarily mean pianist B has a greater chance for optimal performance since she offered less performance data to begin with, which may lead to bias in identifying the zone. The range of IZOF for CA was from 5.68 to 14.32. Though pianist B had wider zone for CA, only two of her performances fit into the zone, the mean of which was 90.8. Based on the T test,  $p = 0.178$  ( $p > 0.05$ ), which indicates that no significant ( $p > 0.05$ ) CA subscale score differences were based on the performances. To compare the zones of pianist A and B in the CA subscale (looking horizontally on the charts), pianist A's zone was more to the right side, which shows her optimal cognitive anxiety value was higher than pianist B. In other words, pianist A needs slightly more CA for peak performance.

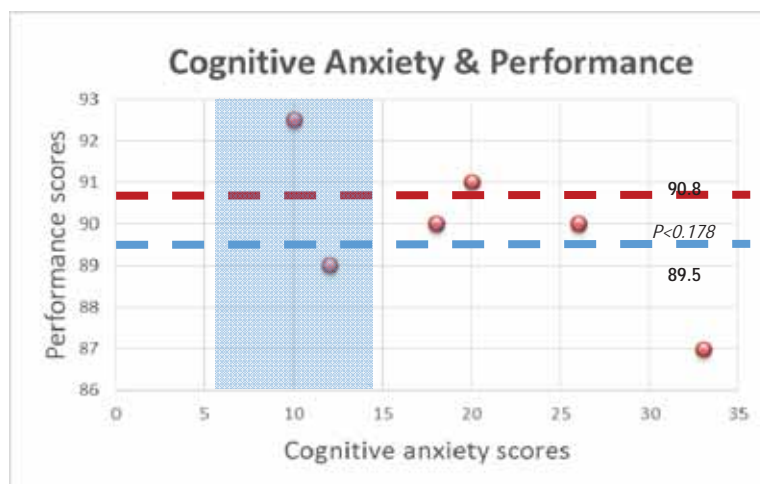


Figure 3. In-zone/out-of-zone CSAI-2 subscale scores (cognitive anxiety) and corresponding performance scores for pianist B

In the somatic anxiety subscale, one performance fit into the zone. The highest score in zone was 92.5, and the mean of out-zone performance score was 89.4. Only one performance in the self-confidence subscale fit into the zone. The highest score was 92.5. Figure 4 shows that pianist B performed better when her somatic anxiety score was low and self-confidence score was high. The mean of the other performance score was 89.6. Compared with pianist A, pianist B needs much less SA intensity and higher SC intensity to achieve optimal performance. By using the One-Sample T test, significant differences ( $p < 0.05$ ) were found for pianist B on her Somatic Anxiety (SA) dimension ( $p = 0.015$ ) and Self-Confidence (SC) dimension ( $p = 0.015$ ). In general, among all those cases (all subscales with two pianists), optimal performances appeared within the IZOF zones except the CA subscale for pianist B. Moreover, consistent with IZOF theory, IZOFs showed considerable difference between pianist A and pianist B on each subscale, supporting the individual nature of each.



Figure 4. In-zone/out-of-zone CSAI-2 subscale scores (somatic anxiety and self-confidence) and corresponding performance scores for pianist B

**4. Discussion**

This study represents an application of the IZOF model in the context of piano performance. Support was found for Hanin’s IZOF theory in respect to the SA and SC dimensions for both pianists, as well as the CA dimension of pianist A but not for the CA dimension of pianist B. The average score of the in-zone performance results was significantly better than the average score of out-zone performance results. Piano performances associated with anxiety of an intensity that fell within the IZOF were observed to be significantly better than piano performances associated with anxiety intensity outside the IZOF. All the best performances were presented in the IZOFs.

Statistically speaking, the result of pianist B’s CA intensity did not support Hanin’s IZOF theory. One of the best performances can be found in the zone, while a bad performance (performing score < 89.5, lower than the mean of out-zone performance scores) was also in the optimal zone. There are several possible explanations for this unexpected finding. One possible reason is that performance samples were not large enough. In this study, pianist B was evaluated only 6 times to determine the zone, which may be insufficient. A second possibility is that recalling from memory when filling out the CSAI-2 is a retrospective procedure, which might not be entirely accurate. Pianist B’s cognitive reaction to the performances fluctuated dramatically. Therefore, the result of CA intensity might be influenced due to errors in recollection. Yet another possible explanation may be associated with pianist B’s overall skill. As in the self-report material pianist B offered, she didn’t start learning piano until she was 8 years old; in the conservatory, she practiced 24 hours per week, far fewer hours than pianist A, who practiced 40 hours a week. It is reasonable to assume that she might have had some problems with technique, memorization, and musical interpretation that affected her evaluative scores no matter what her CA level.

Several efforts can be made to avoid those problems in future research. First, the sample size of performances needs to be increased (at least 9 times) to determine IZOF for each individual. Second, using anxiety measuring instruments that are more specific to music performance, such as the Kenny Music Performance Anxiety Inventory (K-MPAI) (Kenny, Davis, & Oates, 2004), may help improve the accuracy of recollection and minimize memory errors. Third, future researchers might seek to improve the self-awareness abilities of the subjects or seek subjects who are technically competent.

This study verified that the IZOF model is applicable in the area of piano performance. The application of the IZOF model in music performance offers us a new perspective on pre-performance anxiety management. With application of the IZOF model, further research can be conducted to support music performance anxiety management studies. According to the IZOF, we can identify an optimal state of anxiety intensity for piano performance. It will help both piano performers and teachers predict the success of a performance as well as take measures to improve performance. In the next phase, larger-scale studies can be put into practice. Meanwhile, performance predicting and intervening methods will be explored to see whether self-regulation of emotion is effective in adjusting the state of MPA intensity to an optimal level in order to achieve peak performance.

## References

- American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.). Washington, DC: American Psychiatric Association.
- Bodner, E., & Bensimon, M. (2008). After the curtain falls: On the post-performance adjustment of solo singers. *Medical Problems of Performing Artists*, 23(4), 172-178. Retrieved from <https://www.sciandmed.com/mppa/journalviewer.aspx?issue=1178&article=1767>
- Brugués, A. O. (2009). *Music Performance Anxiety: A review of the literature* (Doctoral dissertation). University of Freiburg, Breisgau, Germany.
- Chamberlain, S. T., & Hale, B. D. (2007). Competitive state anxiety and self-confidence: Intensity and direction as relative predictors of performance on a golf putting task. *Anxiety, Stress, and Coping*, 20(2), 197-207. <http://dx.doi.org/10.1080/10615800701288572>
- Fishbein, M., Middlestadt, S. E., Ottati, V., Straus, S., & Ellis, A. (1988). Medical problems among ICSOM musicians: Overview of a national survey. *Medical Problems of Performing Artists*, 3(1), 1-8. Retrieved from <https://www.sciandmed.com/mppa/journalviewer.aspx?issue=1145&article=1451>
- Flett, M. R. (2015). Creating probabilistic idiographic performance profiles from discrete feelings: Combining the IZOF and IAPZ models. *Sport Science Review*, 24(5-6), 241-266.
- Gould, D., & Tuffey, S. (1996). Zones of optimal functioning research: A review and critique. *Anxiety, stress, and coping*, 9(1), 53-68. <http://dx.doi.org/10.1080/10615809608249392>
- Gould, D., Tuffey, S., Hardy, L., & Lochbaum, M. (1993). Multidimensional state anxiety and middle distance running performance: An exploratory examination of Hanin's (1980) zones of optimal functioning hypothesis. *Journal of Applied Sport Psychology*, 5(1), 85-94. <http://dx.doi.org/10.1080/10413209308411307>
- Hanin, Y. L. (1986). State-trait anxiety research on sports in the USSR. In C. D. Spielberger, & R. Diaz-Guerrero (Eds.), *Cross-cultural anxiety* (Vol. 3, pp. 45-64). Washington, DC: Hemisphere.
- Hanin, Y. L. (1989). Interpersonal and intragroup anxiety in sports. In D. Hackfort, & C. D. Spielberger (Eds.), *Anxiety in sports: An international perspective* (pp. 19-28). New York: Hemisphere.
- Hanin, Y. L. (2000). Individual zone of optimal functioning (IZOF) model: Emotion-performance relationships in sport. In Y. L. Hanin (Ed.), *Emotions in sport* (pp. 65-89). Champaign, IL: Human Kinetics Publisher.
- Hanin, Y. L., & Syrjä, P. (1995a). Performance affect in soccer players: An application of the IZOF model. *International Journal of Sports Medicine*, 16(4), 260-265. <http://dx.doi.org/10.1055/s-2007-973002>
- Hanin, Y. L., & Syrjä, P. (1995b). Performance affect in junior ice hockey players: An application of the individual zones of optimal functioning model. *The Sport Psychologist*, 9(2), 169-187. <http://dx.doi.org/10.1123/tsp.9.2.169>
- Juslin, P. N., & Sloboda, J. (2011). *Handbook of music and emotion: Theory, research, applications*. Oxford University Press.

- Kendrick, M. J., Craig, K. D., Lawson, D. M., & Davidson, P. O. (1982). Cognitive and behavioral therapy for musical-performance anxiety. *Journal of consulting and clinical psychology*, 50(3), 353. <http://dx.doi.org/10.1037/0022-006X.50.3.353>
- Kenny, D. T. (2005). A systematic review of treatments for music performance anxiety. *Anxiety, Stress, and Coping*, 18(3), 183-208. <http://dx.doi.org/10.1080/10615800500167258>
- Kenny, D. T. (2011). *The psychology of music performance anxiety*. New York: Oxford University Press. <http://dx.doi.org/10.1093/acprof:oso/9780199586141.001.0001>
- Kenny, D. T., & Margaret, S. O. (2006). Music performance anxiety: New insights from young musicians. *Advances in Cognitive Psychology*, 2(2-3), 103-112. <http://dx.doi.org/10.2478/v10053-008-0049-5>
- Kenny, D. T., Davis, P., & Oates, J. (2004). Music performance anxiety and occupational stress amongst opera chorus artists and their relationship with state and trait anxiety and perfectionism. *Journal of anxiety disorders*, 18(6), 757-777. <http://dx.doi.org/10.1016/j.janxdis.2003.09.004>
- Kim, Y. (2005). Combined treatment of improvisation and desensitization to alleviate music performance anxiety in female college pianists: A pilot study. *Medical Problems of Performing Artists*, 20(1), 17-24. Retrieved from <https://www.sciandmed.com/mppa/journalviewer.aspx?issue=1160&article=1587>
- Krane, V. (1993). A Practical Application of the Anxiety-Athletic Performance Relationship: The Zone of Optimal Functioning Hypothesis. *Sport Psychologist*, 7(2), 113-126. <http://dx.doi.org/10.1123/tsp.7.2.113>
- LeBlanc, A., Jin, Y. C., Obert, M., & Siivola, C. (1997). Effect of audience on music performance anxiety. *Journal of Research in Music Education*, 45(3), 480-496. <http://dx.doi.org/10.2307/3345541>
- Lewinsohn, P. M., Gotlib, I. H., Lewinsohn, M., Seeley, J. R., & Allen, N. B. (1998). Gender differences in anxiety disorders and anxiety symptoms in adolescents. *Journal of Abnormal Psychology*, 107, 109-117. <http://dx.doi.org/10.1037/0021-843X.107.1.109>
- Martens, R., Burton, D., Vealey, R., Bump, L., & Smith, D. (1990). The development of the Competitive State Anxiety Inventory-2 (CSAI-2). In R. Martens, R. S. Vealey, & D. Burton (Eds.), *Competitive anxiety in sport* (pp. 117-190). Champaign, IL: Human Kinetics publisher.
- McGinnis, A. M., & Milling, L. S. (2005). Psychological treatment of musical performance anxiety: Current status and future directions. *Psychotherapy: Theory, Research, Practice, Training*, 42, 357-373. <http://dx.doi.org/10.1037/0033-3204.42.3.357>
- Nideffer, R. M., & Hessler, N. D. (1978). Controlling performance anxiety. *College Music Symposium*, 18(1), 146-153. Retrieved from <http://www.jstor.org/stable/40373929>
- Ostwald, P. (1994). Historical perspectives on the treatment of performing and creative artists. *Medical Problems of Performing Artists*, 9, 113. Retrieved from <https://www.sciandmed.com/mppa/journalviewer.aspx?issue=1118&article=1227>
- Raglin, J. S., & Hanin, Y. L. (2000). Competitive anxiety. In Y. L. Hanin (Ed.), *Emotions in sport* (pp. 93-111). Champaign, IL: Human Kinetics Publisher.
- Ruiz, M., & Hanin, Y. (2003). Athletes self-perceptions of optimal states in karate: An application of the izof model. *Revista de Psicología del Deporte*, 13(2), 224-229. Retrieved from <http://urheilututkimukset.fi/web/publications/5188/>
- Schonberg, H. C. (1963). *The great pianists*. New York, NY: Simon and Schuster.
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *Manual for the State-Trait Anxiety Inventory (self-evaluation questionnaire)*. Palo Alto, CA: Consulting Psychologists Press.
- Steptoe, A. (2001). Negative emotions in music making: The problem of performance anxiety. In P. N. Juslin, & J. A. Sloboda (Eds.), *Music and emotion: Theory and research. Series in affective science* (pp. 291-307). New York, NY, US: Oxford University Press.
- Sweeney, G. A., & Horan, J. J. (1982). Separate and combined effects of cue-controlled relaxation and cognitive restructuring in the treatment of musical performance anxiety. *Journal of Counseling Psychology*, 29(5), 486. <http://dx.doi.org/10.1037/0022-0167.29.5.486>
- Valentine, E. (2002). The fear of performance. In J. Rink (Ed.), *Musical Performance: A guide to understanding* (pp. 168-182). Cambridge, UK: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511811739.013>

Wolfe, M. L. (1989). Correlates of adaptive and maladaptive musical performance anxiety. *Medical Problems of Performing Artists*, 4(1), 49-56. Retrieved from <https://www.sciandmed.com/mppa/journalviewer.aspx?issue=1141&article=1423>

## Appendix A

### Evaluation Criterion for Piano Major Midterm and Final in A Conservatory of Music in China

1) *Repertoire for midterm*: Two etudes (at least one by Chopin). A Bach prelude and fugue from *The Well-Tempered Clavier* or several substantial movements from a suite or partita. *Repertoire for final*: A movement from a major sonata. A representative work from 19th to 20th century. At least one of the pieces should be technically and interpretively demanding and at least ten minutes in length. All repertoire should be performed from memory.

2) Scoring scale: Hundred-mark system, 95 is the recommended highest score. 80 is the passing line.

3) The result will take the average grade. However, the highest and lowest scores will not be counted in the final grading.

4) Evaluation criterion detail:

(1) Method and technique:	
Correct	95-90
Almost correct	90-85
Problematic	85-80
Improper	Below 80
(2) Score reading	
Accurate	95-90
Almost right	90-85
Some mistakes or ignorance	85-80
Problematic	Below 80
(3) Fluency	
Fluent	95-90
A few mistakes	90-85
A few stops	85-80
Not Fluent	Below 80
(4) Music genre and style	
Accurate	95-90
Almost right	90-85
To some extent	85-80
Improper	Below 80
(5) Artistic interpretation	
Very good	95-90
Good	90-85
Normal	85-80
Poor	Below 80



**Copyrights**

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

# Speaking with a Happy Voice Makes You Sound Younger

Sumi Shigeno<sup>1</sup>

<sup>1</sup>Department of Psychology, Aoyama Gakuin University, Tokyo, Japan

Correspondence: Sumi Shigeno, Department of Psychology, Aoyama Gakuin University, Tokyo, Shibuya, 150-8366, Japan. Tel: 81-3-3409-7653. E-mail: sshigeno@ephs.aoyama.ac.jp

Received: July 29, 2016

Accepted: September 2, 2016

Online Published: October 26, 2016

doi:10.5539/ijps.v8n4p71

URL: <http://dx.doi.org/10.5539/ijps.v8n4p71>

## Abstract

This study investigates the effects of emotional voices (expressing neutral emotion, sadness, and happiness) on a judgement of a speaker's age. An experiment was conducted to explore whether happy voices sound younger than neutral and sad voices. The identification of 24 speakers' ages (12 of each gender) based on their emotional voices was done by 40 participants. The speakers' ages were 24-75 years. Participants identified the age of each speaker only by hearing his/her emotional voice. The results showed that when a speaker spoke with a happy voice, participants estimated their age to be younger than their chronological age. Furthermore, the results regarding female happy voices were more conspicuous than male happy voices. In contrast, when a speaker spoke with a sad voice, participants estimated them to be older. The results suggest that a happy voice sounds younger because of its higher voice pitch (*F0*). We discussed the role of vocal pitch and other paralinguistic factors for providing an aging impression.

**Keywords:** happy voice, speaker's age, voice pitch, younger

## 1. Introduction

It is generally believed that a smiling face makes a speaker look younger. In fact, most models for cosmetic advertisements smile to highlight the cosmetics' effect of giving a younger appearance. However, as indicated by Ganel (2015), only one study has examined the effects of smiling on perceived age (Voelkle, Ebner, Lindenberger, & Riediger, 2012). Voelkle et al. (2012) found that age estimation ability decreased with age; furthermore, facial expressions had a substantial impact on the accuracy and bias of age estimation and relative to other facial expressions, the age of neutral faces was estimated most accurately while the age of faces displaying happy expressions was most likely underestimated. However, in contrast to their findings, Ganel (2015) reported that across different experimental conditions and stimulus sets, smiling faces were consistently perceived as older compared to the same persons' neutral faces. Ganel (2015) suggested that the effect reported by Voelkle et al. (2012) is due to observer failure to ignore smile-associated wrinkles, mainly along the region of the eyes.

In our daily communication, a speaker's voice is an important cue to estimate his/her age as much as facial information. We often understand a speaker's emotions only from his/her voices, as exemplified through a telephonic conversation. Moreover, we often fail to look at a speaker's face even in a face-to-face situation (Ekman & Friesen, 1975). By doing so, the information regarding a speaker's emotion would be received through auditory and visual senses. Therefore, it is surprising that the effect of emotional voices on speakers' age perception remains unexplored, although most researchers have explored the effect of aging on cognitive mechanisms: age differences on cross-modal emotional matching and identification (Hunter, Phillips, & MacPherson, 2010); age-related effects on emotion recognition (Chaby Luherne-du Boullay, Chetouani, & Plaza, 2015); speakers' perceived ages with reading voice (Ptacek & Sander, 1966); subjective age estimation of telephone voices (Cerrato, Falcone, & Paoloni, 2000); the accuracy of estimates of speaker age (Eriksson, Green, Sjöström, Sullivan, & Zetterholm, 2004); influences of speech rate and speech spontaneity on estimation of speaker age (Waller, Eriksson, & Sörqvist, 2015).

Can emotional voices influence our recognition of a speaker's age? More specifically, can we assume that someone who is speaking in a happy voice sounds younger than his/her actual age? Spoken language has various paralinguistic information (e.g., emotional state, age, and gender), besides lexical meanings. Emotion is one of the most essential sources which helps us know the situation of the conversation; for example, people speaking

with a happy voice to convey intimacy. This study aimed to test the influence of happy voices on aging impression.

Considering that facial expression influences the vocal emotion perception (Shigeno, 1998), the experimental settings used in this study were only auditory so that participants could focus on emotional voices. In an age test, participants were required to estimate the age of speakers, whose chronological ages were between 24 and 75 years, only by hearing their emotional voices (expressing neutral emotions, sadness, or happiness).

## 2. Method

### 2.1 Participants

Forty participants (5 males,  $M_{age} = 22.0$ ,  $SD = 0.71$ ; 35 females,  $M_{age} = 21.4$ ,  $SD = 0.81$ ) were asked to estimate the age of the speakers by hearing their emotional voices. None had any known history of hearing deficits. The participants provided written informed consent. The present study was approved by the Research Ethics Review Board of the College of Education, Psychology and Human Studies at Aoyama Gakuin University.

### 2.2 Stimuli

The sample of emotional voices was provided by 24 native Japanese actors, aged 24-75, recruited from an agency and recorded on a ProRes recorder (AJA, KI-PRO). Each generation (20-70) comprised four actors (two of each gender) to avoid age-specific tendencies. For example, Torre III and Barlow (2009) observed greater variability in speech productions by older adults compared with their younger, same-sex counterparts, as evidenced by larger standard deviations for their measures. The ages of the four actors in the current experiment were around the middle of each generation: the ranges were 24-26, 34-35, 45, 54-56, 64-66, 74-75 years.

The speakers spoke short sentences in Japanese, such as “Hontoo desu ka. Shinji rare masen”, which corresponds to the sentences “Is that real? I can’t believe it” in English. These sentences were selected because we often hear these spoken in a happy context (e.g., “He told me about my promotion...”) and in a sad context (e.g., “I heard of his death...”). Each speaker spoke them while expressing neutral emotion, happiness, or sadness. The speakers were required to use voice pitch ( $F0$ ) in their vocal expressions of emotion because it is one of the most important parameters of emotional voices (e.g., Murray & Arnott, 1993; Shigeno, 2004), although they were allowed to use expressions such as speaking speed and/or loudness of voice. As a result, when they expressed the emotions in a sad tone, their voices were a little lower and softer than a happy emotion. The speakers were also instructed not to use other elements, such as laughing, crying, or clicking their tongues because these elements had not been sufficiently studied to define individual differences among speakers. The speakers practiced their expression of emotions several times before their voices were recorded more than twice. The noiseless recordings that two researchers specializing in cognitive psychology (the experimenter and a doctoral student) judged to be the most emotional were selected as stimuli.

The utterances appeared in random order. One session consisted of 72 trials: 3 emotions (neutral/happy/sad)  $\times$  1 phrasing (“Is that real? I can’t believe it.”)  $\times$  24 speakers.

### 2.3 Procedure

Forty participants carefully heard the speakers’ voices and focused on the speakers’ ages. They estimated and wrote down each speaker’s age. All conditions of the stimuli were met by the participants. A 200-ms pure tone of 1000 Hz was presented 2.0 s before each utterance as a warning. Participants were given 4 s to record each judgment.

The voice recordings were played from the PC (HP, ProBook 650G1) through loudspeakers (BOSE, 301V; 101 MM) at a level comfortable for listening, so that the listening environment would not differ much from daily life. The experiment was conducted in a quiet room.

## 3. Results

First, the emotional voices were identified by other 58 participants (15 males,  $M_{age} = 21.3$ ,  $SD = 0.90$ ; 43 females,  $M_{age} = 21.0$ ,  $SD = 0.65$ ) to confirm whether the emotions of voices were perceived as a separate emotion (neutral, happiness, or sadness). Table 1 shows the results. A two-way repeated measures analysis of variance (ANOVA) according to the factors of emotion (neutral vs. happiness vs. sadness) and gender (male vs. female speakers) was conducted on correct (i.e., intended) emotion identification. There was a significant main effect of emotion,  $F(2, 114) = 137.49$ ,  $p < .001$ ,  $\eta^2 = .71$ . Multiple comparisons with Bonferroni correction revealed that the most correctly identified emotion was happiness ( $p < .001$ ) and the least correctly identified emotion was neutral ( $p < .001$ ). There was no significant main effect of gender,  $F(1, 57) = 0.001$ ,  $p = .975$ ,  $\eta^2 = .00$ . There was a significant interaction between emotion and gender,  $F(2, 114) = 55.39$ ,  $p < .001$ ,  $\eta^2 = .49$ . A further analysis was

conducted to explore the effect of vocal emotion in each gender. As a result, the effect of vocal emotion was significant: male speakers,  $F(2, 78) = 40.21, p < .001, \eta^2 = .51$  and female speakers,  $F(2, 78) = 61.92, p < .001, \eta^2 = .61$ . Multiple comparisons with Bonferroni correction between any two emotions were significant ( $p < .001$ ) except between neutral and sadness expressed by male speakers.

Table 1. Average percentages of identification of vocal emotion

Vocal emotion		Neutral	Response Happiness	Anger	Disgust	Fear	Sadness
Neutral	Male	54.2	0.9	8.9	23.3	2.3	10.5
	Female	34.6	0.6	29.7	26.9	2.0	6.2
Happiness	Male	13.3	80.9	0.8	3.0	1.3	0.8
	Female	1.4	86.4	1.9	3.2	3.7	3.4
Sadness	Male	4.0	5.6	1.0	2.3	33.8	53.3
	Female	0.6	5.8	7.5	5.8	13.5	67.0

Since our emotional lives have richness and diversity (Barrett, 2009), the identification percentages were scattered across the six emotion categories although the participants were required to identify voices expressing three emotions (neutral, happiness, and sadness). Emotion perception studies have reported that a speaker's intended expression is often identified as different emotions (Shigeno, 1998); identification rates differ greatly depending on the types of emotion (Banse & Scherer, 1996); and neutral emotional voices are identified as specific emotions (Liu & Pell, 2012). In fact, in the present results, neutral voices were perceived less properly than happiness and sadness. For example, neutral female voices were identified as anger (29.7%) and disgust (26.9%) although the percentage of identification as neutral (34.6%) was identified most among the six alternatives. On the other hand, it was more clearly indicated that happiness and sadness were identified as respective emotion most.

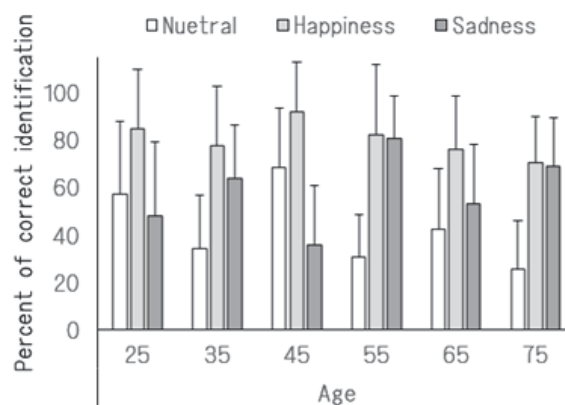


Figure 1. Averaged correct percentages of perceived emotions as a function of speakers' age

Figure 1 shows the correct (i.e., intended) identification of each emotion by each age group. A two-way repeated measures ANOVA according to the factors of emotions (neutral vs. happiness vs. sadness) and an averaged speaker's age (25, 35, 45, 55, 65, and 75) was conducted for correct (i.e., intended) emotion identification. Significant main effects of emotion and the speaker's age were obtained:  $F(2, 114) = 114.96, p < .001, \eta^2 = .67$ ;  $F(5, 285) = 7.32, p < .001, \eta^2 = .114$ . There was a significant interaction between emotion and averaged speaker's age,  $F(10, 570) = 15.25, p < .001, \eta^2 = .44$ .

The results of age judgments were then averaged across all age groups and for both genders. The happy voice of one male speaker in his 50s was excluded from the calculation as it was not perfectly presented. Significant differences were obtained between any two emotions and between male and female speakers.

Figure 2 shows the average of the speakers' estimated age as a function of emotion. A two-way repeated measures ANOVA according to the factors of emotion (neutral vs. happiness vs. sadness) and gender (male vs. female speakers) was conducted on the estimated ages. A significant main effect of emotion was found,  $F(2, 78) = 58.45, p < .001, \eta^2 = .60$ . Multiple comparisons with Bonferroni correction revealed that the perceived age of happy voice was younger than perceived age of neutral ( $p < .001$ ) and sad voices ( $p < .001$ ). No significant main effect of gender was found,  $F(1, 39) = 3.42, p = .072, \eta^2 = .08$ . There was a significant interaction,  $F(2, 78) = 30.31, p < .001, \eta^2 = .44$ , showing that the influence of the three vocal emotions on age identification differs between male and female speakers. As the interaction was significant, further analysis was conducted to explore the effect of vocal emotion in each gender. The simple main effect of vocal emotion was significant for male speakers,  $F(2, 78) = 40.21, p < .001, \eta^2 = .51$ ; for female speakers,  $F(2, 78) = 61.92, p < .001, \eta^2 = .61$ , showing that perceived age of voices differed among the three emotions as indicated in Figure 2. Multiple comparisons with Bonferroni correction between any two emotions expressed by either male or female voices were significant ( $p < .001$ ) except between neutral and sadness expressed by male speakers. Thus, happy voices were judged to be younger than neutral and sad voices and sad voices were judged to be older than neutral (except in female speakers) and happy voices. Furthermore, the current results indicate that, in relation to happiness and sadness, the perceived female age was younger than the perceived male age, happiness:  $F(1, 39) = 4.33, p < .05, \eta^2 = .10$ ; sadness:  $F(1, 39) = 23.33, p < .001, \eta^2 = .37$ .

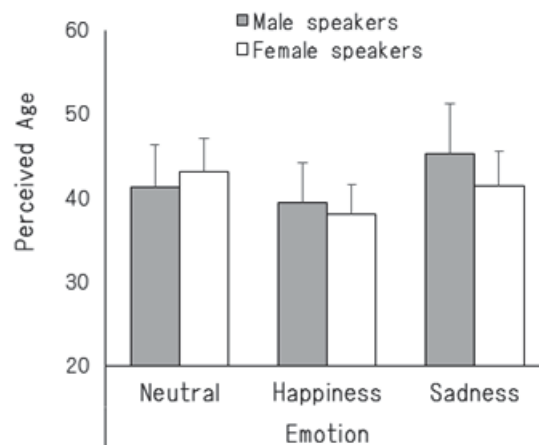


Figure 2. Averaged perceived ages of speakers as a function of neutral, happy, and sad voices. Significant differences were obtained between any two emotions and between male and female speakers

Table 2. Age differences by subtracting chronological age from perceived voice's age

Vocal emotion	Averaged chronological age					
	25	35	45	55	65	75
Neutral	1.1	-4.3	-8.1	-7.2	-12.0	-16.8
Happiness	0.2	-7.1	-12.7	-14.2	-18.4	-15.0
Sadness	-0.3	-2.7	-4.4	-2.8	-16.1	-13.5

Note. Positive age differences indicate that a speaker's voice sounds older; negative age differences indicate that a speaker's voice sounds younger.

Table 2 shows whether the speakers sound younger or older. Age differences were calculated by subtracting chronological age from emotional voice's age. Positive figures indicate that a speaker's voice sounds older than his/her chronological age. In contrast, negative figures indicate that a speaker's voice sounds younger than his/her chronological age. Table 2 indicates that older speakers' voices sound younger than their chronological ages, and the difference was conspicuously larger than the case of younger speakers' voices. A two-way repeated measures ANOVA according to the factors of emotion (neutral vs. happiness vs. sadness) and age (25, 35, 45, 55, 65, and 75) on age differences confirmed the results. A significant main effect of emotion was found,  $F(2, 78) =$

57.56,  $p < .001$ ,  $\eta^2 = .60$ . The main effect of age was also found to be significant,  $F(5, 195) = 153.27$ ,  $p < .001$ ,  $\eta^2 = .80$ , and multiple comparisons with Bonferroni correction indicated that the identification of the younger speakers (in their twenties) was accurate (i.e., small age differences) ( $p < .001$ ) and the older speakers (in their 60s and in their 70s) were identified as younger than their chronological ages ( $p < .001$ ). It is possible to say that the current participants were in their early 20s (i.e., young) and therefore, the perceived ages of younger speakers were more accurate than those of older speakers. The results suggest that an own-age bias also exists (Moyses, 2014) in the age estimation of emotional voices.

#### 4. Discussion

Although, in the facial age estimation, Ganel (2015) suggested that smiling faces look older, the present study indicated that a happy voice sounds younger in the contexts where only voices are heard. Why does someone speaking with a happy voice sound younger than his/her real age? Emotional information is mainly defined by pitch shifts of vowels (Murray & Arnott, 1993; Banse & Scherer, 1996); an acoustical speech analysis of the emotional voices indicated that  $F0$  was correlated with the pleasantness–unpleasantness dimension in a two-dimensional psychological space, as calculated by Multi-Dimensional Scaling (MDS) (Shigeno, 2004); happiness had higher  $F0$  than other emotions (Murray & Arnott, 1993; Shigeno, 2004); and the  $F0$  of younger people is higher than that of older people (particularly for women) (Russell, Penny, & Pemberton, 1995). Considering these findings, a higher  $F0$  of happiness can be the most possible factor that can provide a younger impression.

Using 374 normal and healthy Japanese speakers (187 males and 187 females) from adolescent or older age groups, Nishio and Niimi (2005) reported that changes in Speaking Fundamental Frequency (SFF) associated with aging. They observed that females in their 30s and 40s showed clearly lower frequencies than those in their 20s. Across all age groups, including those in their 80s, SFF tended to decrease with aging. Gelfer and Schofield (2000) reported that subjects perceived as female had a higher mean SFF and higher upper limit of SFF than subjects perceived as male. They further reported that a significant correlation was achieved between upper limit of SFF and ratings of femininity. These investigations could explain the current results that the perceived female age is younger than the perceived male age when they speak in happy or sad voices. However, it remains unexplained that in the case of neutral voices, perceived female age is older than the perceived male age.

On the other hand, with aging, our voice becomes hoarser and more breathy (Gorham-Rowan & Laures-Gore, 2006). Therefore, older people might find it hard to produce a loud and long voice. In fact, when the speakers produced vocal emotions, their voices were different not only in pitch but also in the length and/or loudness of voice. These factors might influence the speaker's age estimation.

In conclusion, a substantial body of present studies suggests that a happy voice sounds younger because of its higher pitch, although during facial recognition, it looked older (Ganel, 2015). The results further showed that the tendency is more conspicuous in female happy voices than male happy voices. As noted by Moyses (2014), although voices are often considered to be the auditory counterparts of faces, the comparison between voice and face is not always obvious; methods and dependent variables of age estimation research differed between studies using faces and those using voices as stimuli. Further research would be necessary to elucidate the discrepant results between male and female speakers and between facial expression and vocal emotion. The results suggest that if a person wishes to give the impression of being younger, he/she should speak with a happy voice.

#### Acknowledgments

This research was supported by JSPS KAKENHI Grant Number 24530919.

#### References

- Banse, R., & Scherer, K. R. (1996). Acoustic profiles in vocal emotion expression. *Journal of Personality and Social Psychology*, 70(3), 614-636. <http://dx.doi.org/10.1037/0022-3514.70.3.614>
- Barrett, L. F. (2009). Variety in the spice of life: A psychological construction approach to understanding variability in emotion. *Cognition Emotion*, 23(7), 1284-1306. <http://dx.doi.org/10.1080/02699930902985894>
- Cerrato, L., Falcone, M., & Paoloni, A. (2000). Subjective age estimation of telephone voices. *Speech Communication*, 31(2), 107-112. [http://dx.doi.org/10.1016/S0167-6393\(99\)00071-0](http://dx.doi.org/10.1016/S0167-6393(99)00071-0)
- Chaby, L., Luherne-du Boullay, V., Chetouani, M., & Plaza, M. (2015). Compensating for age limits through emotional crossmodal integration. *Frontiers in Psychology*, 6, 1-12. <http://dx.doi.org/10.3389/fpsyg.2015.00691>

- Ekman, P., & Friesen, W. V. (1975). *Unmasking the face: A guide to recognizing emotions from facial clues*. Englewood Cliffs, NJ: Prentice-Hall.
- Eriksson, E., Green, J., Sjöström, M., Sullivan, K. P., & Zetterholm, E. (2004). Perceived age: A distracter for voice disguise and speaker identification? In *Proceedings of FONETIK 2004* (pp. 80-83).
- Ganel, T. (2015). Smiling makes you look older. *Psychonomic Bulletin & Review*, 22(6), 1671-1677. <http://dx.doi.org/10.3758/s13423-015-0822-7>
- Gelfer, M. P., & Schofield, K. J. (2000). Comparison of acoustic and perceptual measures of voice in male-to-female transsexuals perceived as female versus those perceived as male. *Journal of Voice*, 14(1), 22-33. [http://dx.doi.org/10.1016/S0892-1997\(00\)80092-2](http://dx.doi.org/10.1016/S0892-1997(00)80092-2)
- Gorham-Rowan, M. M., & Laures-Gore, J. (2006). Acoustic-perceptual correlates of voice quality in elderly men and women. *Journal of Communication Disorders*, 39(3), 171-184. <http://dx.doi.org/10.1016/j.jcomdis.2005.11.005>
- Hunter, E. M., Phillips, L. H., & MacPherson, S. E. (2010). Effects of Age on Cross-Modal Emotion Perception. *Psychology and Aging*, 25(4), 779-787. <http://dx.doi.org/10.1037/a0020528>
- Liu, P., & Pell, M. D. (2012). Recognizing vocal emotions in Mandarin Chinese: A validated database of Chinese vocal emotional stimuli. *Behavior Research Methods*, 44(4), 1042-1051. <http://dx.doi.org/10.3758/s13428-012-0203-3>
- Moyses, E. (2014). Age estimation from faces and voices: A review. *Psychologica Belgica*, 54(3), 255-265. <http://dx.doi.org/10.5334/pb.aq>
- Murray, I. R., & Arnott, J. L. (1993). Toward the simulation of emotion in synthetic speech: A review of the literature on human vocal emotion. *Journal of the Acoustical Society of America*, 93(2), 1097-1108. <http://dx.doi.org/10.1121/1.405558>
- Nishio, M., & Niimi, S. (2005). Changes in speaking fundamental frequency characteristics with aging. *The Japan Journal of Logopedics and Phoniatrics*, 46(2), 136-144. <http://dx.doi.org/10.5112/jjlp.46.136>
- Ptacek, P. H., & Sander, E. K. (1966). Age recognition from voice. *Journal of Speech, Language, and Hearing Research*, 9(2), 273-277. <http://dx.doi.org/10.1044/jshr.0902.273>
- Russell, A., Penny, L., & Pemberton, C. (1995). Speaking Fundamental Frequency Changes Over Time in Women: A Longitudinal Study. *Journal of Speech, Language, and Hearing Research*, 38(1), 101-109. <http://dx.doi.org/10.1044/jshr.3801.101>
- Shigeno, S. (1998). Cultural similarities and differences in the recognition of audio-visual speech stimuli. *Proceedings of International Congress on Spoken Language Processing*, 2, 281-284.
- Shigeno, S. (2004). Recognition of vocal expression of emotion and its acoustic attributes. *Japanese Psychological Research*, 74(6), 540-546. <http://dx.doi.org/10.4992/jjpsy.74.540>
- Torre III, P., & Barlow, J. A. (2009). Age-related changes in acoustic characteristics of adult speech. *Journal of Communication Disorders*, 42(5), 324-333. <http://dx.doi.org/10.1016/j.jcomdis.2009.03.001>
- Voelkle, M. C., Ebner, N. C., Lindenberger, U., & Riediger, M. (2012). Let me guess how old you are: Effects of age, gender, and facial expression on perceptions of age. *Psychology and Aging*, 27(2), 265-277. <http://dx.doi.org/10.1037/a0025065>
- Waller, S. S., Eriksson, M., & Sörqvist, P. (2015). Can you hear my age? Influences of speech rate and speech spontaneity on estimation of speaker age. *Frontiers in psychology*, 6, 1-11.

### Copyrights

Copyright for this article is retained by the author, with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

# A Diary Study on Work-Related Perseverative Cognition and Employees' Need for Recovery

## *The Role of Emotional Support from Family and Neuroticism*

Annie Foucreault<sup>1</sup>, Julie Ménard<sup>1</sup> & Celestine Stevens<sup>1</sup>

<sup>1</sup> Department of Psychology, Université du Québec à Montréal, Montréal, Québec, Canada

Correspondance: Annie Foucreault, Department of Psychology, Université du Québec à Montréal, C. P. 8888, Succ. Centre-Ville, Montréal, Québec, H3C 3P8. Tel: 1-514-987-3000 #2437. E-mail: foucreault.annie@courrier.uqam.ca

Received: September 26, 2016

Accepted: October 26, 2016

Online Published: November 3, 2016

doi:10.5539/ijps.v8n4p77

URL: <http://dx.doi.org/10.5539/ijps.v8n4p77>

### Abstract

Daily Work-related Perseverative Cognition (WPC) increases employees' need for recovery by maintaining physical activation of work-related stressors, thus depleting employees' resources further. The aim of this study was to highlight factors that influence the WPC/need for recovery relationship on a daily basis. It is hypothesized that daily satisfaction with emotional support from family would have both a direct and a moderating effect on the relationship between employees' daily WPC and need for recovery. Since individuals higher in neuroticism tend to report more distress symptoms and perseverative cognition, it was expected that neuroticism would: (1) have a direct effect on WPC and need for recovery, (2) accentuate the WPC/need for recovery relationship and (3) reduce the buffering effect of emotional support from family on need for recovery. A sample of 31 employees completed diaries for five consecutive days before sleep (122 data points). Results from hierarchical linear modeling analyses revealed that daily family support had no direct effect on daily need for recovery. However, daily family support buffered the WPC/need for recovery relationship but only among individuals low in neuroticism. For those high in neuroticism, daily family support was not associated with a reduction of daily need for recovery from work after resources had been depleted due to WPC. These findings suggest that individual characteristics (neuroticism) should be considered in order to interpret the effect of key resources (family support) on recovery. The discussion highlights how organizations can foster family support and offer alternative strategies for those higher in neuroticism.

**Keywords:** employees' need for recovery, emotional support from family, neuroticism, work-related perseverative cognition

### 1. Introduction

When fatigue builds up after effort expenditure to meet work-related demands, employees usually feel a sense of urgency to take a break from work. This emotional state is defined as daily need for recovery (Sonnentag & Zijlstra, 2006). Studies have shown that an inadequate response to one's own daily need for recovery is detrimental as it increases both physical (e.g., cardiovascular diseases; Sluiter, van der Beek, & Frings-Dresen, 1999) and psychological (e.g., psychological distress; Jansen, Kant, & van den Brandt, 2002) health problems related to occupational stress. In order to recover from spent resources, employees should avoid using the systems that are called upon during work periods (Hobföll, 1989; Meijman & Mulder, 1998). Among factors that impede recovery from work demands, research has increasingly focused on work-related perseverative cognition (WPC; i.e., worry and rumination about work-related issues) during non-work periods (Cropley & Millward, 2009; Flaxman, Ménard, Kinman, & Bond, 2012; Radstaak, Geurts, Beckers, Brosschot, & Kompier, 2014; Sonnentag, Kuttler, & Fritz, 2010). Indeed, when worrying and ruminating about work-related issues, employees continue to use personal resources and functional systems that have been active during the day. Although the direct effect of WPC on the recovery process has been widely investigated, few studies have considered moderators that may influence this relationship (e.g., Ménard, Foucreault, & Trépanier, under review). The present study aims to expand the understanding of employees' need for recovery during respite periods by



verifying, through a diary design, whether family emotional support (i.e., a personal resource) and neuroticism (i.e., an individual difference) affect the relationship between WPC and need for recovery on a daily basis.

Recent research in the field of employees' recovery (for review, see: Demerouti, Bakker, & Sanz-Vergel, 2013; Geurts, 2014) have only rarely taken into account the role of family life. Work-family research has clearly shown that family life, and particularly family support, contributes to employees' well-being (e.g., Greenhaus & Powell, 2006; Greenhaus, Ziegert, & Allen, 2011). Building on these insights, it appears relevant to examine whether family life also facilitates the recovery process. Previous studies have highlighted the twofold effect that emotional support can have on the stressor-strain relation: (1) emotional support may have a positive effect on health regardless of the individual's stress level (direct effect on strain), and (2) emotional support may buffer the relationship between stressors and strain (buffering effect; Cohen & Syme, 1985; Cohen & Wills, 1985; LaRocco, House, & French, 1980; Viswesvaran, Sanchez, & Fisher, 1999). However, to our knowledge, such relationships have never been tested on a daily basis. Therefore, the first aim was to investigate both the direct and the buffering effects of emotional support from family on the relation between WPC and employees' daily need for recovery.

When studying the influence of personal resources such as emotional support on need for recovery, it is also important to consider individual characteristics, as there is evidence that such resources may have different effects depending on the employee's attributes (Park et al., 2012). Neuroticism may act as a moderator by amplifying the negative consequences of WPC and by reducing the beneficial contribution of emotional support to recovery. In fact, it has been shown that those higher in neuroticism engage in more perseverative cognition and are less likely to benefit from the positive effect of perceived emotional support (Park et al., 2012; Robinson, Wilkowski, Kirkeby, & Meier, 2006). Thus, following the recommendation of Ragsdale et al. (2011) on the need to investigate the role of emotional stability (i.e., low neuroticism) in employees' recovery, the second aim was to verify the effect of neuroticism on WPC/need for recovery relationship.

In the following section, need for recovery is first defined. Second, on the basis of both the effort-recovery model (ER; Meijman & Mulder, 1998) and the conservation of resource model (COR; Hobföll, 1989), the potential influence of WPC on individuals' daily need for recovery is presented. Lastly, a description of the ways emotional social support from family and neuroticism could both independently and jointly influence individuals' daily need for recovery is presented.

### *1.1 Theoretical Perspectives on the Need for Recovery*

Recovery is crucial to employees' well-being and performance (Binnewies, Sonnentag, & Mojza, 2010). When employees respond to work-related demands, they use up personal resources and energy, which leads to need for recovery (Sonnentag & Zijlstra, 2006). Sonnentag and Zijlstra (2006) defined need for recovery as an urgent sense that one needs to take a break from demands and recover depleted resources. Both the ER model (Meijman & Mulder, 1998) and the COR model (Hobföll, 1989) deepen the understanding of such a need and the ensuing recovery process.

The ER model (Meijman & Mulder, 1998) posits that the efforts mobilized during workdays lead to the activation of various systems depending on the nature of the task that is performed (e.g., cognitive system to make a decision). Such activations are called "load reactions". On a short-term basis, load reactions are both normal and reversible. However, if the systems used do not return to their baseline level on a regular basis (i.e., during respite periods) due to continuous demands, need for recovery occurs. When employees worry and ruminate about work during leisure time, they promote prolonged activation of work-related stressors and tax the same systems used to meet work demands (Flaxman et al., 2012). In doing so, they maintain their fatigued state, thereby compromising both their health and performance (Cropley & Millward, 2009; Meijman & Mulder, 1998).

Hobföll's COR model (1989) completes ER model in explaining need for recovery. COR states that people attempt to retain, protect and consolidate resources, which are defined as any objects (e.g., home), energies (i.e., stamina), personal characteristics (e.g., self-esteem) and life conditions (e.g., having a job) they value. According to this model, a stress reaction occurs when faced with an event that represents a threat of an eventual loss, an immediate loss or an insufficient gain after the investment of resources. Accordingly, resources recovery is essential to healthy functioning. When employees experience WPC after their workday, they remain in an activated mode, thus continuously losing personal resources (Sonnentag et al., 2010). If resources are not replenished, employees may be unable to compensate for those they have lost, and a "spiral of loss" may occur and eventually lead to burnout (Hobföll, 1989).

### 1.2 Theoretical Perspectives on Perseverative Cognition

On the basis of the ER model (Meijman & Mulder, 1998) and COR model (Hobföll, 1989), Binnewies et al. (2010) showed that when individuals actively think about work during leisure time, they experience a higher need for recovery than when they are able to psychologically detach from work. However, in another study, these researchers found that positive cognitions about work are positively related to individual performance and well-being (Binnewies, Sonnentag, & Mojza, 2009). They suggested that positive thoughts about work allow a reappraisal of the employee's experience, and thus facilitate resource acquisition such as self-esteem (Binnewies et al., 2009). Building on previous work on psychological detachment, Flaxman et al. (2012) showed that perseverative and negative cognition about work (i.e., WPC), explained employees' need for recovery during a short-break, over and above the mere act of thinking about work. Hence, in the current study, the main focus was on daily WPC and its effect on daily need for recovery instead of on employees' psychological detachment from work.

Perseverative cognition is defined as a cognitive representation of psychological stressors (e.g., time pressure and workload) that is repeatedly or chronically activated through ruminations about the past and worries about the future (Brosschot, Gerin, & Thayer, 2006). The perseverative cognition hypothesis (Brosschot et al., 2006) provides an explanation for the negative influence that work-related worry and rumination (i.e., WPC) have on employees' respite. According to this hypothesis, WPC prolongs stressor activation after the workday and thus promotes chronic over-activity of the same stress-related systems and repeated use of the same work-related resources (e.g., concentration; Sonnentag et al., 2010) during off-job periods. This prolonged activation impairs the recovery process as WPC put extra demands on individuals who do not have a temporary break from job demands that allow their functional systems and their resource reservoir to return to their baseline level (Meijman & Mulder, 1998; Hobföll, 1989). Accordingly, the following hypothesis is proposed:

Hypothesis 1: Daily WPC (Level 1) will be positively related to need for recovery before sleep (Level 1), throughout the workweek. Specifically, employees will have a higher level of need for recovery than one's personal average on evenings they experienced WPC than on evenings they experienced no WPC.

### 1.3 Theoretical Perspectives on Satisfaction with Emotional Support from Family

Whereas perseverative cognition may impede recovery through resource depletion and system activation, social support may be a key resource to promote recovery (Hobföll, 1998). In the present study, emotional support from family members (e.g., spouse, children, mother, and any other significant relatives), a form of social support, was of interest. It refers to demonstrations of protection, love and empathy toward the individual (House, 1981). This form of social support is the most studied, and empirical evidence suggests that its influence on health is greater than that of others (i.e., informational, instrumental, and esteem; LaRocco, House, & French, 1980). Furthermore, Cohen and Wills' (1985) meta-analysis showed that emotional support from a spouse is more efficient than any other source of social support in buffering stress. Indeed, Ferguson et al. (2012) suggested that family-based resources (e.g., intimacy with a partner) could promote the perception that the employee has successfully met role-related expectations in his/her family domain, thus reinforcing personal resources (e.g., self-esteem).

According to Cohen and Syme (1985), social (and emotional) support acts on the process of work stress in a twofold manner. First, such support may directly reduce the tension felt by employees, regardless of the intensity of the stressors they experienced at work. This *direct effect hypothesis* can be explained theoretically by the work-family enrichment hypothesis (Greenhaus & Powell, 2006). Based on this hypothesis, Ten Brummelhuis and Bakker (2012) argued that emotional support from a spouse is a contextual resource (i.e., home-based) that helps to build other resources, thereby facilitating the recovery process (i.e., both from home and work demands). Thus, the mere perception that family members are willing to help (if needed) may promote a *spiral gain* of personal resources (e.g., positive mood, self-esteem), which in turn, can enrich the work domain by fostering a vigorous attitude at work. Accordingly, it is proposed that emotional support from family have a direct effect on employees' strain (i.e., need for recovery).

Hypothesis 2: Satisfaction with perceived emotional support from family in the evening (Level 1) will be negatively related to need for recovery before sleep (Level 1; *direct-effect hypothesis*). Employees will have a lower level of need for recovery than one's personal average on evenings they reported satisfaction with family emotional support than on evenings they experienced no satisfaction with family support.

Social (and emotional) support's second role is to relieve the effects of stressors on strain (Cohen & Syme, 1985). It has been argued that resources provided by family members through support may help redefine and decrease negative effects of work stressors by strengthening individuals' perception that they can cope with work-related

demands (Cohen & Syme, 1985). House (1981) also posited that support tranquilizes the neuroendocrine system and thereby reduces employees' negative reactions to work-related demands. Since WPC can be considered as a negative work-related demand (Hobföll, 1989; Meijman & Mulder, 1998), it is thus expected that emotional support from family buffers the relationship between prolonged physical activation of stressors (due to WPC) and need for recovery.

Hypothesis 3: Satisfaction with perceived emotional support from family in the evening (Level 1) will moderate the relation between daily WPC (level 1) and need for recovery before sleep (Level 1). The lowest need for recovery will be when individuals report daily WPC and satisfaction with their emotional family support. The highest need for recovery will be when employees who report daily WPC also report no satisfaction with their perceived emotional support from family.

#### *1.4 Theoretical Perspectives on Neuroticism*

Along with resources from the employees' environment, individual characteristics also can have a considerable influence on employees' daily WPC and need for recovery. Neuroticism is a disposition to interpret events that occur in one's life negatively (Watson & Clarke, 1984). It has been shown in self-administrated questionnaires that those high in neuroticism are more susceptible to reporting negative outcomes such as distress symptoms than those who are low on this trait (Le, Donnellan, Spilman, Garcia, & Conger, 2014). The state-trait theory of anxiety (Eysenck, 1967) gives an explanation for those research results. This theory posits that individuals high in neuroticism have a tendency to react quickly to minor stressors in their environment since they have a lower threshold for activation of their limbic (i.e., emotional) system than those low in neuroticism. These individuals are thus more likely to report a higher level of need for recovery than their emotionally stable counterparts when they are exposed to daily work-related stressors such as time pressure. Accordingly, the following hypothesis is posited:

Hypothesis 4: Neuroticism (Level 2) will be positively related to employees' daily need for recovery before sleep (Level 1). Individuals high in neuroticism will tend to report a higher level of need for recovery on a daily basis than those low in neuroticism.

Along with being more reactive, individuals high in neuroticism are more inclined to maintain perseverative cognition about stressful events than those low in neuroticism (e.g., Roelofs, Huibers, Peeters, & Arntz, 2008). It has been suggested that the relationship between neuroticism and perseverative cognition could be explained by the moderating effect of a low level of executive function that limits the capacity of those high in neuroticism to regulate their mental processes (Robinson, 2007). In order to confirm the findings of previous studies, it is hypothesized that:

Hypothesis 5: Neuroticism (Level 2) will be positively related to employees' daily WPC (Level 1). Individuals high in neuroticism will tend to report WPC on a daily basis contrary to those low in neuroticism.

Some researchers have argued that those with a higher level of neuroticism perceive less support from others than those who score lower on this personality trait (Bolger & Eckenrode, 1991). In this vein, Aryee et al. (2005) maintained that individuals high in neuroticism inhibit efforts to elicit social support to cope with stress, and as a consequence experience a higher level of work-family conflict than those with a low level of neuroticism. Another study showed that the buffering effect of support on health is less likely to occur among individuals high in neuroticism (Park et al., 2012). This could be explained by the tendency of people high in neuroticism to engage in negative conversations about work-related issues with those who offer them emotional support, rather than conversing with them on topics that are either constructive or unrelated to work (Zellars & Perrewé, 2001). Hence, the kind of social support obtained by those who are high in neuroticism could result in WPC because of their own negative input into interactions with their relatives.

Consequently, as those high in neuroticism are more likely to report a higher need for recovery and are less likely to benefit from their social support than emotionally stable individuals, it is crucial to account for this personality trait in the study's model. It is therefore proposed that a three-way interaction would be more appropriate than a usual two-way interaction to show how neuroticism, daily WPC and satisfaction with family emotional social support together affect employees' respite. Thus, the following hypothesis was posited:

Hypothesis 6: Neuroticism (Level 2) and satisfaction with perceived emotional support from family (Level 1) will moderate the relationship between daily WPC (Level 1) and need for recovery (Level 1). The buffering effect of emotional support from family between daily WPC and need for recovery will only be observed among those low in neuroticism.

## 2. Method

### 2.1 Participants

Participants were recruited from a range of private (45.3%) and public organizations (48.4%) as well as non-profit organizations (6.5%) in Canada, using snowball sampling (Goodman, 1961). Inclusion criteria were the following: (a) intention to work on a majority of days during the week of the study (b) at least 18 years of age and (c) Internet access at home, in order to complete the online diaries. A total of 36 employees expressed interest in participating in this study and received the questionnaires through their personal email address. Five participants were excluded from the analyses because of failure to complete at least three diaries out of five. For the 31 remaining participants (122 data points), the Little's MCAR test (Little, 1988) indicated that the data were missing completely at random,  $\chi^2 = .116$  ( $df = 1$ ,  $p = .733$ ). The majority of participants were women (70.97%) and averaged 36 years of age ( $SD = 9.87$ ). Most worked on a full-time basis (77.4%; i.e., 35 hours per week, on average). The majority had no children (54.8%) and 48.4% were married or had a partner.

### 2.2 Procedure

The Institutional Review Board of Université du Québec à Montréal's Human Sciences Faculty approved this study. Participants received a flyer explaining the major goals of the research project, and those interested were provided with the initial questionnaire. The first page of this questionnaire included a consent form that informed participants about confidentiality and anonymity as well as instructions on when to complete the questionnaire and online diaries. The questionnaire was to be completed on the Sunday evening, while daily diaries had to be completed over five consecutive workdays, from Monday to Friday, before going to sleep. The questionnaire assessed socio-demographic variables and neuroticism. Diaries assessed daily need for recovery, emotional support from family, and WPC. Each daily diary that was completed by participants gave them a chance to win a prize (2 X 50\$).

### 2.3 Measures

#### 2.3.1 Self-Reported Neuroticism

Neuroticism was assessed using the Neuroticism-Anxiety (N-Anx) subscale of the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ; Aluja et al., 2006). It consists of ten items (e.g., "*I often worry about things that other people think are unimportant.*"). Participants had to indicate to which extent each statement described them on a four-point scale ranging from 1 (*totally disagree*) to 4 (*totally agree*). The Cronbach's alpha subscale ( $\alpha = .81$ ) was similar to that in the original study ( $\alpha = .83$ ; Aluja et al., 2006).

#### 2.3.2 Daily Need for Recovery

Daily need for recovery was assessed before going to sleep from Monday to Friday, using the acute fatigue subscale of the Occupational Fatigue, Exhaustion, Recovery scale (OFER15; Winwood, Lushington, & Winnefield, 2006). This subscale has 5 items (e.g., "*After work I had little energy left today.*"). The instructions, which were adjusted for the purpose of this study, asked participants to indicate on a scale of 0 (*strongly disagree*) to 6 (*strongly agree*) to which extent each item represented how they felt during the evening. The original scale had a Cronbach's alpha of .84 and, in this study, alphas varied from .55 to .87 over the five measurements.

#### 2.3.3 Daily Work-Related Perseverative Cognition

The Work-related Worry and Rumination Scale (WWRS) was used to assess work-related perseverative cognition (5 items; Flaxman et al., 2012). Participants were asked to indicate whether they had the types of work-related thoughts mentioned in each statement (e.g., "*My thoughts kept returning to a stressful situation at work.*") on a 5-point Likert scale (i.e., 1 = *not at all* to 5 = *a great deal*). However, the distribution of this variable was positively skewed since participants did not have WPC after every workday. Thus, this scale was dichotomized: 0 = *had no daily WPC*, and 1 = *had daily WPC*. Internal reliability of the original scale ( $\alpha = .86$ ) was similar to that of the current study (alphas varied from .76 to 1.00 over the five measurements).

#### 2.3.4 Daily Satisfaction about Perceived Emotional Support from Family

Satisfaction about perceived emotional support provided by family was measured using a single item from the Questionnaire of Perceived Social Support (QSSP; Bruchon-Schweitzer & Quintard, 2001). Participants had to answer the following question: "*Are you satisfied with the comfort and listening you had received from your family when you needed it during the evening*". Family refers to spouse, children, and any other significant relatives. Their answers were on a 6-point Likert scale (i.e., 0 = *Not applicable* to 5 = *Very satisfied*). However, the distribution of this variable was also positively skewed, since participants did not always have the

opportunity to receive emotional support from their family after every workday. Thus, this scale was dichotomized: 0 = *had no family support or were not at all satisfied with their family support*, and 1 = *were satisfied with their family support*.

### 2.3.5 Control Variables

Since some sociodemographic variables are expected to have an influence on individuals' daily need for recovery (e.g., Sonnentag et al., 2010), gender, age, number of children, hours of work per week, and contract work hours (i.e., full-time or part-time) were assessed.

## 2.4 Data Analyses

### 2.4.1 Correlation Analyses

SPSS v.21 (IBM Corp., 2012) was used to conduct preliminary analyses. In order to verify bivariate correlations with between-person variables (i.e., Level 2 variables; socio-demographical variables and neuroticism) and within-person variables (i.e., Level 1 variables; need for recovery, WPC and emotional support from family), averages of individuals' scores for the overall workweek were calculated. Pearson's correlation coefficients were used for all the relations examined except for gender and contract work hours. For the latter, Spearman's correlation coefficient for ordinal data were employed.

### 2.4.2 Hierarchical Linear Models

To examine the positive relation between WPC and need for recovery as well as potential influence of satisfaction with emotional family support and neuroticism, a series of Hierarchical Linear Models (HLM) were created using HLM 7 (Raudenbush, Bryk, & Congdon, 2011). Hierarchical linear models are the most commonly used analyses in diary studies as they enable scholars to test hypotheses in which repeated situational measures (i.e., need for recovery, WPC and emotional support from family at Level 1) are nested within individuals' dispositional measures (i.e., neuroticism at Level 2; Reis & Glabe, 2000). Thus, based on the recommendations by Ohly et al. (2010), the predictors at the within-person level of analysis (i.e., WPC and emotional support from family) were centered to the group mean, while the predictor at the between-person level of analysis (i.e., neuroticism) was centered to the grand mean. The analyses included random effects of the intercept and slopes. Equations were verified in a two-tailed manner. The restricted maximum likelihood was used as the estimation method.

In order to test the hypotheses related to daily need for recovery (hypotheses 1, 2, 3, 4, and 6), six nested models were created. The intercept was the only predictor included in the null model. To test hypotheses 1, 2, and 4, daily WPC, satisfaction with emotional support from family, and neuroticism were entered separately in the HLM regression equation (see Models 1, 2, and 4). In order to verify hypothesis 3, the variables forming the WPC X family support interaction term were centered and their cross product were calculated and entered in Model 3 with the main effects of WPC and family support. The three-way interaction hypothesis (i.e., hypothesis 4) was tested in Model 5 by adding neuroticism to the Model 4 equation. To test hypothesis 5, two nested models were conducted: (1) the null model included WPC and (2) the Model 1 including neuroticism at Level 2.

## 3. Results

### 3.1 Correlation Analyses

The zero-order correlations and descriptive statistics are presented in Table 1. The pattern of correlations is in line with expectations. WPC in the evening was positively related to need for recovery before going to sleep at the within level ( $r = .27, p = .002$ ). Furthermore, as expected, neuroticism was positively related to need for recovery at the between level ( $r = .56, p = .001$ ). Results also revealed that women in the sample reported higher level of neuroticism ( $r = -.59, p < .001$ ) and need for recovery during the workweek ( $r = -.43, p = .017$ ) than men. Finally, the number of hours typically worked per week was positively related to WPC at the between level ( $r = .40, p = .026$ ).

HLM was conducted in order to verify whether gender needed to be controlled for in the main analyses, as it was positively correlated with need for recovery at the between-level. Gender was not related to daily need for recovery at the within-level ( $\gamma_{01} = 1.00, p = .058$ ) so it was not included as a control variable in the main analyses.

Table 1. Means, standard deviation and zero-order correlations

Variables	$\alpha$	$M$	$SD$	1	2	3	4	5	6	7	8	9
1. Age		35.61	9.87	–								
2. Gender		1.29	.46	.12	–							
3. Number of children		.97	1.17	.58**	.30	–						
4. Contract work hours		1.23	.43	.12	-.18	-.18	–					
5. Hours of work / week		39.10	7.80	.15	-.02	.10	-.58*	–				
6. Neuroticism	.81	2.08	.49	.00	-.59**	-.18	-.03	-.10	–			
7. Daily need for recovery	.55 à .94	2.97	.99	-.02	-.43*	-.09	.15	.19	.56**	–	.27*	.05
8. Daily WPC	.76 à 1.00	1.49	.36	.06	-.32	.00	-.20	.40*	.34	.45*	–	-.07
9. Daily emotional support from family		1.44	.33	.08	-.02	.33	-.10	.28	.02	.05	.07	–

Notes.  $n$  at Level 1 = 122.  $n$  at Level 2 = 31.  $\alpha$  variation = Cronbach’s alpha variation across the day of the study. Gender = women (0), men (1). Contract work hours = full time (0) or part time employment (1). Hours of work/week = number of hours typically worked per week. Daily WPC = daily work-related perseverative cognition. \* = significant at  $p < .05$ . \*\* = significant at  $p < .01$ .

### 3.2 Hierarchical Linear Models

Results for need for recovery as the outcome are presented in Table 2 while those for WPC as the outcome are depicted in Table 3. Hypothesis 1 was first tested. Contrary to expectations, daily WPC was not positively related to daily need for recovery before sleep ( $\gamma_{10} = .30, p = .180$ ; Model 1). Subsequently, Hypothesis 2 on the direct effect of daily satisfaction with emotional support from family was verified. Results did not support the prediction. The daily relationship between family support and need for recovery was not significant ( $\gamma_{20} = -.19, p = .272$ ; Model 2). Likewise, Hypothesis 3 that daily satisfaction with emotional support from family would moderate the daily relation between WPC and need for recovery was not significant ( $\gamma_{30} = -.12, p = .429$ ; Model 3). Hypothesis 4 was supported. Neuroticism significantly predicted daily need for recovery ( $\gamma_{01} = 1.11, p = .009$ ; Model 4), with those high in neuroticism reporting a higher need on a daily basis than those low on the trait. Although the relationship is in the predicted direction, neuroticism was not positively related to WPC as expected in Hypothesis 5 ( $\gamma_{01} = .44, p = .070$ ; Model 1).

The three-way interaction of WPC, emotional support from family and neuroticism in relation to daily need for recovery was also tested (i.e., Hypothesis 6). Results revealed that the interaction was significant ( $\gamma_{31} = .20, p = .045$ ). As shown in Figure 1, the highest level of daily need recovery was among those high in neuroticism, on days when they experienced WPC and no satisfaction with family support. Also, daily WPC hindered the recovery process among those high in neuroticism, regardless of whether or not they were satisfied with the support they received from family. However, for those low in neuroticism, WPC was only associated to need for recovery on days when they were dissatisfied with emotional support from family. In fact, when they were satisfied with emotional support from family and also reported WPC during the evening, their need for recovery was lower than when they had no WPC. Therefore, the most successful recovery pattern was found among those low in neuroticism when they perceived emotional support from family and reported WPC. Thus, emotional support’s effect on need for recovery was potentialized when individuals low in neuroticism worried and ruminated about work. Hypothesis 6 was thus supported. Results are discussed in details in the next section.

Table 2. Hierarchical linear modeling analyses for variables predicting need for recovery

	Null model			Model 1			Model 2			Model 3			Model 4			Model 5		
	Coef.	$t$	$p$	Coef.	$t$	$p$	Coef.	$t$	$p$	Coef.	$t$	$p$	Coef.	$t$	$p$	Coef.	$t$	$p$
Intercept $\gamma_{00}$	3.61	15.38	<.001	3.62	15.36	<.001	3.61	15.38	<.001	3.51	15.34	<.001	3.61	16.92	<.001	3.61	16.87	<.001
<b>Level 1</b>																		
WPC $\gamma_{10}$				.30	1.37	.180				.25	1.27	.215				.24	0.96	.348
Emotional support from family $\gamma_{20}$							-.19	-1.12	.272	-.12	-0.80	.429				-.12	-0.71	.483



#### 4. Discussion

This study addresses an important question linking two research areas that have rarely been combined: recovery and work-family enrichment. The main objective was to determine the influence of emotional support from family and neuroticism on the daily relationship between work-related perseverative cognition and employees' need for recovery. It was hypothesized that emotional support from family and neuroticism would have a direct effect on need for recovery and also play a buffering role on a daily basis. Results from the hierarchical linear models did not support neither the hypothesized positive relationships between WPC, family support and need for recovery nor the buffering effect of family support between WPC and need for recovery. These results contradict findings from previous studies (e.g., Cohen & Wills, 1985; Cropley & Millward, 2009; Flaxman et al., 2012) and are probably due to the presence of a three-way interaction with WPC, emotional support from family and neuroticism. In fact, this significant interaction highlights the key role of neuroticism to fully understand the relationship between WPC, family support and recovery.

The results support all of the assumptions regarding neuroticism. First, neuroticism was significantly predictive of individuals' daily need for recovery. This finding provides some support to the state-trait theory of anxiety (Eysenck, 1967) and the finding by Langelaan et al. (2006) that neuroticism is the personality trait most strongly related to burnout among the "Big Five". According to these researchers, those high in neuroticism tend to magnify the perceived burden of job demands, which promotes burnout. Therefore, employees high in neuroticism may also exacerbate their daily work-related stressors (e.g., chronic pressure from supervisors) and feel more exhausted on a daily basis. Second, in this study, neuroticism significantly predicted daily WPC. This result is in line with the proposition that a ruminative response style is a prominent cognitive process for those high in neuroticism (Roelofs et al., 2008).

Third, the results support the existence of an interaction between neuroticism, emotional support from family and WPC that affects employees' daily need for recovery. As predicted, the relations of emotional support and WPC to need for recovery were not the same among employees who are high versus low in neuroticism. On the one hand, the highest daily level of need for recovery was observed among those high in neuroticism when they were dissatisfied with emotional support from family. Moreover, for this subsample, emotional support did not have a buffering effect on the relationship between WPC and need for recovery. Among those high in neuroticism, the strength of the relationship remained the same whether or not employees were satisfied with emotional support from family, showing no beneficial outcome from such support. This result could be explained by the strong likelihood that individuals high in neuroticism will have negative conversations (about their work) with those who offer them social support (Zellars & Perrewé, 2001). It could also be explained by their tendency to interpret information from their environment emotionally and negatively (i.e., interpretation bias; Mathews & MacLeod, 1994). Therefore, even if they reported to be satisfied with emotional support from family, they failed to benefit from it.

When employees low in neuroticism worried and ruminated about work, they benefited from emotional support from family in the reduction of their daily need for recovery. Conversely to those high in neuroticism, these emotionally stable employees seem to benefit from discussing work-related issues when they received emotional support, by accumulating resources, such as self-esteem, that help them to address their problems at work. As emotionally stable individuals are less prone to interpretation bias (Mathews & MacLeod, 1994), they may have used the comments made by their relatives in a constructive manner, which reduced the deleterious effects of WPC on their need for recovery. However, when they do not report worry and rumination about work-related issues during the evening, they may not take advantage of the protective mechanism associated with emotional support from family. This may explain why they had a higher need for recovery when they had no WPC and were not satisfied with their family support than when they had WPC and were satisfied about their support. Furthermore, it could be particularly important to them to receive support when they have negative thoughts, but when it is not the case, there are other factors that could affect their need for recovery. If, for example, their worries are about domestic tasks, there is no need for emotional support, but rather for instrumental support.

##### 4.1 Theoretical Implications

The findings support previous research based on the ER model (Meijman & Mulder, 1998) and COR model (Hobföll, 1989) by suggesting that individuals should try to take a break from work demands by psychologically detaching themselves from work-related negative thoughts as they use the same functional systems and resources than those needed during the workday (e.g., Flaxman et al., 2012; Sonnentag et al., 2010). This study also presented emotional support from family as a home-related contextual resource that helps to reduce the deleterious effect of WPC on need for recovery, thus supporting the work-home resources model (Ten



Brummelhuis & Bakker, 2012). However, the principal contribution of the study is highlighting that emotional support from family was a resource only for those low in neuroticism.

This study reinforces previous findings that family can be a source of social support strongly associated with resource replenishment (Greenhaus & Powell, 2006; Ruderman, Ohlott, Panzer, & King, 2002; Ten Brummelhuis & Bakker, 2012). In this study, emotional support from family was resourceful only to those low in neuroticism. This finding converges with the work-family enrichment hypothesis (Greenhaus & Powell, 2006), which states that having multiple roles, such as being a parent, a spouse and a worker, can be a source of enrichment for employees (for review, see: McNall, Nicklin, & Masuda, 2010). Recently, Ferguson et al. (2012) found that employees acquire personal resources (e.g., self-esteem) when they receive social support from their partner. According to these scholars, when additional resources are acquired through emotional support from family, it boosts their emotional state, helping them manage family and work demands, thus leading to increased satisfaction in both family and work domains. This boosted emotional state may reduce the importance of WPC among those low in neuroticism, which could explain the decreased need for recovery notwithstanding the presence WPC. In this case, emotional support from family could be perceived as being even more resourceful when they worry or ruminate. In this vein, Maslach and Jackson (1985) showed that those who have a spouse and children were less likely to experience burnout than those who were single. Accordingly, family appears to be an important emotional resource for those who can benefit from it (i.e., those low in neuroticism, and especially when they have a high level of WPC). Even if having a family involves additional demands and efforts after the workday, results indicate that family members may help employees low in neuroticism to generate more personal resources than strain. Supporting the enrichment hypothesis (Greenhaus & Powell, 2006) rather than the scarcity hypothesis (see Goode, 1960), the results show that individuals do not necessarily experience conflict and stress by participating in multiple roles. This study also goes further by suggesting that the assumptions related to the enrichment model mainly apply to employees low in neuroticism.

While this study failed to confirm the direct-effect hypothesis of emotional support proposed by some researchers (e.g., Ten Brummelhuis & Bakker, 2012; Viswesvaran et al., 1999), the meta-analysis by Cohen and Wills (1985) offers explanations for this result. These scholars highlighted that studies supporting the buffering hypothesis evaluated support's *function*, whereas those showing evidence for a direct effect assessed the individual's degree of *integration* in a social network (i.e., the number of people with whom the individual is engaged in a social relationship). The scale used in the present study (QSSP; Bruchon-Schweitzer & Quintard, 2001) assesses employees' satisfaction with the comfort and listening received from family members (i.e., function of emotional support), and does not account for their degree of integration in their social network. Consequently, direct effect of emotional support from family on employees' daily need for recovery was not observed. Since functional support and social integration represent two different processes by which support may improve employees' well-being (Cohen & Wills, 1985), researchers are encouraged to combine a functional as well as a structural measure to assess support in future studies.

#### 4.2 Strengths, Limitations and Future Research

This study established the nature of the relationship between WPC, need for recovery, emotional support from family and neuroticism through daily diaries. Using diaries over five consecutive workdays allowed the observation of the variability of participants' affects in their real context of occurrence (Reis & Gable, 2000).

In spite of the relevant results obtained in this study, it is important to note its limitations. First, the study is correlational; it is therefore impossible to establish causality between the variables tested. Researchers are encouraged to replicate this study's findings with an experience sampling method (ESM; see Larson & Csikszentmihalyi, 1983). Second, there is a potential bias due to the self-reported nature of the data. Future studies could use physiological indicators of need for recovery (e.g., adrenaline secretion) to vary the sources of information (Flaxman et al., 2012). Finally, while it is recognized that the sample size was small, Ohly et al. (2010) built a strong argument showing that sample size greater than 30 is sufficient to reduce biased results. However, researchers are encouraged to replicate this study with a larger sample size among various types of professional occupations.

#### 4.3 Practical Implications and Conclusion

Findings from this study have considerable implications for intervention. In fact, these results suggest that organizations would benefit from establishing conditions (e.g., work-life policies) that promote the replenishment of their employees' personal resources, since the replenishment of energy during periods of respite has been found to be related to performance at work (Sonnentag, 2003). For instance, organizations could

permit staff to adjust work schedules to allow for time with their partner, as this may enable them to receive more emotional support.

These results also highlight that family support did not help reduce the harmful effects of WPC among individuals high in neuroticism in this sample. Thus, interventions oriented toward emotional support from family may be less effective with these employees. However, other interventions may be resourceful to them. As the current state of knowledge implies that WPC may have negative effects on employees' well-being in the long term (Sonnentag et al., 2010), fostering actions to reduce the frequency of worry and rumination among those high in neuroticism, who are particularly prone to such cognition, seems of particular importance. Martin and Tesser (1996) propose three mechanisms that can alleviate perseverative cognition over time: goal attainment, distraction and disengagement from the goal. Employers could encourage goal attainment by training their employees to divide their responsibilities into tasks that can be achieved on a daily basis (Cropley & Millward, 2009). Mastery experiences (e.g., through sports, learning activities and volunteer work) have been identified as efficient for distracting individuals from job-related issues. Finally, disengagement from work goals can be facilitated by establishing clear work/home boundaries (e.g., not using work-related technologies at home; Cropley & Millward, 2009). Ultimately, resources are an important aspect to consider, but in order to benefit from them, they have to be considered as resources. For those low in neuroticism, emotional support from family is a valuable resource when they feel worried. On the other hand, for those high in neuroticism, emotional family support does not seem to be perceived as a resource regardless of the level of WPC.

### Acknowledgements

This work was supported by the Social Sciences and Humanities Research Council of Canada (SSHRC; 430-2013-000731).

### References

- Aluja, A., Rossier, J. R. M., García, L. F., Angleitner, A., Kuhlman, M., & Zuckerman, M. (2006). A cross-cultural shortened form of the ZKPQ (ZKPQ-50-cc) adapted to English, French, German, and Spanish languages. *Personality and Individual Differences*, 41(4), 619-628. <http://dx.doi.org/2048/10.1016/j.paid.2006.03.001>
- Aryee, S., Srinivas, E. S., & Tan, H. H. (2005). Rhythms of life: Antecedents and outcomes of work-family balance in employed parents. *Journal of Applied Psychology*, 90(1), 132-146. <http://dx.doi.org/2048/10.1037/0021-9010.90.1.132>
- Binnewies, C., Sonnentag, S., & Mojza, E. J. (2009). Feeling recovered and thinking about the good sides of one's work. *Journal of Occupational Health Psychology*, 14(3), 243-256. <http://dx.doi.org/2048/10.1037/a0014933>
- Binnewies, C., Sonnentag, S., & Mojza, E. J. (2010). Recovery during the weekend and fluctuations in weekly job performance: A week-level study examining intra-individual relationships. *Journal of Occupational and Organizational Psychology*, 83(2), 419-441. <http://dx.doi.org/10.1348/096317909X418049>
- Bolger, N., & Eckenrode, J. (1991). Social relationships, personality, and anxiety during a major stressful event. *Journal of Personality and Social Psychology*, 61, 440-449. <http://dx.doi.org/2048/10.1037/00223514.61.3.440>
- Brosschot, J. F., Gerin, W., & Thayer, J. F. (2006). The perseverative cognition hypothesis: A review of worry, prolonged stress-related physiological activation, and health. *Journal of Psychosomatic Research*, 60(2), 113-124. <http://dx.doi.org/2048/10.1016/j.jpsychores.2005.06.074>
- Bruchon-Schweitzer, M., & Quintard, B. (2001). *Personnalités et Maladies. Stress, coping et ajustement*. Paris: Dunod.
- Cohen, S., & Syme, S. L. (1985). Issues in the study and application of social support. *Social Support and Health*, 3, 3-22.
- Cohen, S., & Wills, T. A. (1985). The stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98, 310-357. <http://dx.doi.org/10.1037/0033-2909.98.2.310>
- Cropley, M., & Millward, L. J. (2009). How do individuals "switch-off" from work during leisure? A qualitative description of the unwinding process in high and low ruminators. *Leisure Studies*, 28(3), 333-347. <http://dx.doi.org/10.1080/02614360902951682>

- Demerouti, E., Bakker, A. B., & Sanz-Vergel, A. I. (2013). Recovery and work-life interface. In D. A. Major, & R. J. Burke (Eds.), *Handbook of Work-Life Integration Among Professionals: Challenges and Opportunities* (pp. 225-244). Cheltenham, UK: Edward Elgar. <http://dx.doi.org/10.4337/9781781009291.00022>
- Eysenck, H. J. (1967). *The biological basis of personality*. Springfield, NJ: Thomas.
- Ferguson, M., Carlson, D., Zivnuska, S., & Whitten, D. (2012). Support at work and home: The path to satisfaction through balance. *Journal of Vocational Behavior*, 80(2), 299-307. <http://dx.doi.org/10.1016/j.jvb.2012.01.001>
- Flaxman, P. E., Ménard, J., Kinman, G., & Bond, F. W. (2012). Academic's experiences of a respite from work: Effects of self-critical perfectionism and perseverative cognition on post-respite well-being. *Journal of Applied Psychology*, 97(4), 854-865. <http://dx.doi.org/10.1037/a0028055>
- Geurts, S. A. E. (2014). Recovery from work during off-job time. In G. Bauer, & O. Hämmig (Eds.), *Bridging occupational, organizational and public health* (pp. 193-208). Dordrecht (The Netherlands): Springer Science+Business Media. [http://dx.doi.org/10.1007/978-94-007-5640-3\\_12](http://dx.doi.org/10.1007/978-94-007-5640-3_12)
- Goode, W. J. (1960). A theory of role strain. *American Sociological Review*, 25, 483-496. <http://dx.doi.org/10.2307/2092933>
- Goodman, L. A. (1961). Snowball sampling. *The Annals of Mathematical Statistics*, 148-170. <http://dx.doi.org/10.1214/aoms/1177705148>
- Greenhaus, J. H., Ziegert, J. C., & Allen, T. D. (2012). When family-supportive supervision matters: Relations between multiple sources of support and work family balance. *Journal of Vocational Behavior*, 80(2), 266-275. <http://dx.doi.org/10.1016/j.jvb.2011.10.008>
- Greenhaus, J. H., & Powell, G. N. (2006). When work and family are allies: A theory of work-family enrichment. *Academy of Management Review*, 31(1), 72-92. <http://dx.doi.org/10.5465/AMR.2006.19379625>
- Hobföll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, 44(3), 513-524. <http://dx.doi.org/10.1037/0003-066X.44.3.513>
- Hobföll, S. E. (1998). *Stress, Culture, and Community: The Psychology and Physiology of Stress*. New York, NY: Plenum. <http://dx.doi.org/10.1007/978-1-4899-0115-6>
- House, J. S. (1981). *Work stress and social support*. Reading, MA: Addison-Wesley.
- IBM Corp. (2012). *IBM SPSS Statistics for Windows, Version 21.0*. Armonk, NY: IBM Corp.
- Jansen, N. W., Kant, I., & van den Brandt, P. A. (2002). Need for recovery in the working population: Description and associations with fatigue and psychological distress. *International Journal of Behavioral Medicine*, 9(4), 322-340. <http://dx.doi.org/10.1207/S15327558IJBM0904.03>
- Langelaan, S., Bakker, A. B., van Doornen, L. J. P., & Schaufeli, W. B. (2006). Burnout and work engagement: Do individual differences make a difference? *Personality and Individual Differences*, 40(3), 521-532. <http://dx.doi.org/10.1016/j.paid.2005.07.009>
- LaRocco, J. M., House, J. S., & French, J. R. (1980). Social support, occupational stress, and health. *Journal of Health and Social Behavior*, 21(3), 202-218. <http://dx.doi.org/10.2307/2136616>
- Larson, R., & Csikszentmihalyi, M. (1983). The experience sampling method. In H. T. Reis (Ed.), *Naturalistic approaches to studying social interaction. New directions for methodology of social and behavioral sciences* (pp. 41-56). San Francisco, CA: Jossey-Bass.
- Le, K., Donnellan, M. B., Spilman, S. K., Garcia, O. P., & Conger, R. (2014). Employees behaving badly: Associations between adolescent reports of the Big Five and counterproductive work behaviors in adulthood. *Personality and Individual Differences*, 61, 7-12. <http://dx.doi.org/10.1016/j.paid.2013.12.016>
- Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83(404), 1198-1202. <http://dx.doi.org/10.1080/01621459.1988.10478722>
- Martin, L. L., & Tesser, A. (1996). Some ruminative thoughts. In R. S. Wyer Jr. (Ed.), *Advances in social cognition* (Vol., IX, pp. 1-47). Hillsdale, NJ: Erlbaum.
- Maslach, C., & Jackson, S. E. (1985). The role of sex and family variable in burnout. *Sex Roles*, 12, 837-850. <http://dx.doi.org/10.1007/BF00287876>

- Mathews, A., & MacLeod, C. (1994). Cognitive approaches to emotion and emotional disorders. *Annual Review of Psychology*, *45*, 25-50. <http://dx.doi.org/10.1146/annurev.ps.45.020194.000325>
- Ménard, J., Foucreault, A., & Trépanier, S. G. (Under review). Working after the workday can be respiteful on a daily basis: A diary study among workers. *European Journal of Work and Organizational Psychology*, *40*.
- Meijman, T. F., & Mulder, G. (1998). Psychological aspects of workload. In P. J. D. D. H. Thierry (Ed.), *Handbook of work and organizational psychology* (Vol. 2, pp. 4-33). Hove, England: Psychology Press.
- McNall, L. A., Nicklin, J. M., & Masuda, A. D. (2010). A meta-analytic review of the consequences associated with work-family enrichment. *Journal of Business and Psychology*, *25*(3), 381-396. <http://dx.doi.org/10.1007/s10869-009-9141-1>
- Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research. *Journal of Personnel Psychology*, *9*(2), 79-93. <http://dx.doi.org/10.1027/1866-5888/a000009>
- Park, J., Kitayama, S., Karasawa, M., Curhan, K., Markus, R. H., Kawakami, N., ... Ryff, C. D. (2013). Clarifying the links between social support and health: Culture, stress, and neuroticism matter. *Journal of Health Psychology*, *18*(2), 226-235. <http://dx.doi.org/10.1177/1359105312439731>
- Radstaak, M., Geurts, S. A., Beckers, D. G., Brosschot, J. F., & Kompier, M. A. (2014). Work stressors, perseverative cognition and objective sleep quality: A longitudinal study among Dutch Helicopter Emergency Medical Service (HEMS) pilots. *Journal of Occupational Health*, *56*, 469-477. <http://dx.doi.org/10.1539/joh.14-0118-OA>
- Ragsdale, J. M., Beehr, T. A., Grebner, S., & Han, K. (2011). An integrated model of weekday stress and weekend recovery of students. *International Journal of Stress Management*, *18*(2), 153-180. <http://dx.doi.org/10.1037/a0023190>
- Raudenbush, S. W., Bryk, A. S., & Congdon, R. (2011). *HLM 7 for Windows* [Computer software]. Lincolnwood, IL: Scientific Software International, Inc.
- Reis, H. T., & Gable, S. (2000). Event-sampling and other methods for studying everyday experience. In H. T. Reis, & C. M. Judd (dir.), *Handbook of research methods in social and personality psychology* (pp. 190-222). United Kingdom: Cambridge University press.
- Robinson, M. D. (2007). Personality, affective processing, and self-regulation: Toward process based views of extraversion, neuroticism, and agreeableness. *Social and Personality Psychology Compass*, *1*(1), 223-235.
- Robinson, M. D., Wilkowski, B. M., Kirkeby, B. S., & Meier, B. P. (2006). Stuck in a rut: Perseverative response tendencies and the neuroticism-distress relationship. *Journal of Experimental Psychology: General*, *135*(1), 78-91. <http://dx.doi.org/10.1037/0096-3445.135.1.78>
- Roelofs, J., Huibers, M., Peeters, F., & Arntz, A. (2008). Effects of neuroticism on depression and anxiety: Rumination as a possible mediator. *Personality and Individual Differences*, *44*(3), 576-586. <http://dx.doi.org/10.1016/j.paid.2007.09.019>
- Ruderman, M. N., Ohlott, P. J., Panzer, K., & King, S. N. (2002). Benefits of multiple roles for managerial women. *Academy of Management Journal*, *45*(2), 369-386. <http://dx.doi.org/10.2307/3069352>
- Sonnentag, S. (2003). Recovery, work engagement, and proactive behavior: A new look at the interface between nonwork and work. *Journal of Applied Psychology*, *88*(3), 518-528. <http://dx.doi.org/10.1037/0021-9010.88.3.518>
- Sonnentag, S., Binnewies, C., & Mojza, E. J. (2010). Staying well and engaged when demands are high: The role of psychological detachment. *Journal of Applied Psychology*, *95*(5), 965-976. <http://dx.doi.org/10.1037/a0020032>
- Sonnentag, S., Kuttler, I., & Fritz, C. (2010). Jobs stressors, emotional exhaustion, and need for recovery: A multi-source study of the benefits of psychological detachment. *Journal of Vocational Behavior*, *76*(3), 355-365. <http://dx.doi.org/10.1016/j.jvb.2009.06.005>
- Sonnentag, S., & Zijlstra, F. R. H. (2006). Job characteristics and off-job activities as predictors of need for recovery, well-being, and fatigue. *Journal of Applied Psychology*, *91*, 330-350. <http://dx.doi.org/10.1037/0021-9010.91.2.330>

- Sluiter, J. K., van der Beek, A. J., & Frings-Dresen, M. H. W. (1999). The influence of work characteristics on the need for recovery and experienced health: A study on coach drivers. *Ergonomics*, 42(4), 573-583. <http://dx.doi.org/10.1080/001401399185487>
- Ten Brummelhuis, L. L., & Bakker, A. B. (2012). A resource perspective on the work-home interface: The work-home resources model. *American Psychologist*, 67(7), 545-556. <http://dx.doi.org/10.1037/a0027974>
- Viswesvaran, C., Sanchez, J. I., & Fisher, J. (1999). The role of social support in the process of work stress: A meta-analysis. *Journal of Vocational Behavior*, 54(2), 314-334. <http://dx.doi.org/10.1006/jvbe.1998.1661>
- Watson, D., & Clarke, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin*, 96, 465-490. <http://dx.doi.org/10.1037/0033-2909.96.3.465>
- Winwood, P. C., Lushington, K., & Winefield, A. H. (2006). Further development and validation of the Occupational Fatigue Exhaustion Recovery (OFER) Scale. *Journal of Occupational and Environmental Medicine*, 48(4), 381-438. <http://dx.doi.org/10.1097/01.jom.0000194164.14081.06>
- Zellars, K. L., & Perrewé, P. L. (2001). Affective personality and the content of emotional social support: Coping in organizations. *Journal of Applied Social Psychology*, 31(3), 469-467. <http://dx.doi.org/10.1037/0021-9010.31.3.469>

### Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

# A Study of the Perceived Stress Level of University Students in Hong Kong

Joey Man Yee KWOK<sup>1</sup> & Douglas Kei Shing NG<sup>2</sup>

<sup>1</sup>Department of Applied Psychology, Hong Kong Polytechnic University, Hong Kong

<sup>2</sup>School of Science and Technology, Open University of Hong Kong, Hong Kong

Correspondence: Joey Man Yee KWOK, Department of Applied Psychology, Hong Kong Polytechnic University, Hong Kong. E-mail: joey.kwok@connect.polyu.hk

Received: October 3, 2016

Accepted: October 26, 2016

Online Published: November 3, 2016

doi:10.5539/ijps.v8n4p91

URL: <http://dx.doi.org/10.5539/ijps.v8n4p91>

## Abstract

**Background.** In the school year 2015/2016, a significantly increased suicide rate among students in Hong Kong raised alarm bells to the public. High levels of stress among Hong Kong students was believed to be one of the main causes of these suicide incidents. In order to examine the stress levels of Hong Kong students, we targeted the group of undergraduates and initiated this research study.

**Objective.** This study aimed to provide more information and objective analysis with regard to the stress levels of undergraduate students in Hong Kong.

**Method.** There was a total ( $N = 337$ ) number participants enrolled in this study at the Open University of Hong Kong. Meanwhile, Perceived Stress Scale-10 (PSS-10) was adopted as the measure of perceived stress level of university students. The Perceived Stress Scale-10 is a 10-item scale designed to measure the self-reported perceived stress level. The set of questionnaires also includes The Beck Anxiety Inventory (BAI) scale which was used for evaluating the convergent validity of PSS-10; The General Self Efficacy (GSE) Scale and the Subjective Happiness Scale (SHS) which were used for evaluating the related divergent validity.

**Results.** Referring to the findings, the stress level of the participants who were mostly from the age group of 18-29 had an average score of 19.02 which was considered to be higher than the standard score ( $M = 14.2$ ;  $SD = 6.2$ ), and thus undergraduate students who belonged to this age group were found to present a potential higher stress level among those participants.

**Conclusions.** This study simply showed the general stress level of the target population, and such information could provide a meaningful reference for further study of stress levels among Hong Kong students. However, it could not show the other detailed information such as the reasons for causing a high potential stress. Therefore, it suggested that the follow-up study could focus more specifically on a particular type of stress (i.e., academic stress) in investigation.

**Keywords:** perceived stress, university students, factor analysis

## 1. Introduction

### 1.1 Stress Level of Hong Kong University Students

“Since the start of the academic year, a spike in the number of students in Hong Kong who have committed suicide has seen 22 young people” (South China Morning Post, 2016). It was definitely an alarming message to Hong Kong people, as well as the education system in Hong Kong. According to the statistics from the Centre for Suicide Research and Prevention of the University of Hong Kong (2015), there were around 23 student suicides on the average between the year of 2010 and 2014 which implied that a significantly increasing rate of suicides was found in Hong Kong recently.

A recent study conducted by Cheung and his colleagues (2016) suggested that when baccalaureate nursing students were having sleep problems, financial difficulty, relationship crises with family/friends, physical/mental health problems, lack of leisure activity, etc., these would affect the students to perceive mild to severe anxiety, stress and depression (Cheung et al., 2016). It was believed that similar conditions might be found on other undergraduate students of different faculties. Besides, several studies revealed a high prevalence rate of

depression among the first-year students in Hong Kong (Song et al., 2008; Wong, Cheung, Chan, Ma, & Tang, 2006). This might relate to adaption problems in new learning environments and as well as the stress from both social and academic demands (Uehara, Takeuchi, Kubota, Oshima, & Ishikawa, 2010). Other studies also revealed that moderate depression was prevalent in Chinese university students (Chen et al., 2013; Ibrahim, Kelly, Adams, & Glazebrook, 2013). Referring to Hong Kong culture, people are generally proud of their highly competitive abilities. However, this may result in the related pressure in daily living outside of study. According to the study of Shamsuddin (2013), high academic expectation was found to be one of the sources in contributing a risk factor on physical and mental health problems of students. From the progress report of Committee on Prevention of Student Suicides in Hong Kong (EDB, 2016), the findings showed that about 20% out of the 34 student suicide cases between 1 September 2013 and 30 April 2016 in Hong Kong, resulted from mental illnesses, such as early psychosis, depression and anxiety disorders. Also, 80% of student suicide cases were related to adjustment issues and 60% of the 34 cases in these recent years were found to be related to education adjustment problems.

In order to address the questions of (1) why young people have such a high level of stress and (2) what severe stress level they are experiencing, we started to design a quantitative research study with hypothesis of (1) stress levels of participants could be significantly indicated by the Perceived Stress Scale-10 (PSS-10) scores and (2) demographic profile of respondents could provide related reasons for the stress levels of an individual. This study started with the target population of university students. The aboved-mentioned PSS-10 scale (Appendix A) was adopted as the main scale for investigating the stress level of the participants. On the other hand, the Beck Anxiety Inventory (BAI) (Appendix B), General Self Efficacy Scale (GSE) (Appendix C) and the Subjective Happiness Scale (SHS) (Appendix D) were the instruments selected for evaluating the convergent and divergent validities with PSS-10 and this would be open for further discussion.

## 2. Method

### 2.1 Participants

Participants (N = 337) consisted of undergraduate students from School of Science and Technology, The Open University of Hong Kong (OUHK). Data collection was done between March and April, 2016.

A 10% random sampling check for accuracy against the data in the original survey forms was conducted after the whole data entry process had been completed. No apparent error was detected by the sampling check on forms numbered 23, 27, 43, 53, 56, 68, 76, 81, 84, 111, 135, 144, 146, 157, 165, 168, 173, 187, 190, 195, 202, 211, 223, 253, 260, 263, 264, 268, 286, 287, 311, 312, 324 and 326. With the survey precautions and accuracy checks taken prior to data analysis, it was considered that the data for this research had been acquired as accurate and as reliable as possible.

Participants completed demographic questions on variables such as age, gender, country of birth, level of study program, study satisfaction, life satisfaction, job status and relationship status. Table 1 shows the demographic profile of respondents. Participants ranged in age from 18 to 36 (M = 21.3, SD = 2.4). Over half of participants were male (53.1%). Nearly all of the participants were enrolled in Bachelor Degree Programs (99.1%). 61.5% of participants were satisfied with their studies and 70.6% of participants were satisfied with their life. 58.5% of participants were working part time or full time. The majority of the participants were single (71.8%).

Table 1. Demographic profile of respondents

Variables		N = 337
Age, n (%)	18-23	298 (88.4)
	24-29	34 (10.1)
	30-35	2 (.6)
	36 above	2 (.6)
Gender, n (%)	Female	157 (46.6)
	Male	179 (53.1)
Country of Birth, n (%)	Hong Kong	291 (83.4)
	Mainland China	52 (15.4)
	Other	4 (1.2)

Level of study programme, <i>n</i> (%)	Diploma or Associate Degree	1 (.3)
	Degree	334 (99.1)
	Master	0 (0)
	Doctoral	2 (.6)
Study satisfaction, <i>n</i> (%)	Satisfied	39 (11.6)
	Quite satisfied	168 (49.9)
	Not satisfied with	117 (34.7)
	Dissatisfied	13 (3.9)
Life satisfaction, <i>n</i> (%)	Satisfied	46 (13.6)
	Quite satisfied	192 (57.0)
	Not satisfied with	83 (24.6)
	Dissatisfied	16 (4.7)
Job status, <i>n</i> (%)	Unemployed	139 (41.2)
	Part time	191 (56.7)
	Full time	6 (1.8)
Relationship status, <i>n</i> (%)	Single	242 (71.8)
	In relationship	88 (26.1)
	Married	5 (1.5)

## 2.2 Procedure

Participants were recruited from the School of Science and Technology at the Open University of Hong Kong. The informed consent form together with a set of Chinese questionnaires which included the data collections of Demographic profile of respondents; Perceived Stress Scale-10 (PSS-10); Beck Anxiety Inventory (BAI); General Self-Efficacy (GSE); and Subjective Happiness Scale (SHS), were delivered to OUHK students after class between March and April in 2016. The related procedure was described as follows.

Firstly, the participants were asked to remain seated if they were willing to participate in this research study. Secondly, the class teacher helped to read the general instructions and deliver the set of questionnaires to each of the participants. Thirdly, those participants were asked to complete the questionnaire individually and anonymously within the required time of 15 minutes. Finally, the entire completed questionnaire was folded in half and put into a collection box by the participant.

## 2.3 Data Analysis

The Exploratory Factor Analysis (EFA) was done by SPSS version 22 in order to explore the links between the observed variables (items) and the latent variables (factors) to identify the factor structure. Only factors with eigenvalues greater than 1 were retained. Factor loadings above 0.40 were required for the interpretation of the factor structure (Hogarty, Hines, Kromrey, Ferron, & Mumford, 2005). Reliability analyses were reported by Cronbach's alpha coefficient. Cronbach's alpha values above 0.7 were considered as high internal consistency and those between 0.6 to 0.7 were considered as satisfactory internal consistency (Nunnally & Bernstein, 1999).

In the second part of the questionnaire (PSS-10), some item included positively-keyed and then those positively-keyed items were "reverse-scored" before computing individuals' total scores and before conducting many psychometric analyses, which included items 4, 5, 6 and 7.

A test on the normality of distribution of collected data was applied to ensure the appropriateness of the application of parametric tests in this study. The normality test indicated that the data were normally distributed since all the measured variables were all smaller than 2 and all the kurtosis values were smaller than 7.



## 2.4 Instruments

### 2.4.1 Background on Perceived Stress Scale-10

PSS-10 (Cohen & Williamson, 1988) (Appendix A) is a measure of the extent of how an individual perceives his/her life as uncontrollable, unpredictable, and overloading (Roberti, Harrington, & Storch, 2006). Participants are required to answer a 5-point Likert scale indicating how often an individual thinks or feels in a certain way about each question during the last month. The 5-point Likert scale which ranges from 0 (never) to 4 (very often) could show a high indication of perceived stress level by ranging from 0 to 40.

The PSS was originally comprised of 14 items. However, Cohen and Williamson (1988) proposed another shortened 10-item PSS version, which was considered more psychometrically superior than the old 14-item version (Ng, 2013). Since the PSS-10 version has been translated and validated in different languages (i.e., Japanese, Swedish, Spanish, Turkish, Portuguese, French and Thai), Ng (2013) proposed that it was essential to validate the PSS-10 to enable application to Chinese population. Therefore, the psychometric properties of the Chinese PSS-10 version were then examined and evaluated by Ng in 2013.

At present, there are a total of three standard versions of the PSS which include the original PSS-14, the PSS-10, and the PSS-4 (Cohen et al., 1983). PSS-14 has been reported to have a good consistency with the Cronbach's alpha .86 in the previous study of smoking-cessation intervention (Cohen et al., 1983). However, its predictive and concurrent validity were considered as moderate. Besides, Cohen and Williamson (1988) reported that the convergent validity of both the PSS-10 and PSS-4 were found to be moderate and the reliability was relatively low in PSS-4 (.60) when compared to PSS-10 (.78). Therefore, Cohen and Williamson (1988) suggested that PSS-10 is the best form among the three versions of PSS and this is the rationale for us to adopt PSS-10 as the main instrument in our study.

### 2.4.2 Other Instruments

Apart from the previous background discussion of PSS-10, other selected scales also completed by participants in this study were described below. Those selected scales have been published previously and were shown to have adequate psychometric properties (Che, Lu, Chen, Chang, & Lee, 2006; Leung, D., & Leung, A., 2011; Nan, Ni, Lee, Tam, Lam, Leung, & McDowell, 2014).

Beck Anxiety Inventory (BAI). The BAI (Appendix B) was developed by Beck and his colleagues in 1988. It is a 21-item self-report questionnaire which measures an individual on his/her severity level of anxiety symptoms. It is a 4-point Likert-type scale ranging from 0 (not at all) and 3 (severely, I could barely stand it), which could show a high indication with an increased severity level of anxiety symptoms (Beck et al., 1988). The items could be divided into two domains which are tailored to measure both the psychological complaints and somatic symptoms (Chapman, Williams, Mast, & Woodruff-Borden, 2009). BAI was then translated into a Chinese version and validated by Che and her colleagues in 2006.

General Self Efficacy Scale (GSE). The GSE (Appendix C) scale was developed by Schwarzer in 1981. It was first developed with 20-item in German version (Schwarzer et al., 1997). Jerusalem and Schwarzer (1992) then proposed another shortened form with 10-item GSE with a rather short and quick scale for practical use in measuring an individual's beliefs about their ability in performing a behavior or producing an outcome, such as academic achievement or daily decision making (Bandura, 1977). The GSE scale was then translated into different languages, including a Chinese version (Schwarzer & Jerusalem, 1995).

Subjective Happiness Scale (SHS). The SHS (Appendix D) was developed by Lyubomirsky and Lepper in 1999. It is a four-item scale for measuring an individual's subjective happiness by using a 7-point rating scale. In the SHS, the participants are required to answer to what extent each characterization is the best to describe themselves (i.e., descriptions of happy and unhappy individuals). Besides, SHS was translated into Chinese with backward translation to English (Nan et al., 2014).

## 3. Results

### 3.1 Factor Analyses

Principal components factor analyses with both Direct Oblimin (with default delta = 0) and Promax (with default kappa = 0) rotations were computed separately on both the Perceived Stress Scale (PSS), Beck Anxiety Inventory (BAI), General Self-Efficacy Scale (GSE) and Subjective Happiness Scale (SHS) in order to determine the factor structure of the scales. Several criteria were used in determining factors. First, the eigenvalue scree plot was examined. Second, items were included with factor loadings greater than 0.40. Third, conceptual clarity was considered when evaluating the factor structure.

Perceived Stress Scale (PSS). The Kaiser-Meyer-Olkin (KMO) analysis was carried out to examine the criteria of PCA for identifying the factor structure. Since Kaiser-Meyer Olkin (KMO) index was .787, the data set is suitable for factor analysis as it is greater than 0.50. Bartlett's test of sphericity was highly significant ( $\chi^2(45) = 983.843; p = 0.00$ ). This information allowed us to identify the factor model using the PCA approach.

Examination of the eigenvalue scree plot in Figure 1 with the elbow point above this debris or break revealed that either a two-factor or three factor solution was appropriate. The three-factor solution produced one factor that contained only three items and had inadequate internal consistency. In contrast, the two-factor solutions produced factor that were conceptually meaningful and had adequate internal consistency. Consequently, the two-factor solution was selected, namely, Perceived Helplessness Subscale (PHS) and Perceived Self-Efficacy Subscale (PSES).

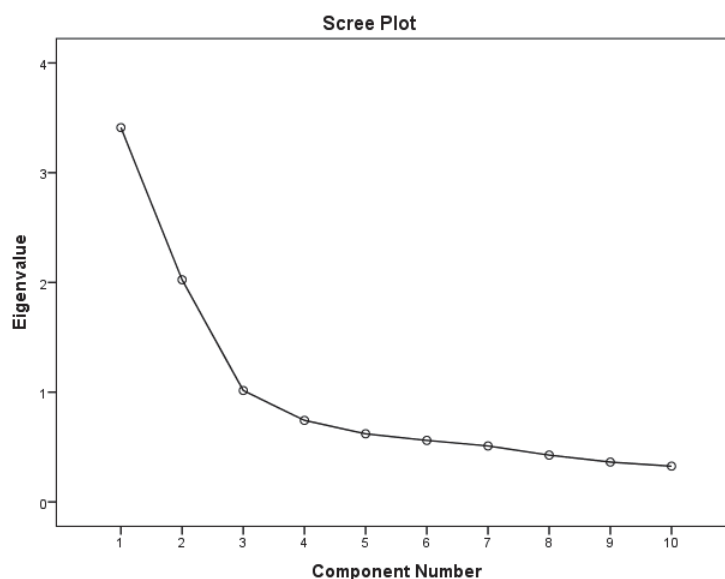


Figure 1. Scree plot for Perceived Stress Scale (PSS)

Factor loadings, eigenvalues, and percentages variance were explained by each factor and are presented in Table 2. One factor contains items describing Perceived Helplessness Subscale (PHS). The other factor contains items describing Perceived Self-Efficacy Subscale (PSES). As shown in Table 2, all items on the scale loaded unambiguously on a single factor.

Table 2. Factor loadings for the Perceived Stress Scale (PSS)

Item	In the last month, ...	PHS	PSES
1	How often have you been upset because of something that happened unexpectedly?	.682	.342
2	How often have you felt that you were unable to control the important things in your life?	.741	.231
3	How often have you felt nervous and "stressed"?	.772	.300
4	How often have you felt confident about your ability to handle your personal problems?	.405	-.576
5	How often have you felt that things were going your way?	.440	-.668
6	How often have you found that you could not cope with all the things that you had to do?	.635	.204
7	How often have you been able to control irritations in your life?	-.427	.603
8	How often have you felt that you were on top of things?	-.385	.648

9	How often have you been angered because of things that were outside of your control?	.491	.383
10	How often have you felt difficulties were piling up so high that you could not overcome them?	.685	.117
Eigenvalue		3.411	2.025
% variance		34.111	20.246

PHS = Perceived Helplessness Subscale, PHES = Perceived Self-Efficacy Subscale

According to Table 2, for exploring the dimensions of 10 measured variables, a principal component analysis was performed. Factor 1 refers to “Perceived Helplessness Subscale” (34.1%) in variance with eigenvalue 3.4, consisting of 6 items (items 1-3, 6, 9-10) with factor loadings ranging from .49-.77. Factor 2 refers to “Perceived Self-Efficacy Subscale” (20.2%) in variance with eigenvalue 2.0, which consists of 4 items (items 4-5, 7-8) with factor loadings ranging from -.67-.65.

Means and standard deviations by gender for both subscales are presented in Table 3. Independent sample Student’s *t*-tests reflected a statistical difference between the means of males and females on the PHS ( $t = 2.404$ ,  $df = 323$ ,  $p < 0.025$ ) and on the PSES ( $t = 3.488$ ,  $df = 323$ ,  $p < 0.025$ ). Gender bias for the PSS has been reported by Cohen and Williamson (1988). Females reported higher levels of overall perceived stress than males.

Table 3. Mean and standard deviation of Perceived Stress Scale (PSS) by gender

	Male ( <i>N</i> = 174)	Female ( <i>N</i> = 151)	Total ( <i>N</i> = 325)
Perceived Helplessness Subscale (PHS)	12.8351 (2.77637)	13.5644 (2.66985)	13.1707 (2.74387)
Perceived Self-Efficacy Subscale (PSES)	5.4963 (1.40032)	6.0169 (1.27208)	5.7352 (1.36421)

Beck Anxiety Inventory (BAI). The Kaiser-Meyer-Olkin (KMO) analysis was carried out to examine the criteria of PCA for identifying the factor structure. Since KMO index was .952, the data set is suitable for factor analysis as it is greater than 0.50. Bartlett’s test of sphericity was highly significant ( $\chi^2(210) = 4841.476$ ;  $p = 0.00$ ). This information allowed us to identify the factor model using the PCA approach.

Examination of the eigenvalue scree plots in Figure 2 revealed that either a one-factor solution or two-factor solution would be appropriate. Consequently, the two-factor model was selected which was conceptually meaningful and had adequate internal consistency (Beck et al., 1988). Factor loadings, eigenvalues (11.373 for factor 1, 1.417 for factor 2), and percentages of variance explained by the factor are presented in Table 4.

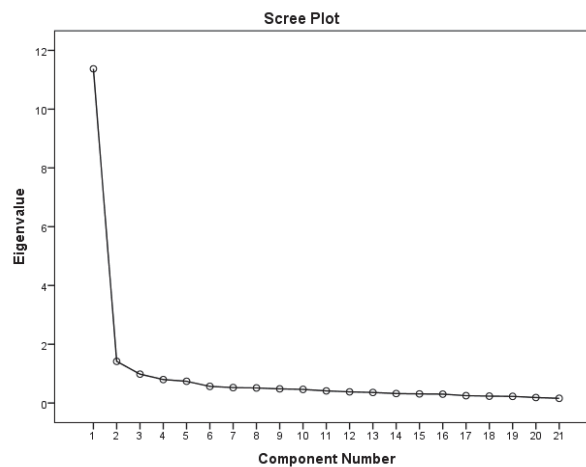


Figure 2. Scree plot for Beck Anxiety Inventory (BAI)

Table 4. Factor loadings for the Beck Anxiety Inventory (BAI) and existing loadings

Item	Somatic	cognitive	Beck et al. (1988)
1 Numbness and tingling	.595	.128	S
2 Feeling hot	.783	-.006	S
3 Wobbliness in legs	.825	-.068	S
4 Unable to relax	.009	.823	C
5 Fear of the worst happening	-.090	.874	C
6 Dizzy or lightheaded	.731	.023	S
7 Heart pounding or racing	.626	.178	S
8 Unsteady	-.031	.885	S
9 Terrified	.380	.490	C
10 Nervous	.126	.722	C
11 Feelings of choking	.624	.240	C
12 Hands Trembling	.823	-.056	S
13 Shaky	.831	-.002	S
14 Fear of losing control	.396	.458	C
15 Difficulty breathing	.810	.009	C
16 Fear of dying	.593	.110	C
17 Scared	.274	.585	S
18 Indigestion or discomfort in abdomen	.473	.323	C
19 Faint	.931	-.173	S
20 Face flushed	.747	-.029	S
21 Sweating (not due to heat)	.674	.070	S
Eigenvalue	11.373	1.417	
% variance	54.155	6.748	

Factors are classified by: S, somatic; C, cognitive

According to Table 4, for exploring the dimensions of 21 measured variables, a principal component analysis was performed. Factor 1 refers to “Somatic” (54.2%) in variance with eigenvalue 11.4, consisting of 14 items (items 1-3, 6-7, 11-13, 15-16, 18-21) with factor loadings ranging from .47-.93. Factor 2 refers to “Cognitive” (6.7%) in variance with eigenvalue 1.4 consisting of 7 items (items 4-5, 8-10, 14, 17) with factor loadings ranging from .46-.89.

Those items that were being highlighted indicated that the examined factor in this study was contradicted with the factor proposed by the author. For example, refer to the item 15 “Difficulty Breathing”. It showed obvious high loading on somatic factor. However, Beck proposed that this item belonged to the cognitive factor instead (Chapman, Williams, Mast, & Woodruff-Borden, 2009). Moreover, items 8, 11, 15-18 encountered the same contradiction problems as well. It revealed that the interpretation of these above mentioned items present differed between the participants and the author.

Means and standard deviations by gender for both subscales are presented in Table 5. Independent sample Student’s *t*-tests reflected no statistical difference between the means of males and females on the somatic factor ( $t = .233$ ,  $df = 321$ ,  $p = .816$ ) and on the cognitive factor ( $t = 1.716$ ,  $df = 321$ ,  $p = .087$ ).

Table 5. Mean and standard deviation of Beck Anxiety Inventory (BAI) by gender

	Male (N = 170)	Female (N = 153)	Total (N = 323)
1. Somatic factor	16.7451 (6.50930)	16.9106 (6.23532)	16.8403 (6.36895)
2. Cognitive factor	9.8320 (3.83295)	10.5559 (3.73004)	10.1780 (3.79051)

General Self-Efficacy Scale (GSE). The Kaiser-Meyer-Olkin (KMO) analysis was carried out to examine the criteria of PCA for identifying the factor structure. Since KMO index was .929, the data set is suitable for factor analysis as it is greater than 0.50. Bartlett's test of sphericity was highly significant ( $\chi^2(45) = 1784.578; p = 0.00$ ). This information allowed us to identify the factor model using the PCA approach.

Examination of the eigenvalue scree plots in Figure 3 revealed that a one-factor solution would provide strongest conceptual clarity without compromising psychometric properties. Factor loadings, eigenvalues, and percentages of variance explained for each factor are presented in Table 6.

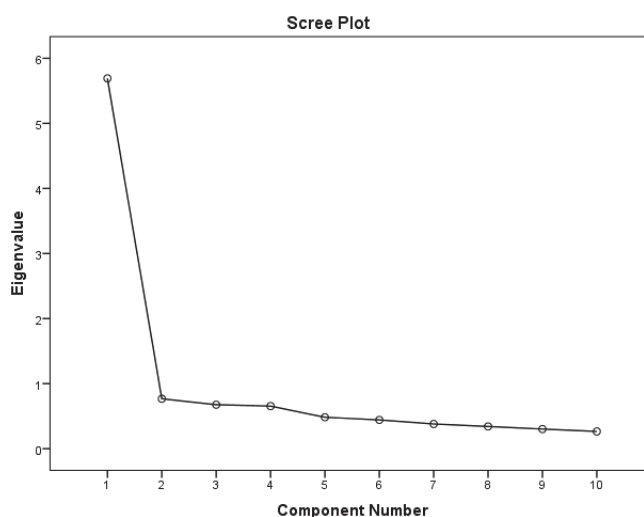


Figure 3. Scree plot for General Self-Efficacy Scale (GSE)

Table 6. Factor loadings for the General Self-Efficacy Scale (GSE)

Item	Loading
1 I can always manage to solve difficult problems if I try hard enough.	.704
2 If someone opposes me, I can find the means and ways to get what I want.	.593
3 It is easy for me to stick to my aims and accomplish my goals.	.718
4 I am confident that I could deal efficiently with unexpected events.	.796
5 Thanks to my resourcefulness, I know how to handle unforeseen situations.	.774
6 I can solve most problems if I invest the necessary effort.	.762
7 I can remain calm when facing difficulties because I can rely on my coping abilities.	.798
8 When I am confronted with a problem, I can usually find several solutions.	.763
9 If I am in trouble, I can usually think of a solution.	.803
10 I can usually handle whatever comes my way.	.807
Eigenvalue	5.692
% variance	56.916

According to Table 6, for exploring the dimensions of 10 measured variables, only one dimension was suggested. It refers to the factor of “Perceived Self-Efficacy” (56.9%) in variance with eigenvalue 5.7. Factor loadings ranged from .59-.81, which implied that all the ten items in the scale were highly correlated to the significant factor of “Perceived Self-Efficacy”.

Mean and standard deviation by gender is presented in Table 7. Independent sample Student’s t-tests reflected a statistical difference between the means of males and females on the General Self-Efficacy Scale (GSE) ( $t = -4.070$ ,  $df = 329$ ,  $p < 0.001$ ). Gender bias for the GSE has been reported by Schwarzer and Jerusalem in 1995. Females reported lower levels of GSE than males.

Table 7. Mean and standard deviation of General Self-Efficacy scale (GSE) by gender

	Male ( <i>N</i> = 176)	Female ( <i>N</i> = 155)	Total ( <i>N</i> = 331)
General Self-Efficacy Scale (GSE)	18.3412 (4.10083)	16.5430 (3.90521)	17.5201 (4.11547)

Subjective Happiness Scale (SHS). The Kaiser-Meyer-Olkin (KMO) analysis was carried out to examine the criteria of PCA for identifying the factor structure. Since KMO index was .725, the data set is suitable for factor analysis as it is greater than 0.50. Bartlett’s test of sphericity was highly significant ( $\chi^2(6) = 660.294$ ;  $p = 0.00$ ). This information allowed us to identify the factor model using the PCA approach.

Examination of the eigenvalue scree plots in Figure 4 revealed that a one-factor solution would provide strongest conceptual clarity without compromising psychometric properties. Factor loadings, eigenvalues, and percentages of variance explained by the factor are presented in Table 8.

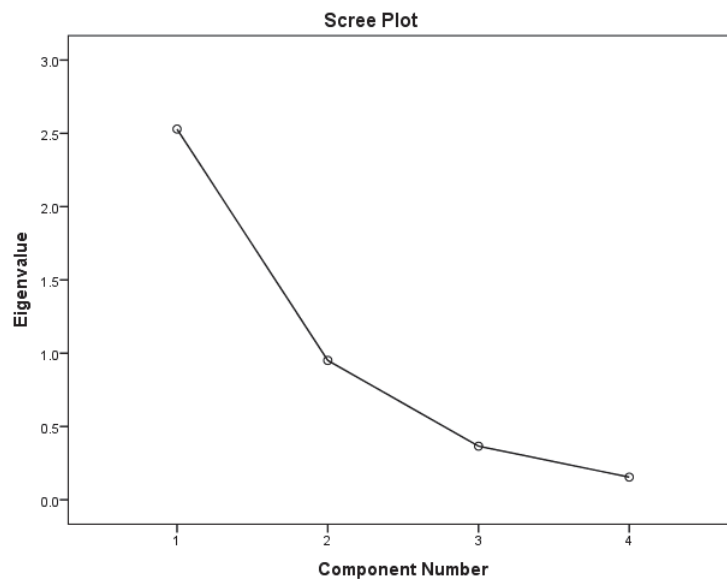


Figure 4. Scree plot for Subjective Happiness Scale (SHS)

Table 8. Factor loadings for the Subjective Happiness Scale (SHS)

Item		Loading
1	In general, I consider myself: Not a very happy person to a very happy person	.928
2	Compared to most of my peers, I consider myself: Less happy to more happy	.926
3	Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterization describe you?	.854
4	Some people are generally not very happy. Although they are not depressed, they never seem as happy as they might be. To what extent does this characterization describe you?	-.286
Eigenvalue		2.529
% variance		63.226

According to Table 8, for exploring the dimensions of 4 measured variables, only one dimension was suggested. It refers to the factor of “Perceived Happiness” (63.2%) in variance with eigenvalue 2.5. Factor loadings ranged from .85-.93, which implied that most of the items in the scale were highly correlated to the significant factor of “Perceived Happiness”.

Mean and standard deviation by gender is presented in Table 9. Independent sample Student’s *t*-tests reflected no statistical difference between the means of males and females on the Subjective Happiness Scale (SHS) ( $t = .058$ ,  $df = 331$ ,  $p = .954$ ).

Table 9. Mean and standard deviation of Subjective Happiness Scale (SHS) by gender

	Male ( <i>N</i> = 176)	Female ( <i>N</i> = 157)	Total ( <i>N</i> = 333)
Subjective Happiness Scale (SHS)	10.0831 (3.40801)	10.1051 (3.4962)	10.1068 (3.44840)

To test whether there was any significant difference on the four scales between study satisfaction and life satisfaction groups, inferential statistics were applied using parametric test. A MANOVA test was applied to the four scales in order to reveal difference between study satisfaction and life satisfaction groups. The criterion level for significance was set at 0.05 (i.e.,  $p < .05$ ). The result of the MANOVA test was unable to identify any significant difference between study satisfaction group in respect of the four scales; Wilks’  $\Lambda = .957$ ;  $p = .369$ . However, there is a significant difference between life satisfaction group in respect of the four scales; Wilks’  $\Lambda = .869$ ;  $p < 0.05$ . Follow up univariate ANOVAs indicated that Perceived Stress Scale (PSS), Beck Anxiety Inventory (BAI) and General Self-Efficacy Scale (GSE) were significantly different for different degree of life satisfaction,  $F = 7.188$ ,  $p = .000$ ,  $F = 3.131$ ,  $p = 0.026$  and  $F = 6.055$ ,  $p = 0.01$  respectively.

### 3.2 Reliability

In the second part of the questionnaire, Perceived Stress Scale-10 (PSS-10) produced the total Cronbach’s alpha of the reliability for the entire scale to be  $\alpha = .61$ . For the internal consistency of the PSS-10, factor of Perceived Helplessness Subscale (PHS) and Perceived Self-Efficacy Subscale (PSES) were .809 and .745 respectively.

In the third part of the questionnaire, Beck Anxiety Inventory (BAI) produced the total Cronbach’s alphas of the reliability for the entire scale to be  $\alpha = .956$ . For the internal consistency of the BAI, factors of Somatic and Cognitive were .945 and .896 respectively.

In the fourth part of the questionnaire, General Self-Efficacy Scale (GSE) produced the total Cronbach’s alphas of the reliability for the entire scale to be  $\alpha = .915$ . Last but not least, Subjective Happiness Scale (SHS) produced Cronbach’s alpha for the entire scale to be  $\alpha = .599$ . Cronbach’s alpha would be .894 if item 4 (relatively low in relation of “Perceived Happiness” factor) was removed from the scale.

### 3.3 Convergent and Divergent Validity

Convergent validity is agreement between measures of the same construct assessed by different methods while Discriminant validity is distinguishing between different constructs (Campbell & Fisk, 1959). The CFA replicated a four-factor structure for the scales. This was reflected in a fit indices in Table 10. All factor loadings

were positive and were above the perfect level. The convergent validity was supported by the correlation between Perceived Stress Scale-10 (PSS-10) and Beck Anxiety Inventory (BAI),  $r = .74$ ,  $p > .001$  (Table 11). The divergent validity was supported by the correlation between Perceived Stress Scale-10 (PSS-10) and General Self-Efficacy Scale (GSE),  $r = -.73$ ,  $p < .001$ ; divergent validity was also supported when comparing PSS-10 to Subjective Happiness Scale (SHS),  $r = -.65$ ,  $p < .001$ . It helps to establish the construct validity by demonstrating that the construct Perceived Stress Scale-10 (PSS-10) is different from others, such as General Self-Efficacy Scale (GSE) and Subjective Happiness Scale (SHS).

Table 10. The results of confirmatory factor analysis

Variable	$\chi^2$ statistic (df)	<i>p</i> -value	Goodness of fit indices								
			Cmin/df	RMSEA	SRMR	GFI	CFI	NFI	RFI	IFI	TLI
Four-factor model	2785.37 (943)	< 0.001	2.954	.076	.073	0.783	.790	.716	.688	.792	.770

Since the *R* value is lower the better ( $R < .6$ ) and the *I* value is higher the better ( $I > .95$ ), *R* values were reflected Goodness of fit indices (RMSEA:  $.08 < .6$ ; SRMR:  $.07 < .6$ ). However, *I* values were generally ranging from .7- .8 which were considered as fair goodness of fit indices in the related examination of this study.

Table 11. Correlations between four scales

	1	2	3	4
1 Perceived Stress	–	.744*	-.726*	-.649*
2 Anxiety		–	-.610*	-.565*
3 Self Efficacy			–	.583*
4 Happiness				–

Correlation is significant at the 0.001 (2-tailed)

The correlation among these scales is significantly different from zero at the 0.001 level (two-tailed).

#### 4. Discussion

According to the study, we have good sample sizes of over 300 data which were collected and this matched the rule of thumb that suggests at least 300 samples are required for factor analysis (Williams, Brown, & Onsmann, 2012). Referring to the findings, the stress level of the participants who were mostly from the age group of 18-29 had an average score of 19.02 which was considered to be higher than the standard score ( $M = 14.2$ ;  $SD = 6.2$ ), and there was found to be a potential higher stress among these participants. This might reflect the conditions that those participants were feeling a bit stressful at the time when they responded to our questionnaire, because it was near the end of semester and thus many examinations were coming up. Therefore, the time of data collection might be one of the determinants that influenced the results in measuring the stress level of the university students. It is suggested that we could collect the data from different time periods in order to evaluate the results of the stress level among the university students in a more objective way.

Moreover, referring to the scale of PSS-10 and GSE, both of them were proved to have gender bias issues in the construct (Taylor, 2015; Leung, D., & Leung, A., 2011). In the findings of this study, female students were tested as experiencing higher stress than those male students. Meanwhile, female students were tested as perceiving lower self-efficacy than male students. These outcomes might fulfill the discussion of gender bias issues of both PSS-10 and GSE. Also, another reason for drawing such outcomes might be because of all our participants were studying in the School of Science and Technology. Male students were believed to be generally superior in logical and scientific thinking than their female counterparts according to the traditional Chinese values. Therefore, those female students might perceive that they had less “self-efficacy” than the male students. In addition, females were also generally believed to be more sensitive in emotional feelings and expressions. Hence this might be one of the reasons to help explain why female students perceived higher stress in PSS-10 than the male. It is suggested that the study should be extended to examine the target group from expanding the area to different schools and departments within the university, or even across different universities in Hong Kong. This



would help to obtain rather more objective findings for evaluating the overall stress level of university students as well as investigating for the gender bias issues.

## 5. Conclusions

Referring to the two research questions, (1) the PSS-10 scores showed the significant stress levels of the target population. In this study, it was found that university students who were mostly from the age group of 18-29 presented a potential higher stress than the rest of the participants. However, (2) the demographic profile of respondents could not reveal the reasons for stress levels specifically. Although this quantitative study could not measure the detailed information of causal relationships, it did provide some insights into the underlying causes (i.e., gender differences). Therefore, in-depth focus group interviews are suggested to help figure out the causes of stress among university students as part of further research.

On the other hand, predictive validity of PSS-10 is suggested for further examination in the future. If we could predict whether the measured stress levels would be maintained over a period of time, then some preventive precautions could be taken for those participants who have potential higher levels of stress. It is hoped to develop the important first step in preventing someone from attempting suicide.

Last but not least, the study findings revealed the relationships between life satisfaction and the stress levels of individuals. It also endeavours to explore such potential factor in the future for the sake of investigating the related protective components for the mental and physical health of Hong Kong students.

## Acknowledgments

The authors would like to express their deepest gratitude to Dr. Cecilia Ma for technical support for this study, and to the Open University of Hong Kong for giving permission to conduct this study. Special thanks must go to Professor James Caldwell, Honorary Professor, Open University of Hong Kong for his great encouragement and for his efforts in the copy editing of this paper.

## References

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review*, 84, 191-215. <http://dx.doi.org/10.1037/0033-295X.84.2.191>
- Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, 56(6), 893-897. <http://dx.doi.org/10.1037/0022-006X.56.6.893>
- Campbell, D. T., & Fisk, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, 56, 81-106. <http://dx.doi.org/10.1037/h0046016>
- Centre for Suicide Research and Prevention. (2015). *Suicide rates by age group in Hong Kong: 1981-2014*. Retrieved from <http://csrp.hku.hk/statistics/>
- Chapman, L. K., Williams, S. R., Mast, B. T., & Woodruff-Borden, J. (2009). A confirmatory factor analysis of the Beck Anxiety Inventory in African American and European American young adults. *Journal of Anxiety Disorders*, 23(3), 387-392. <http://dx.doi.org/10.1016/j.janxdis.2008.12.003>
- Che, H. H., Lu, M. L., Chen, H. C., Chang, S. W., & Lee, Y. J. (2006). Validation of the Chinese version of Beck Anxiety Inventory. *Medician of Taiwan*, 10(4), 447-454.
- Chen, L., Wang, L., Qiu, X. H., Yang, X. X., Qiao, Z. X., Yang, Y. J., & Liang, Y. (2013). Depression among Chinese university students: Prevalence and socio-demographic correlates. *PLoS One*, 8(3), e58379. <http://dx.doi.org/10.1371/journal.pone.0058379>
- Cheung, T., Wong, S. Y., Wong, K. Y., Law, L. Y., Ng, K., Tong, M. T., ... Yip, P. S. F. (2016). Depression, anxiety and symptoms of stress among baccalaureate nursing students in hong kong: A cross-sectional study. *International Journal of Environmental Research and Public Health*, 13(8), 1-25. <http://dx.doi.org/10.3390/ijerph13080779>
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385-396. <http://dx.doi.org/10.2307/2136404>
- Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan, & S. Oskamp (Eds.), *The social psychology of health: Claremont Symposium on Applied Social Psychology* (pp. 31-67). Newbury Park, CA: Sage.

- Education Bureau. (2016). *Committee on prevention of student suicides in Hong Kong*. Retrieved from [http://www.edb.gov.hk/attachment/en/student-parents/crisis-management/about-crisis-management/CPSS\\_progress\\_report\\_en.pdf](http://www.edb.gov.hk/attachment/en/student-parents/crisis-management/about-crisis-management/CPSS_progress_report_en.pdf)
- Leung, D. Y., & Leung, A. Y. (2011). Factor structure and gender invariance of the Chinese General Self-Efficacy Scale among soon-to-be-aged adults. *Journal of advanced nursing*, 67(6), 1383-1392. <http://dx.doi.org/10.1111/j.1365-2648.2010.05529.x>
- Hogarty, K. Y., Hines, C. V., Kromrey, J. D., Ferron, J. M., & Mumford, K. R. (2005). The quality of factor solutions in exploratory factor analysis: The influence of sample size, communality, and overdetermination. *Educational and Psychological Measurement*, 65(2), 202-226. <http://dx.doi.org/10.1177/0013164404267287>
- Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research*, 47(3), 391-400. <http://dx.doi.org/10.1016/j.jpsychires.2012.11.015>
- Jerusalem, M., & Schwarzer, R. (1992). Self-efficacy as a resource factor in stress appraisal. In R. Schwarzer (Ed.), *Self-Efficacy: Thought Control of Action* (pp. 195-216). Hemisphere, Washington.
- Juárez, F., & Contreras, F. (2008). Psychometric properties of the General Self-efficacy Scale in a Colombian Sample. *International Journal of Psychological Research*, 1(2), 6-12.
- Lyubomirsky, S., & Lepper, H. S. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social indicators Research*, 46(2), 137-155. <http://dx.doi.org/10.1023/A:1006824100041>
- Nan, H., Ni, M. Y., Lee, P. H., Tam, W. W., Lam, T. H., Leung, G. M., & McDowell, I. (2014). Psychometric evaluation of the Chinese version of the subjective happiness scale: Evidence from the Hong Kong FAMILY Cohort. *International Journal of Behavioral Medicine*, 21(4), 646-652. <http://dx.doi.org/10.1007/s12529-014-9389-3>
- Ng, S. M. (2013). Validation of the 10-item Chinese perceived stress scale in elderly service workers: One-factor versus two-factor structure. *BMC psychology*, 1(1), 1. <http://dx.doi.org/10.1186/2050-7283-1-9>
- Nunnally, J., & Bernstein, I. (1999). *Psychometric Theory*. New York: McGraw-Hill.
- Roberti, J. W., Harrington, L. N., & Storch, E. A. (2006). Further psychometric support for the 10-item version of the perceived stress scale. *Journal of College Counseling*, 9(2), 135-147. <http://dx.doi.org/10.1002/j.2161-1882.2006.tb00100.x>
- Schwarzer, R., & Jerusalem, M. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in Health Psychology: A User's Portfolio* (pp. 35-37). Causal and Control Beliefs, NFER-Nelson, Windsor.
- Schwarzer, R., Baessler, J., Kwiatek, P., Schroder, K., & Zhang, J. X. (1997). The assessment of optimistic self-beliefs: Comparison of the German, Spanish, and Chinese versions of the General Self-efficacy Scale. *Applied Psychology: International Review*, 46, 69-88. <http://dx.doi.org/10.1111/j.1464-0597.1997.tb01096.x>
- Shamsuddin, K., Fadzil, F., Ismail, W. S. W., Shah, S. A., Omar, K., Muhammad, N. A., ... Mahadevan, R. (2013). Correlates of depression, anxiety and stress among Malaysian university students. *Asian Journal of Psychiatry*, 6(4), 318-323. <http://dx.doi.org/10.1016/j.ajp.2013.01.014>
- Song, Y., Huang, Y., Liu, D., Kwan, J. S. H., Zhang, F., Sham, P. C., & Tang, S. W. (2008). Depression in college: Depressive symptoms and personality factors in Beijing and Hong Kong college freshmen. *Comprehensive Psychiatry*, 49(5), 496-502. <http://dx.doi.org/10.1016/j.comppsy.2008.02.005>
- South China Morning Post. (2016). *Students at breaking point: Hong Kong announces emergency measures after 22 suicides since the start of the academic year*. Retrieved from <http://www.scmp.com/news/hong-kong/healthenvironment/article/1923465/students-breaking-point-hong-kong-announces>
- Taylor, J. M. (2015). Psychometric analysis of the Ten-Item Perceived Stress Scale. *Psychological assessment*, 27(1), 90. <http://dx.doi.org/10.1037/a0038100>

- Uehara, T., Takeuchi, K., Kubota, F., Oshima, K., & Ishikawa, O. (2010). Annual transition of major depressive episode in university students using a structured self-rating questionnaire. *Asia-Pacific Psychiatry*, 2(2), 99-104. <http://dx.doi.org/10.1111/j.1758-5872.2010.00063.x>
- Williams, B., Brown, T., & Onsmann, A. (2012). Exploratory factor analysis: A five-step guide for novices. *Australasian Journal of Paramedicine*, 8(3), 1.
- Wong, J. G. W. S., Cheung, E. P. T., Chan, K. K. C., Ma, K. K. M., & Tang, S. W. (2006). Web-based survey of depression, anxiety and stress in first-year tertiary education students in Hong Kong. *Australian and New Zealand Journal of Psychiatry*, 40(9), 777-782. <http://dx.doi.org/10.1080/j.1440-1614.2006.01883.x>

## Appendix A

### The Perceived Stress Scale-10

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, indicate with a check how often you felt or thought a certain way.

- 1) In the last month, how often have you been upset because of something that happened unexpectedly?  
 0 = never     1 = almost never     2 = sometimes     3 = fairly often     4 = very often
- 2) In the last month, how often have you felt that you were unable to control the important things in your life?  
 0 = never     1 = almost never     2 = sometimes     3 = fairly often     4 = very often
- 3) In the last month, how often have you felt nervous and "stressed"?  
 0 = never     1 = almost never     2 = sometimes     3 = fairly often     4 = very often
- 4) In the last month, how often have you felt confident about your ability to handle your personal problems?  
 0 = never     1 = almost never     2 = sometimes     3 = fairly often     4 = very often
- 5) In the last month, how often have you felt that things were going your way?  
 0 = never     1 = almost never     2 = sometimes     3 = fairly often     4 = very often
- 6) In the last month, how often have you found that you could not cope with all the things that you had to do?  
 0 = never     1 = almost never     2 = sometimes     3 = fairly often     4 = very often
- 7) In the last month, how often have you been able to control irritations in your life?  
 0 = never     1 = almost never     2 = sometimes     3 = fairly often     4 = very often
- 8) In the last month, how often have you felt that you were on top of things?  
 0 = never     1 = almost never     2 = sometimes     3 = fairly often     4 = very often
- 9) In the last month, how often have you been angered because of things that were outside of your control?  
 0 = never     1 = almost never     2 = sometimes     3 = fairly often     4 = very often
- 10) In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?  
 0 = never     1 = almost never     2 = sometimes     3 = fairly often     4 = very often

Each item is rated on a 5-point scale ranging from never (0) to almost always (4). Positively worded items are reverse scored, and the ratings are summed, with higher scores indicating more perceived stress.

PSS-10 scores are obtained by reversing the scores on the four positive items. For example, 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0. Items 4, 5, 7, 8 are the positively stated items and receive the reverse score. Items 1, 2, 3, 6, 9, 10 are scored as it. Then sum across all 10 items.

## Appendix B

### Beck Anxiety Inventory Scale (BAI)

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much	Moderately-it wasn't pleasant at times	Severely-it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3

## Appendix C

### The General Self Efficacy Scale (GSE)

Below are ten statements about yourself which may or may not be true. Using the 1-4 scale below, please indicate your agreement with each item by placing the appropriate number on the line following that item.

Please be open and honest in your responding.

The 4-point scale:

(1) Not at all true                      (2) Hardly true                      (3) Moderately true                      (4) Exactly true

- 1) I can always manage to solve difficult problems if I try hard enough. \_\_\_\_\_
- 2) If someone opposes me, I can find the means and ways to get what I want. \_\_\_\_\_
- 3) It is easy for me to stick to my aims and accomplish my goals. \_\_\_\_\_
- 4) I am confident that I could deal efficiently with unexpected events. \_\_\_\_\_
- 5) Thanks to my resourcefulness, I know how to handle unforeseen situations. \_\_\_\_\_
- 6) I can solve most problems if I invest the necessary effort. \_\_\_\_\_
- 7) I can remain calm when facing difficulties because I can rely on my coping abilities. \_\_\_\_\_

- 8) When I am confronted with a problem, I can usually find several solutions. \_\_\_\_\_
- 9) If I am in trouble, I can usually think of a solution. \_\_\_\_\_
- 10) I can usually handle whatever comes my way. \_\_\_\_\_

#### Appendix D

##### The Subjective Happiness Scale (SHS)

For each of the following statements and/or questions, please circle the point on the scale that you feel is most appropriate in describing you.

- 1) In general, I consider myself:

not a very happy person    1       2       3       4       5       6       7    a very happy person

- 2) Compared to most of my peers, I consider myself:

less happy    1       2       3       4       5       6       7    more happy

- 3) Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterization describe you?

not at all    1       2       3       4       5       6       7    a great deal

- 4) Some people are generally not very happy. Although they are not depressed, they never seem as happy as they might be. To what extent does this characterization describe you?

not at all    1       2       3       4       5       6       7    a great deal

#### Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

# Understanding Workplace Adaptation as an Acculturation Process: A Qualitative Examination of South Korean Highly Skilled Workers in Japan

Geonsil Lee<sup>1</sup>, Joonha Park<sup>2</sup> & Lauren Ban<sup>3</sup>

<sup>1</sup>Department of Clinical Psychology, School of Education, The University of Tokyo, Tokyo, Japan

<sup>2</sup>Faculty of Communication, Nagoya University of Commerce and Business, Nisshin, Japan

<sup>3</sup>Foundation House, Center for Survivors of Torture and Trauma, Refugee Mental Health Service, Melbourne, Australia

Correspondence: Geonsil Lee, Department of Clinical Psychology, School of Education, The University of Tokyo, 7-3-1, Hongo, Bunkyo-ku, Tokyo, 113-0033, Japan. Tel: 81-35-841-1397. E-mail: lee@p.u-tokyo.ac.jp

Received: September 22, 2016

Accepted: October 26, 2016

Online Published: November 7, 2016

doi:10.5539/ijps.v8n4p107

URL: <http://dx.doi.org/10.5539/ijps.v8n4p107>

## Abstract

Although study on job stress and coping among Highly Skilled Migrants (HSMs) has been increasing around Anglo European countries, little is known about Asian migrants working in Asian countries. The present study examined stress factors among South Korean HSMs in Japan and explored their coping strategies in relation to acculturation processes. Semi-structured interviews with eight participants found three main domains affecting work adaptation-related stress: acculturation and adjustment, life events, and job stress. Job demand, relationship formation, and company climate were identified as major job stress factors. HSMs tended to perceive job stress factors as being related to a cultural difference or unique characteristics of Japanese organizations. This qualitative study addresses an initial step towards researching Asian migrant workers in Japan society, suggesting importance of incorporating culture-specific issues in acculturation processes with their job adjustment issues. It is necessary for immigration policy makers to encourage reciprocal understandings between migrants and local colleagues for improving mental health and well-being of both groups in organizations.

**Keywords:** acculturation in Asia, Japanese immigration policy, job stress, Korean migrants, migrant workers, workplace adaptation

## 1. Introduction

As a consequence of globalisation, work-induced mobility and economic migration across national borders have been increasing over the past decades (Carr, 2010). In Japan, declining fertility rates and population aging have increased the difficulty of securing human resources. Therefore migrant workers have been considered as an alternative resource to fill the employment vacancies in the country. In contrast to the past tendency where most migrant workers, mainly from developing countries, were involved in unskilled and low-wage occupations (Iguchi, 2014; Komai, 1997), today, there is increasing national interest in highly qualified migrant workers for securing professional human resources in the globalizing society. As a strategy, the government has established policies to give active support for the placement of international students in Japanese companies. These policies, established in 2008, aid the job seeking and settlement of international students after their graduation. In the current study, we aimed examine migrant workers' job adjustment processes and stress factors in Japan. By doing so, we tried to understand both general and culture-specific stress factors surrounded in Japanese organization.

### 1.1 Migrant Groups in Japan

In Japanese migration history, there are largely two migrant groups based on national historical background and migrants' purpose of stay: those who settled down early in colonization or the WWII, roughly before 1952 ("old comers"), and those who came to Japan for economic purposes afterwards, especially in or after the 1980s ("new comers", Komai, 1997). The latter group is divided into three sub-groups based on time periods: a first period (from the end of 1970s to the first half of 1980s, known as the period of postwar economic growth), a second

period (the second half of 1980s, known as the period of the high-growth economy), and a third period (after 1990 when the national immigration law was revised).

With increased international competition for securing high skilled personnel since late 1990s, Japan has joined the stream by starting the inflow of IT workers in 2000 from especially S. Korea and started pushing to attract international students and improving reporting systems of foreign worker employment. Based on this background, Lee (2012) adds a fourth period group, who moved to Japan around from mid 2000s when the employment policy for foreign workers was revised to present for their high professional characteristics different from the previous who were mainly involved in low-skilled occupations. This group corresponds to what we call *Highly Skilled Migrants* (HSMs) in Japan in this article. A distinguished tendency among these recent migrants is that they tend to choose to migrate into the country and work not only for economic reasons but also for the purpose of self-actualization, as defined as growth of an individual toward fulfillment of the highest needs, in particular those for meaning in life in Maslow's hierarchy of needs theory, by using their high professional abilities as well as personal interest in Japanese culture and society.

### 1.2 South Korean Migrants

The current study particularly focuses on South Korean HSMs in Japan. The Korean migrants group composes the second largest (21.6%), following the Chinese (22.8%) in Japan at the year of 2014 (Ministry of Justice, 2015). The percentage of South Korean workers has been rapidly increasing along with Korean government's strong support for overseas employment with aim of resolving the low employment problem within the country. Japan in particular has been rising as an important job market country among many South Korean professionals as indicated by the fact that 42% of South Korean workers in Japan are involved in high professional occupations (Ministry of Health, Labour and Welfare, 2013).

It is important to consider culture-specific characteristics of South Korean migrants in Japan in promoting their desirable adaptation and well-being. In general, Koreans are understood to have strong family-centered values influenced by Confucianism (Callahan, 1999). Also, based on the historical background such as colonization in the early 20th century, deep-rooted hostility to the Japanese people and society still remain considerably among many of them (Kim, Cho, & Harajiri, 1997). Therefore, it is assumed that these would be meaningful factors to be considered in studying Korean migrants' acculturation issues in Japan in terms of their strong national identification, feeling of familial obligation, and hostility to the host culture and the people.

### 1.3 Migrant Workers' Double Burden: Job Adaptation and Acculturation

Being confronted with a new cultural context requires adaptation, which can produce stress. Berry and his colleagues have described the process where people undergo new challenges in a new cultural context as acculturation or adjustment (e.g., Berry, 1997; Berry & Kim, 1988). According to Berry (1997, 2006), acculturating persons generally confront two important issues: 1) is it important to maintain my original cultural heritage? And 2) is it important to engage in intercultural interactions with other groups, including members of the dominant cultures? If the answers to these questions are dichotomized as yes-no responses, four acculturation strategies are identified: *integration* (orientation to both cultures), *assimilation* (orientation to the dominant culture only), *separation* (orientation to the own original cultural heritage only), and *marginalization* (orientation to neither cultures). It has been widely supported that *integration* is associated with the most adaptive outcome, including psychological and socio-cultural adaptation (e.g., Berry et al., 1987; Ward & Kennedy, 1994).

However, the process of dealing with two cultures or more places a burden on the individual and can lead to stress affecting physical and psychological health producing such effects as depression, adjustment disorders, anxiety disorders, sleep problems, and somatic symptoms (e.g., Mori, 2000; Wei et al., 2007). To date, most research in this area has focused on Western cultural contexts where there have been active migrations over the past decades (e.g., Mirdal, 1985; Weishaar, 2008, 2010). Moreover, it has been suggested that migrants' acculturation and their mental health affect their economic conditions and activities (Bhui et al., 2003; Moussaoui & Agoub, 2010); however, relatively few studies have focused on migrants' job stress, job adjustment and their mental health (Ahonen, Benavides, & Benach, 2007; de Castro, Gee, & Takeuchi, 2008).

Among the few of studies on migrant workers, Ahonen et al. (2007) suggests that a lack of understanding of work and safety caused by language barriers as well as mental health problems due to homesickness and difficulty in relationship formation are major acculturation issues. However, as the authors note, most of these studies have focused on unskilled workers in the U.S. Therefore, it is necessary to extend the focus to other occupations such as HSMs and in other regions like Asian country contexts. Based on this background, the present study focuses on acculturation and job adaptation issues among Korean HSMs in Japan.

#### *1.4 Work Stress in Japanese Workplace*

Workers' mental health is an important issue in Japanese society as it is in many other countries. According to a research report by Ministry of Health, Labour, and Welfare (2012), 60.9% of Japanese workers showed job stress, which also indicates "interpersonal relationships in workplace (41.3%)" as one of major stressors, along with "quality of work (33.1%)" and "quantity of work (30.3%)". However, as described in earlier paragraphs, it is very possible that migrant workers, who have to deal with not only those problems but also acculturation issues, may bear a far heavier burden in work adjustment and coping.

#### *1.5 Asian Migrant Workers in Japan*

Although Asian migrants are taking up more than 90% of the entire foreign employees in Japan (Ministry of Justice, 2015), there is considerable lack of psychological research on this group and their coping. This may be partly because Asians are generally less willing to access counseling service (Chataway & Berry, 1989; Khawaja & Dempsey, 2007). The few studies that do exist suggest that the low level of literacy about mental health and the lack of public support for immigrants served as obstacles in their ability to seek support for mental health issues (Iguchi, 2014; Mizuno, 2003). In addition, the literature suggests that cultural norms emphasizing harmony maintenance tend to affect Asians' perception that they have to control their emotions by themselves rather than asking others for help, which in turn worsens their mental health by inhibiting adequate coping (Wei et al., 2007).

In sum, the present study examined acculturation issues among South Korean HSMs who voluntarily came to Japan after 2000 for their career goals. We aim to examine both job stress factors that affect workers in Japan regardless of cultural background or residential status and those specific to migrant workers, as well as interactions between the general and specific factors.

## **2. Method**

Our interview guide in the main study was based on the results from previous research about acculturation and job stress among migrant workers as well as results of a preliminary study conducted as an unstructured interview with a participant. The detail of complete guide is explained in the later part of this section.

### *2.1 Preliminary Study*

We interviewed a Korean international student who had just received an offer from a Japanese company and planned to start employment right after graduation (Participant A in Table 1). The student was considered to be a suitable participant for the preliminary study because he had been in Japan for about 5 years and had good Japanese language proficiency, which may be close to the average status of Korean HSMs in Japan. By examining his concerns, worries or expectations, we expected to understand potential stress factors among the HSM group.

The participant expressed some concern about possible difficulties at the company regarding the work itself but also Japanese colleagues' understanding about multiculturalism and attitudes to foreign workers. It was also found that his long-term career goals and future plans were major factors for satisfaction with the current work, expectation about future career, motivation for work adaptation, and at the same time, worries about starting career in the foreign country. Expected job stress factors were consistent with actual stress factors such as task-related burdens, interpersonal relationships, job fitness and life career, as suggested to be important in previous research (Iguchi et al., 2012).

Based on the findings of the preliminary study, we prepared the interview guide with aim of uncovering migrants' experience of exposure to Japanese culture and their acculturation processes in work settings. Question items in the main interview included the following: "Why did you decide to come to Japan?", "How did you prepare for immigration in the home country (S. Korea)?", "Have you had any stressful experiences in Japan and how did you deal with them (for those who had studied in Japan, such experiences in the universities were also asked)?", "How could you get the job?", "Did you have stressful experiences after entering the company and if so, do you have any coping episodes?", "Did you have meaningful/useful experiences after entering the company?", "How do you feel at present?", and "What are your plans in the future?".

For the purpose of this paper, we will focus on stressful experiences in job settings and coping strategies that occurred only after each participant commenced employment. Also, following the feedback from the participant in the preliminary study who expressed difficulty in delivering his thoughts and feelings well enough in Japanese language, we revised the interview to be conducted in the participant's preferred language between Korean and Japanese. In fact, for bilingual interviewees, mother language is considered to be more efficient in delivering specific emotional states and subtle nuances (Brislin, 1970).



## 2.2 Main Study

### 2.2.1 Sample Selection

Among South Korean migrant workers, we targeted those who had been in Japan for 3 years or more and who used Japanese language in the usual work settings. We also limited the career categories to administrative workers or those with professional knowledge or skills mastered. This group, named “Highly skilled professionals” has been supported by the government to secure high quality human resources in globalization (Ministry of Foreign Affairs of Japan, 2015). Data was collected by snowball sampling through Korean graduate students and the alumnus community of a university in Tokyo. All participants were residents of Tokyo.

### 2.2.2 Participants

Five men and three women participated in the research. Being on average 32.8 years old, ranging from 28 to 38 years, they had migrated on average 6.5 years previously, ranging from four to eleven years approximately. Six of the participants got graduate degrees in Japan, implying that they had enough time to experience Japanese culture. Table 1 shows details of demographic information for each participant.

### 2.2.3 Interviews

A series of semi-structured interviews were conducted, which were designed to explore individuals’ experiences of acculturation and evaluate subtle differences in ascribing meaning to the experiences and interpreting them (Kahn & Watson, 2005). While a structured interview is stick to a set of pre-determined questions, a semi-structured interview is open, allowing new ideas to be brought up during the interview so that the interviewer can explore particular themes or responses further (Cohen & Crabtree, 2006). Interviews were conducted over two time periods: Session One was from March to October 2009 and Session Two was from July to November 2010. In Session Two, we re-interviewed two interviewees (Participants B and D) from Session One and interviewed an additional migrant (Participant I) to see if similar views are found. Although the data is about 6 years old at the current time of October, 2016, our presentation of the data is justified for the following two reasons. First, the Employment Policy for Foreign Workers executed by the government has been sustained since 2007, implying little difference in the government supports to the migrant groups, which is significant to their acculturation processes. Second, although the population of Korean HSM has been slightly dropped after the 3.11 earthquake in 2011, the number in 2015 indicates no significant difference from 2010 (Immigration Bureau of Japan, 2011, 2015), implying the situation of the group has little changed for the past few years. All these indicate that our data is still relevant and represents the current reality of the Korean HSM in Japan.

All participants were first instructed about research purpose, confidentiality and ethical guideline of the study before their respondents were recorded with a digital voice recorder over the session. Interviews took averaging 98 minutes per session, and were administered by the first author who was fluent in both Japanese and Korean languages. All interviews were basically undertaken in Korean language but at times in Japanese upon participant’s convenience. Although the interview contents varied from issues related to motivation to come to Japan to those about long-term acculturation and job adjustment, our analysis focused on psychological and cognitive changes with regard to job adjustment.

### 2.2.4 Data Analysis

Data from the interviews were analyzed by adopting Grounded Theory Approach (Strauss & Corbin, 1999). This approach is useful especially when a research question focuses on specific process and experiences (Denzen & Lincoln, 2000). We analyzed the data focusing on the main stressors Korean HSM experience, especially how culture-specific factors and their perception of the factors affect the coping processes.

Given the different characteristics of working environment and procedure across participants’ occupations, we conducted theoretical sampling setting their occupational status as criteria for each analysis process. Administrative work was analyzed firstly (Step 1, administrator), followed by the other sets of data analyzed based on occupational profession and independence of job contents (Steps 2, 3, 4, system-engineer, technical professional, and researcher, respectively), so that the higher steps included those with less interpersonal interactions required. Step 5 was intended to elaborate the results up to Step 4, by interviewing a participant who had the longest work experiences in multiple Japanese companies and had been promoted to a manager position. Table 1 shows the demographic data for each sampling step. Through this way of theoretical sampling, we aimed to generalize findings of specific groups to the entire work fields.

All interviews were digitally recorded and transcribed verbatim. The coded data was named in each semantic unit (open coding). After examination of detailed contents of each label by eight collaborators who were

unaware of the research purpose, a total of 7 categories and 23 sub-categories were created at the final stage based on the agreed interpretations and the appropriateness of label-naming (selective coding).

Table 1. Demographic data of the study participants at each sampling step

Sampling step	ID	Gender	Age (years old)	Occupation	Years of residence in Japan	Years of work experience in Japan
Preliminary study	A	Male	27	Administrator	5 years	-
Step 1	B	Female	38	Administrator	8 years	4 years
	C	Male	32	Administrator	6 years	3 years
Step 2	D	Male	32	Technician (System engineer)	4 years	4 years
	E	Male	33	Technician (System engineer)	4 years	4 years
Step 3	F	Female	28	Technical professional	8 years	11 months
	G	Male	30	Technical professional	4 years	11 months
Step 4	H	Female	32	Researcher	7 years	3.5 years
Step 5	I	Male	38	Fashion design manager	11 years	9 years
Step 6	B	Female	39	Administrator	9 years	5 years
	D	Male	33	Technician (System engineer)	5 years	5 years

Note. Age and years were recorded at the time of the interview in 2009.

Table 2. An overview of the main categories and the subcategories created in the study

Core-category	Category	Properties	Sub-Category	
Adaptation for building Life Career*	Adaptation in daily life*	Stress factors	Adaptation in daily life*	
		Coping	Information gathering	
			Learning through experiences	
		Acculturation (related stressor)	Stress factors	formation of their own family*
			Ambivalent feeling to family*	Supporting their parents*
		Work-adaptation* (related stress)		Coping
	Contacts to various communities			
	Job demand*		Variation of contact method	
			Acceptance	
	Relationship formation*		Stress factors	Career development through work acquisition*
			Coping	Imitation
		Acquisition and learning		
Stress factors		Adaptation		
Relationship formation*	Coping	Transformation		
		Expectation about relation formation*		
	Stress factors	Need for relationships as an occupational purpose*		
Relationship formation*	Coping	Active trials to make interpersonal contact		
		Making use of official gathering opportunities		

Company climate*	Stress factors	Keeping minimal relationships even if superficial
		Lack of multicultural understanding among colleagues
	Coping	Re-understanding of Japanese culture*
		Acceptance and reinterpretation
		Efforts to understand the other's culture

Note. \* These categories are used in the model of Korean HSMs' workplace adaptation process (Figure 1).

### 3. Results

With the categories and sub-categories created through analyses (Table 2), we present the model showing Korean HSMs' workplace adaptation process. Overall results show that all participants understand job adjustment in Japan as a part of their entire life project to build their life career. That is, despite various stress factors causing mental demand, they had strong motivation to adjust to the society and organization for the sake of career development and career life after returning to S. Korea. Importantly, developmental tasks such as family formation and supporting parents tend to play ambivalent function in that it increases their motivation for the adjustment, but also sometimes amplifies anxiety and conflicts for the cases where returning to the home country becomes invisible. The following sections present relevant stressors for each category with descriptions in detail.

#### 3.1 Stress Factors among Korean HSMs

There were five factors identified as major domains related to stress among migrant workers: cultural adaptation-related stress, stress from life events, job demand, formation of relationships with colleagues, and company climate. Whereas the first two factors were considered to be domains where any migrants would feel or experience regardless of occupational status while adjusting to the new culture (acculturation-related stress factors, hereafter), the other three were commonly identified as a set of stress factors participants face as workers of their companies (work-related stress factors, hereafter). Where relevant, we discuss the acculturation issue in reflection of Berry's (1997) model of four orientations.

##### 3.1.1 Acculturation-Related Stress Factors

First, many respondents expressed stress about adaptation to the new environment, because it required them to attain knowledge of new social norms and skills. Specific issues varied from language acquisition, understanding about Japanese culture, relationship formation with others to food and life styles. Those who started work without previous experiences of studying abroad in Japan (Participants D and E), despite having been in the country for nearly 5 years as workers, described a lot of stress due to the lack of knowledge and experiences about the new culture out of work settings and the society in general, such as going to the bank, recycling, and paying taxes. Compared with international students who have many opportunities of getting guidance about on- and off-campus life, workers who are hired to produce good work performance and outcomes for the company get few opportunities to learn about how to do things in everyday life.

Another stress factor was related to general human developmental process. While the earlier adjustment problems remain unsolved, new life events they are faced with, such as marriage and childbirth, tend to increase the stress level. This factor is distinguished from cultural adaptation-related stress because it can exist regardless of residence status, so that even local people would experience it to some extent in life development. However, the influence to migrants would continue more strongly, interacting with cultural adaptation problems. Not only existing as the current problems, such issues can also remain a psychological burden because it is directed to a fundamental question about where the new family should settle down with regard to the issues of nationality, children's education, etc. (Cho, 2016). For instance, Participants C and G responded that they wanted their children to learn and form national identity as a Korean rather than participating in acculturation actively. This implies that the participants were motivated to keep their national identity and might feel stress seeing their children's identity transformed or integrated over the adaptation to Japanese society. This corresponds to the "separation" strategy in Berry's acculturation model, in that they appear to place a value on holding on to their original culture concerning their children getting accustomed to and interacting with the other (i.e., Japanese culture).

“Although I want to hurry with my marriage, it’s hard to find a (Korean) partner here (in Japan), but also it’s too early to quit the job and go back to Korea just for marriage ... Even if I’ll live in Japan after marriage, I’ll keep thinking about going back because I have to do so at some point in the future for children’s education and identity formation.” (Participant C, male, 32 yrs.)

Indeed, such concerns about going back to Korea were found among all participants and tended to play a role in aggravating stress in interaction with development-related tasks in life. While many were satisfied with their current work status in Japan as a means of improving their careers, they appeared to feel a sense of obligation about going back when confronted with critical life events such as marriage, children’s education as described above or considering family relationships including obligations of supporting parents and performing ancestral rites. This may well reflect Confucian disciplines, which continue to play a major role in Korean society by constructing the foundations for people’s perspectives on what is worthwhile in one’s life (Callahan, 1999). For Korean migrants who are confronted with acculturation issues, this seems to serve a Korean-specific factor that more or less affects their smooth acculturation process. The conflict between the opposite motivations seem to be greater as they get accustomed to and feel more comfortable with the current job and life in Japan because then they get more hesitant to compromise with reality. Implications of our findings are two-fold. First, they suggest a meaningful culture-specific tendency that Korean migrants’ strong sense of obligation about kinship tends to discourage their embracing the dominant culture, resulting in prohibition of integration in Berry’s (1997) term. Second, the increasing conflict implies that one’s improvement in sociocultural adaptation such as improvements of job performance and better life adjustment does not solve every problem about acculturation and that it may take time to attain integration strategies because one has to go through psychological dilemmas and burdens about being away from the home country or feeling as if he or she is shrinking from his or her responsibility about Korean family.

To sum up, it was found that Korean HSMs get to have new development-related experiences throughout their long-term stay in Japan. In this process, many have psychological conflicts between the acculturated new life styles and constant motivation to keep the national identity as a Korean. This kind of problems tends to occur repeatedly as they are going through between acculturation and life development.

### 3.1.2 Work-Related Stress Factors and Coping Processes

#### 1) Job demand

All participants reported that they had difficulty in learning new tasks, while being satisfied with applying their knowledge to real work settings and improving their career experiences. Five participants said that they felt confused at the beginning of their employment, being exposed to organizational system emphasizing interpersonal relationships between members and reality sometimes different from what they learned in university. Such phenomena may be examples of “*reality shock*”, which occurs in socialization within a group (Shein, 1978).

To cope with the difficulty in dealing with a new task, participants first tried to imitate the company’s rule or manual even if they did not fully understand the task itself (“imitation”). This was followed by the next step where they could acquire a new approach as told by the organization (“acquisition and learning”). Feedbacks from Japanese coworkers or bosses helped their complete understanding of the task (“adaptation”). Once accustomed to the approach and able to make outcomes, they tried more positive and agentic actions, by modifying weakness of the learned approach to the way they think more comfortable or efficient (“transformation”). These processes are reflected in the following example.

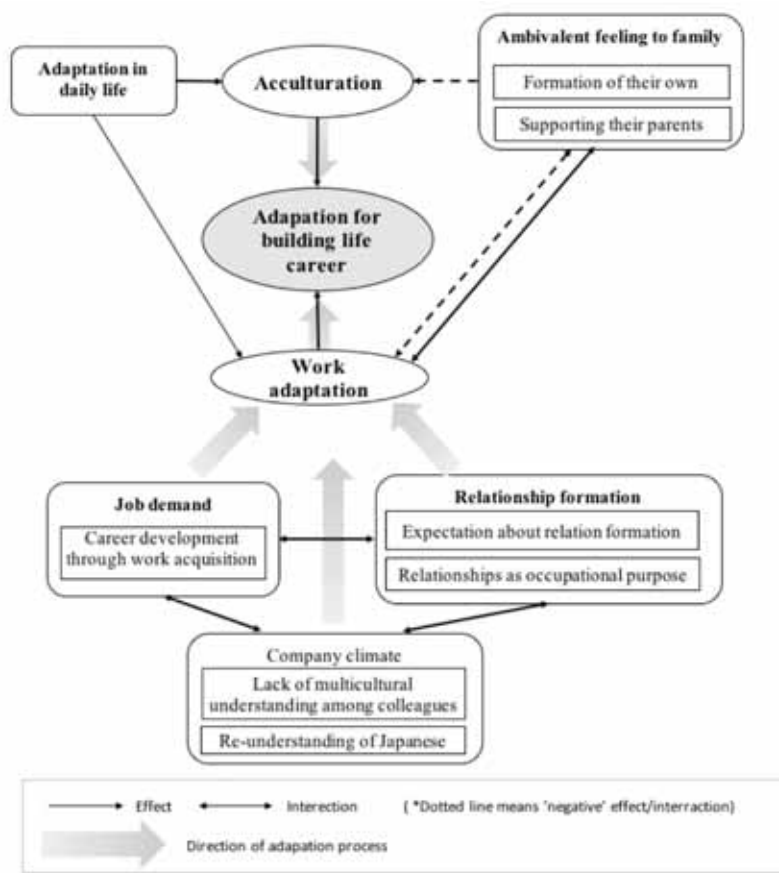


Figure 1. Korean HSMs' workplace adaptation process

“First I did things as asked by the company because I had no idea... but after finding my feet in the company, my performance could get recognized by others and I could gain confidence and some sense of the work. For some parts I felt quite odd or uncomfortable with, I switched how to handle them to a Korean style, which was more comfortable and efficient to me. When asked (by other colleagues) for the reason, I explained it, which was accepted. So now I do things in ways I feel the most comfortable.” (Participant B, female, 38 yrs.)

It is noteworthy that many participants similarly tended to attribute the different characteristics of the task itself to the cultural difference by distinguishing between Japanese and Korean work styles. Some preferred adjusting the manual to “Korean style”, while others appreciated the Japanese working style, saying that it improved the overall job performance after all. Whether there is a culturally actual difference in characteristics of tasks or not is beyond the scope of our question and requires future work; however, what those responses imply in terms of migrants' cognition of the work environments is that participants perceived desirable work styles or characteristics of tasks in relation with overall characteristics of the society. Their adjustment of the work manual to their cultural origin and application of Japanese styles to their own work reflect Berry's separation and integration strategies respectively. By implication, work settings are another domain where acculturation strategies can be applied by migrant workers, but compared with other acculturation domains, not only national identity but also perceived efficiency of work styles more or less tend to affect their strategy preference.

## 2) Relationship formation

While most participants showed willingness to form good relationships with colleagues, there were a few variations across occupational categories. Those in office work or trade-related work appeared to experience more interpersonal communications among colleagues, resulting in high concerns about interpersonal relationships. In contrast, those in research or system engineering fields that require little interpersonal interactions but individual tasks tended to have few chances to create such relationships. However, such a lack of opportunities for relationship formation among the latter group was not perceived as a stressor because it rarely affected their overall work performance.

Korean workers sought various ways of creating and improving interpersonal relationships within the company. For instance, they tried *personal approaches* such as initiating a conversation or asking colleagues to go for lunch; and they tried *public approaches* such as actively participating in company dinners or get-togethers (called “*Nomikai*” in Japanese). The results did not appear so positive though: some participants reported a few experiences that Japanese colleague seldom approached to them (Participant E), appeared to keep distance from them, expressed some discrimination (Participants B, F, I), and even ignored them (Participant E).

The data suggests that attitudes to multicultural understanding in various companies may depend on the internal climate of the companies and characteristics of local workers in general. For example, Participant H says that she rarely had uncomfortable experiences with her colleagues because her group mainly involved academic researchers and each individual’s characteristics were respected in general, such that cultural differences were perceived as one of common attributes everyone has. As reflected in the response below, she was trying to understand each of Korean and Japanese styles of relationship formation from an objective perspective as much as possible.

“Of course, first I felt difficulty in forming close relationships and my usual relationships were very dry. But looking back how interpersonal relationships around me were in my student life in Japan, there seemed to be some cultural difference in conception about friends or the way interpersonal relationships were created and maintained. Japanese people tend to want to keep some distance from others to have a personal space. So if they put themselves to others’ shoes, they would be less than happy. For example, they’d feel a little uncomfortable to meet with their colleagues after work (for dinner) or on weekend even if they’d consider them very close. So now I don’t want to think too much about such relationship issues as they can be just individuals’ or cultural characteristics, and this way of thinking helps me feel rather comfortable.” (Participant H, female, 32 yrs.)

According to studies of interpersonal relationships among international students in Japan, many Asian international students value on friendships but actually have low satisfaction with their interpersonal relationships (Tanaka & Hujihara, 1992). Sakoda, Kodama, and Tanaka’s (2008) study suggests compared with Japanese students, Chinese international students tend to limit the range of friendship or genuine interpersonal relationships to more intimate contexts so that complete self-disclosure is achieved between individuals. This is similar to our current finding that some participants mentioned that Japanese people tended to favor limiting their work-based relationships to the public space, whereas Koreans tended to extend such relationship to their personal space. Another study suggests that there is a cultural difference in a psychological sense of community, such that non-Japanese Asians (e.g., Koreans) are more influenced by, hence more sensitive to ingroup belongingness than Japanese people (Ikeda, 2006). Those results may be interpreted by that Japan is relatively more individualistic than and not as collectivistic as other Asian countries such as China and South Korea (Hofstede, Hofstede, & Minkov, 2010). To sum up, the reported unexpected outcomes from interpersonal relationships with Japanese in the present study could partly because of the difference in occupations or characteristics of tasks described earlier, but as suggested in the previous studies, also be explained by the cultural differences in relationship formation between Japanese and non-Japanese (e.g., Chinese, Korean) groups. It implies that better understanding about cultural differences in perceptions of interpersonal relationships and closeness can be an important key to protect maladjustment, disappointment or even conflicts in interpersonal relationships at organizations.

So far, we have suggested that job demand and relationship formation are important work-related stress factors among Korean HSMs. We speculate that these two factors would be interrelated in terms of facilitating or hindering workplace adaptation processes. For example, one with bad relationships with other colleagues cannot make good outcomes after all, because interpersonal relationships in the company could affect his or her work performance directly or indirectly. Indeed, the obsessive thinking that they have to keep good relationships within the company appeared to serve another stress factor to many participants. On the other hand, those who had fewer difficulties in relationship formation tended to perceive job-demand-related stress and psychological burden as less severe.

“My boss was Korean, who helped me in many ways to adjust to the company environment and gave me detailed instructions on how to do things I was not sure of. Thanks to him, although starting a new career would be challenging to anyone of course, I think I was under relatively little stress.” (Participant G, male, 30 yrs.)

### 3) Company climate

Company climate factor is a little complicated because perceived company climate is actually used in their perceptions or understanding of many aspects of the organization such as pursued work style, relationship formation styles, and the like as described earlier. Nevertheless, we distinguished this factor from the other two

because it was considered to have rather indirect effects on individuals, relevant to a macro-level aspect. Defined as people's perceptions of a corporative work environment, the organizational climate is the sum of overall impressions or perceptions about all members of the group (Lawler, Hall, & Oldman, 1974). In this sense, company climate, what is considered to be a typical example of organization climate, can be understood in relation with the overall culture of the nation where national characteristics are imbedded. Likewise, the Japanese company climate where Japanese management styles or national characters are reflected could be an important task to migrant workers not only for adjustment to the company but also for acculturation to the host country. The following paragraphs describe a couple of example responses implying overlaps between company climate and cultural characteristics.

Participant F who works at a French company expressed the company climate as full of "Western thinking style" that emphasizes actual tasks and outcomes in dealing with troubles occurring in internal relations. Participant C mentioned some possibility that company culture influenced by CEO's cultural background could also affect the company climate or group thinking style. These two episodes imply direct influence of CEOs' cultural background on company climate.

"Maybe because it's a foreign (Western) branch, actual performance is emphasized than any other things in our company. In fact, I had a harsh time at first because of my boss's discrimination, ... but because my outcomes were quite good, the company supported my work environment more comfortable. For example, they listened to my problems through consultants with the human resources team, and now I don't have to see the boss often because he moved to a different department. Though, I feel a sort of pressure all the time that unless I make more outcomes, such supports wouldn't be available any more... To say verbatim, it's a kind of give and take." (Participant F, female, 32 yrs.)

"My CEO is Korean Japanese, and I feel a little difference in his management style, attitudes to foreign employees including Koreans, and the company climate from those of average Japanese CEOs in other companies. I didn't notice that first, but hearing about typical Japanese companies from my friends working in those companies, I could certainly see it." (Participant C, male, 38 yrs.)

Sometimes the effects of CEOs' cultural background can be more subtle by encouraging certain climate among workers in the workplace. Also, company climate can be established through converging attitudes shared by the majority of workers, which at times triggers disharmony and conflicts. For example, Participant B described her experiences where she had difficulties in job adjustment because her local coworkers explicitly belittle or discriminate Korean culture or the people. On the other hand, Participant C expressed satisfaction with the work environment because his colleagues are supportive showing no ignorance or prejudice towards him.

To sum up, formed and maintained mainly by major Japanese members of the company, company climate was another aspect of acculturation and job adjustment tasks among foreign workers. Also, this factor was found to interact directly or indirectly with other stress factors in the company such as intercultural communications between foreign workers and Japanese colleagues in the workplace or intergroup interactions with other national companies. These findings imply that it is necessary for not only foreign workers but also Japanese workers as a dominant national group to understand cultural differences embedded in or possibly felt by some foreign workers in the company. Especially, encouraging employers to get a better understanding of multiculturalism would be important because they are in important positions in facilitating foreign workers' positive adjustment to their careers (Berry, 1997, 2006; Rasmi, Safdar, & Lewis, 2009).

#### **4. Discussion**

Our study establishes a first step to the investigation of adjustment issues and coping among South Korean HSMs in Japan. Among acculturation-related stress factors: acculturation and adjustment to a new culture, life events, and job and workplace adjustment, the last aspect was further categorized into three: job demand, relationship formation, and company climate, consistent with the previous findings about job stress (Eguchi et al., 2012). Different from local workers, our participants considered cultural aspects to be imbedded in each stressor and felt more uncomfortable and incompetent in dealing with them for this reason. Nevertheless, migrants' clear sense of purpose in terms of working in Japan played a critical role in their ability to cope with the acculturation- and job adjustment-related problems.

Notably, all participants had a fairly strong motivation to maintain their national identity, which seemed to cause an additional psychological discomfort between satisfaction with the current occupation and life and future plans about going back to the home country, especially for the sake of family-related issues. To relate with Berry's (1997) acculturation theory, those phenomena are seen as psychological dilemmas particularly between one's acceptance of integration as being satisfied with the reality and motivation for separation as feeling obligatory

for his or her family in the home country. To elaborate more, many HSMs externally appeared to use integration strategies with a fair understanding about social norms or cultural practice of the dominant country, while having internal conflicts about ethno-cultural identity regarding such issues as going back to the home country, child education, and supporting parents. As described earlier, this is a complicated issue in relation to South Koreans' culture-specific characteristics along with their history-oriented attitudes toward Japanese people and the society (Callahan, 1999; Kim, Cho, & Harajiri, 1997). Also, it implies that there can be different or multiple acculturation strategies being used by individual depending on acculturation tasks or contexts, which requires further investigation.

Our findings imply that Japanese colleagues' cross-cultural understandings can serve a preventive approach to caring mental health of migrant workers and improving diversity in their work climate. This is consistent with that positive attitudes toward understanding other cultures than their own and interacting with other cultural groups among people in a dominant culture give positive effects on migrants' acculturation (Berry, 1997, 2006). With acknowledgement of mental health problems among workers, the Japanese government announced a new policy to make it compulsory to take a stress-level test regularly as a preventive approach to maintaining and improving employees' health in December 2015. Moreover, in the globalizing work environment with increasing foreign workers and increasing interactions with foreign companies, encouraging them to get better understandings about culture-specific characteristics of foreign workers and the necessity of supports for them would improve not only migrant workers' mental health but also those of local workers by relieving job stress factors they may experience in interactions with foreign co-workers.

The current qualitative study took a meaningful approach to understanding stress factors and coping among migrant workers in Japan by examining the contents of participants' actual experiences and episodes. However, it merely focused on South Koreans for the group-specific reason explained earlier in this paper, which limits generalizability of the present findings to migrant workers in Japanese context. Future studies with samples from different cultural backgrounds can improve understandings about general as well as culture-specific factors by comparisons of various cultural groups. By doing so, one can contribute to providing important information to improve policy about foreign employment including supporting systems for migrant workers. Also, it would be important to consider possible culture-specific characteristics such as familism and historic relationship between the home and host countries as implied in the present findings. Finally, the present study focused on general characteristics of Korean HSMs depending on occupation types, rather than possible influence of personal factors (e.g., gender, marriage status, duration of employment). Likewise, recent research on South Korean workers on job stress and mental health suggests significant relationships between occurrence of anxiety symptoms and experiences of occupational stress stemming from the psychosocial work environment (Lee et al., 2015). Future research can elaborate the present findings by examining influence of such personal characteristics, mental disorders, and environmental factors.

In conclusion, the current study found various factors affecting South Korean HSMs' acculturation and job adjustment processes in Japanese context, which are categorized into the acculturation-related stress factors (cultural adaptation-related stress and stress from life events), and work-related stress factors (job demand, formation of relationships with colleagues, and company climate). The two processes are partly overlapped with each other in interaction with culture-specific factors such as national identity and attitudes to the host country. These findings highlight the importance of taking a long-term preventive approach to improving migrant workers' mental health through monitoring and psychological education for smooth adaptation, and providing a psychological support regarding their integrative and long-term career planning. Also, this study calls for encouraging reciprocal understandings about their counterparts' culture between migrants and local colleagues for improving overall mental health and well-being in organizations.

### Acknowledgments

Publication of this work was funded by Japan Society for the Promotion of Science (15H06715) award to second author.

### References

- Ahonen, E. Q., Benavides, F. G., & Benach, J. (2007). Immigrant populations, work and health: A systematic literature review. *Scandinavian Journal of Work, Environment and Health*, 33(2), 96-104. <http://dx.doi.org/10.5271/sjweh.1112>
- Benet-Martínez, V., Lee, F., & Leu, J. (2006). Biculturalism and cognitive complexity: Expertise in cultural representations. *Journal of Cross-Cultural Psychology*, 37, 386-407. <http://dx.doi.org/10.1177/0022022106288476>



- Berry, J. W., & Kim, U. (1988). Acculturation and mental health. In P. Dasen, Berry, & J. W. Sartorius (Eds.), *Health and cross-cultural psychology* (pp. 207-236). Newbury Park, CA: Sage.
- Berry, J. W. (1997). Immigration, acculturation and adaptation. *Applied Psychology: An International review*, 46, 5-58. <http://dx.doi.org/10.1111/j.1464-0597.1997.tb01087.x>
- Berry, J. W. (2006). Stress perspectives on acculturation. In D. L. Sam, & J. W. Berry (Eds.), *The Cambridge handbook of acculturation psychology* (pp. 43-57). Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511489891.007>
- Bhui, K., Abdi, A., Abdi, M., Pereira, S., Dualeh, M., Robertson, D., ... Ismail, H. (2003). Traumatic events, migration characteristics and psychiatric symptoms among Somali refugees. *Social Psychiatry and Psychiatric Epidemiology*, 38(1), 35-43. <http://dx.doi.org/10.1007/s00127-003-0596-5>
- Brislin, R. W. (1970). Back translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185-216. <http://dx.doi.org/10.1177/135910457000100301>
- Carr, S. C. (Ed.). (2010). *The Psychology of Global Mobility*. New York: Springer. <http://dx.doi.org/10.1007/978-1-4419-6208-9>
- Callahan, W. (1999). Negotiating cultural boundaries: Confucianism and trans/national identity in Korea. *Journal of Cultural Research*, 3(3), 329-364. <http://dx.doi.org/10.1080/14797589909367170>
- Chataway, C., & Berry, J. (1989). Acculturation experiences, appraisal, coping, and adaptation: A comparison of Hong Kong Chinese, French, and English students in Canada. *Canadian Journal of Behavioural Science*, 21, 295-309. <http://dx.doi.org/10.1037/h0079820>
- Cho, R. M. (2016). Exploring the acculturation profiles and adaptation of children in multiethnic families in South Korea. *Asian and Pacific Migration Journal*, 25(3), 245-274. <http://dx.doi.org/10.1177/0117196816655163>
- Cohen, D., & Crabtree, B. (2006). *Qualitative Research Guidelines Project*. Retrieved from <http://www.qualres.org/HomeSemi-3629.html>
- De Castro, A. B., Gee, G. C., & Takeuchi, D. T. (2008). Job-related stress and chronic health conditions among Filipino immigrants. *Journal of Immigrant and Minority Health*, 10(6), 551-558. <http://dx.doi.org/10.1007/s10903-008-9138-2>
- Danzin, N., & Lincoln, Y. (2000). *Handbook of Qualitative Research* (2nd ed.). USA: Sage Publications.
- Eguchi, H., Tsuda, Y., Tsukahara, T., Washizuka, S., Kawakami, N., & Nomiyama, T. (2012). The effects of workplace occupational mental health and related activities on psychological distress among workers. *Journal of Occupational of Environmental Medicine*, 54(8), 939-947. <http://dx.doi.org/10.1097/JOM.0b013e31825107bb>
- Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and Organizations: Software of the Mind* (3rd ed.). USA: McGraw-Hill Education.
- Iguchi, Y. (2014). Asia strategy on international migration. *Public Policy Review*, 10(1), 109-151.
- Ikeda, M. (2006). Daigakusei no sinriteki community kankaku: Nihon to kankoku no ibunkakanhikaku (A Cross-Cultural Study on the Psychological Sense of Community in Japanese and Korean Contexts) [In Japanese]. *Educational Studies: International Christian University*, 48, 151-160.
- Immigration Bureau of Japan. (2011). *International students' employment conditions in Japanese company in the year of 2010* [In Japanese]. Retrieved from October 17, 2016, from <http://www.moj.go.jp/content/000077277.pdf>
- Immigration Bureau of Japan. (2015). *International students' employment conditions in Japanese company in the year of 2014* [In Japanese]. Retrieved from October 17, 2016, from <http://www.moj.go.jp/content/001153834.pdf>
- Kahn, S., & Watson, J. C. (2005). The Canadian immigration experiences of Pakistani women: Dreams confront reality. *Counseling Psychology Quarterly*, 18(4), 307-317. <http://dx.doi.org/10.1080/09515070500386026>
- Khawaja, N., & Dempsey, J. (2007). Psychological distress in international university students: An Australian study. *Australian Journal of Guidance and Counselling*, 17, 13-27. <http://dx.doi.org/10.1375/ajgc.17.1.13>
- Komai, H. (1997). *Shinrai/Teishu gaikokujin ga wakaruru jiten (A Dictionary about New-coming immigrants)* [In Japanese]. Tokyo: Akaishi.

- Kim, U., Cho, W., & Harajiri, H. (1997). The Perception of Japanese people and culture: The case of Korean nationals and sojourners. In K. Leung, U. Kim, S. Yamaguchi, & Y. Kashima (Eds.), *Progress in Asian Psychology* (pp. 321-344). CA: Willy.
- Lawler, E., Hall, D., & Oldman, G. (1974). Organizational climate: Relationship to organizational structure, process and performance. *Organizational Behaviour and Performance*, 11(1), 139-155. [http://dx.doi.org/10.1016/0030-5073\(74\)90010-5](http://dx.doi.org/10.1016/0030-5073(74)90010-5)
- Lee, G. (2012). Gaigokujin-roudousha no mental health to sinrienzyo no genzyo (A review of the research on foreign workers' mental health and psychological support) [in Japanese]. *Bulletin of the Graduate School of Education: The University of Tokyo*, 52, 403-410.
- Lee, K. H., Chae, C. H., Kim, Y. O., Son, J. S., Kim, J. H., Kim, C. W., ... Jung, Y. S. (2015). Anxiety symptoms and occupational stress among young Korean female manufacturing workers. *Annals of Occupational and Environmental Medicine*, 27(24). <http://dx.doi.org/10.1186/s40557-015-0075-y>
- Mirdal, G. M. (1985). The condition of tightness—The somatic complaints of Turkish migrant women. *Acta Psychiatrica Scandinavica*, 71(3), 287-296. <http://dx.doi.org/10.1111/j.1600-0447.1985.tb01286.x>
- Ministry of Foreign Affairs of Japan. (2015). *Highly skilled professional visa*. Retrieved October 17, 2016, from [http://www.mofa.go.jp/j\\_info/visit/visa/long/visa16.html](http://www.mofa.go.jp/j_info/visit/visa/long/visa16.html)
- Ministry of Health, Labour, and Welfare. (2012). *Survey on State of Employees' Health* [In Japanese]. Retrieved February 15, 2015, from [http://www.mhlw.go.jp/toukei/lis t/ dl/h24-46-50\\_01.pdf](http://www.mhlw.go.jp/toukei/lis t/ dl/h24-46-50_01.pdf)
- Ministry of Justice. (2015). *The number of foreign nationals Entering Japan and the number of Japanese leaving Japan in the year of 2015* [in Japanese]. Retrieved October 17, 2016, from <http://www.moj.go.jp/content/001176885.pdf>
- Mizuno, H. (2003). *Ryugakusei no hienzyosikousei nikansuru sinrigakuteki kenkyu (Psychological Study for international student's non-help seeking tendency)* [In Japanese]. Japan: Kazemashobo.
- Mori, S. (2000). Addressing the mental health concerns of international students. *Journal of Counseling and development*, 78(2), 137-144. <http://dx.doi.org/10.1002/j.1556-6676.2000.tb02571.x>
- Rasmi, S., Safdar, S. F., & Lewis, J. R. (2009). A Longitudinal Examination of the MIDA model with International Students. In A. Chybicka, S. F. Safdar, & A. Kwiatkowska (Eds.), *Culture & Gender: An Intimate Relation* (pp. 42-57). Sopot, Poland: Gdańskie Wydawnictwo Psychologiczne.
- Sakoda, Y., Kodama, M., & Tanaka, T. (2008). Zainitsi-tcugokujin-ryugakusei no taijinkankei nikansuru jireibunsekikenkyu: Nihonjindaigakusei tonokankeiseiritsukonnan no kizyo o saguru (Research of case analysis for Chinese international students in Japan: Exploring the mechanism about difficulties of relationship formation between Japanese university student and international) [In Japanese]. In *The 49th Conference Summaries of the Japans Society of Social Psychology* (pp. 64-65).
- Smith, R. A., & Khawaja, N. G. (2011). A review of the acculturation experiences of international students. *International Journal of International Relations*, 35, 699-713. <http://dx.doi.org/10.1016/j.ijintrel.2011.08.004>
- Strauss, A., & Corbin, J. (1999). *Basics of Qualitative Research Techniques and Procedures for Developing Grounded Theory* (2nd ed.). London: Sage.
- Tadmor, C., Tetlock, P., & Peng, K. (2009). Acculturation Strategies and Integrative Complexity: The Cognitive Implications of Biculturalism. *Journal of Cross-Cultural Psychology*, 40(1), 105-139. <http://dx.doi.org/10.1177/0022022108326279>
- Tanaka, T., & Hujihara, T. (1992). Zainichi-ryugakusei no taijinkoudouzyou no konnan: Ibunkatekiou o sokusinsuru tameno nihon no soshyaru sapoto no kentou (Difficulty in interpersonal behavior of International students in Japan: Implications of Japanese social skill learning toward cross-cultural adjustment) [In Japanese]. *The Journal of Social Psychology*, 7(2), 92-101.
- Ward, C., & Kennedy, A. (1993). Psychological and socio-cultural adjustment during cross-cultural transitions. *International Journal of Intercultural Relations*, 16, 175-194. [http://dx.doi.org/10.1016/0147-1767\(92\)90017-O](http://dx.doi.org/10.1016/0147-1767(92)90017-O)
- Wei, M. F., Heppner, P. P., Mallen, M. J., Ku, T. Y., Liao, K. Y. H., & Wu, T. F. (2007). Acculturative stress, perfectionism, years in the United States, and depression among Chinese international students. *Journal of Counseling Psychology*, 54(4), 385-394. <http://dx.doi.org/10.1037/0022-0167.54.4.385>

Weishaar, H. B. (2008). Consequences of international migration: A qualitative study on stress among Polish migrant workers in Scotland. *Public Health*, 122(11), 1250-1256. <http://dx.doi.org/10.1016/j.puhe.2008.03.016>

### **Copyrights**

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

# Romantic Priming Effects on the Social Desirability and Hireability of Self-Promoting Women

Samantha B. Douglas<sup>1</sup> & Juanita Cole<sup>2</sup>

<sup>1</sup> Department of Psychology, Azusa Pacific University, Azusa, CA, USA

<sup>2</sup> Laboratory of Comparative Human Cognition, University of California San Diego, San Diego, CA, USA

Correspondence: Samantha B. Douglas, Department of Psychology, Azusa Pacific University, Azusa, CA, 91702, USA. Tel: 1-909-908-3841. E-mail: samanthadouglas@apu.edu

Received: September 30, 2016

Accepted: October 20, 2016

Online Published: November 7, 2016

doi:10.5539/ijps.v8n4p121

URL: <http://dx.doi.org/10.5539/ijps.v8n4p121>

## Abstract

The present study examined the effects of romantic and intelligence priming on the social-desirability and hireability of self-promoting and communal female job applicants. Participants were first primed with either romantic or intelligence related images and then asked to evaluate the social-desirability and hireability of three female job applicants. These job applicants were self-promoting and competent, communal and competent, or communal and not competent. After rating the job applicants, participants were reprimed and asked to complete a scale measuring career aspiration. Results revealed that participants rated the self-promoting applicant as more hireable than the communal applicants. In contrast, the communal and competent applicant was rated more socially desirable than the self-promoting applicant. No effect of priming on participants' career aspiration or applicants' social-desirability or hireability was found. However, there was a marginally significant relationship between participant gender and first choice to hire.

**Keywords:** gender, discrimination, romance, backlash effects

## 1. Introduction

In the past decade women in the United States of America have made significant gains in the labor force, such as higher rates of employment and earnings. However, equality has yet to be achieved and the glass ceiling remains in many industries. In 2012, women earned only 81 cents for every dollar a man earned (U.S. Bureau of Labor Statistics, 2013). This pay gap has contributed to the feminization of poverty, meaning that women are more likely to be poor than men (U.S. Department of Commerce Economics and Statistics Administration, 2011). Moreover, the gendered workforce has kept women in lower status positions compared to men in similar occupations (U.S. Department of Commerce Economics and Statistics Administration, 2011). Women are still significantly underrepresented in higher levels of the workforce, such that women account for only 19.2% of board seats and 4.3% of CEO positions in S&P 500 companies (Catalyst, 2015).

Gender stereotypes further create significant barriers for women since they contain prescriptions that dictate how one should behave. Prescriptions for women include being warm, kind, sensitive, and friendly (Prentice & Carranza, 2002). These prescriptive beliefs about gender have yet to change despite advances made by women in the workplace (Prentice & Carranza, 2002). People tend to support the gender normative idea that women need to be more communal than men (Moss-Racusin & Rudman, 2010). Additionally, people believe that agentic traits are less desirable for women compared to men (Prentice & Carranza, 2002). Since agentic traits are associated with competence and leadership (Prentice & Carranza, 2002) men have an advantageous position. For example, agentic males are viewed as having more social skills than agentic females (Rudman & Glick, 2001).

Studies show that there is a lack of fit between women's gender prescriptions and leadership (Prentice & Carranza, 2002). Koch (2005) found that female leaders received more negative affect responses (e.g., frowns) from participants and were also given lower competency ratings by other women (but not men). Rudman, Moss-Racusin, Phelan, and Nauts (2012) found that hiring discrimination of agentic female leaders was mediated by prejudice that stems from the dominance penalty. The dominance penalty occurs when women who display agency (i.e., status-enhancing traits) receive extreme ratings of dominance, but men who exhibit the same behaviors do not receive such a penalty (Rudman et al., 2012). Okimoto and Brescoll (2010) found that

power-seeking female candidates suffered decreased competency and communality ratings. Similarly, Zeigler-Hill and Myers (2011) showed that women (but not men) with higher self-esteem, compared to those with moderate or low self-esteem, scored lower on the warmth-trustworthiness dimension of the Partner Ideal Scales when being evaluated by heterosexual men. Additionally, Okimoto and Brescoll (2010) found that people were less likely to vote for a female politician if they perceived that the candidate was seeking power. These results suggest that gender stereotypes allow power-seeking behaviors for men, but not for women (Okimoto & Brescoll, 2010). Similarly when women's success in a male stereotyped job is clearly presented, the women are rated significantly less likable and more interpersonally hostile than men who are successful (Heilman, Wallen, Fuchs, & Tamkins, 2004).

One important agentic trait is self-promotion, which involves "pointing with pride to one's accomplishments, speaking directly about one's strengths and talents, and making internal rather than external attributions for achievement" (Rudman, 1998, p. 629). Research has demonstrated self-promotion is necessary to be viewed as competent in job interview scenarios (Rudman, 1998). Rudman (1998) found that even though self-promotion is essential, women are penalized for being self-promoting in that they are deemed less likeable than gender prescription abiding women. Phelan and Rudman (2010) revealed that self-promoting women are seen as more arrogant and dominating than males who use self-promotion. Netchaeva, Kouchaki, and Sheppard (2015) showed that men were more assertive towards women who express ambitious agency (e.g., self-promotion) compared to women who express administrative agency (e.g., directness). Amanatullah and Tinsley (2013) showed that females who self-advocate for a higher salary received more negative social judgments than males. In an applicant evaluation scenario, self-promoting females were rated less likely to be interviewed and hired compared to females who did not self-promote; no effect of self-promotion on the evaluation of men was observed (Waung, Hymes, Beatty, & McAsulan, 2015). In order to be viewed as competent leaders, women need to be self-promoting, but when they express agentic traits they are sanctioned for it (Pfeffer, Fong, Cialdini, & Portnoy, 2006; Phelan & Rudman, 2010; Rudman, 1998). Economic and social penalties given to women who violate gender prescriptions are called backlash effects (Phelan, Moss-Racusin, & Rudman, 2008; Rudman, 1998). As a result of these backlash effects women are put in a dilemma; even though they need to demonstrate agency they are sanctioned for doing so (Rudman, 1998).

In addition to backlash effects, studies have shown that romantic ideologies may also be a career barrier for some women. During young adult years, women (but not men) are likely to experience goal conflict between being romantically desirable and being intelligent in Science, Technology, Engineering, and Math (STEM) (Park, Young, Troisi, & Pinkus, 2011). In Park et al.'s (2011) study, women who were primed with romantic images or overheard a romantic conversation showed less interest in STEM and being a math/science major than women who were primed with intelligent conversations or pictures. Park, Young, Eastwick, Troisi, and Streamer (2015) showed that when heterosexual women who preferred smarter romantic partners are primed with the goal of being romantically desirable, they show decreased STEM performance and interest. Additionally, Rudman and Heppen (2003) showed that women with higher levels of implicit romantic fantasies were more likely to select lower paying occupations as well as occupations with low education requirements, and also scored lower on projected income and other high-status job measures. One possible explanation for this outcome is that romantic ideologies encourage women to rely on men for economic and social gains (Rudman & Heppen, 2003). Overall, the literature suggests that women experience a conflict between being romantically desirable and pursuing career goals that imply the violation of gender prescriptions.

This study expands on the literature of backlash effects and romanticism by examining the effects of romantic priming on the social-desirability and hireability of self-promoting and communal female job applicants. Participants in this study were primed with either romantic or intelligence images and then asked to evaluate the social desirability and hireability of potential applicants for a given job description. We hypothesized that there would be no main effect for priming or participant gender on the social desirability or hireability rankings. However, a gender and priming interaction effect was predicted such that females in the romantic priming condition were expected to rate the social desirability of the self-promoting candidate lower than females in the intelligence condition. Priming was not expected to affect male participants' social desirability or hireability rankings. It was also hypothesized that females in the romantic priming condition would be less likely to select the self-promoting candidate as their first choice to hire compared to females in the intelligence condition. No main effect of gender or priming condition on participants' career aspiration was expected. However we hypothesized there would be an interaction effect, such that females in the romantic priming condition were expected to have lower career aspiration than females in the intelligence condition.

## 2. Method

### 2.1 Participants

A total of 143 students (70 male, 73 female) participated in this study and received partial credit for an introductory psychology course requirement at a private university in southern California. The mean age of the sample was 19.39 ( $SD = 2.19$ ), with ages ranging from 18-34. The majority of the participants identified themselves as Caucasian (46.85%) and Asian (16.78%), followed by Latino (14.69%), Bi-Racial (13.29%), African-American (4.99%), Native Hawaiian/Pacific Islander (2.10%), and Other (1.40%).

### 2.2 Procedure

In order to conceal the true purpose of the experiment participants were told the study investigated what types of images college students were able to remember best. After researchers obtained informed consent from each participant, they were randomized into either a romantic or intelligence priming condition. Participants then viewed a slideshow of either 15 romantic or intelligence related images (three seconds per photo) according to their condition. The order in which photos were presented on the slideshow was randomized. Continuing with the concealment of the study's purpose participants were next asked to complete a task that required a high level of thinking in order to distract them from remembering the images. During this task, participants read a job description and three cover letters of potential job applicants and rated each applicant's social desirability and hireability. The order in which participants read the cover letters was also randomized. After reviewing each cover letter participants were asked to hire one of the applicants and select their first, second, and third choice based on the job applicants' cover letters. Participants were then reprimed with another five images (three from the previous slide show and two new images) according to their condition. The order in which photos appeared in this slide show was also randomized and images were presented for four seconds each. As part of concealing the purpose of the study, participants were told the slideshow was a memory task and were asked to specify which images they had seen before and which images they had not. Lastly, participants were asked to complete a career aspiration scale and a basic demographic questionnaire. Once all the measures were checked for completeness participants were debriefed and thanked for their time.

### 2.3 Materials

#### 2.3.1 Priming Slide Shows

The priming slide shows consisted of 15 images (borrowed from the study of Park et al., 2011) pertaining to each condition. Previous research found that the romantic images primed participants with a want to be romantically desirable and the intelligence images primed participants with a want to be intelligent (for more information on validation see Park et al., 2011). In order to keep locations of the images consistent between each condition, six romantic priming images were excluded from the slide show because they were in outdoor settings. A new romantic priming set was created using six new images and nine images from the study of Park et al. (2011). Additionally, two new images for each condition were validated, since new images would need to be included in the memory test. The new romantic priming set was validated by a separate sample ( $N = 31$ , 58% female) where participants were asked to answer the same questions used to validate the original pictures from Park et al. (2011). These images were validated by participants rating on a Likert scale of 1 (not at all) to 9 (extremely) "How much does this image make you want to be romantically desirable" and "How much does this image make you want to be intelligent".

Results indicated that the new set of romantic images, including the two additional images to be used for the memory test, induced a greater want to be romantically desirable ( $M = 5.56$ ,  $SD = 1.52$ ) compared to a want to be intelligent ( $M = 3.54$ ,  $SD = 1.42$ ),  $t(29) = 6.15$ ,  $p < .001$ ,  $d = 1.12$ . Another sample of 53 participants (49% female) was used to test the intelligence images. Results indicated that the two new intelligence images resulted in a greater desire to be intelligent ( $M = 6.60$ ,  $SD = 2.24$ ) than romantically desirable ( $M = 2.09$ ,  $SD = 1.57$ ),  $t(52) = -14.33$ ,  $p < .001$ ,  $d = -1.97$ .

#### 2.3.2 Job Description and Cover Letters

In order to test participants' opinions of communal and self-promoting women a job description (see Appendix A) and three cover letters of potential applicants were created. The job description was for a research lab coordinator position that required applicants to be both communal and self-promoting. These traits were validated using another sample ( $N = 38$ , 50% female). Participants were asked to rate two questions on a Likert scale of 0 (not at all) to 6 (very). Validation questions asked, "Communal is defined as being sensitive, warm, caring, and concerned about others. Given this definition how much do you think this job description requires candidates to be communal?" and "Self-promotion is defined as speaking with pride about one's own

accomplishments, being direct about strengths and talents, and making internal attributions for achievements. Given this definition, how much do you think this job description requires candidates to be self-promoting?" A paired samples t-test indicated that the job description required applicants to be both self-promoting ( $M = 3.79$ ,  $SD = 1.68$ ) and communal ( $M = 3.71$ ,  $SD = 1.39$ ),  $t(37) = -.24$ ,  $p = .82$ ,  $d = -.04$ .

The cover letters used in this study (see Appendix B) were written to make the applicant seem self-promoting or communal, as well as competent or not competent. The first applicant was communal and not competent (CN), the second was self-promoting and competent (SC), and the third was communal and competent (CC). The purpose of the CN applicant was to conceal that participants were really being asked to pick between a self-promoting (SC) or communal (CC) applicant. The same sample used to validate the job description was also used to validate the cover letters. Participants answered three questions on a scale of 0 (not at all) to 6 (very). These questions included: (1) "Communal is defined as being sensitive, warm, caring, and concerned about others. Given this definition, how communal is this candidate?"; (2) "Self-promotion is defined as speaking with pride about one's own accomplishments, being direct about strengths and talents, and making internal attributions for achievements. Given this definition, how self-promoting is this candidate?"; and (3) "Given the job description, how competent do you think that this candidate is for the position?"

As purposed, the CN applicant ( $M = 3.18$ ,  $SD = 1.33$ ) was not as competent as the SC applicant ( $M = 5.00$ ,  $SD = 1.07$ ),  $t(37) = -7.44$ ,  $p < .001$ ,  $d = -1.20$ , or as competent as the CC applicant ( $M = 4.79$ ,  $SD = .96$ ),  $t(37) = -6.95$ ,  $p < .001$ ,  $d = -1.13$ . Additionally, the SC applicant ( $M = 5.18$ ,  $SD = .93$ ) was significantly more self-promoting than the CC applicant ( $M = 4.68$ ,  $SD = 1.33$ ),  $t(37) = 3.31$ ,  $p = .002$ ,  $d = .54$ . In contrast, the CC applicant ( $M = 4.68$ ,  $SD = 1.12$ ) was significantly more communal than SC applicant ( $M = 3.11$ ,  $SD = 1.69$ ),  $t(37) = -5.09$ ,  $p < .001$ ,  $d = .83$ .

### 2.3.3 Hireability and Social Desirability Index

A hireability index was created to assess the general hireability of each applicant. This index consisted of four questions (see Table 1) that participants rated on a Likert scale of 0 (not at all) to 6 (very). These questions were averaged to form a mean score for each applicant, where higher numbers indicated greater hireability. Reliability for this index was strong ( $\alpha = .87$ ). Similarly, a social desirability index ( $\alpha = .79$ ) was created to examine the social desirability of each applicant. This index consisted of four questions that were rated on the same Likert scale as the hireability index, where higher scores indicated greater social desirability. Four of the eight questions used in these indices were borrowed from previous studies that examined backlash effects (Phelan et al., 2008; Rudman & Glick, 1999; Rudman & Glick, 2001).

Table 1. Hireability and social desirability indices

Hireability Index ( $\alpha = .87$ )
How likely is it that you would choose to interview this candidate?*
How likely is it that <i>Dr. Smith</i> would hire this candidate for the job?
How likely is it that <i>you</i> would hire this candidate for the job?*
How successful do you think this candidate would be in the Research Lab Coordinator position?
Social Desirability Index ( $\alpha = .79$ )
How much did the candidate strike you as likeable?*
How much do you think assistants in the lab would enjoy working with this candidate?
How much would you characterize this person as someone you would like to get to know better?*
If you worked in the research lab how much would you want to work with this candidate?

Note. \*These questions were borrowed from previous studies that examined backlash effects (Phelan et al., 2008; Rudman & Glick, 1999; Rudman & Glick, 2001).

### 2.3.4 Career Aspiration

The Career Aspiration Scale (CAS) was developed by Gray and O'Brien (2007) and consists of ten items that gauge attitudes towards career goals and advancement. The CAS includes questions such as, "I plan on developing as an expert in my career field" and "I think I would like to peruse graduate training in my

occupational area of interest". Participants rate agreement with each item on a Likert scale of 0 (not at all true of me) to 4 (very true of me). In this study, the reliability of the scale was found to be adequate ( $\alpha = .74$ ). These ten items were averaged to create a mean score for each participant, where higher scores indicated greater career aspiration.

#### 2.4 Data Analysis

Results from Shapiro-Wilk tests indicated that all social desirability and hireability scores for each candidate were not normally distributed ( $p < .05$ ), so Wilcoxon Signed-Ranks tests were used to analyze the data. In order to use an analysis of variance (ANOVA) to test for main and interaction effects between gender and priming condition two new normally distributed variables were created: (1) the difference in hireability score between the SC candidate and the CC candidate; and (2) the difference in the social-desirability score between the SC candidate and the CC candidate. Additionally, an ANOVA was used to examine main and interaction effects of priming condition and gender on participants' career aspiration.

### 3. Results

#### 3.1 Social Desirability and Hireability

Participants found the SC candidate ( $Mdn = 5.25$ ) more hireable than the CC candidate ( $Mdn = 4.75$ ),  $S = 930.50$ ,  $p = .02$ . In contrast, the CC candidate ( $Mdn = 4.75$ ) was rated more socially desirable than the SC candidate ( $Mdn = 4.25$ ),  $S = 1737.50$ ,  $p < .001$ . Additionally, participants found the CN ( $Mdn = 3.50$ ) candidate less hireable than the CC ( $Mdn = 4.75$ ),  $S = 4107.50$ ,  $p < .001$ , and SC candidates ( $Mdn = 5.25$ ),  $S = 4859.50$ ,  $p < .001$ . The CN candidate ( $Mdn = 4.25$ ) was also rated less socially desirable than the CC candidate ( $Mdn = 4.75$ ),  $S = 2161.00$ ,  $p < .001$ . However, no difference ( $p > .05$ ) in social desirability scores was found between the SC and CN candidates. An ANOVA revealed that there were no significant ( $p > .05$ ) main or interaction effects of participant gender or priming condition on the social-desirability or hireability difference variables.

#### 3.2 First Choice to Hire

A Chi-square analysis revealed a marginally significant relationship between gender and first choice to hire  $\chi^2(2, N = 143) = 5.48$ ,  $p = .06$ , in which males more frequently selected the CN candidate as their first choice to hire than females (see Figure 1). However, Chi-square analysis found no significant ( $p > .05$ ) effects of priming on first choice to hire.

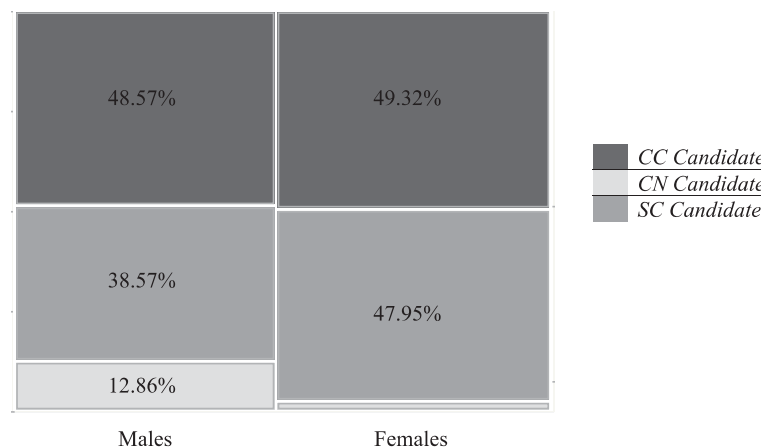


Figure 1. Participant gender and first choice to hire

#### 3.3 Career Aspiration

Results from an ANOVA showed that female participants' career aspiration ( $M = 2.81$ ,  $SD = .60$ ) did not significantly differ ( $p > .05$ ) from males ( $M = 2.96$ ,  $SD = .58$ ). Similarly, no significant differences in career aspiration between the romantic ( $M = 2.88$ ,  $SD = .62$ ) and intelligence ( $M = 2.90$ ,  $SD = .57$ ) priming conditions was found. Results also showed no significant ( $p > .05$ ) interaction effects of participant gender and priming on career aspiration.



#### 4. Discussion

This study explored the effects of romantic and intelligence priming on the social desirability and hireability of self-promoting and communal female job applicants. Results did not support our hypothesis that females in the romantic priming condition would be more likely to select the SC candidate as their first choice to hire. However, participants did rate the SC candidate as more hireable than the CC and CN candidates. In contrast, the CC candidate was rated more socially desirable than the SC and CN candidates. Additionally, results showed there was a marginally significant relationship between participant gender and first choice to hire. The present study also examined the effects of romantic and intelligence priming on career aspiration. Results showed no main or interaction effects of participant gender or priming condition on career aspiration. Therefore, results did not confirm our hypothesis that females in the romantic priming condition would have lower career aspiration than females in the intelligence priming condition.

In job hiring scenarios criteria is often shifted to disadvantage self-promoting women so that their success is undermined and their supposed deficit in social skills is overemphasized (Phelan et al., 2008). However, this shift in hiring criteria is not observed when the applicant is male, even though he possesses the same social deficits (Phelan et al., 2008). These changes in criteria and other backlash effects significantly disadvantage self-promoting women. Even when women abide by gender prescriptions and are more communal than self-promoting, their social skills are undervalued and their lack of self-promotion and other agentic traits are overemphasized (Phelan et al., 2008).

The appearance of confidence seems to be positively related to many individual outcomes in organizations such as hiring and promotion decisions, but gender differences continue to persist. For example, research conducted by Guillén, Mayo, and Karelaia (2016) found social attraction, or being liked by colleagues, moderates the competence-confidence gender gap. While for men competence is sufficient to appear confident, competent women must be liked to reap the benefits of their competence. So much so that being disliked turns competence into a liability for women. Paradoxically, more competent women appear less confident.

Research by Heilman and Okimoto (2007) suggests that women are penalized for success in male gender-typed areas of the workforce because their success implies they lack communality. However, when information about a successful woman in a traditionally masculine domain is supplemented with evidence that she is also communal, negative reactions are reduced (Heilman & Okimoto, 2007). Similarly, Brescoll and Uhlmann (2008) revealed that when a female expressed anger in a professional setting she received a lower status conferral, salary, and competence ratings compared to a male who also expressed anger. However, when a female provided an explanation for her anger she received higher status conferral and salary compared to a female target that did not mention an explanation for her anger. Together these results suggest that women can mitigate the negative effect of violating gender stereotypes.

Previous research has demonstrated that women are just as likely as men to elicit backlash on self-promoting and/or agentic women (Parks-Stamm, Heilman, & Hearn, 2008; Rudman, 1998; Rudman & Kilianski, 2000). Our study aligned with previous literature since the self-promoting candidate received backlash in that she was rated less socially desirable than the qualified communal candidate. Even though the communal candidate was socially desirable she was not rated as hireable as the self-promoting candidate. This supports previous literature that has shown self-promotion is needed to be viewed as competent (Rudman, 1998). The backlash that self-promoting women receive can significantly impact their careers. Heilman et al. (2004) showed that an employee's likability affected participants' recommendations for the employee's salary level and whether or not they wanted to have them as a manager. Heilman et al. (2004) thus demonstrated that while competency is important, so is likability. In their meta-analysis, Williams and Tiedens (2016) found that when dominance is explicit (but not implicit) women are rated as less likable than dominant men. However, dominant targets were rated as more competent than non-dominant targets independent of target gender. Results from the meta-analysis demonstrated that dominant behavior had a greater negative effect on women's downstream outcomes (e.g., hireability) compared to men's.

Williams and Tiedens (2016) suggest that these downstream outcomes follow patterns of likability ratings and not competence ratings. Some research has suggested that women are aware of the penalties for violating gender prescriptions, such that in one study women anticipated greater relational problems when being in a leadership position (i.e., CEO, political leader, director of a science research center) compared to men (Lips, 2001). Interestingly, results from the present study showed that while male and female participants selected the CC candidate in equal proportions, they differed in that men chose the SC candidate less than females and more often selected the CN candidate. These results suggest that some males may prefer a communal and unqualified

candidate to a self-promoting and qualified candidate. This finding may imply that in some cases, abiding by communal gender-prescriptions is more important for females than demonstrating agency and capability.

In addition to confirming previous findings on backlash effects, the present study examined the effects of romantic versus intelligence priming on the social desirability and hireability of female applicants. Results revealed no significant effects of priming condition on the social desirability or hireability scores of the applicants. These results suggest that romantic ideologies may not provoke participants to further sanction female applicants who violate gender prescriptions. Additionally, results showed that romantic priming had no effect on participants' career aspiration. These results do not necessarily conflict with previous studies that have shown the negative influence of romanticism on women's career aspiration. The Career Aspiration Scale may not have been as sensitive to changes in career goals as previous studies' measures (e.g., expected income).

#### 4.1 Limitations and Future Research

It should be noted that no exploratory or confirmatory factor analysis was conducted to test the validity of both the social desirability and hireability indices. While some questions used in the indices were taken from published studies (Phelan et al., 2008; Rudman & Glick, 1999; Rudman & Glick, 2001), the additional items added to the index would benefit from such data analyses. The age of the sample was fairly young and should be expanded upon. We cannot say whether the same results would be observed in an older population that has more experience in the workforce.

The present study only included applicants high in either self-promotion or communality. Heilman and Okimoto (2007) demonstrated that when information about self-promoting females also includes information that they are communal negative reactions are minimized. Future studies should explore the hireability and social desirability ratings of applicants that are high in both self-promotion and communality. As well, future research should explore differences in females' social desirability and hireability in both gender incongruent and congruent positions. Lastly, further research should examine how self-promoting women are treated in the workplace in order to better understand the longitudinal effects of backlash.

#### References

- Amanatullah, E. T., & Tinsley, C. H. (2013). Punishing female negotiators for asserting too much... or not enough: Exploring why advocacy moderates backlash against assertive female negotiators. *Organizational Behavior and Human Decision Processes*, 120(1), 110-122. <http://dx.doi.org/10.1016/j.obhdp.2012.03.006>
- Brescoll, V. L., & Uhlmann, E. L. (2008). Can an angry woman get ahead? Status conferral, gender, and expression of emotion in the workplace. *Psychological Science*, 19(3), 268-275. <http://dx.doi.org/10.1111/j.1467-9280.2008.02079.x>
- Catalyst. (2015, October 13). *Pyramid: Women in S&P 500 Companies*. Retrieved from <http://www.catalyst.org/knowledge/women-sp-500-companies>
- Gray, M. P., & O'Brien, K. M. (2007). Advancing the assessment of women's career choices: The Career Aspiration Scale. *Journal of Career Assessment*, 15(3), 317-337. <http://dx.doi.org/10.1177/1069072707301211>
- Guillén, L., Mayo, M., & Karelaiia, N. (2016, August). *The competence-confidence gender gap: Being competent is not (always) enough for women to appear confident*. Paper presented at the Academy of Management Annual Meeting, Atlanta, GA. Retrieved from <http://margaritamayo.com/files/2016/07/The-competence-confidence-gender-gap.pdf>
- Heilman, M. E., & Okimoto, T. G. (2007). Why are women penalized for success at male tasks? The implied communality deficit. *Journal of Applied Psychology*, 92(1), 81. <http://dx.doi.org/10.1037/0021-9010.92.1.81>
- Heilman, M. E., Wallen, A. S., Fuchs, D., & Tamkins, M. M. (2004). Penalties for success: Reactions to women who succeed at male gender-typed tasks. *Journal of Applied Psychology*, 89(3), 416. <http://dx.doi.org/10.1037/0021-9010.89.3.416>
- Koch, S. C. (2005). Evaluative affect display toward male and female leaders of task-oriented groups. *Small Group Research*, 36(6), 678-703. <http://dx.doi.org/10.1177/1046496405281768>
- Lips, H. M. (2001). Envisioning positions of leadership: The expectations of university students in Virginia and Puerto Rico. *Journal of Social Issues*, 57(4), 799-813. <http://dx.doi.org/10.1111/0022-4537.00242>

- Moss-Racusin, C. A., & Rudman, L. A. (2010). Disruptions in women's self-promotion: The backlash avoidance model. *Psychology of Women Quarterly*, 34(2), 186-202. <http://dx.doi.org/10.1111/j.1471-6402.2010.01561.x>
- Netchaeva, E., Kouchaki, M., & Sheppard, L. D. (2015). A man's (precarious) place: Men's experienced threat and self-assertive reactions to female superiors. *Personality and Social Psychology Bulletin*, 41(9), 1247-1259. <http://dx.doi.org/10.1177/0146167215593491>
- Okimoto, T. G., & Brescoll, V. L. (2010). The price of power: Power seeking and backlash against female politicians. *Personality and Social Psychology Bulletin*, 36(7), 923-936. <http://dx.doi.org/10.1177/0146167210371949>
- Park, L. E., Young, A. F., Eastwick, P. W., Troisi, J. D., & Streamer, L. (2015). Desirable but not smart: Preference for smarter romantic partners impairs women's STEM outcomes. *Journal of Applied Social Psychology*, 46(3), 158-179. <http://dx.doi.org/10.1111/jasp.12354>
- Park, L. E., Young, A. F., Troisi, J. D., & Pinkus, R. T. (2011). Effects of everyday romantic goal pursuit on women's attitudes toward math and science. *Personality and Social Psychology Bulletin*, 37(9), 1259-1273. <http://dx.doi.org/10.1177/0146167211408436>
- Parks-Stamm, E. J., Heilman, M. E., & Hearn, K. A. (2008). Motivated to penalize: Women's strategic rejection of successful women. *Personality and Social Psychology Bulletin*, 34(2), 237-247. <http://dx.doi.org/10.1177/0146167207310027>
- Pfeffer, J., Fong, C. T., Cialdini, R. B., & Portnoy, R. R. (2006). Overcoming the self-promotion dilemma: Interpersonal attraction and extra help as a consequence of who sings one's praises. *Personality and Social Psychology Bulletin*, 32(10), 1362-1374. <http://dx.doi.org/10.1177/0146167206290337>
- Phelan, J. E., Moss-Racusin, C. A., & Rudman, L. A. (2008). Competent yet out in the cold: Shifting criteria for hiring reflect backlash toward agentic women. *Psychology of Women Quarterly*, 32(4), 406-413. <http://dx.doi.org/10.1111/j.1471-6402.2008.00454.x>
- Phelan, J. E., & Rudman, L. A. (2010). Prejudice toward female leaders: Backlash effects and women's impression management dilemma. *Social and Personality Psychology Compass*, 4(10), 807-820. <http://dx.doi.org/10.1111/j.1751-9004.2010.00306.x>
- Prentice, D. A., & Carranza, E. (2002). What women and men should be, shouldn't be, are allowed to be, and don't have to be: The contents of prescriptive gender stereotypes. *Psychology of Women Quarterly*, 26(4), 269-281. <http://dx.doi.org/10.1111/1471-6402.t01-1-00066>
- Rudman, L. A. (1998). Self-promotion as a risk factor for women: The costs and benefits of counterstereotypical impression management. *Journal of Personality and Social Psychology*, 74(3), 629. <http://dx.doi.org/10.1037/0022-3514.74.3.629>
- Rudman, L. A., & Glick, P. (1999). Feminized management and backlash toward agentic women: The hidden costs to women of a kinder, gentler image of middle managers. *Journal of Personality and Social Psychology*, 77(5), 1004. <http://dx.doi.org/10.1037/0022-3514.77.5.1004>
- Rudman, L. A., & Glick, P. (2001). Prescriptive gender stereotypes and backlash toward agentic women. *Journal of Social Issues*, 57(4), 743-762. <http://dx.doi.org/10.1111/0022-4537.00239>
- Rudman, L. A., & Heppen, J. B. (2003). Implicit romantic fantasies and women's interest in personal power: A glass slipper effect? *Personality and Social Psychology Bulletin*, 29(11), 1357-1370. <http://dx.doi.org/10.1177/0146167203256906>
- Rudman, L. A., & Kilianski, S. E. (2000). Implicit and explicit attitudes toward female authority. *Personality and Social Psychology Bulletin*, 26(11), 1315-1328. <http://dx.doi.org/10.1177/0146167200263001>
- Rudman, L. A., Moss-Racusin, C. A., Phelan, J. E., & Nauts, S. (2012). Status incongruity and backlash effects: Defending the gender hierarchy motivates prejudice against female leaders. *Journal of Experimental Social Psychology*, 48(1), 165-179. <http://dx.doi.org/10.1016/j.jesp.2011.10.008>
- U.S. Bureau of Labor Statistics. (2013, October 1). *Highlights of Women's Earnings in 2012*. Retrieved from <http://www.bls.gov/cps/cpswom2012.pdf>
- U. S. Department of Commerce Economics and Statistics Administration. (2011). *Women in America: Indicators of Social and Economic Well-Being*.

- Waung, M., Hymes, R., Beatty, J. E., & McAuslan, P. (2015). Self-promotion statements in video resumes: Frequency, intensity, and gender effects on job applicant evaluation. *International Journal of Selection and Assessment*, 23(4), 345-360. <http://dx.doi.org/10.1111/ijsa.12119>
- Williams, M. J., & Tiedens, L. Z. (2016). The subtle suspension of backlash: A meta-analysis of penalties for women's implicit and explicit dominance behavior. *Psychological bulletin*, 142(2), 165. <http://dx.doi.org/10.1037/bul0000039>
- Zeigler-Hill, V., & Myers, E. M. (2011). An implicit theory of self-esteem: The consequences of perceived self-esteem for romantic desirability. *Evolutionary Psychology*, 9(2), 147-180. <http://dx.doi.org/10.1177/147470491100900202>

## Appendix A

### Research Lab Coordinator Position Description

Seeking a student who is skilled in psychological research methods for a research lab coordinator position. This student will be working closely with faculty who are involved in current research studies. The position requires basic statistical skills, data management skills, and leadership skills to direct other student research assistants. This student must also have administrative and organizational skills to make sure proceedings run as planned. Writing and research skills are necessary, as findings from these labs will be published.

Some of the responsibilities will include:

- Working closely with faculty to establish credible testing methods
- Coordinating and hiring student research assistants
- Training all research assistants on lab skills and research policies
- Overseeing equipment inventory
- Working with the research team to publish findings from lab

Interested candidates should contact Dr. Smith via e-mail at [dsmith@apu.edu](mailto:dsmith@apu.edu)

## Appendix B

### Candidate Cover Letters

#### Communal Not Competent (CN) Candidate

Hello,

I hope your day is going well so far! My name is Amanda Powell, and I am junior psychology student here at APU. I saw your posting online and I felt like I would be good for the job because I think I have good qualifications for it. Here are some of them:

- Leadership and event planning skills from Resident Life training
- Class experience with Excel
- Volunteer kid's program coordinator
- Administrative skills from summer camp counseling position
- Recipient of Founder's Award (Cumulative GPA: 3.2)
- Active member of the Psych Club
- Distribution and collection of surveys

Thank you so much for your time and consideration! I've been looking forward to an opportunity like this for a long time. I hope to hear back from you soon!

Have a great day!

Amanda Powell

(626) 555-4345

[apowell1010@apu.edu](mailto:apowell1010@apu.edu)

Self-Promoting Competent (SC) Candidate

To whom it may concern,

My name is Jessica N. Newman and I am currently a junior at Azusa Pacific University. I am interested in the Research Lab Coordinator position because I feel that it would further my skills in psychological sciences. Based on my numerous qualifications I can assure you that I am more than capable of being the Research Lab Coordinator.

I have a thorough understanding of how to use SPSS and Excel to organize and analyze data. In addition, I have been selected to be a teaching assistant for multiple upper division psychology courses. As a teaching assistant, I have worked alongside fulltime faculty to develop course curriculum and train students to write appropriately for psychological sciences. As well, I was awarded the Trustee's Scholarship (cumulative GPA 3.9) and have consistently been honored on the Dean's List.

My distinctive research qualifications include leading a study on the placebo effect and increased endurance in my research methods course. To expand upon my study from research methods, I collaborated with Dr. Williams in a research practicum setting. Results from this collaboration were presented at an APA conference in poster format. Following this presentation, I submitted an article to a psychological journal.

Given my qualifications I would be an excellent fit for the Research Lab Coordinator Position. If you need any further information please contact me at [jnewman1010@apu.edu](mailto:jnewman1010@apu.edu) or at (626) 555-4876.

Sincerely,

Jessica N. Newman

Communal Competent (CC) Candidate

Dr. Smith,

My name is Melanie Jacobs and I am a junior at Azusa Pacific University. My mentor suggested that I apply for the Research Lab Coordinator position. Mostly, I am interested in the position because I believe it would be an opportunity to build new relationships with professors and students in the department.

I have participated in a research practicum and research methods class experiment. In research practicum, our team assisted a professor on their study concerning child development. During my research methods class we ran an experiment to examine the association between stress and relationship satisfaction. As a research team we presented the results at an APA conference and also worked together to submit an article to a psychological journal.

While being a part of these research teams I was exposed to using both SPSS and Excel. Additionally, I aid professors as a teaching assistant for upper division psychology classes. As a teaching assistant I have organized and led study groups to prepare students for exams and have helped the professors with grading. I have also been a consistent member of the Dean's list and have received the Trustee's Scholarship (GPA: 3.9).

I would love to meet the research team members who are currently a part of the lab, so that I could see if I would be a good addition to the research lab team. I look forward to further discussing this opportunity with you. If you have any questions or concerns, please feel free to contact me by e-mail at [mjacob1010@apu.edu](mailto:mjacobs1010@apu.edu) or by phone at (626) 555-7384.

Thank you for your time,

Melanie Jacobs

**Copyrights**

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

## Predictive Ability of Social Intelligence from Attachment Styles

Alghamdi Michael A.<sup>1</sup>, Al.Qudah Mohammad F.<sup>1</sup>, Albursan Ismael S.<sup>1</sup>, Abduljabbar Adel S.<sup>1</sup> & Bakhiet Salaheldin F.<sup>1</sup>

<sup>1</sup> King Saud University, Saudi Arabia

Correspondence: Albursan Ismael S., King Saud University, Saudi Arabia. E-mail: Ismael\_bursan@yahoo.com

Received: October 13, 2016

Accepted: October 31, 2016

Online Published: November 7, 2016

doi:10.5539/ijps.v8n4p131

URL: <http://dx.doi.org/10.5539/ijps.v8n4p131>

### Abstract

With our present study we aimed to explore the prevalent attachment styles among female university students and to investigate the extent to which attachment styles (secure, avoidant and anxious-ambivalent) may interpret differences in Social Intelligence (SI). Our subjects were 404 female students randomly selected from the preparatory year and the fourth year at King Saud University in Riyadh. We used and extracted the psychometric characteristics of the Adult Attachment Styles Scale and the Social Intelligence Scale. Data revealed that the most prevalent attachment style among our sample of students at King Saud University was secure attachment followed by avoidant and then anxious-ambivalent attachment. Analysis of multiple regression showed that both secure and anxious-ambivalent attachment contributed significantly to predicting SI. Avoidant attachment, on the other hand, did not prove to be a strong SI predictor.

**Keywords:** social intelligence, attachment styles, KSA, university students

### 1. Introduction

The issue of “attachment” has captured the attention of researchers concerned with development and socialization, e.g., Freud, Wolpe, Ainsworth, Harlow and Lorenz. A reason for this interest is that attachment as a social-emotional behavior style affects the development and mental health of a person throughout life (Arremawi, 2011). In his attachment theory, Bowlby (1991) suggested that humans are innately inclined to establish intimate relationships with given people in his/her social milieu. This inclination, most evident in the mother-child relationship, remains effective throughout life and is essential for survival.

Early research in this area focused on attachment to the mother, its styles and its relation to various behavioral, cognitive and social aspects (Ainsworth, Blehar, Waters, & Wall, 1978). The application of the principles and concepts of attachment theory to adult relationships led to significant discoveries about the dynamics of human relations. It also helped with the discovery of social-emotional origins of human adaptive and maladaptive characteristics (Cassidy & Shaver, 1999).

Ainsworth and colleagues (Ainsworth et al., 1978) studied attachment styles among infants and noted how these styles varied according to the feeling of security or anxiety in the relationship with the mother. Empirical evidence was found for an apparent match between such styles and the subsequent attachment styles in friendship and emotional relationships among adults. Researchers also found that attachment styles relate to behavioral, cognitive, emotional and social aspects in interpersonal relationships and that they relate to an individuals’ feelings and social interactions (Shaver & Brennan, 1992).

Attachment styles in adults are extensions of styles established in childhood. A child is exposed to different forms of socialization that affect his/her attitudes towards parents, self and others. These attitudes underlie the formation of intimate and social relationships in later stages of development. Attachment is the aspect of social and emotional behavior in young children that presents as the most significant for subsequent stages of development. This aspect of behavior is manifested in a child’s attachment to his/her caregiver as the most significant person for a child, especially if this is the child’s mother (Al-Maleki, 2010). The consensus among researchers is that attachment manifests as one of three styles: 1) “secure” attachment in which the individual trusts others and feels secure in their closeness, 2) “anxious-ambivalent” attachment where the individual shows excessive interest in others and excessively demands their closeness, and 3) “avoidant” attachment in which the individual does not like to be close to others or share intimacy with them.

Attachment underlies subsequent social relationships and interactions. It is affected by the kind of relationships experienced by a child which shape his/her ability to interact with others and an awareness of their own feelings and the feelings of others. This is what is meant by Social Intelligence (SI), which is affected by the attachment styles that characterize one's social relationships. SI according to Abo-Donia (1998) is a mental ability essential for lifelong social interaction. Similarly, Zahran (2000) suggests that SI refers to the ability to conceive social relations, to comprehensively interact with others and to behave appropriately in different social situations and settings. SI, therefore, is necessary for social adjustment and success in social life.

Social intelligence is an important issue in psychology and has therefore received considerable research interest. It has become of greater significance in our modern society with more rapid social changes and more complicated social challenges. Because SI can be practiced and observed, individuals may be viewed as more or less socially intelligent. By displaying SI an individual can impress others with effective social behaviors desirable in his/her community (Abo-Amsha, 2013).

Assuming the significance that research has revealed concerning attachment and its effect on an individual's social relations and interactions and their psychological and social adjustment, we explored the relationship between attachment styles and SI among female students attending King Saud University. To the best of our knowledge, few studies have tackled this topic, e.g., Al-Ollwan (2011), and Deniz, Hamarta and Ari (2005). These two studies and several others investigated the relationship between attachment styles and different aspects of SI, e.g., emotional intelligence, social skills, social competence, social interaction and social anxiety.

A study by Khori (2004) indicated a positive relationship between an individual's secure attachment style and his/her marital adjustment. However, a negative relationship was found between avoidant attachment and marital adjustment. Results also showed that secure individuals often get married to each other, and that the same applies to insecure individuals. Also, in a study by Al-Ameri (2015), a statistically significant correlation was detected between secure attachment and the development of the psycho-social ego. Conversely, a negative relationship was found between insecure attachment and the powers of the ego. Furthermore, a study by Al-Omeiri (2015) detected a positive correlation between neurosis and anxious attachment, and between extroversion and devotion on the one hand and secure attachment on the other. A negative relationship was also detected between submission and devotion on the one hand and avoidant attachment on the other.

Abo-Ghazal and Flwah (2014) found that secure attachment is the most prevalent of all attachment styles among Jordanian adolescents. They found differences in avoidant attachment between males and females in favor of females. Results also indicated a significantly positive relationship between avoidant attachment and negative attitude toward problems. Besides, a significant positive relationship was found between secure and avoidant attachment on the one hand and avoidant problem solving and rational problem solving on the other.

Also, the studies conducted by Arslan, Arslan and Ari (2012), and Zeyrek, Gencoz, Bergman and Lester (2009) reported a significant positive relationship between secure attachment and problem solving style. Secures attachment correlated negatively with negative problem solving. Also, busy and frightened attachment negatively correlated with negative problem solving, poor self-confidence and unwillingness to assume responsibility.

The study by Ayda (2008) reported a negative correlation between secure attachment and depression in adolescents. Anxious attachment was the attachment style that significantly contributed to depression in the same sample. Similarly, Muras (1996) documented higher levels of depression and anxiety in adolescents with anxious and avoidant attachment compared to adolescents with secure attachment.

One of the few attachment studies conducted is Al-Harout's (2000) wherein it was reported that children with secure attachment are significantly distinct from children with avoidant attachment on social competence variables. Similarly, and he found that individuals with secure attachment outnumber individuals with avoidant and anxious-ambivalent attachment on the quantity and quality of social interactions. The quality of social interactions was measured by their value and resultant satisfaction and enjoyment in the company of others. The study also found that individuals with anxious-ambivalent attachment have higher incidence of depression and social anxiety than individuals with secure and avoidant attachment.

Joseph and Allen (2002) studied attachment and autonomy as predictors of the development of social skills and delinquency during mid-adolescence. Secure attachment proved to be a strong predictor of better social skills. Insecure attachment, on the other hand, was accompanied by a noticeable increase in delinquency during mid-adolescence.

In this same respect, Ditommaso, Brennen-McNulty, Ross and Burgess (2003) report a significant positive relationship between secure attachment and social skills. Conversely, they found a negative relationship between

anxious-ambivalent attachment and social skills. A significant relationship between secure attachment and Emotional Intelligence (EI) was also found by Hamarta, Deniz and Saltali (2009). Secure attachment was found to be a statistically significant predictor of EI.

Al-Maleki (2010) reported a significant relationship between anxious attachment and secure attachment on one hand and self-efficacy on the other. Anxious attachment and secure attachment were strong predictors of self-efficacy. It was revealed that avoidant attachment and secure attachment relate significantly to social skills. No significant relationship was detected between anxious attachment and social skills. Secure attachment, which was the most prevalent, proved to be a strong predictor of social skills.

In a study conducted by Brumariu and Kerns (2010), children with secure attachment displayed lower levels of social and scholastic anxiety. However, they displayed a higher level of separation anxiety. Finally, Al-Ollwan (2011) found a significant correlation between Emotional Intelligence (EI) and both social skills and attachment styles (secure, avoidant and anxious). Researchers also reported a significant correlation between social skills and secure attachment.

Our review of relevant literature highlights the significance of the present study whereby we studied attachment styles and SI. These two variables are significant for the development of social relations wherein a better understanding of such can assist with finding solutions to social problems encountered by individuals and society. The investigation of attachment styles can also sensitize us to better ways of reducing psychological problems and social disorders in the general population.

The survey of relevant literature assisted us in forming a clearer picture of the important aspects we undertook for our present study. The studies of Lawrence and Donald (1990), Joseph (1992) indicated that social competence and social skills are important aspects of SI. The studies we reviewed helped with the formulation of questions and hypotheses for our research and assisted us with the selection of suitable statistical techniques and the interpretation of results. The studies of Abo-Ghazal and Jaradat (2009) and Al-Manaberi (2010) were of special value for the development of the present study's tools.

## **2. Statement of the Problem**

To the best of our knowledge, few studies have undertaken researching the relationship between attachment styles and SI of adults in Arabic and Saudi universities. This important issue therefore needs to be further researched in the Arabic environment. The need for the present study was also fueled by the fact that attachment plays an important role in a person's life. It is the basis on which an individual establishes his/her future relations. Individuals with secure attachment are open to learning and change whereas individuals with insecure attachment are not as open to new information (Mikulincer, 1997).

Attachment styles proved to correlate with many variables that facilitate social interaction and enhance psychological adjustment, some of which include social skills and self-efficacy. In this respect, Ditommaso et al. (2003), Wei, Russell and Zakalik (2005), and Simpson (1990) assert that individuals with secure attachment possess better social skills and social competence. They treat others with trust and feel satisfied with their relations and this promotes beneficial social interaction. Conversely, individuals with insecure attachment are characterized by both poor social skills and social competence. Distrust and dissatisfaction govern their relations with others, which hinders their social interaction and negatively affects their self-efficacy.

Social intelligence is a form of intelligence that relates directly to one's life, psychological adjustment and interaction with others, this form of intelligence is made up of a number of abilities that enable the individual to interact with his/her environment successfully. The SI construct, according to Silver and Lee (2001) and Marlowe (1986), includes the following components: 1) social sensitivity, 2) social foresight, 3) social skills, 4) social competence, 5) social effectiveness, 6) sympathy, 7) emotional skills, 8) social anxiety, 9) social adjustment, and 10) the ability to interact with others. Hence, a socially intelligent individual is one who establishes secure social skills and successfully interacts with others. Such an individual can integrate well with his community, which enables him/her to achieve the highest levels of personal, psychological and social adjustment (Asqoul, 2009). Furthermore, Johnson (2008) asserts that emotional intelligence is a form of SI. Other aspects of SI include social skills, competence, knowledge, effectiveness, behavior, anxiety and interaction. These components can therefore be predictors of SI. The aforementioned highlights the need to investigate the relationship between attachment styles and SI as recommended by researchers, e.g., Mikulincer, Shaver and Pereg (2003).

We explored the extent to which attachment styles can predict SI among King Saud University female students. More specifically, we addressed the following questions: 1) Which attachment styles are most prevalent among the



female students at King Saud University? 2) Can attachment styles (secure, avoidant, anxious-ambivalent) interpret differences in social intelligence among the female students at King Saud University?

### 3. Significance of the Study

The significance of the study is derived from the following considerations:

- 1) The significance and novelty of the issue of adult attachment styles. To the best of our knowledge, there are limited studies exploring the relationship between attachment styles and social intelligence. Our study is therefore expected to offer opportunities for further research.
- 2) Attachment has several styles that should be examined concerning their nature and their relationship with other variables like social intelligence. This offers new insights for counselling and guidance services in our complex modern society.
- 3) Attachment is a significant and multi-faceted topic. Most studies assert the significance of attachment in childhood and highlight its manifestation, either positive or negative, on adults. These studies have also reported on the importance of employing attachment to eliminate threat and to attain the feeling of security needed for lifelong psychological well-being and adjustment.
- 4) The investigation of the relationship between attachment and social intelligence is expected to have educational implications. It may direct the attention of decision makers in educational institutes to factors that lead to insecure attachment. Perhaps this would facilitate more careful attention being paid to students with insecure attachment which in turn would aid the student's achievements and social competence.
- 5) Our study is expected to adapt the tool for assessing attachment styles to the Saudi environment. This tool will then be available for Saudi researchers going forward.
- 6) The results of our study may also add insights to future endeavors to design counselling and remedial programs for enhancing secure attachment and social intelligence among adults and individuals from other age groups.

### 4. Study Terms

- 1) Attachment Styles—attachment styles refer to the score a student receives on the Attachment (secure, avoidant, anxious-ambivalent) Styles Scale.
- 2) Social Intelligence—social intelligence refers to the score a student receives on the Social Intelligence Scale.

### 5. Limitations of the Study

The study is limited to: 1) Investigating the relationship between attachment styles and social intelligence, 2) female students at the preparatory and fourth year at King Saud University, 3) the second term of the academic year 2013-2014, and 4) King Saud University in Riyadh.

### 6. Method

#### 6.1 Sample

The population of the present study were all undergraduate female students enrolled in the second semester of the academic year 2013-2014 at King Saud University (N = 7178). A representative sample of the study population was selected randomly. The sample consisted of 404 female students at the preparatory year (age average = 19 years) and the fourth year (age average = 22 years). This sample represented 14% of the total population. Questionnaires were given to 450 potential participants with a total of 430 completed questionnaires returned. Twenty six questionnaires were excluded for missing data and unanswered items among other reasons leaving a usable sample of 404 students from all departments.

#### 6.2 Tools

The following tools were used in the present study:

##### 6.2.1 An Adult Attachment Styles Scale

The researchers used the Al-Yarmouk Adult Attachment Styles Scale developed by Abo-Ghazal and Jaradat (2009) after surveying attachment scales in published research, e.g. (Hazan & Shaver, 1987; Becker & Billing, 1997; Bakker, Van Oudenhoven, & Van der Zee, 2004; and Huntsinger & Luecken, 2004). The scale was standardized on a sample of undergrad students at Al-Yarmouk University in 2009. It consists of twenty 6-point Likert scale items. Each response was associated with a point value (5 = "strongly agree" and 0 = "strongly disagree"). The items of the scale are distributed under three main styles: 1) secure attachment: this style shows the extent to which one's view of self and others are positive. It consists of 6 items. Thus its total score ranges from 0 to 30. Example items from this style are "It is easy for me to establish intimate relations with others" and "I know I will find

someone to help whenever I need help". 2) anxious-ambivalent attachment: this style shows to what extent one's view of self are negative and of others are positive. It consists of 7 items. The score ranges from 0 to 35. Example items from this style are "I think I love others more that they love me" and "Others do not respect me as much as I respect them". 3) avoidant attachment: this style shows to what extent one's view of self are positive and of others are negative. It consists of 7 items. The score ranges from 0 to 35. Example items from this style are "It is important for me to be independent from others" and "I don't worry when I am alone, as I don't need others".

#### 6.2.2 Validity and Reliability of the Original Attachment Scale

*Validity:* to establish the validity of the original Attachment Styles Scale, it was submitted to six professors at the Educational and Counseling Psychology Department at Al-Yarmouk University. Based on the referees' comments, three items were reworded. All the referees agreed that items represented the styles they belonged to. Furthermore, the validity of the scale was established by computing the correlations between items and the styles they belonged to. Correlation coefficients range from .52 to .69, all significant at the .05 level.

*Reliability:* the reliability of the Attachment Styles Scale was established by computing the internal consistency of its dimensions. Cronbach-alpha coefficients were .76, .64 and .57 for anxious-ambivalent attachment, avoidant attachment and secure attachment respectively.

#### 6.2.3 Validity and Reliability of the Present Study Attachment Scale

*Validity:* to establish the validity of the Attachment Styles Scale in the present study, it was submitted to ten specialists in educational psychology, development, and measurement and evaluation at King Saud University. They were invited to judge the relevance of items to their target dimensions and the clarity of their wording. The researchers set an agreement level of 80% to delete or add items. There was a consensus concerning the relevance of items to their dimensions. However, some items were reworded to address the female students. This indicated that the validity of the scale was acceptable for our study.

Furthermore, the scale was administered to a pilot sample of 60 female students at King Saud University (not the students who participated in the study). Correlations between items and their dimensions were then computed. Correlation coefficients ranged from .405 to .757, all significant at the .01 level. This indicated that the scale was therefore quite reliable to be used in the present study.

*Reliability:* to establish the reliability of the Attachment Scale for our research, it was administered to a pilot sample of 60 female students at King Saud University (the same pilot sample used for establishing validity). The internal consistency between items and their dimensions was then checked by Cronbach-alpha and split-half techniques. These statistics are shown in Table 1:

Table 1. Cronbach-alpha and split-half reliability coefficients of the Adult Attachment Styles Scale

No.	Styles	Reliability Coefficients	
		Split-half	Cronbach-alpha
1	Anxious-ambivalent attachment	.789	.820
2	Avoidant attachment	.769	.843
3	Secure attachment	.740	.761

#### 6.2.4 The Social Intelligence Scale

After we surveyed several scales assessing SI, we selected the scale developed by Al-Manaberi (2010) for our study. The dimensions of this scale and its wording (social knowledge, social effectiveness and social competence) were of high relevance and convenience to our research objectives as it was standardized on a comparable Saudi sample.

The scale has 42 multiple-choice items measuring three dimensions of SI:

1) Social Knowledge: this dimension is measured by 12 items probing social conduct, traditions, values and rules. These 12 items described social situations measuring respondent's knowledge of social traditions, values and rules that would be considered socially acceptable in public life in general and on campus in particular.

2) Social Effectiveness: this dimension has 15 items assessing the respondent's ability to affect and take into consideration or appreciate others' feelings.

3) Social Competence: this dimension of SI is assessed by 15 items exploring the respondent's ability to establish successful social relations and behave appropriately and effectively in different social situations.

#### 6.2.5 Validity and Reliability of the Present Study Social Intelligence Scale

*Validity:* the validity of the SI scale was established by administering it to a pilot sample of 60 female students at King Saud University. Correlations between items and their dimensions were then computed. Correlation coefficients ranged from .33 to .55, all significant at the .01 level. Furthermore, correlations between the dimensions and the total score were computed. Correlations ranged from .44 to .71, all significant at the .01 level. This indicated high construct validity. The scale could therefore be reliably used for our present study.

*Reliability:* to establish the reliability of the Social Intelligence Scale, it was administered to a pilot sample of 60 students. The internal consistency between the scale dimensions and the scale as a whole was then checked by Cronbach-alpha and split-half techniques. These statistics are shown in Table 2:

Table 2. Cronbach-alpha and split-half reliability coefficients of the Social Intelligence Scale

No.	Dimensions	Reliability Coefficients	
		Split-half	Cronbach-alpha
1	Social knowledge	.753	.787
2	Social effectiveness	.768	.783
3	Social competence	.863	.844
	The whole scale	.739	.745

Table 2 shows that reliability coefficients resulting from Cronbach-alpha and split-half were quite high. Cronbach-alpha and split-half total reliability coefficients were .745 and .739 respectively. Cronbach-alpha coefficients for the scale dimensions ranged between .783 and .844. The corresponding split-half coefficients ranged from .753 and .863. All coefficients were therefore high, indicating that the scale is highly reliable. These results are in line with Al-Manaberi's (2010) study.

*Scoring:* we used a 4-point rating scale. Response 1, which represents the highest level of intelligent behavior, was allocated 4 points. Response 4, which represents the lowest level of intelligent behavior, was allocated 1 point. It is worth mentioning here that all the items were in random order and worded positively. Thus, the scores on this scale ranged from 42 to 168.

## 7. Data Analysis

Data were scored and analyzed using the SPSS Package. Descriptive statistics were used to answer the first research question. Finally, Person correlation coefficient and multiple regression analysis were used to answer the second question.

## 8. Results

### 8.1 Attachment Styles Prevalent among Students

To answer the first research question regarding prevalent attachment styles among female King Saud university students, means and standard deviations of respondents' responses on the Attachment Scale were computed. These statistics are presented in Table 3 below.

Table 3. Means and standard deviations of responses on the Attachment Styles Scale

No.	Attachment Styles	M	SD	Order
1	Anxious-ambivalent attachment	14.30	5.676	3
2	Avoidant attachment	21.32	4.529	2
3	Secure attachment	22.06	5.081	1

It is clear from Table 3 that the most prevalent attachment style among King Saud University female students is secure attachment ( $M = 22.06$ ), followed by avoidant attachment ( $M = 21.32$ ) and then anxious-ambivalent attachment ( $M = 14.30$ ).

### 8.2 Interpreting Differences in Social Intelligence among Students by Attachment Styles

To answer our second research question about the extent to which attachment styles can interpret differences in SI among students, Pearson correlation coefficients were computed to examine the strength of the relationship between attachment styles and SI. These statistics are listed in Table 4 below.

Table 4. Correlation coefficients between Attachment Styles and SI

No.	Attachment Styles	Social Intelligence			
		Social Knowledge	Social Competence	Social Effectiveness	Total Score
1	Secure attachment	.155**	.175**	.047	.190**
2	Anxious-ambivalent attachment	-.073-	-.218**	-.074-	-.199**
3	Avoidant attachment	-.154**	.036	-.039-	-.067-

Significant at the .01 level

Evidenced by Table 4, there is a statistically significant ( $p > .01$ ) positive relationship between secure attachment and social knowledge ( $r = .155$ ), social competence ( $r = .175$ ) and total social intelligence ( $r = .190$ ).

Table 4 also highlights a statistically significant negative relationship between anxious-ambivalent attachment and social competence and total social intelligence.

Furthermore, a statistically significant ( $p > .01$ ) negative relationship ( $r = -.154$ ) was found between avoidant attachment and social knowledge.

To investigate the extent to which attachment styles can interpret differences in SI among students, the multiple regression analysis was computed. Data of these statistics are presented in Table 5.

Table 5. Multiple regression analysis for differences in SI by Attachment Styles

Dependent Variable	Predictors	Non-standard regression coefficient B	Multiple correlations coefficient R	Explained variance	f	Probability
Social intelligence	Anxious attachment	-327.	.199.	.04.	16.58	.000.
	Secure attachment	401.	0.272	.07.	15.00	.000.

It is obvious from Table 5 that both anxious and secure attachment explained 7% of the variance in SI. Anxious attachment explained 4% of the variance. This signifies that it significantly ( $p > .001$ ) predicts social intelligence. Secure attachment explained 3% of the variance in SI. This value is also significant ( $p > .001$ ). Avoidant attachment did not significantly predict SI.

## 9. Discussion and Recommendations

Previous research has revealed the significance of attachment styles on psychological and social adjustment motivating us to explore the relationship between attachment styles and social intelligence among female students attending King Saud University. Our data revealed that the most prevalent attachment style for female students at King Saud University is secure attachment, followed by avoidant and anxious-ambivalent attachment respectively. This means that in general the students' view of themselves and others are positive, and that security and satisfaction govern their relations with others. The students proved that they could establish trustful relations with others and do not feel anxious when close to others which is consistent Hazan and Shaver's (1987) view of secure

attachment. A possible explanation for this finding is that students enjoyed a warm and stable relationship with their mothers. This is consistent with Bowlby's (1969, 1973) assertion that warm and stable relations with mothers during early years is an indicator of secure attachment. Individuals who enjoy a close relationship with their mother acquire positive emotional experiences as they grow. These results are also consistent with studies conducted by Hazan and Shaver (1987, 1990), Abo-Ghazal and Jaradat (2009), Ashahwan (2002), Al-Maleki (2010), Khori (2004), Abo-Ghazal and Flwah (2014), and Al-Omeiri (2015). It is apparent that secure attachment is prevalent in many cultures or that it is of a universal nature.

We computed Pearson correlation coefficients to examine the strength of the relationship between attachment styles and SI and report that there is a statistically significant positive relationship between secure attachment and social knowledge, social competence and total SI. This indicates that a student's positive view of self and others are associated with higher SI and this consequently implies that students with secure attachment possess higher social skills, social effectiveness and social competence. Trusting and satisfying relationships with others on campus would make a student socially intelligent (Simpson, 1990) as such personal relationships promote social interactions. The positive view of self and of others that a student with secure attachment possesses would enable him/her to establish successful social relations with others. It is accepted that establishing understanding social relationships and cooperating with others are basic dimensions of SI.

This finding is in line with the findings reached in the study by Al-Harout (2000). It also concurs with the study of Ditommaso et al. (2003) and the study of Al-Maleki (2010) that reported a positive relationship between secure attachment and social skills. Finally, this finding is in line with the study of Al-Ollwan (2011) reporting a significant relationship between secure attachment and social skills on one hand and emotional intelligence on the other.

It is also clear that there is a statistically significant negative relationship between anxious-ambivalent attachment on one hand and social competence and total social intelligence on the other. Similar findings were reached in the studies conducted by Ditommaso et al. (2003) and Al-Ollwan (2011) where a negative relationship was detected between anxious-ambivalent attachment and social skills. However, this finding is inconsistent with the study by Al-Maleki (2010) that did not report a statistically significant negative relationship between anxious attachment and social skills. In addition, the results showed that a statistically significant negative relationship was found between avoidant attachment and social knowledge. This means that students with avoidant attachment have a lower level of social knowledge. The same finding was reached in the studies by Al-Maleki (2010) and Al-Ollwan (2011) where a negative relationship was found between avoidant attachment and social skills.

Analysis of multiple regression showed that secure attachment and anxious-ambivalent attachment contributed significantly to predicting SI. Avoidant attachment, on the other hand, did not prove to be a strong predictor of SI and these findings reveal that students with secure attachment have the highest level of SI. They possess better social skills and relations than do students with other styles of attachment. They are therefore more capable of establishing and sustaining relationships with others. Students with a negative view of self and others lack the social skills to establish and sustain relations with others.

This finding can also be interpreted in the light of the key role that self-efficacy plays in one's life. Social self-efficacy is one of the concepts that Bandura presented in his survey of the social and cognitive factors included in learning. It refers to one's belief regarding his/her ability to take the initiative in social communication and to establish new friendships. These beliefs mediate the relationship between anxious attachment, feeling, and poor social skills, which affects the level of SI (Mallinckrodt & Wei, 2005). Individuals with anxious attachment feel lower social effectiveness, which results in lower levels of perceived social support. This makes them feel lonely and incapable of social communication. This, in turn, leads to lower SI. Besides, individuals with higher levels of anxious attachment have negative internal working models towards self and are consequently more likely to have a lower level of social self-efficacy. As to self-understanding, it mediates the relationship between avoidant attachment and poor social communication. It plays a noticeable role in establishing new friendships and enhancing the level of SI. Studies reported a positive relationship between avoidant attachment and unwillingness to open disclosure (Collins & Read, 1990; Kobak & Hazan, 1991).

Results of our study concur with the study of Joseph and Allen (2002) where secure attachment predicted social skills, and partially with the study of Hamarta, Deniz and Saltali (2009) where it predicted Emotional Intelligence (EI). The present study is also in line with the study conducted by Abo-Ghazal and Jaradat (2009) where secure and anxious attachment predicted self-esteem and the feeling of loneliness, and the study conducted by Al-Ollwan (2011) where attachment styles predicted the EI of university students. The results of the present study also concurs with the results reported by Khori (2004) that documented a positive relationship between an

individual's secure attachment and his/her marital adjustment, and a negative relationship between avoidant attachment and marital adjustment. Similarly, the present study concurs with the study conducted by Abo-Ghazal and Flwah (2014) where a positive relationship was found between anxious attachment and negative attitude towards problems, and between secure and avoidant attachment on the one hand and avoidant problem solving, rational problem solving and positive attitude towards social problem solving on the other. Finally, the current results are consistent with the results reached by Arslan, Arslan and Ari (2012), and Zeyrek, Gencoz, Bergman and Lester (2009) where a positive correlation was documented between secure attachment and problem solving style, and a negative correlation was found between secure attachment and negative problem solving.

Taking into consideration the results and the limitations of our study, we offer the following recommendations: 1) developing training programs to eliminate anxious and avoidant attachment styles and enhance secure attachment among university students, 2) developing preventive programs that allow for students' participation in activities requiring cooperation and mutual trust in order to help them develop positive views of themselves and of others, 3) providing psychological counseling services based on the attachment theory to university students who have adaptation problems like anxiety, depression and poor SI, 4) designing special programs to enhance students' SI through scientific and social activities, 5) designing training programs to enhance self-esteem, social intelligence and secure attachment, especially in students with anxious and avoidant attachment that proved to have negative effects on their intelligence, social skills and mental health, 6) replicating the present study with other populations, especially males, age groups and settings, e.g., social care institutes, 7) investigating the relationship between attachment styles and variables like self-and social-efficacy, self-disclosure and psychological disorders like social phobia and poor self-confidence, and 8) development of a causal model exploring the relationship between SI and attachment styles with mediating variables gender, specialization and academic level.

### Acknowledgment

The authors extend their appreciation to the Deanship of Scientific Research, King Saud University for funding this work through the International Research Group Project RG-1436-028.

### References

- Abo-Amsha, M. (2013). *Social and affective intelligence and their relation to the feeling of happiness among university students in Gaza* (Unpublished M.A Thesis). Al-Azhar University, Gaza, Palestine. (In Arabic)
- Abo-Donia, N. (1998). A structural analysis of the social competence scale. In *Educational and Psychological Research* (Vol. 75, pp. 557-583). Faculty of Education, Al-Azhar University. (In Arabic)
- Abo-Ghazal, M., & Jaradat, A. K. (2009). Adult attachment styles and their relation to self-esteem and the feeling of loneliness. *The Jordanian Journal of Educational Sciences*, 5, 45-57. (In Arabic)
- Abo-Ghazal, M., & Flwah, A. (2014). Attachment styles and social problem solving in adolescents in the light of the variables of social type and age group. *The Jordanian Journal of Educational Sciences*, 10(3), 351-368. (In Arabic)
- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Styles of attachment assessed in the strange situation and at home*. Hillsdale, NJ: Erlbaum.
- Al-Harout, H. (2000). *Attachment styles and their relation to social anxiety and competence in late childhood* (Unpublished M.A Thesis). The College of Graduate Studies, the Jordanian University. (In Arabic)
- Al-Ameri, A. S. (2015). The relationship between attachment styles and the development of the powers of the psych-social ego in a sample of male and female individuals from adolescence to adulthood. *Journal of Gazan University-Human Sciences Branch*, 2, 36-45. (In Arabic)
- Al-Omeiri, N. A. (2015). *The relationship between attachment styles and the major personality factors among Om Al-Qura University students in the light of some variables* (Unpublished M. A. Thesis). Psychology Department, Om Al-Qura University, KSA. (In Arabic)
- Al-Maleki, H. (2010). Adult attachment styles and their relation to self-efficacy and social skills. *Arabic Studies in Education and Psychology*, 4, 203-231. (In Arabic)
- Al-Manaberi, F. (2010). *Social intelligence, social responsibility and academic achievement in a sample of faculty of education students at Om Al-Qura University* (Unpublished M.A Thesis). Om Al-Qura University, Mecca. (In Arabic)

- Al-Ollwan, A. (2011). Emotional intelligence and its relation to social skills and attachment styles of university students in the light of the two variables of specialization and gender. *The Jordanian Journal of Educational Sciences*, 7, 125-144. (In Arabic)
- Arremawi, M. (2011). *General psychology*. Amman, Dar Almasirah Publisher. (In Arabic)
- Arslan, E., Arslan, C., & Ari, R. (2012). An Investigation of Interpersonal problem solving Approaches with respect to attachment styles. *Educational Sciences: Theory & Practice*, 12(1), 15-23.
- Ashahwan, N. (2002). *Attachment styles associating child abuse and symptoms of maladjustment in abused children* (Unpublished M.A Thesis). The Jordanian University, Amman, Jordan. (In Arabic)
- Asqoul, K. (2009). *Social intelligence and its relation to critical thinking and some variables of university students*. (Unpublished M.A Thesis). The Islamic University, Gaza, Palestine. (In Arabic)
- Bakker, W., Van Oudenhoven, J., & Van Der Zee, K. (2004). Attachment styles, personality and Dutch emigrants intercultural adjustment. *European Journal of Personality*, 18, 387-404. <http://dx.doi.org/10.1002/per.515> (In Arabic)
- Becker, T., & Billing, R. (1997). Validity of scores on three attachment style scales: Exploratory and confirmatory evidence. *Educational and Psychological Measurement*, 57, 477-493. <http://dx.doi.org/10.1177/0013164497057003009>
- Bowlby, J. (1969). *Attachment and loss*. New York, NY: Basic Books.
- Bowlby, J. (1973). *Attachment and loss*. New York, NY: Basic Books.
- Bowlby, J. (1990). *A secure base: Parent-child attachment and healthy human development*. New York, NY: Basic Books.
- Brumariu, L. E., & Kerns, K. A. (2010). Mother-child attachment styles and different types of anxiety symptoms: Is there specificity of relations. *Child Psychiatry and Human Development*, 41, 663-674. <http://dx.doi.org/10.1007/s10578-010-0195-0>
- Cassidy, J., & Shaver, P. R. (1999). *Handbook of attachment: Theory, research and clinical applications*. New York, NY: Guilford Press.
- Collins, N. L., & Read, S. J. (1990). Adult attachment working models and relationship quality in dating couples. *Journal of Personality and Social Psychology*, 58, 644-663. <http://dx.doi.org/10.1037/0022-3514.58.4.644>
- Deniz, M., Hamarta, E., & Ari, R. (2005). An investigation of social skills and loneliness levels of university students with respect to their attachment styles in a sample of Turkish students. *Social Behavior and Personality*, 33, 19-32. <http://dx.doi.org/10.2224/sbp.2005.33.1.19>
- Ditommaso, E., Brennen-McNulty, C., Ross, L., & Burgess, M. (2003). Attachment styles, social skills and loneliness in young adults. *Personality and Individual Differences*, 35, 303-312. [http://dx.doi.org/10.1016/S0191-8869\(02\)00190-3](http://dx.doi.org/10.1016/S0191-8869(02)00190-3)
- Hamarta, E., Deniz, M., & Saltali, N. (2009). Attachment styles as a predictor of emotional intelligence. *Educational Sciences: Theory and Practice*, 9, 213-229.
- Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology*, 52, 511-524. <http://dx.doi.org/10.1037/0022-3514.52.3.511>
- Hazan, C., & Shaver, P. (1990). Love and work: An attachment-theoretical perspective. *Journal of Personality and Social Psychology*, 59, 270-280. <http://dx.doi.org/10.1037/0022-3514.59.2.270>
- Huntsinger, E., & Luecken, L. (2004). Attachment relationships and health behavior: The meditational role of self-esteem. *Psychology and Health*, 19, 515-526. <http://dx.doi.org/10.1080/0887044042000196728>
- Johnson, G. (2008). *Learning styles and emotional intelligence of the adult learner* (Unpublished Doctoral Dissertation). Auburn University, U.S.A.
- Joseph, P., & Allen, M. (2002). Attachment and autonomy as predictors of the development of social skills and delinquency during mid-adolescence. *Journal of Counseling and Clinical Psychology*, 170, 65-66.
- Joseph, R. (1992). An individual difference approach to predicting social competence. *Psychological Abstracts*, 130, 5-33.
- Kobak, R., & Hazan, C. (1991). Attachment in marriage: Effects of security & accuracy of working models. *Journal of Personality & Social Psychology*, 60, 861-869. <http://dx.doi.org/10.1037/0022-3514.60.6.861>

- Lawrence, J., & Donald, S. (1990). Interpersonal competence, social intelligence and general ability. In *Educational Testing Service*. USA.
- Mallinckrodt, B., & Wei, M. (2005). Attachment, social competencies, social support and psychological distress. *Journal of Counseling Psychology*, 52, 358-367. <http://dx.doi.org/10.1037/0022-0167.52.3.358>
- Marlowe, H. (1986). Social intelligence: Evidence for multidimensionality construct independence. *Journal of Educational Psychology*, 78, 52-58. <http://dx.doi.org/10.1037/0022-0663.78.1.52>
- Mikulincer, M. (1997). Adult attachment style and information processing: Individual differences in curiosity and cognitive closure. *Journal of Personality and Social Psychology*, 72, 1217-1230. <http://dx.doi.org/10.1037/0022-3514.72.5.1217>
- Mikulincer, M., Shaver, P., & Pereg, D. (2003). Attachment theory & affect regulation: The dynamic development & cognitive consequences of attachment related strategies. *Motivation and Emotion*, 27, 77-102. <http://dx.doi.org/10.1023/A:1024515519160>
- Muras, A. (1996). Attachment style and its relationship to affect, social behavior. *Dissertation Abstracts International*, 56, 5-10
- Shaver, P., & Brennan, K. (1992). Attachment styles and the big five personality traits: Their connections with each other and with romantic relationship outcome. *Personality & Social Psychology Bulletin*, 18, 536-545. <http://dx.doi.org/10.1177/0146167292185003>
- Silver, C., & Lee, W. (2001). The role of attachment in responses to victims of life crises. *Journal of Personality & Social Psychology*, 80, 425-438. <http://dx.doi.org/10.1037/0022-3514.80.3.425>
- Simpson, A. (1990). Influence of attachment styles on romantic relationships. *Journal of Personality & Social Psychology*, 59, 971-980. <http://dx.doi.org/10.1037/0022-3514.59.5.971>
- Wei, M., Russell, D., & Zakalik, R. (2005). Adult attachment, social self efficacy, self-disclosure, loneliness, and subsequent depression for freshman college students: Longitudinal study. *Journal of Counseling Psychology*, 52, 602-614. <http://dx.doi.org/10.1037/0022-0167.52.4.602>
- Zahran, H. (2000). *Social psychology*. Cairo, AlamAlkotob. (In Arabic)
- Zeyrek, E., Gencoz, F., Bergman, Y., & Lester, D. (2009). Suicidality, problem-solving skill, attachment style, and hopelessness in Turkish students. *Death Studies*, 33(9), 815-827. <http://dx.doi.org/10.1080/07481180903142407>

### Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).



## Reviewer Acknowledgements

*International Journal of Psychological Studies* 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.

*International Journal of Psychological Studies* is recruiting reviewers for the journal. If you are interested in becoming a reviewer, we welcome you to join us. Please find the application form and details at <http://recruitment.ccsenet.org> and e-mail the completed application form to [ijps@ccsenet.org](mailto:ijps@ccsenet.org).

### **Reviewers for Volume 8, Number 4**

Anjolie Diaz, Ball State University, United States

Daniel Mateos-Moreno, University of Malaga, Spain

Marcelo Afonso Ribeiro, University of São Paulo, Brazil

Maria del Camino Escolar Llamazares, University of Burgos, Spain

Prachi Saxena, Banaras Hindu University, United States

Rus Mihaela, Ovidius University, Romania

Sarah Alsawy, University of Manchester, United Kingdom

Sarita Sood, University of Jammu, India

Siegfried Zepf, University of Saarland, Germany

Stanislava Stoyanova, South-West University “Neofit Rilski”, Bulgaria

Tuna Uslu, Istanbul Gedik University, Turkey

# Call for Manuscripts

Published by the Canadian Center of Science and Education, *International Journal of Psychological Studies (IJPS)* is an international, double-blind peer-reviewed, open-access journal with both print and online versions. *IJPS* encourages high-quality submissions. In order to carry out our non-discrimination principles, we use a double-blind system of peer review. *IJPS* covers the entire spectrum of research including the following topics: general psychology, cognitive psychology, neuropsychology, developmental psychology, educational psychology, as well as social psychology. The journal is published in both printed and online versions.

We are seeking submissions for forthcoming issues. All manuscripts should be written in English. Manuscripts from 3000–8000 words in length are preferred. All manuscripts should be prepared in MS-Word format, and submitted online, or sent to: [ijps@ccsenet.org](mailto:ijps@ccsenet.org)

## **Paper Selection and Publishing Process**

- a) Upon receipt of a submission, the editor sends an e-mail of confirmation to the submission's author within one to three working days. If you fail to receive this confirmation, your submission e-mail may have been missed.
- b) Peer review. We use a double-blind system for peer review; both reviewers' and authors' identities remain anonymous. The paper will be reviewed by at least two experts: one editorial staff member and at least one external reviewer. The review process may take two to three weeks.
- c) Notification of the result of review by e-mail.
- d) If the submission is accepted, the authors revise paper and pay the publication fee.
- e) After publication, the corresponding author will receive two hard copies of the journal, free of charge. If you want to keep more copies, please contact the editor before making an order.
- f) A PDF version of the journal is available for download on the journal's website, free of charge.

## **Requirements and Copyrights**

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the authorities responsible where the work was carried out, and that, if accepted, the article will not be published elsewhere in the same form, in English or in any other language, without the written consent of the publisher. The editors reserve the right to edit or otherwise alter all contributions, but authors will receive proofs for approval before publication.

Copyrights for articles are retained by the authors, with first publication rights granted to the journal. The journal/publisher is not responsible for subsequent uses of the work. It is the author's responsibility to bring an infringement action if so desired by the author.

## **More Information**

E-mail: [ijps@ccsenet.org](mailto:ijps@ccsenet.org)

Website: [ijps.ccsenet.org](http://ijps.ccsenet.org)

Paper Submission Guide: <http://submission.ccsenet.org>

Recruitment for Reviewers: <http://recruitment.ccsenet.org>

The journal is peer-reviewed  
The journal is open-access to the full text  
The journal is included in:

Google Scholar  
LOCKSS  
Open J-Gate  
PKP Open Archives Harvester

SHERPA/ROMEO  
Standard Periodical Directory  
Ulrich  
Universal Digital Library

## International Journal of Psychological Studies Quarterly

Publisher Canadian Center of Science and Education  
Address 1120 Finch Avenue West, Suite 701-309, Toronto, ON., M3J 3H7, Canada  
Telephone 1-416-642-2606  
Fax 1-416-642-2608  
E-mail [ijps@ccsenet.org](mailto:ijps@ccsenet.org)  
Website [ijps.ccsenet.org](http://ijps.ccsenet.org)

