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Revue canadienne d'orthophonie et d'audiologie

CASLPA-ACOA

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CANADIAN JOURNAL OF SPEECH-LANGUAGE PATHOLOGY AND AUDIOLOGY

Purpose and Scope

The Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA) is the only national body that supports and represents the professional needs of speech-language pathologists, audiologists and supportive personnel inclusively within one organization. Through this support, CASLPA champions the needs of people with communications disorders. The association was founded in 1964 and incorporated under federal charter in 1975. CASLPA's periodical publications program began in 1973.

The purpose of the *Canadian Journal of Speech-Language Pathology and Audiology* (CJSLPA) is to disseminate contemporary knowledge pertaining to normal human communication and related disorders of communication that influence speech, language, and hearing processes. The scope of the Journal is broadly defined so as to provide the most inclusive venue for work in human communication and its disorders. CJSLPA publishes both applied and basic research, reports of clinical and laboratory inquiry, as well as educational articles related to normal and disordered speech, language, and hearing in all age groups. Classes of manuscripts suitable for publication consideration in CJSLPA include tutorials; traditional research or review articles; clinical, field, and brief reports; research notes; and letters to the editor (see Information to Contributors). CJSLPA seeks to publish articles that reflect the broad range of interests in speech-language pathology and audiology, speech sciences, hearing science, and that of related professions. The Journal also publishes book reviews, as well as independent reviews of commercially available clinical materials and resources.

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CASLPA Vision and Mission

Vision
The Canadian Association of Speech-Language Pathologists and Audiologists ... the national voice and recognized resource for speech-language pathology and audiology.

Mission
The Canadian Association of Speech-Language Pathologists and Audiologists ... supporting and empowering our members to maximize the communication and hearing potential of the people of Canada

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Objet et Portée

L'Association canadienne des orthophonistes et audiologistes (ACOA) est l'association professionnelle nationale reconnue des orthophonistes et des audiologistes du Canada. L'Association a été fondée en 1964 et incorporée en vertu de la charte fédérale en 1975. L'Association s'engage à favoriser la meilleure qualité de services aux personnes atteintes de troubles de la communication et à leurs familles. Dans ce but, l'Association entend, entre autres, contribuer au corpus de connaissances dans le domaine des communications humaines et des troubles qui s'y rapportent. L'Association a mis sur pied son programme de publications en 1973.

L'objet de la *Revue canadienne d'orthophonie et d'audiologie* (RCOA) est de diffuser des connaissances relatives à la communication humaine et aux troubles de la communication qui influencent la parole, le langage et l'audition. La portée de la Revue est plutôt générale de manière à offrir un véhicule des plus compréhensifs pour la recherche effectuée sur la communication humaine et les troubles qui s'y rapportent. La RCOA publie à la fois les ouvrages de recherche appliquée et fondamentale, les comptes rendus de recherche clinique et en laboratoire, ainsi que des articles éducatifs portant sur la parole, le langage et l'audition normaux ou désordonnés pour tous les groupes d'âge. Les catégories de manuscrits susceptibles d'être publiés dans la RCOA comprennent les tutoriels, les articles de recherche conventionnelle ou de synthèse, les comptes rendus cliniques, pratiques et sommaires, les notes de recherche, et les courriers des lecteurs (voir Renseignements à l'intention des collaborateurs). La RCOA cherche à publier des articles qui reflètent une vaste gamme d'intérêts en orthophonie et en audiologie, en sciences de la parole, en science de l'audition et en diverses professions connexes. La Revue publie également des critiques de livres ainsi que des critiques indépendantes de matériel et de ressources cliniques offerts commercialement

La Revue canadienne d'orthophonie et d'audiologie est appuyée par une subvention d'Aide aux revues savantes accordée par le Conseil de recherches en sciences humaines du Canada (subvention no. 651-2008-0062), pour la période de janvier 2009 à décembre 2011.

ACOA : Vision et Mission

Vision
L'Association canadienne des orthophonistes et audiologistes : porte-parole national et ressource reconnue dans le domaine de l'orthophonie et de l'audiologie.

Mission
L'Association canadienne des orthophonistes et audiologistes appuie et habilite ses membres en vue de maximiser le potentiel en communication et en audition de la population canadienne.

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Table of Contents

Table des matières

From the Editor

Fall Issue

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There is never a dull moment here at the editorial office, and I am excited to share a number of updates and announcements with our readership this month.

New Associate Editor for Speech (English)

On behalf of the whole team at the *Canadian Journal of Speech-Language Pathology and Audiology*, I would like to thank Dr. Jana Rieger for her outstanding work as the associate editor for speech papers over the last 1½ years. Dr. Rieger is currently embarking on a research leave, so it makes sense for her to step down from the editor position. And Dr. Rieger is going out with a bang; she is the guest editor of an upcoming special issue on head and neck cancer, which will be published in the winter. While we are sad to see Jana go, we are thrilled to welcome the new associate editor for speech, Dr. Vincent Gracco from McGill University, to the editorial team. Dr. Gracco's expertise will be invaluable for the journal, and we are all looking forward to working with him.

Social Sciences and Humanities Research Council (SSHRC) Grant in Aid of Scholarly Journals

I am pleased to announce the success of our recent funding application to the SSHRC. The Aid to Scholarly Journals program provides funding for Canadian scientific journals. In our case, the funding will be used to double the content of the journal over the course of the coming three years. The SSHRC monies will allow us to increase the volume of the journal beyond what can currently be published (and printed and mailed). Together with this expansion, we will also create a better and more complete online repository for published papers. At this point, the *Canadian Journal of Speech-Language Pathology and Audiology* is only accessible by CASLPA members and by users of a limited number of libraries. Everybody else has to pay for individual articles. This limits our international visibility and our accessibility to non-CASLPA members, which in turn hampers our citations and our impact factor. The creation of an online repository will improve our profile and, in the long run, increase our number of citations in other journals in the years to come. We are excited about the opportunity to increase the journal content and to revamp the online archive with the help of the SSHRC grant.

A Paperless Canadian Journal of Speech-Language Pathology and Audiology?

As we start our work on the new and improved online archive, we also gently appeal to you to consider kicking the paper habit. The most important cost factors involved in producing the journal are related to off-set printing and mailing. As we work on growing the journal, we would like to slowly shift the majority of our readers to the digital edition. Of course, we will continue to offer a print edition for those members who have a strong preference for it. So, please consider changing to the digital delivery of the journal when you fill in your membership renewal form the next time.

Canadian Journal of Speech-Language Pathology and Audiology Readership Survey

In early 2009, CASLPA members were asked their opinions about the journal. We would like to thank all the members who took the time to participate in this survey. Below, we present you a selection of some of the feedback and comments that were received. CASLPA received responses from 529 readers, representing 9.8% of the membership. Of the respondents, 82.5 % were S-LPs, 13.1% audiologists, 3% supportive personnel, and 1.3% other (e.g., students). I will briefly summarize and address some of the survey results.

- 92.6% of the respondents stated that the CJSLPA is meeting its purpose to disseminate contemporary knowledge pertaining to human communication and related disorders.

- 77.5% place a high or medium value on CJSLPA as a member benefit.

- 62.3% reported reading most or all issues, and 40.5% reported reading most or all of each issue.

- 82.1% responded that they felt the CJSLPA was useful and worth the time they spent reading it.

- 89.5% stated that reading the CJSLPA helped them professionally (9.1% "greatly" and 80.4% "somewhat").

- While 60.9% of the respondents reported that they were satisfied with the number of articles per issue ("just right"), 37.3% found that there were too few papers. As we aim to double the number of papers per issue over the course of the next years, we will provide more content to appeal to more readers.

- The majority of respondents reported that they were satisfied with the length of articles (87.9%: "just right").

- The types of papers rated most highly by respondents were articles (98.6% "very" or "somewhat" interested) and clinical reports (96.8%), followed by field reports (90.5%), book and materials reviews (89.4%), and tutorials (88.3%). There was less interest expressed in brief reports (72.6%) and research notes (65.9%).

- There was marked interest in special issues – 59% of respondents indicated that they would like to see them once per year, and 28.2% stated that they would appreciate multiple special issues per year. As we embark on increasing the journal volume and content, we will have more print space to invite papers for special issues or thematically focused issues.

The last time the readership had been polled was in 2006. When we compare the ratings and the comments from these two readership surveys, there are only very minor differences in the quantitative results and similar themes that emerge from the open-ended feedback. In terms of the positive feedback, we are pleased that the readers of the CJSLPA continue to value their journal. In terms of the developmental feedback that we have received, we can see that some work remains to be done. Our main focus over the remainder of my tenure as editor will be to strive for better visibility and to expand the volume of the journal to ensure the viability of the CJSLPA in the competitive world of scientific publishing. We will need your help as we move forward on making the journal more well-known to an international readership: the CJSLPA is your journal, and your contributions are the foundation of its success.

Tim Bressmann
Editor
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Mot du rédacteur en chef

Numéro d'automne

■ ■ ■

On ne s'ennuie pas au bureau de la rédaction, et je suis très heureux de partager quelques nouvelles et annonces avec nos lecteurs ce mois-ci.

Nouveau rédacteur en chef adjoint – parole (anglais)
Au nom de toute l'équipe de la Revue canadienne d'orthophonie et d'audiologie (RCOA), je tiens à remercier Dr Jana Rieger pour son excellent travail à titre de rédactrice en chef adjointe pour les articles sur la parole au cours de la dernière année et demie. Dr Rieger débute un congé pour recherche, ce qui fait qu'il est logique pour elle de renoncer à ses fonctions de rédactrice adjointe. Elle nous quitte en grande : elle est la rédactrice invitée d'un numéro spécial sur le cancer de la tête et du cou qui paraîtra à l'hiver. Bien que le départ de Jana nous attriste, nous sommes très heureux d'accueillir dans l'équipe de rédaction le nouveau rédacteur en chef adjoint, Dr Vincent Gracco de l'Université McGill. L'expertise du Dr Gracco sera indispensable pour la revue, et nous attendons tous avec impatience de travailler avec lui.

Subvention d'aide aux revues savantes du Conseil de recherches en sciences humaines (CRSH)
J'ai le plaisir d'annoncer que notre récente demande de subvention adressée au CRSH a été acceptée. Le programme d'aide aux revues savantes octroie des fonds aux revues scientifiques canadiennes. Dans notre cas, le financement servira à doubler le contenu de la revue au cours des trois prochaines années. Les fonds nous permettront d'enrichir le contenu par rapport à ce que nous publions (et imprimons et postons) actuellement. En parallèle à cette augmentation du nombre de pages, nous allons aussi créer un service d'archivage élargi et complet en ligne pour le contenu publié. Pour l'instant, seuls les membres de l'ACOA et un nombre limité de bibliothèques ont accès à la RCOA. Toutes les autres personnes doivent payer pour obtenir des articles, ce qui limite notre visibilité internationale et notre accessibilité auprès des personnes qui ne sont pas membres de l'ACOA. En conséquence, cela fait en sorte qu'on nous cite peu et que notre incidence est plus limitée. La création d'un service d'archivage en ligne améliorera notre profil et, à long terme, augmentera au fil des ans le nombre de références faites à notre contenu dans d'autres revues. Nous sommes heureux d'avoir l'occasion d'accroître le contenu de la revue et de réorganiser les archives en ligne grâce à la subvention du CRSH.

Version électronique de la Revue canadienne d'orthophonie et d'audiologie?
Alors que nous commençons à mettre en place un nouveau système amélioré d'archivage en ligne, nous vous demandons de songer à passer à la version électronique de la revue. La plus grande partie des coûts afférents à la publication de la revue a trait à l'impression offset et à l'envoi par la poste. Dans la foulée de nos efforts pour augmenter le contenu

de la revue, nous souhaitons faire passer peu à peu la majorité de nos lecteurs à l'édition numérique. Évidemment, nous continuerons à offrir la version papier aux membres qui préfèrent grandement ce format. Alors, veuillez songer à passer à la version numérique quand vous remplirez le formulaire de renouvellement de votre adhésion la prochaine fois.

Enquête auprès du lectorat de la Revue canadienne d'orthophonie et d'audiologie

Au début de 2009, on a demandé aux membres de l'ACOA leur opinion au sujet de la revue. Nous tenons à remercier tous les membres qui ont pris le temps de participer à cette enquête. Nous publions ci-dessous un aperçu des réactions et remarques que nous avons reçues. L'ACOA a reçu des réponses de 529 lecteurs, ce qui représente 9,8 % de nos membres. De ces répondants, 82,5 % sont orthophonistes, 13,1 % audiologistes, 3 % membres du personnel de soutien et 1,3 % un autre type de membres (p. ex. : des étudiants). Je résume brièvement certains résultats de l'enquête :

- 92,6 % des répondants sont d'avis que la RCOA remplit sa fonction de diffuser des connaissances contemporaines sur la communication humaine et les troubles afférents;
- 77,5 % accordent une valeur élevée ou moyenne à la RCOA comme avantage de l'adhésion;
- 62,3 % ont signalé lire tous les numéros ou presque, et 40,5 % ont indiqué lire tout le contenu de chaque numéro ou presque;
- 82,1 % ont indiqué qu'ils étaient d'avis que la RCOA était utile et qu'elle valait la peine d'être lue;
- 89,5 % ont indiqué que le fait de lire la RCOA les a aidés sur le plan professionnel (9,1 % « grandement aidé » et 80,4 % « sensiblement aidé »);
- 60,9 % des répondants ont dit qu'ils étaient satisfaits du nombre d'articles par numéro (« juste assez »), mais 37,3 % ont trouvé qu'il y en avait trop peu. Puisque nous cherchons à doubler le contenu par numéro au cours des prochaines années, nous fournirons davantage de contenu pour plaire à davantage de lecteurs;
- la majorité des répondants ont signalé qu'ils étaient satisfaits de la longueur des articles (84,2 % ont dit « juste assez »);
- les types de contenu qui a obtenu la meilleure évaluation de la part des répondants sont les articles (98,6 % des répondants y sont « très » ou « sensiblement » intéressés) et les comptes rendus cliniques (96,8 %), suivis des comptes rendus d'expérience (90,5 %), de l'évaluation de livres et de matériel (89,4 %) et des tutoriels (88,3 %). Il y a eu moins d'intérêt exprimé pour les comptes rendus sommaires (72,6 %) et les notes de recherche (65,9 %);
- il y a eu un intérêt marqué pour les numéros spéciaux – 59 % des répondants ont indiqué qu'ils souhaiteraient en avoir un par année et 28,2 % ont dit qu'ils aimeraient en avoir plusieurs par année. À mesure que le contenu de la revue prendra de l'ampleur, nous disposerons de plus d'espace afin de solliciter des articles pour des numéros spéciaux ou thématiques.

La dernière enquête auprès du lectorat remonte à 2006. En comparant les résultats et les remarques de ces deux enquêtes, nous avons relevé seulement quelques différences quantitatives mineures et avons noté que des thèmes semblables ont été soulevés à la partie Commentaires à la fin. Parmi les remarques positives que nous avons reçues, nous sommes heureux de constater que les lecteurs de la RCOA continuent à valoriser leur revue. Parmi les remarques d'éléments à améliorer, nous remarquons qu'il reste du travail à faire. Pour le reste de la durée de mon mandat, nous nous efforcerons d'accroître la visibilité et d'étendre le contenu de la revue pour assurer la viabilité de la RCOA dans le monde compétitif des revues savantes. Nous aurons besoin de votre aide à mesure que nous progressons pour faire connaître la revue à un auditoire international. La RCOA est votre revue, et son succès repose sur vos contributions.

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Dynamic Assessment of Narratives with Grade 3 Children in a First Nations Community

Évaluation dynamique d'énoncés narratifs d'enfants de 3ᵉ année dans une communauté des Premières Nations

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Abstract

Diagnostic accuracy of the *Dynamic Assessment and Intervention* tool (DAI; Miller, Gillam & Peña, 2001) was examined with 17 Grade 3 children belonging to a First Nations community who were classified either as normal language learners (NLL) or as having possible language learning difficulties. The DAI was designed to provide a culturally sensitive evaluation of language learning abilities. Results showed that both groups benefited from direct teaching of specific targets, but children in the NLL category benefited to a greater extent and generalized more often to targets not directly addressed. A discriminant analysis resulted in high specificity and sensitivity. These results suggest that the DAI is a useful diagnostic tool for identifying children with language learning difficulties in this population.

Abrégé

Nous avons examiné l'exactitude du diagnostic de l'outil d'évaluation dynamique et d'intervention (*Dynamic Assessment and Intervention* [DAI]; Miller, Gillam et Peña, 2001) auprès de 17 enfants de 3ᵉ année appartenant à une communauté des Premières Nations qui ont été classés comme étant des apprenants normaux d'une langue ou comme ayant d'éventuelles difficultés d'apprentissage d'une langue. Le DAI a été conçu pour offrir une évaluation des capacités d'apprentissage d'une langue en tenant compte de la culture. Les résultats montrent que les deux groupes ont bénéficié d'un enseignement direct de cibles précises, mais les enfants de la catégorie normale en ont profité davantage et ont eu tendance à plus appliquer les apprentissages à des cibles non testées directement. Une analyse discriminante a révélé une grande spécificité et une grande sensibilité de l'outil. Ces résultats donnent à penser que le DAI est un outil diagnostique utile pour repérer les enfants ayant des difficultés d'apprentissage au sein de cette population.

Key words: dynamic assessment, language assessment, narratives, First Nations children

This paper describes our attempt to use the *Dynamic Assessment and Intervention* (DAI) tool (Miller, Gillam, & Peña, 2001), a culturally sensitive language assessment tool, to distinguish language difference and possible language disorder within a First Nations community in Alberta. Language assessment methods may contain cultural biases (Langdon, 1989; Peña, Quinn, & Iglesias, 1992). Cultural bias occurs when assessment tools that are developed based on expectations about skills for the dominant cultural group are used with another group for whom those expectations are not appropriate. For example, a child from a non-mainstream cultural group may fail to attain an adequate score on a measure because of a lack of

familiarity with a task and not because of an impairment, resulting in an inappropriate referral for services. Those assessing language abilities need to be aware of these biases (Gillam, Peña, & Miller, 1999; Gutierrez-Clellen & Iglesias, 1992; Terrel & Terrel, 1983). Cultural bias may result in underestimation of the ability of children from minority cultures (Terrel & Terrel, 1983). It is imperative to find methods that will minimize cultural bias so that children who truly require intervention are uniquely identified.

Dynamic assessment has been proposed as an alternative method of assessment when the language of individuals belonging to a minority culture is evaluated (Carter et al., 2005; Hwa-Froelich & Vigil, 2004; Lidz & Peña, 1996; Peña, 2000). It has been suggested that dynamic assessment is a method that can help to differentiate children who may have language disorders from those who perform less well on individual static testing for other reasons, such as lack of familiarity with a task.

Dynamic Assessment

In traditional speech-language assessment, static knowledge-based measures have been used to evaluate the communicative abilities of clients, but there has been a movement toward process-oriented approaches. A static approach focuses on the immediate linguistic output during testing, judging distinct aspects of linguistic performance in isolation (Ellis-Weismer & Evans, 2002). A process-based approach referred to as *dynamic assessment* focuses not only on what an individual can accomplish independently, but also on the benefits that occur through further instruction (Gillam & McFadden, 1994; Olswang & Bain, 1996). Dynamic assessment models have been greatly influenced by Vygotsky's theory of cognitive development (Vygotsky, 1986) and Feuerstein's mediated learning experience (Feuerstein, Rand, & Hoffman, 1979). According to Vygotsky, children develop through social interaction with those in their environment who are more proficient in the language and culture. Vygotsky proposed that a child's ability to learn could be assessed by comparing the difference between a child's independent level of functioning and the higher level of functioning that they may achieve through adult support and help, which Vygotsky termed the *zone of proximal development* (ZPD). The amount of assistance that a child needs in the ZPD indicates how close the child is to the next level of independent functioning. Vygotsky hypothesized that for two children with the same level of independent functioning, a child who needed less assistance to exhibit a higher level of functioning was closer to mastering the skill at an independent level than was a child who needed more assistance to reach that higher level.

Based on Vygotsky's notion of the ZPD, Feuerstein developed the concept of *mediated learning experience* (MLE), a form of learning that occurs when a mediator intercedes between the learner and environmental factors (Feuerstein, 1990; Feuerstein et al., 1979; Feuerstein, Rand, Hoffman, & Miller, 1980). The mediator's purpose in this interaction is to help the learner interact more efficiently and productively with learning materials (Kozulin & Presseisen, 1995). The key to successful dynamic assessment is determining a learner's independent achievement level and then working with the learner just beyond that level in an MLE.

Typically, a dynamic assessment consists of three phases: *test*, in which the testee's individual abilities are observed in a task with minimal assistance from the examiner; *teach*, in which the examiner assists the testee in tasks similar to those used in the test phase; and *re-test*, in which the testee is once again tested independently. Success of the intervention is measured by change from test to re-test phases.

Using Dynamic Assessment to Control for Cultural Bias

Dynamic assessment is thought to be appropriate for identifying children in need of long-term intervention because it highlights not only current knowledge and skills but also the child's ability to learn. Children who do not demonstrate a skill independently but quickly acquire the skill with brief mediation are considered capable learners, whereas children who do not benefit from short-term mediation are considered candidates for more intensive intervention (Olswang & Bain, 1996). Peña and colleagues (Lidz & Peña, 1996; Peña et al., 1992; Quinn, Goldstein, & Peña, 1996) argue that dynamic assessment should thus be able to distinguish children from other cultures who have not acquired skills due to different experiences and cultural practices from other children in the same culture who have learning problems. Peña et al. (1992) used the dynamic assessment model to investigate the effects of mediation on Latino-American and African-American preschool children with no disorders and those with possible language disorders. Children's language was initially assessed through standardized language and intelligence testing, parent/teacher reports, and classroom interaction observations. Dynamic assessment procedures involved a test–teach–retest methodology in which mediation involved activities focused on developing labeling strategies. Results indicated that child modifiability on the labeling strategies task and post-mediation standardized test scores (*Expressive One Word Picture Vocabulary Test*, Gardner, 1979) differentiated children with typical or low language ability from those with no disorders better than pre-test performance.

Ukrainetz, Harpell, Walsh, and Coyle (2000) completed a preliminary investigation of dynamic assessment methods for assessing language-learning ability with Native American kindergarten children. Based on teacher report and examiner classroom observation, 23 kindergarten children from an Arapahoe/Shoshone cultural background were split into groups of stronger ($n = 15$) or weaker ($n = 8$) language learners. Mediation focused on categorization of objects. Their study found that modifiability and post-test scores were significantly higher for stronger language learners than for weaker language learners.

Narratives as a Context for Assessment

Narrative assessment would appear to be an appropriate context for dynamic assessment for children in general and for First Nations children in particular. Historically, the First Nations peoples of Canada have had a strong oral tradition with an emphasis on oral storytelling (Darnell, 1974; Howard, 1999; Wilson, 1996). The oral narrative tradition is recognized as an important part of First Nations culture (Einhorn, 2000).

Westby (1994) suggests that narrative assessment, which focuses on textual language abilities rather than on knowledge of discrete aspects of language such as semantics and syntax, appears to be more sensitive to the language requirements of school than to standardized discrete-point tests. Numerous studies have shown that school-age children with language impairments have difficulty telling stories (Fey, Catts, Proctor-Williams, Tomblin, & Zhang, 2004; Gillam & Johnston, 1992; Gillam, McFadden, & van Kleeck, 1995; Liles, Duffy, Merritt, & Purcell, 1995). Children with language impairments tell stories that have fewer story grammar components and episodes (Paul, Hernandez, Taylor, & Johnson, 1996; Schneider, Hayward, & Dubé, 2006), reduced sentence complexity (Gillam & Johnston, 1992), fewer cohesive ties and incomplete cohesive ties (Liles, 1985), more grammatical errors (Gillam & Johnston, 1992; Liles et al., 1995; Norbury & Bishop, 2003), and poorer overall story quality (Gillam et al., 1995; McFadden & Gillam, 1996; Paul et al., 1996).

Oral narratives are an ideal medium for testing language of children cross-culturally because they are a major genre in cultures that are primarily oral as well as those that are highly literate (Ong, 1982). According to Westby (1994), narratives are a universal genre and therefore provide an appropriate medium for evaluating language cross-culturally.

It has been noted that cultural preferences for storytelling can vary across cultures. Distinctive aspects of preferred style in First Nations storytelling have been reported (Scollon & Scollon, 1984). For example, audience participation is an important aspect of Athabaskan Indian storytelling, as audiences are encouraged to reply with an *ehe* (yes) at the end of each verse (Scollon & Scollon, 1984); such participation might be inappropriate in other cultures. Westby (1994) suggests that Native American narratives represent a different view of space, time, and motion than narratives from Western cultures. As an example, she points out that Navaho storytellers tend to devote much of their time to describing walking, the landscape, and places passed, with relatively less time spent on actions. In addition, cultures may have recurring themes in stories (such as trickster stories among many First Nations groups) that are easily recognized within the culture but which may be difficult to comprehend for those from other storytelling traditions.

However, it has been argued that despite cultural differences that may exist in terms of style or preferred content, basic narrative structure is universal, at least within a standardized context (Westby, 1994). A study by Mandler, Scribner, Cole, and Deforest (1980) found that upon presentation of a basic story, adults from another culture (both schooled and unschooled members of the Vai people of Liberia) provided essentially the same information when retelling the story as had Western people in previous research, suggesting there are some story formats that are common and universal. Mandler et al. (1980) obtained this result in a condition when all participants were presented with a story to retell. This suggests that when presented with a standardized story, participants will tell a story that conforms to a structure that is recognizable across cultures. Similar results have been found in studies of native North American children. Hedberg, Ochsner, and Fink (1988), as cited in Kay-Raining Bird & Vetter (1994), found no differences in story retellings of rural Arapahoe children and age-matched mainstream American children. Kay-Raining Bird and Vetter (1994) did find some differences in story recall amongst children of a Chippewa–Cree community. Children whose primary caregiver was considered "traditional" produced stories that were more highly structured in general than children whose primary caregiver was considered "nontraditional." This same study also found, however, that episodic structure in the story recalls was similar for all children. Overall, the evidence suggests that when using stories with a given structure, First Nations children will recall the structures in ways similar to non-First Nations children. Despite differences that may exist in terms of style or preferred content, when presented with a basic story, speakers from different cultures will recognize and reproduce core elements of story structure.

Dynamic Assessment of Narratives

The DAI assessment tool (Miller et al. 2001) was designed to assess narrative language abilities in a culturally sensitive manner. Based on Vygotsky's and Feuerstein's theories, the DAI permits estimation of the *modifiability* of language in a manner thought to be neutral to experience, economics, and culture because it centers on linguistic growth in a social setting (Gillam et al., 1999). The DAI's focus on narrative abilities to determine a child's level of linguistic learning potential and its use of dynamic assessment are the two main reasons this tool was chosen for the present study. The DAI is intended to provide a method of assessment that is not culturally biased and that can distinguish children in need of intervention from those who need just a brief intervention in order to tell adequate stories.

Present Study

The present study seeks to investigate a similar question asked by Ukrainetz et al. (2000), namely, whether a dynamic assessment would differentiate children with normal language learning (NLL) abilities from children with possible language learning difficulties (PLLD). However, in the current research we used a narrative context, specifically, DAI.

The purpose of this study was to determine the accuracy of the DAI in distinguishing possible language delay from language difference with a group of Grade 3 First Nations children. The authors of the DAI claim that it examines the modifiability of language, independent from experience, economics, and culture. To test this claim with our target population, the following questions were addressed:

1) Will children with normal language learning (NLL) abilities show greater improvement after the teach phase of the DAI than children with possible language learning disorders (PLLD)?

2) Using variables that are used in the DAI to determine the identification of language learning disorders, will classification of children into NLL and PLLD groups based on DAI results agree with classification into groups by school personnel?

Methods

Participants

The 17 participants involved in this study were Grade 3 children from three classrooms on the Samson Cree Nation Reserve in Alberta, Canada. These children received instruction in English, with Cree taught in an alternative language class. Consent forms were sent to the parents/guardians of all the children attending Grade 3 at this school. The special education teacher, the Grade 3 teachers, and the principal were asked to provide input regarding the presence or absence of language-learning difficulties based on previous speech-language pathology assessment, classroom performance, and classroom observation. Specifically, they were asked to identify children who had been previously identified as having language difficulties or who they suspected had language difficulties based on their knowledge of the children. Five of the children were labeled as having PLLD by these school personnel. Twelve children were considered to have NLL abilities. Information on group membership was given to the third author. The first two authors served as examiners and were blind regarding group information (PLLD or NLL) until after all testing, intervention, and scoring was completed. The examiners did not discuss the children's language status with school personnel during the course of the study.

Materials

The DAI (Miller, Gillam, & Peña, 2001) evaluates oral narrative abilities using two wordless storybooks. It uses a *test-teach-retest* format. In the *test* phase, a child creates a narrative from one wordless picture book with no assistance from the examiner. Then the child participates in supported mediation sessions focused on narrative elements (*teach* phase). Finally, in the *retest* phase, the child again produces a narrative without assistance from the other wordless picture book. The DAI provides scoring criteria for narratives produced in the test and retest phases across several dimensions: number and quality of story components included (setting, character information, temporal order of events, and causal relationships), story

ideas and language used within each story (complexity of ideas, complexity of vocabulary, grammatical complexity, knowledge of dialogue, and creativity), and episode elements and structure present in each story (initiating event, attempt, consequence, internal response, plan, and reaction/ending). The DAI also provides scoring criteria for teacher effort and child modifiability during the teach component (described in the next section). The two picture books that come with the DAI, *Two Friends* and *The Bird and His Ring*, have been shown to elicit equivalent total story scores and productivity measures (Peña et al., 2006).

Procedure

Each child was seen individually by one of the two examiners. Sessions were conducted in a quiet room with only the child and examiner present. Sony Mini Disc audio recorders were used to record the stories told by each child during each phase of the study. Procedures described in the DAI manual were followed, as described below.

Test Phase

The first session included a 5- to 10-minute interview during which time was spent talking to the child to familiarize the child with the examiner. The wordless picture book *Two Friends* was presented to the child to peruse in order to develop a story to accompany the pictures. The child then orally narrated the book. This provided the test phase performance score for narrative production. The examiner responded to the child only with neutral responses such as "uh-huh," "oh," or "okay." The story was audio-recorded and later transcribed onto the DAI Story Record Form. From the transcribed record, each examiner evaluated and scored the story following the DAI scoring protocol. This consisted of assigning a numerical value between 1 and 5 for each narrative component. An assignment of 1 would indicate a complete lack of the component within the narrative while an assignment of 5 indicated a complex and complete insertion of the component within the narrative. For example, if a child did not include story setting information for time or place when narrating the story, a score of 1 would be assigned. If a child included setting information for either time or place, a score of 3 would be assigned. If a child included setting information that included time and place, a score of 5 would be assigned. All of the scoring scales have 5 points except for Episode Elements and Structure, which has 7 points.

Teach Phase

Each child participated in two mediation sessions. The first of the two sessions took place an average of 3 days after the test phase session (range 1–5 days). The DAI manual instructs the examiner to mediate one component that was assigned a score of 1 or 2, which indicates little or no knowledge of this component, and one component that was assigned a score of 3 or 4, which indicates some knowledge of this element, in the child's test phase story production. The DAI manual provides structured outlines for mediation strategies for each story component area. Each outline begins with an intention to teach that pro-

vides a clear explanation of what is going to be addressed. The next step involves explaining the meaning of the story component in relation to telling a story by giving examples from the *Two Friends* test story. For example, to mediate setting information, the examiner and child would look at the storybook and collaborate on the story setting by coming up with words and phrases about when and where the animals are at the beginning of the story. The next step is to help the child plan how to incorporate the particular story component when narrating stories in the future. Finally, there is a transfer step used to summarize the session and encourage the child to develop ways to remember what was learned. Examiners also record the type of support provided to each child and how the child responded to this support. The second mediation session followed the same procedure but with the other story component that had been identified for mediation for that child. The second session was conducted the day after the first except in one case where the session took place 2 days later.

Following each mediation session, children were rated on two scales. On the first scale the examiner assigned a numerical value between 1 and 5 to describe the amount of effort required to teach the child, where 1 = *a lot* (constant effort and continuous examples were required) and 5 = *little* (few or no principles or examples stated). For the second scale the examiner assigned a numerical rating between 1 and 5 to describe child responsiveness to the teaching, where 1 = *not very* (constant support was required) and 5 = *very* (needed very little support).

Re-test Phase

Post-testing was conducted an average of 10 days after the initial test phase session (range 7–12 days). The procedures were identical to the test phase, except that each child was presented with the other wordless picture book from the DAI, *The Bird and His Ring*. Time was allowed for the child to become familiar with the storybook before the child narrated a story. This story was transcribed from the audio-recording and then evaluated and scored according to the DAI guidelines.

Inter-rater Reliability

The 17 children were randomly divided into two groups. Each examiner transcribed the stories of the children in one of the two random groups. After transcription, each examiner scored the transcripts of her group according to the scoring criteria of the DAI. Once scored, each examiner reviewed the transcripts and scoring done by the other examiner. Final scoring decisions were reached through consensus between the two examiners.

Statistical analyses were conducted using SPSS software (SPSS Inc., 2004).

Results

Overall Effect of Mediation

Our first research question was whether DAI test-to-retest phase score differences would be greater for children identified as NLL than for children identified as having

PLLD. All components were rated on a 5-point Likert scale, except for one, Episode Elements and Structure, which was rated on a 7-point scale. To equate this scale to the others, ratings were converted to the equivalent score on a 5-point scale (e.g., a score of 5/7 was converted to 3.57/5). We summed the ratings of all variables for each story to create the variable total narrative score. We then conducted an analysis of variance with *group* as the between-subjects variable and *time* as the within-subjects variable.

There was no main effect for group based on total narrative scores, $F(1, 15) = 0.48$, $p = .50$, partial $\eta^2 = .03$. There was a significant effect for time, $F(1, 15) = 28.15$, $p < .001$, partial $\eta^2 = .65$, and most importantly, a significant Group x Time interaction, $F(1, 15) = 16.53$, $p = .001$, partial $\eta^2 = .52$. The effect size for the interaction indicated that 52% of the variance was accounted for by the interaction between these variables. The significant interaction between group and time indicated that test–retest score differences were indeed greater for the NLL group than for the PLLD group. The interaction effect, illustrated in Figure 1, indicated that DAI scores were similar for groups at the test phase but increased more for children with NLL after the mediation sessions.

Classification Agreement

The data were also examined to determine to what degree conclusions drawn from the DAI agreed with the classification of children into groups (NLL or PLLD) by school personnel. School classification was the result of a collaborative decision by classroom and special education teachers and the principal about the students' language learning abilities and was based on previous speech-language pathology assessment, academic performance, and classroom observation.

To determine whether the results of the DAI mediation were successful in distinguishing between children with normal language-learning abilities and those who had a possible language-learning disability, we used discriminant
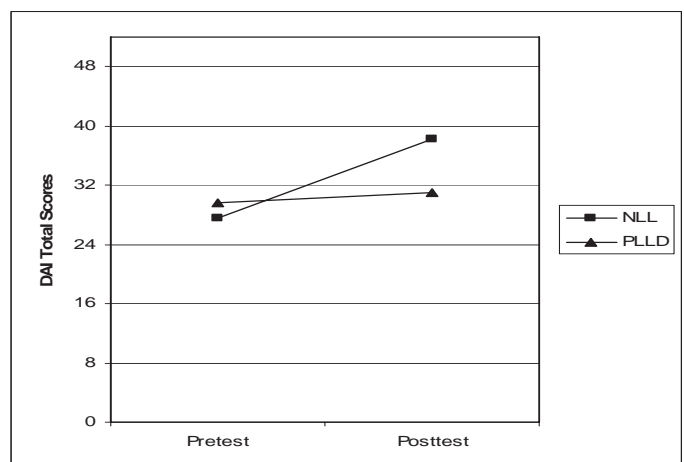
Figure 1. Pretest and posttest DAI total scores by group (maximum score = 52). NLL = normal language learning; PLLD = possible language learning disorders.

analysis (Klecka, 1980). Discriminant analysis can be used to investigate whether and to what extent a measure or set of measures classifies participants into the correct pre-existing groups (in this case, children with and without possible language-learning difficulty). Discriminant analysis is recommended as standard practice for establishing that a particular test can be used to identify children with language impairments (Plante & Vance, 1994). Because we were interested in how well the DAI would distinguish among the groups when used as an assessment tool, we selected measures that corresponded to DAI criteria for determining whether a child is a "capable language learner" or "exhibits language-learning difficulty." According to the DAI criteria, to be considered a capable language learner, a child needs to (a) improve at least one point both on components that had been focused on in mediation sessions and on components that were not included in mediation and (b) receive ratings of 4 or 5 on the 5-point scales for teaching effort and student responsiveness. The DAI distinguishes between two types of children with language-learning difficulty (L-LD): those who are ready to benefit from mediated teaching and those who are not ready. Our concern for this study was to investigate the ability of the DAI to distinguish between children with and without L-LD, regardless of whether or not the latter children were ready for intervention. Thus we combined the criteria for the two groups of L-LD. Criteria for identification as having L-LD are: (a) mediation results in a 1-point or less increase in components targeted; (b) mediation results in no change in non-targeted components; (c) teaching effort is rated from 1 to 3; and (d) student responsiveness is rated from 3 to 5 for those ready to benefit from intervention and from 1 to 2 for those not yet ready. Based on these criteria, we selected the following measures for the discriminant analysis: *average change on targeted components* (average for each child on the two components chosen for the mediation phase), *average change on non-targeted components* (average change for each child on the components that were not addressed in the mediation phase), *student responsiveness* (total of the ratings for the two mediation sessions), and *teaching effort* (total of the ratings for the two sessions). Figures 2 and 3 display the means and standard deviations for these variables.

Note that when combining the criteria for those ready for remediation and those not ready for remediation, Criterion 3 for L-LD covers the entire range of possible student responsiveness scores (1–5). However, because student responsiveness is one of the DAI's criteria for identifying children with L-LD, and because we expected that student responsiveness would differ in our two groups, we decided to include this measure in the variables for the discriminant analysis.

As a first step, a MANOVA was calculated in order to determine whether the groups differed on the variables. The multivariate test was significant, Pillai's Trace $(4, 12) = 4.94$, $p = .014$, partial $\eta^2 = .62$. Univariate tests were corrected for multiple tests using Holm's procedure for multiple tests (Wright, 1992). All four tests were significant. Cohen's d effect sizes were moderate for average change in targeted components and large for the other three variables. See Table 1 for the univariate test results. Table 2 presents the intercorrelations among the variables. All variables were correlated except for average change in non-targeted components, which correlated only with average change in targeted components.

Next, the discriminant analysis was conducted using the four variables, entered in one step. As part of the analysis, a discriminant function is calculated, which is a mathematical formula that combines the predictor variables to discriminate between the groups (Brace, Kemp, & Snelgar, 2003). If the discriminant function is statistically significant, then the predictor variables are successfully discriminating between groups. The value of the discriminant function was significantly different for the NLL and PLLD groups, Wilks' $\Lambda = .38, \chi^2 = 12.66, df = 4, p = .013$. The discriminant functions at group centroids were .903 for the NLL group and -2.167 for the PLLD group, indicating discrimination between the groups. Table 3 shows the correlations between the variables and the discriminant function. The magnitude of the correlations indicates the strength of the prediction of each variable. Correlations between predictor variables and the discriminant function indicate that the best predictor variable appears to be average change in targeted components, followed by average change in non-targeted components.
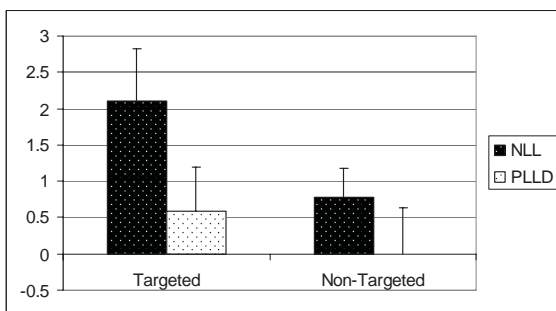

Figure 2. Means for average change from test to retest on targeted and non-targeted DAI story components. NLL = normal language learning, PLLD = possible language learning disorders.
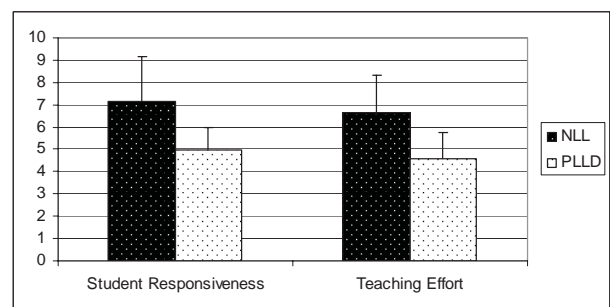

Figure 3. Mean ratings for student responsiveness and teaching effort. NLL = normal language learning, PLLD = possible language learning disorders.

Table 4 shows the classification of children by school personnel and by DAI classification. We found a 94.1% agreement overall between the DAI classification and school personnel classification. Specificity (i.e., number of children in the NLL group who were identified as such by the DAI) was 91.7%; only one child from the NLL group was misclassified as PLLD. On student responsiveness and teaching effort, this child received ratings of 1 in the first session and 3 in the second session, which were under the DAI capable language learner's criterion of 4 or more for each score. The child increased an average of .5 points on both targeted and non-targeted components. All children in the PLLD group were classified as such by the DAI results; thus sensitivity was 100%.

To investigate whether all four variables were necessary to discriminate the groups, the discriminant analysis was repeated using only average change in targeted components and average change in non-targeted components. Specificity, sensitivity, and overall accuracy remained exactly the same using only these two variables. We repeated the analysis a third time using only student responsiveness and teaching effort; specificity (75%) and overall accuracy (82.4%) were reduced, with two additional NLL children being misclassified as PLLD, while sensitivity remained at 100%.

It should be noted that despite the high specificity obtained in the discrimination analysis, some of the children in the NLL group were rated lower than 4 on the student responsiveness and/or teaching effort scores and thus would not have met the DAI criteria for capable language learners. However, these children obtained average change scores well above the criterion of 1 or more, which resulted in their classification as capable language learners in the discriminant analysis. Tables 5 and 6 indicate whether each criterion was met for each individual child. While most children meet the criteria for their group, a few children failed to meet the criterion for teaching effort and/or student responsiveness.

Discussion

This study examined the use of dynamic assessment within a First Nations community using the DAI. The DAI was examined because it focuses on a child's ability to tell stories, which is a skill that is found across cultural boundaries. It is important to test potential assessment tools, such as the DAI, that have a more suitable format for a variety of cultures as Canada has an abundance of cultures whose language needs may be more appropriately assessed with a culturally sensitive tool. This study examined the power of the DAI to distinguish between children with normal language learning abilities and those with a possible language learning disorder.

Overall effect of mediation on story scores

Our first research question was whether test-to-retest changes in DAI narrative measures would be significantly higher with the NLL group than with the PLLD group. As is apparent in Figure 1, the two groups were similar at

Table 1

Univariate Test Results for Variables in the Discriminant Function Analysis

Variable	Univariate F	p	Partial η^2	Cohen's d
Average change in mediated components	16.45	.001*	.52	1.0
Average change in non-mediated components	9.44	.008*	.39	0.60
Student responsiveness	5.21	.037*	.26	1.38
Teaching effort	6.30	.024*	.30	1.45

*p < adjusted alpha using Holm's procedure (Wright, 1992).

Table 2

Correlations Among Variables in the Discriminant Function

	Student responsiveness	Teaching effort	Average change in targeted components
Teaching effort	.77**	—	
Average change in targeted components	.58*	.55*	—
Average change in non-targeted components	.38	.20	.49*

*p < .05, **p < .01.

Table 3

Correlations Between Predictor Variables and the Discriminant Function

Variable	Correlation
Student responsiveness total of ratings	.46
Teaching effort total of ratings	.51
Average change in targeted components	.82
Average change in non-targeted components	.62

Table 4

Numbers of Children Classified as NLL or PLLD by School Personnel and by Test Results

Test classification	School classification	
	NLL	PLLD
Capable language learner	11 (91.7%)	1 (8.3%)
Language–learning difficulty	0	5 (100%)

Note. Overall rate of classification agreement = 94.1% (16/17).

the test phase, but after mediation their story scores were different. While both groups changed over time, those who were capable learners (NLL) benefited more from the one-on-one instruction during the mediated sessions than the PLLD group. The results suggest that children in the PLLD group had more difficulty learning and incorporating new information into their storytelling.

Discrimination between groups

Group comparisons on variables in the discriminant analysis

Comparisons between the NLL and PLLD groups revealed that both the targeted and non-targeted components changed more for the NLL group than the PLLD group. The change in the non-targeted components in the NLL group suggests a transfer of the narrative teaching to the other components. There was some positive change in the PLLD group in the targeted components (as seen in Figure 3), but no change is seen in non-targeted components as with the NLL group. While the PLLD group did not benefit as much overall, they did improve in the components that were taught in a very direct and focused way, if only slightly. Unlike their typical language peers, these children demonstrated no skill transfer in the same period of time; this difference is expected with the DAI procedure and, in fact, is one of the criteria for differentiating capable language learners from those exhibiting language-learning difficulty. It is likely that the children in the PLLD group require a longer period of time to consolidate new information. Our results support the need for direct and focused instruction for children with possible language learning difficulties.

Table 5

DAI Criteria for Capable Language Learner by Child for Children Classified as Normal Language Learners by School Personnel

Participant	Student responsiveness[a]	Teaching effort[a]	Increase in targeted variables	Increase in non-targeted variables[b]	Total criteria met
NLL1	+	+	+	+	4
NLL2	−	+	+	+	3
NLL3	+	+	+	+	4
NLL4[c]	−	−	−	+	1
NLL5	+	+	+	+	4
NLL6	+	+	+	+	4
NLL7	+	+	+	+	4
NLL8	−	−	+	+	2
NLL9	+	+	+	−	3
NLL10	+	+	+	+	4
NLL11	+	+	+	+	4
NLL12	+	+	+	+	4

[a]Rated as 4 or 5 for one or both mediated sessions. [b]Increase of +1 or more in at least 3 untargeted variables. [c]This was the child from the NLL group who was classified as PLLD in the discriminant analysis.

Table 6

DAI Criteria for Language-Learning Difficulties by Child for Children Classified as having Possible Language-Learning Difficulties by School Personnel

Participant	Student responsiveness[a]	Teaching effort[b]	Increase ≤ 1 on targeted variables	No increase in non-targeted variables[c]	Total criteria met
PLLD1	+	+	+	+	4
PLLD2	+	+	+	+	4
PLLD3	+	+	+	+	4
PLLD4	+	+	+	−	3
PLLD5	+	+	+	+	4

[a]For student responsivity, a child can score anywhere from 1–5 and be considered L-LD; a score of 1 would indicate that the child would not be ready to benefit from intervention. All PLLD children in this study scored 2 or 3 on this variable in at least one session. [b]For teaching effort, a child can be considered ready to benefit from intervention if he/she scores from 1 to 3 (although a 1 on both this variable and student responsiveness would indicate a child who is not ready to benefit from intervention). All PLLD children scored 2 or 3 on this variable in at least one session. [c]Defined as change of +1 point in fewer than 3 untargeted variables.

The two groups differed on the teaching effort and student responsiveness ratings that were completed after the mediation sessions. These group differences indicate that children in the NLL group were rated as requiring less effort to teach and being more responsive to mediation than children in the PLLD group.

Classification Agreement

The discriminant analysis investigated whether the DAI classification would provide an accurate classification compared to the school personnel classification. Using variables related to criteria specified in the DAI manual for distinguishing between children with and without language-learning difficulties, the discriminant analysis indicated that the DAI test classification places the children into similar groups as the school personnel classification in the majority of cases. Only one NLL child was misclassified as PLLD, while no PLLD children were misclassified. Thus, conclusions that would be drawn from the DAI agree very well with classifications made by school personnel.

Our findings regarding student responsiveness and teaching effort differ from those of Peña et al. (2006), who found that their modifiability score (the sum of student responsiveness and teaching effort ratings) was the single most accurate measure in their discriminant analysis. Given the many differences between their study and ours (e.g., their participants were in Grades 1 and 2 and had different cultural backgrounds), it is not possible to determine the reason for the different results. It seems possible, however, that ratings would vary according to children's ages. Future research should investigate the effect of age on the measures used in the DAI.

Some of the children in the NLL group had low student responsiveness and/or teaching effort scores but obtained average change scores. This would be important to keep in mind when assessing an individual child in the absence of scores for comparison children. The assessor may want to weigh the relative magnitudes of ratings versus average change in story scores after mediation when making a decision. The DAI manual provides examples of assessments with three children, two of whom were identified by the measure as capable language learners and one of whom was identified as exhibiting language-learning difficulties. It is clear from the examples provided in the manual that assessors often need to weigh the evidence obtained from the ratings to determine a child's category rather than requiring each measure to meet an absolute criterion. Given the fact that the same level of specificity could be obtained using only average change in targeted and non-targeted components in our study, it may be advisable to give more weight to these factors in identification of L-LD. However, given the small sample in this study, the findings must be replicated and cross-validated with more children and with different cultural groups before firm recommendations can be made. Since classifications of school personnel and the DAI identified the same children as having difficulties with only one exception, we assume that school personnel were skilled at identifying children who may have language

problems. Imagine, however, a case in which a child from this population was referred incorrectly as possibly having language difficulties. Recall that in the present study, children from both groups scored similarly in the initial test phase. If the child was tested using a static measure of narrative ability similar to the procedure in the test phase of the current study, it would be quite likely that the child would test similarly to children who have language difficulties whether or not the child was actually a capable language learner. The data from the teach and re-test phases would be needed to accurately distinguish the child from children with true language problems. The advantage of a dynamic technique such as that used in the DAI is the ability to examine a child's ability to learn a skill rather than the ability to assess a current skill level.

When assessing individual children, the examiner must keep in mind that a child may not meet all of the criteria for capable language learner but may still be considered one based on the overall pattern of results. In addition, if future studies find similar results to the current study, change in targeted and non-targeted components may be sufficient to classify a child as having or not having a language-learning disorder.

The fact that school personnel and DAI results agreed so well suggests that the use of referrals followed up by the DAI procedure should result in accurate identification of children with language impairment. The results of this study echo those of previous studies with other populations such as Latino-American, African-American, Arapahoe, and Shoshone (Peña et al., 1992; Ukrainetz et al., 2000). As in those studies, dynamic assessment provided information that distinguished children with identified and persistent language problems from those who needed only a brief mediation to improve their performance.

Future Directions

The DAI was successfully used in the present study to distinguish children with and without possible language learning disorders in this population. It would be important to replicate this study in more First Nations communities, both urban and rural, and with a larger sample size. Additional data could serve as a cross-validation sample to see whether the same results would be obtained for the discriminant function. Replication, cross validation, and larger samples will allow a greater understanding of the accuracy and validity of this culturally sensitive tool when used with First Nations children. In addition, information on fidelity (e.g., ease of administering the program in a standardized way) and reliability of story measures would be desirable. The present study did not examine fidelity of program administration, and stories were scored by consensus between the examiners. It would be useful to document these features of the DAI in future research.

Conclusions

This study found that Dynamic Assessment and Intervention (Miller et al., 2001) was an accurate assessment tool for children in Grade 3 on the Samson Cree Reserve in

Alberta, Canada, because it was able to distinguish children with possible language-learning difficulties from those with normal language-learning abilities. By providing evidence suggesting the utility of the DAI, this study has added support to the use of dynamic assessment to distinguish difference from disorder in First Nations children. While any single assessment tool requires the confirmation of other assessment tools to make a diagnosis, the DAI tool shows promise for use in differentiating children who may have language learning disorders from those who have normal language learning abilities.

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■ Analyse psychométrique d'outils d'évaluation utilisés auprès des enfants francophones

■ Psychometric Analysis of Assessment Tools Used with Francophone Children

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Abrégé

Le processus évaluatif constitue une partie intégrante du travail clinique dans le domaine de la santé et de l'éducation. Si un nombre important d'outils d'évaluation normalisés existe pour les patients/clients de langue anglaise, il en va bien autrement des outils adaptés aux patients/clients francophones qu'ils soient adultes ou enfants/adolescents. Les professionnels de l'évaluation du langage sont donc continuellement confrontés à la pénurie d'outils adaptés à leur clientèle. La présente étude poursuit deux objectifs : 1) faire le point sur la situation de l'évaluation du langage et de la parole des enfants francophones du Canada en produisant un répertoire des outils existants et 2) faire une étude critique de 31 d'entre eux. Les résultats obtenus démontrent que bien que plusieurs outils soient disponibles, peu d'entre eux répond toutefois aux standards psychométriques. Les résultats suggèrent donc d'appuyer toute démarche susceptible de mener au développement et à l'adaptation d'outils d'évaluation permettant de mieux desservir la population francophone canadienne.

Abstract

The assessment process constitutes an integral part of clinical work in health and education. Although a large number of standardized assessment tools exist for English speaking patients/clients, the situation is quite different for tools tailored to francophone patients/clients, be they adults or children/adolescents. The current study has two goals: 1) to describe the current situation in speech and language assessment of francophone children in Canada by compiling an inventory of existing tools and 2) to complete a critical review of 31 of these tools. The findings demonstrate that although a large number of tools are available, few meet psychometric standards. The findings suggest that measures aimed at promoting the development and adaptation of assessment tools in French should be supported.

Mots clés : évaluation, francophone, langage, enfants, validité, fidélité

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L e processus évaluatif constitue une partie intégrante du travail clinique dans le domaine de la santé et de l'éducation. Ses objectifs se trouvent générale-ment dans l'une des quatre catégories suivantes : 1) diagnostiquer la présence d'un trouble ou d'un déficit; 2) établir et décrire les forces et faiblesses d'un patient; 3) cibler des objectifs et des stratégies d'intervention; et finalement 4) mesurer la réponse face au traitement (Lahey, 1988, 1990; McCauley & Swisher, 1984a; Merrell & Plante, 1997; Paul, 2007).

Cet article porte sur les tests normalisés en français. Les tests standardisés ou normés présentent des données servant de système de référence puisque ces données sont recueillies auprès d'un échantillon représentatif de la population à laquelle on administre le test. Ils constituent les outils sur lesquels se base la majorité des décisions relatives aux deux premiers objectifs (Huang, Hopkins, & Nippold (1997) et sont toutefois moins utiles pour établir et mesurer les objectifs d'intervention. D'autres épreuves, telles que les tests à critères, sont plus appropriés (McCauley & Swisher, 1984b; Kerr, Guildford, & Kay-Raining Bird, 2003, Lefebvre & Trudeau, 2005). Contrairement aux tests standardisés, les tests à critères examinent les performances d'un sujet par rapport à des critères prédéterminés et non par rapport aux performances d'un groupe normatif, ceci permettant d'obtenir des informations cliniques tout aussi utiles.

Limites des outils de langue anglaise traduits ou adaptés en français

Si un nombre important d'outils d'évaluation normés de la parole et du langage existent pour les clients de langue anglaise, il en va bien autrement des outils de langue française développés et adaptés aux clients francophones qu'ils soient adultes ou enfants/adolescents. En effet, les professionnels de l'évaluation[1] du langage sont continuellement confrontés à la pénurie d'outils adaptés à leur clientèle. Afin de pallier à cette difficulté, ils ont parfois tenté de créer des tests originaux, mais ils ont surtout emprunté des outils conçus en Europe et traduits ou adaptés des tests anglais en français (Garcia & Desrochers, 1997). Les résultats de ces deux dernières stratégies n'ont cependant pas toujours été des plus heureux. En effet, dans la majorité des cas, ces adaptations/ traductions ont été effectuées pour répondre à un besoin urgent de combler le manque d'outils comparables en français. Par conséquent, dans l'utilisation de ces versions « empruntées », les spécialistes se retrouvent souvent devant trois problèmes: 1) ces tests reposent rarement sur des normes culturelles et linguistiques appropriées pour la population ciblée; 2) ils ne sont plus équivalents, sur le plan linguistique, aux tests initiaux de langue anglaise; et 3) ils ne reposent pas sur des normes appropriées satisfaisant à des critères psychométriques pour la population visée. Les conséquences reliées à ces difficultés sont susceptibles de limiter la validité des informations pouvant être tirées de l'évaluation du langage, tout comme les décisions qui en découlent.

Limites linguistiques et culturelles

Au plan linguistique et culturel, par exemple, quels renseignements utiles à l'évaluation d'un patient canadien-français peuvent être tirés d'un test de vocabulaire dont les images illustrent des variétés de plantes typiques de la France et peu connues au Canada ou dans lesquelles

figurent des personnages célèbres d'un pays étranger (Garcia & Desrochers, 1997). De la même manière, on peut se demander comment le clinicien interprétera-t-il la production d'un anglicisme ou d'une expression régionale, tous deux absents du manuel de correction, mais pourtant bien présents dans la réalité linguistique du patient évalué. L'ensemble des réponses admissibles dans chaque test doit donc prendre en compte ces comportements linguistiques régionaux, puisque toute déviation à ce principe peut conduire à une sous-estimation des capacités linguistiques réelles du client.

Limites relatives aux critères linguistiques

Au plan linguistique, des problèmes en lien avec la traduction et l'adaptation même de l'outil peuvent fausser l'interprétation et le diagnostic clinique qui en ressort. Par exemple, dans la construction des tests, les auteurs contrôlent généralement avec minutie la longueur des paragraphes ou des textes qui font partie de l'évaluation. Or, il n'est pas rare de voir que les textes traduits, bien qu'équivalents en ce qui a trait au sens, ne le sont pas quant à la longueur du texte. Or, un texte racontant la même histoire qu'un autre récit mais en moins ou plus de mots, pourrait induire une variation dans le niveau de difficulté, ce qui se reflète inévitablement dans la performance obtenue au test. La traduction des items peut également modifier le niveau de difficulté des diverses structures grammaticales ou la difficulté relative de diverses structures grammaticales composant les items. Par exemple, le pronom pluriel d'un test anglais est marqué par « they » alors qu'en français, il est marqué par « ils » ou « elles ». Des items qui ne sont pas comparables à la version originale pour ce qui est du niveau de difficulté laissent le clinicien dans le doute à propos de la validité réelle des habiletés évaluées par le test. Ces quelques exemples démontrent bien qu'adapter un texte ne s'en tient pas uniquement à la traduction formelle des items mais implique trois procédures : 1) adapter le matériel d'emprunt de manière à assurer sa pertinence culturelle pour la population ciblée, 2) prendre connaissance des variables (p.ex., longueur des mots, fréquence d'occurrence dans la langue) qui ont été considérés dans le choix des stimuli de manière à effectuer les mêmes contrôles dans le choix des stimuli français correspondants, et finalement 3) bien comprendre les objectifs de l'outil utilisé afin de préserver la comparabilité du nouvel outil avec la version originale.

Limites relatives aux normes

Finalement, en ce qui concerne les normes d'un test, elles permettent de situer un individu par rapport à son groupe de référence. En d'autres mots, un score faible au test se traduit par une performance faible dans l'échantillon de normalisation et, par inférence, un score faible dans la population. Toutefois, pour être en mesure de faire une telle inférence, l'outil doit d'abord répondre aux critères psychométriques que sont : 1) la validité, c'est-à-dire que le test mesure véritablement ce qu'il prétend mesurer (McCauley & Swisher, 1984b) et 2) la fidélité, c'est-à-dire

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[1]Par l'appellation *professionnels de l'évaluation*, nous entendons les orthophonistes, les audiologistes, les psychologues, les enseignants, ou tout autre professionnels qui, dans leur travail, ont à évaluer le langage.

la capacité de reproduire les résultats obtenus auprès d'un individu dans un intervalle de temps donné (McCauley & Swisher, 1984b). Ainsi, les scores dérivés d'un outil ne satisfaisant pas à ces qualités psychométriques sont très difficiles à interpréter et les décisions cliniques impossibles à justifier sur la base de la performance au test uniquement. Il faut donc considérer la standardisation comme une police d'assurance; elle ne prévient pas tous les cas aberrants, mais elle fournit un cadre de référence permettant de vérifier efficacement les hypothèses cliniques et de confirmer la présence de certains déficits.

Les auteurs de ces outils adaptés/traduits ainsi que les cliniciens qui les utilisent sont bien conscients des imperfections des outils qu'ils ont élaborés et qui sont décrites précédemment. Toutefois, malgré ces lacunes, les professionnels considèrent qu'à choisir entre une absence totale de ressources et des outils imparfaits, il est plus constructif d'adopter la seconde stratégie (Garcia & Desrochers, 1997).

Les outils de langue française

La réalité du manque d'outil et l'insatisfaction des cliniciens quant à la disponibilité des tests d'évaluation en français sont entre autres discutées par Garcia, Paradis, Sénécal & Laroche (2006) et Kerr, Guildford, & Kay-Raining Bird (2003). Malgré que certains travaux se soient intéressés à compiler les outils de langue française les plus fréquemment utilisés par les audiologistes et orthophonistes canadiens (p.ex. Garcia et al., 2006; Garcia & Desrochers, 1997), aucun article n'a tenté de dresser un répertoire des outils d'évaluation existants. Pourtant un tel travail s'avère des plus pertinent puisqu'il semble que la sélection des tests utilisés par une majorité de professionnels, peu importe la langue de pratique, est guidée principalement par des critères subjectifs et non objectifs. L'exemple qui suit le démontre bien. Record et Tomblin (1994) ont examiné la pratique de 27 orthophonistes-cliniciens, membres de l'*American Speech-Language-Hearing Association* (ASHA). Ils rapportent que l'opinion concernant les qualités psychométriques de l'outil, ainsi que la familiarité avec le test représentaient, pour ces professionnels, les critères les plus décisifs dans la sélection des tests à utiliser pour évaluer le langage d'enfants. De plus dans un sondage sur les habitudes d'évaluation des audiologistes et orthophonistes canadiens, Kerr et al. (2003) rapportent que, dans leur travail auprès des enfants, les répondants du sondage utilisaient généralement les cinq mêmes tests pour exécuter les tâches liées à l'évaluation et à la réadaptation. Il est justifié de s'interroger à savoir dans quelle mesure une telle pratique serait guidée, du moins en partie, par un manque de connaissances de l'existence d'autres outils.

Étude des qualités psychométriques des outils d'évaluation

Un autre aspect important sur lequel les professionnels canadiens rapportent de l'insatisfaction concerne la qualité psychométrique des mesures auxquelles ils ont accès (Garcia et al., 2006; Garcia & Desrochers, 1997).

Aucune étude ne s'est intéressée à évaluer la qualité psychométrique des tests de langue française utilisés pour évaluer les jeunes canadiens francophones. Connaître la qualité psychométrique des outils actuellement utilisés s'avère crucial puisque l'utilisation de tests standardisés qui répondent aux critères de psychométrie est nécessaire afin de répondre à la préoccupation grandissante d'une pratique fondée sur des données probantes (*evidence-based practice;* Shipley & McAfee, 2004). De plus, l'Ordre des audiologistes et orthophonistes de l'Ontario (2000), ainsi que l'Ordre des orthophonistes et audiologistes du Québec (2003) préviennent leurs membres que le fait de tirer des conclusions basées sur des tests non standardisés ou qui ne possèdent pas des niveaux de qualités psychométriques appropriés va à l'encontre du code déontologique de leur ordre professionnel.

Il est possible de retrouver dans la littérature diverses études de qualités psychométriques menées sur les tests américains de langage et d'articulation utilisés auprès des enfants. Une premières est celle de McCauley et Swisher (1984a) dans laquelle les auteurs ont examiné 30 tests de langage et d'articulation pour les enfants d'âge préscolaire, en utilisant 10 critères psychométriques portant principalement sur la validité, la fidélité, et les caractéristiques de l'échantillon de normalisation. Les résultats révèlent que la plupart des informations nécessaires pour évaluer la validité et la fidélité des tests étaient absentes du manuel de l'utilisateur. En effet, seulement 20% des tests remplissaient 50% des critères.

Reprenant les critères de McCauley et Swisher (1984a) et en ajoutant d'autres pour considérer, entre autres, les effets de plancher et de plafond potentiels dans certains tests, Plante et Vance (1994) ont mené, 10 ans plus tard, une analyse de 20 tests destinés à évaluer le langage d'enfants d'âge préscolaire. Leurs résultats démontrent que seulement 38% des tests répondaient à la moitié des critères. Ils en concluent que malgré l'évolution des standards de pratique, cette plus grande sensibilité ne se transpose toutefois pas en gains substantiels concernant la qualité des informations fournies aux praticiens par les éditeurs de tests.

Finalement, Hutchinson (1996) suggère que les professionnels devraient se baser sur 20 critères pour évaluer les qualités psychométriques d'un test à utiliser dans une démarche clinique. En plus des critères reliés à la validité, la fidélité et à la standardisation, l'auteur aborde la question des fondements théoriques du test et soulève des questions relatives aux objectifs, au développement et à l'interprétation du test.

Objectifs de l'étude

Le présent travail a donc deux principaux objectifs : 1) générer un répertoire des outils d'évaluation disponibles en français pour les enfants francophones nord-américains et 2) faire une revue des qualités psychométriques de certains outils standardisés faisant partie du répertoire généré. Dans cet article, nous présenterons succinctement les principaux résultats obtenus dans le développement

du répertoire des tests et nous détaillerons les résultats du deuxième objectif.

Par cette recherche, nous voulons faire le point sur les qualités psychométriques de certains outils standardisés servant à l'évaluation du langage des enfants francophones au Canada. Nous désirons ainsi encourager la discussion à ce sujet et fournir aux professionnels davantage d'informations susceptibles de les aider à choisir des instruments. Nous souhaitons également les informer sur les répercussions relatives à l'utilisation des tests sur le diagnostic et la prise en charge subséquente des clients/patients, lorsque les qualités psychométriques de ces tests sont potentiellement défaillantes. Finalement, nous espérons que la présente étude stimulera la poursuite de travaux visant le développement d'outils spécifiquement destinés aux jeunes enfants canadiens dont la langue maternelle est le français « québécois », l'adaptation de tests déjà existants (en anglais ou en français « européen ») ainsi qu'une meilleure standardisation des outils actuellement en usage. Afin de répondre aux deux objectifs, l'étude a été divisée en deux parties. La première partie décrit la démarche menant à la création d'un répertoire des outils d'évaluation du langage utilisés en français tandis que la deuxième partie se veut une critique de certains des outils répertoriés.

Partie 1 : Répertoire des outils d'évaluation du langage en français

Méthodologie

La méthodologie utilisée pour mener à la création du répertoire des outils d'évaluation du langage compte plusieurs étapes. En tout premier lieu, une revue de littérature a été effectuée sur *PubMed* et aussi en consultant tous les exemplaires de la *Revue d'orthophonie et d'audiologie (Journal of Speech-Language Pathology and Audiology)* depuis 1985. Dans une seconde étape, une recherche élargie dans Internet a permis d'identifier des sites de regroupements professionnels européens dans les domaines de la logopédie et de la neuropédiatrie. Ces sites se sont avérés très utiles afin d'identifier des outils développés pour les enfants francophones d'origine européenne (p.ex. : française, belge, etc.).

Dix chercheurs ont par la suite été contactés afin de vérifier dans quelles mesures ils connaissaient les outils trouvés. Ces chercheurs occupaient des postes de recherches et d'enseignement dans des facultés telles que celles de l'éducation, de la psychologie, de l'audiologie et de l'orthophonie et étaient spécialisés en psychométrie ou dans l'évaluation des enfants. Ces chercheurs occupaient des postes en recherche et en enseignement dans des universités canadiennes. Certains d'entre eux travaillaient entre autres à l'adaptation en français québécois d'outils initialement conçus en anglais ou à la création de nouveaux tests destinés à la population pédiatrique québécoise. Leur contact a mené à l'obtention de documents généraux de référence portant sur l'évaluation du langage des enfants mais aussi sur les facteurs importants devant être considérés dans l'évaluation de cette population, comme par exemple les œuvres de Rondal (1997) et Chevrier-Muller & Narbona (1999). Toutefois, peu d'entre eux connaissaient les tests européens qui leur ont été présentés. Les tests « adaptés » ou les versions « maison » d'outils en français initialement conçus en anglais leur étaient davantage familiers.

Des rencontres ont par la suite été effectuées avec sept praticiens (orthophonistes, psychologues, spécialistes en déficience auditive, et audiologistes) travaillant dans divers milieux incluant commissions scolaires, centres hospitaliers et cliniques privées dans le but d'en apprendre davantage sur les outils qu'ils connaissaient et sur ceux qu'ils utilisaient les plus fréquemment dans le cadre de leurs évaluations. Nous les avons également interrogés à propos de leurs besoins en matière d'évaluation du langage pour les enfants nord-américains de langue française et sur les facteurs qui motivaient généralement la sélection des tests qu'ils utilisaient dans leur travail quotidien. Parmi les outils les plus fréquemment nommés, se retrouvaient quelques tests développés pour les enfants européens de langue française, mais surtout des versions « maisons » adaptés en français, de tests anglophones pour lesquels les normes américaines servaient de critères de référence.

Finalement, la visite de diverses testothèques, matériathèques, médiathèques et docutothèques des facultés/programmes de psychologie, d'orthophonie et d'éducation a permis de mettre en lumière l'existence d'une multitude de versions « maison » de divers tests fréquemment utilisés en langue anglaise ayant été adaptés en français. Ces visites ont également permis d'identifier et de se familiariser avec d'autres épreuves ayant été développées pour les enfants francophones. Bien que les outils d'évaluation de la parole et du langage sont surtout administrés par les orthophonistes ou autres thérapeutes, nous avons également inclus les tests d'évaluation cognitive de l'enfant comprenant une composante de l'évaluation du langage.

Résultats

À la suite de discussions avec des professionnels de l'évaluation dans les domaines de la santé et de l'éducation, les tests publiés à partir de 1948 ont été inclus dans le répertoire. Les tests publiés avant cette année n'étant plus ou que rarement utilisés par les professionnels. Neuf domaines généralement reconnus, tant par les professionnels que par les maisons d'édition de tests, pour être liés au langage et à son développement ont été considérés : 1) la reconnaissance/perception de la parole, 2) la production de la parole/articulation, 3) la mémoire auditive verbale, 4) la conscience phonologique, 5) la compréhension du langage, 6) la production du langage, 7) la lecture, 8) l'écriture/l'orthographe, et 9) la cognition/intelligence. Pour chaque test, les informations suivantes ont été répertoriées : le nom complet du test, le/les auteurs, la date de parution (la date initiale, ainsi que les parutions ultérieures), l'âge (ou les caractéristiques spéciales) de la population visée, les caractéristiques de l'étalonnage (nombre d'enfants, origine, spécification de l'échantillon),

et finalement le type d'adaptation. À ce sujet, l'appellation *pour enfants francophones* sous-entend un test ayant été développé spécifiquement pour les enfants de langue française; celle *adaptation maison* signifie une traduction libre effectuée par des cliniciens sans étude de normalisation et de standardisation. Par conséquent, l'échantillon du test original sert de critère de référence pour comparer les résultats obtenus par un patient. Finalement, l'appellation *adaptation et validation* signifie qu'une traduction officielle en français du test originalement développé dans la langue anglaise a été effectuée et qu'une étude de normalisation a été menée auprès d'un groupe d'enfants francophones (et dans certains cas francophones canadiens) pour guider les décisions cliniques.

Le Tableau 1 présente les caractéristiques d'adaptation des outils du répertoire des tests. Chaque test ne représente pas qu'un seul domaine puisque certains outils particuliers (p. ex., Batterie d'évaluation du langage écrit et de ses troubles, BELEC) ciblent plusieurs domaines identifiés au Tableau 1. Le répertoire compte 110 outils. La majorité des tests ont été développés pour les enfants francophones, puis des adaptations/validations et finalement des adaptations « maison ». Il est toutefois possible que le nombre d'outils dans la catégorie « validation maison » soit sous-estimé puisque durant nos rencontres avec les professionnels, certains étaient hésitants à montrer ces outils « maison » ou à discuter de leur existence. Le Tableau 1 présente donc les outils « maison » auxquels nous avons eu accès.

L'analyse du répertoire permet de faire plusieurs observations. Tout d'abord, les outils évaluant le langage, que ce soit dans son volet expressif ou réceptif, constituent la catégorie possédant le plus grand nombre de tests. On note que peu d'outils (10) existent pour la reconnaissance/perception de la parole comparativement au nombre pour la production de la parole/articulation (13). On observe également que certains domaines, tels que la lecture et l'orthographe sont presque exclusivement composés

de tests développés ou adaptés/validés pour les enfants francophones comparativement à ceux évaluant le langage réceptif ou expressif qui comptent en plus de nombreuses adaptations « maison ». En effet, sur les 51 outils répertoriés pour les domaines reliés à l'alphabétisation (lecture/orthographe), seulement deux représentent des adaptations de tests anglophones et aucune adaptation « maison » n'a été répertoriée. À l'opposé, pour les domaines du langage réceptif et expressif, 10 tests sont des adaptations « maison ». De telles disparités entre les domaines peuvent être liées aux besoins en évaluation qui s'avèrent plus grands et sans doute plus diversifiés dans les domaines du langage réceptif ou expressif que ceux pour l'évaluation de la lecture et l'écriture. Finalement, les tests développés pour les enfants francophones d'origine européenne sont nombreux et présents dans tous les domaines étudiés.

Partie 2 : Critique de tests d'évaluation du langage en français

Méthodologie

Pour les 110 outils répertoriés, des critères d'exclusion ont été appliqués pour l'analyse psychométrique. Tout d'abord, de ce nombre, les 13 tests ayant eu une *adaptation « maison »* n'ont pas été considérés pour l'analyse. De plus, 66 outils furent retirés de la liste de tests puisque le test ou le manuel de l'examinateur n'était pas disponible pour l'évaluation. Ainsi, un total de 31 tests ou outils furent soumis à l'analyse psychométrique (Tableau 2).

La procédure utilisée pour l'analyse psychométrique des outils rejoint celle d'abord proposée par McCauley et Swisher (1984a) puis réactualisée par Plante et Vance (1994). Des critères ont été ajoutés de manière à représenter plus fidèlement de nouvelles tendances observées aujourd'hui par les maisons d'édition d'outils psychométriques. Ces six critères additionnels proviennent principalement d'écrits scientifiques dont Hutchison (1996) et Beran (2003). Au total, 16 critères représentent des caractéristiques de base devant être obligatoirement considérées par le clinicien pour utiliser un test dans le but de poser un diagnostic ou d'émettre une décision clinique à propos d'une performance d'un patient/client au test. Puisque ces tests sont utilisés par des professionnels de différents domaines, ces critères sont importants car ils assurent d'obtenir des informations plus objectives. Conséquemment, les décisions cliniques qui en découlent risquent moins d'être influencées par la manière dont les praticiens conceptualisent et interprètent les construits évalués. Ces critères sont présentés et expliqués en Annexe A.

Tableau 1

Caractéristiques d'adaptation des outils répertoriés

Domaine	Développé pour les enfants francophones		Adaptation/ Validation		Adaptation maison
	Canadiens	Non-canadiens	Canadiens	Non-canadiens	
Reconnaissance de la parole		8	1		1
Production de la parole	1	11			1
Conscience phonologique	1	14			1
Mémoire auditive		12		1	
Langage réceptif		28	3	4	5
Langage expressif		37	1	5	5
Lecture	1	26		2	0
Écriture/Orthographe		22	0		0
Cognition/Rendement intellectuel	2	9	3	7	0

L'analyse psychométrique a été effectuée par une doctorante en psychologie. Au cours du processus, à la suite des discussions, l'évaluatrice et deux autres chercheurs en sont venus à un consensus sur les critères s'appliquant à chaque test. Le nombre de critères de chaque test a été additionné, chaque critère possédant une importance relative équivalente (i.e. 1 critère = 1 point). Un test a été considéré comme satisfaisant un critère si le manuel présentait, dans son entier, suffisamment d'information en lien avec le critère en question pour en permettre l'évaluation.

Résultats

Le Tableau 2 présente le nombre de tests satisfaisants chaque critère. En moyenne, 14,18 tests (écart-type = 11,18) ont satisfait chaque critère. Les critères les plus fréquemment satisfaits sont ceux en lien avec (1) les objectifs du test, (2) la définition des construits, (12) la taille de l'échantillon de normalisation, (15) l'administration et les qualifications du clinicien, et finalement (16) l'année de publication du test et de l'étude de standardisation. À l'opposé, les critères les moins fréquemment satisfaits sont ceux qui abordent la question de (3) la validité de construit, (6) la validité prédictive, (9) de la fidélité inter-juges, (13) des effets plancher/plafonds, et finalement (14) des positions extrêmes. Aucun des tests analysés n'a satisfait les critères 9 et 14.

Le Tableau 3 présente les tests satisfaisants à chaque critère. Malgré l'apparition plus fréquente de certains outils, le patron observé à la Figure 1 n'est toutefois pas dysharmonieux (par exemple, quelques tests qui rencontrent remplissent tous les critères, alors que d'autres n'en remplissent que très peu). En moyenne, chaque test a rempli 6.81 critères (écart-type : 2,91). Quatorze critères est le nombre le plus élevé de caractéristiques ayant été satisfaites, et un seul test, l'Échelle d'intelligence de Weschler pour enfants, 4ième édition, (WISC-IV), y parvient. Deux tests, l'Échelle d'intellignece de Weschler pour la période préscolaire et primaire, 3ième édition (WPPSI-III) et les Inventaires MacArthur du développement de la communication (IMDC), une adaptation et validation d'un test anglais avec des enfants franco-québécois, satisfont 12 critères. L'Échelle de vocabulaire en images Peabody (ÉVIP), qui est une adaptation et validation du *Peabody Picture Vocabulary Test* avec des individus d'origine canadienne française a répondu à 10 critères. À l'opposé, le Test de lecture California (California Lecture Test) ne satisfait qu'à deux critères. En somme, 16 tests évalués répondent à moins de sept critères d'analyse.

Discussion

Cette étude visait en tout premier lieu à répertorier des outils existants pour l'évaluation du langage des enfants francophones canadiens. Les résultats ont montré que parmi les 110 outils retrouvés , très peu d'entre eux ont été spécifiquement développés pour les enfants francophones nord-américains. Premièrement, les résultats révèlent que les professionnels doivent
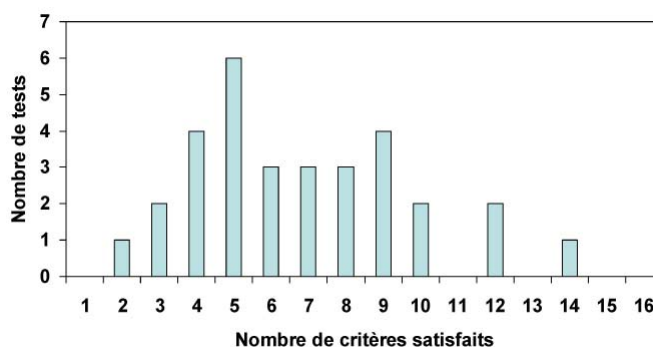

Figure 1. Distribution des tests par nombre de critères psychométriques satisfaits

avoir recours à plusieurs outils d'évaluation de conception « maison » ou des outils d'abord conçus pour une population américaine anglophone. L'utilisation de tels outils peut compromettre la validité et la fiabilité de l'évaluation si ces derniers ne sont pas développés selon des règles précises (voir Vallerand, 1989). Conséquemment, la marge d'erreur possible dans les résultats issus du processus d'évaluation pourrait être considérablement élevée. La démarche de vérification d'hypothèses cliniques se trouve potentiellement compromise et la mesure de l'interprétation de la sévérité du trouble, erronée (Garcia et al., 2006; Garcia & Desrochers, 1997).

Les résultats montrent également que plusieurs outils répertoriés sont conçus et validés en Europe. Or, la réalité des enfants européens se distingue de celle de la population pédiatrique canadienne française à plusieurs égards. Par exemple, comme l'utilisation et le contenu du vocabulaire sont intimement liés à la culture, le français européen et le français canadien présentent certainement des différences marquées; leurs systèmes d'éducation, tant dans l'organisation de sa structure que dans le contenu académique de ses programmes, diffèrent et ne correspondent pas à la réalité du système d'éducation canadien français comme le Québec (p.ex. un enfant français de 10 ans est en 2ième année de son primaire moyen dans le cycle III, alors qu'un enfant allemand débute sa première année de secondaire; l'enfant suisse fait sa première année de transition et finalement l'enfant québécois est en 5ième année du 3ième cycle du primaire). Les cliniciens utilisant les outils doivent donc être tout particulièrement vigilants et bien connaître le système scolaire d'où proviennent les enfants formant l'échantillon de normalisation.

Une dernière réalité mise en lumière par cette recherche est celle des outils francophones développés au Québec et publiés dans les années '60 et '70. De tels tests, bien qu'intéressants sont désuets. Ils ne sont plus adaptés à la réalité des enfants d'aujourd'hui tant au plan de leur contenu que des théories sur lesquels ils s'appuient. Ces dernières ne correspondent plus aux

Tableau 2

Tests remplissant les critères de qualités psychométriques

Critère	Nombre de tests	Tests remplissant les conditions du critère
1	31	BELEC, ELO, N-EEL, L2MA, IMDC, EVIP, WPPSI-III, LMC-R, Cube de Kohs, TNO, TIMÉ-2, ODEDYS, EPFL, BTBC, BTBC-PS, DORLEC, ALOUETTE-R, BQAL, Jeannot et Georges, EIHM-E, ECOSSE, EC-SL-SE, BPAL, VL-Kh, TV-BP, WISC-IV, EIHM-10/24, ITPA, LAC, TDD
2	28	BELEC, ELO, N-EEL, L2MA, IMDC, EVIP, WPPSI-III, LMC-R, Cube de Kohs, TNO, TIMÉ-2, ODEDYS, EPFL, BTBC, BTBS-PS, DORLEC, ALOUETTE-R, BQAL, Jeannot et Georges, EIHM-E, ECOSSE, EC-SL-SE, VL-Kh, TV-BP, WISC-IV, EIHM-10/24, TDD
3	5	EVIP, WPPSI-III, BTBC, WISC-IV, TDD
4	9	IMDC, WPPSI-III, EPFL, EIHM-E, EC-SL-SE, BPAL, WISC-IV, EIHM-10/24, TDD
5	13	IMDC, EVIP, WPPSI-III, Cube de Kohs, TNO, TIMÉ-2, BTBC-PS, BQAL, EC-SL-SE, BPAL, WISC-IV, TDD
6	3	IMDC, BTBC, WISC-IV
7	14	IMDC, EVIP, WPPSI-III, LMC-R, TNO, TIMÉ-2, BTBC, BTBC-PS, EIHM-E, EC-SL-SE, BPAL, WISC-IV, EIHM-10/24,
8	12	N-EEL, IMDC, EVIP, WPPSI-III, TNO, TIMÉ-2, EPFL, BTBC, BTBC-PS, EIHM-E, WISC-IV, EIHM-10/24
9	0	
10	6	IMDC, EVIP, WPPSI-III, BTBC, BTBC-PS, WISC-IV
11	13	N-EEL, L2MA, IMDC, WPPSI-III, Cube de Kohs, TNO, TIMÉ-2, ODEDYS, EPFL, ECOSSE, EC-SL-SE, WISC-IV, EIHM-10/24
12	24	BELEC, L2MA, IMDC, EVIP, WPPSI-III, Cube de Kohs, TNO, TIMÉ-2, ODEDYS, EPFL, BTBC, BTBC-PS, ALOUETTE-R, CRT, Jeannot et Georges, EIHM-E, ECOSSE, EC-SL-SE, BPAL, VL-Kh, TV-BP, WISC-IV, EIHM-10/24
13	2	ELO, WISC-IV
14	0	
15	30	BELEC, ELO, N-EEL, L2MA, IMDC, EVIP, WPPSI-III, LMC-R, Cube de Kohs, TNO, TIMÉ-2, ODEDYS, EPFL, BTBC, BTBC-PS, ALOUETTE-R, BQAL, CRT, DORLEC, Jeannot et Georges, EIHM-E, EC-SL-SE, BPAL, VL-Kh, TV-BF, WISC-IV, EIHM-10/24, ITPA, LAC, TDD
16	28	BELEC, ELO, N-EEL, L2MA, IMDC, EVIP, WPPSI-III, LMC-R, Cube de Kohs, TNO, TIMÉ-2, ODEDYS, EPFL, BTBC, BTBC-PS, ALOUETTE-R, BQAL, CRT, DORLEC, EIHM-E, EC-SL-SE, BPAL, VL-Kh, WISC-IV, EIHM-10/24, ITPA, LAC, TDD

Liste des tests évalués

ALOUETTE-R : *L'Alouette.* Lefavrais, P. (2006).
BELEC : *Batterie d'évaluation du langage écrit et de ses troubles.* Mousty, P., Leybaert, J., Alegria, J., Content, A., & Moraïs, J. (1994).
BPAL : *Le temps d'apprendre à lire : Batterie prédictive de lecture-écriture d'Inizan.* Inizan, A. (2000).
BQAL : *Bilan qualitatif des apprentissages de la lecture.* Campeau-Fillion, F., & Gauthier, G. (1990).
BTBC : *Test des concepts de base de Boehm* (TCBB). Chevrier, J. M. (1974).
BTBC-PS : *Test des concepts de base de Boehm* (TCBB-P). Chevrier, J. M. (1974).
CRT : *Test de lecture California* (CRT). Claes, M., Dehant, A., & Lamy, J. (1977).
Cube de Kohs : *Test des cubes de Kohs.* Kohs, C. (1972).
DORLEC : *Disposition Orthographe Lecture.* Lobrot, M. (1980).
EC-SL-SE : *Échelle composite du savoir lire et du savoir écrire au cours préparatoire.* Inizan, A., Inizan, A., & Bartout, D. (2002).
ECOSSE : *Epreuve de Compréhension Syntaxico-Sémantique.* Lecocq, P. (1996).
EIHM-10/24 : *Épreuve individuelle d'habileté mentale* (EIHM-Adultes). Chevrier, J.-M. (1989).
EIHM-E : *Épreuve individuelle d'habileté mentale.* Chevrier, J.-M. (1989).
ELO : *Évaluation du langage oral.* Khomsi, A. (2001).
EPFL : *Épreuve de performance fonctionnelle en lecture.* Ruel, P.-H. (1976).
EVIP : *Échelle de vocabulaire en images Peabody* (EVIP). Dunn, L. M., Theriault-Whalen, C. M., & Dunn, L. M. (1991).
N-EEL : *Nouvelles épreuves pour l'examen du langage.* Chevrié-Muller, C., & Plaza, M. (2001).
IMDC : *Inventaires MacArthur du développement de la communication* (CDI). Fenson, L., Dale, P. S., Reznick, J. S., & Thal, D. J. (1993). Adaptation par Trudeau, N., Frank I., & Poulin-Dubois, D. (1999).
ITPA *: Illinois Test of Psycholinguistic Abilities.* Kirk & McCarthy. (1961). Adaptation par Salomon, A. (1975).
Jeannot et Georges : *Épreuve de Jeannot et Georges.* Hermabessier, G. & Sax, H. (1972).
LAC : *Lindamood auditory conceptualization test.* Lindamood, H.C. & Lindamood, P.C. (1979). Adaptation par Silencieux, S. (1999).
L2MA : *Langage oral, langage écrit, mémoire & attention.* Chevrié-Muller, C., Simon, A. M., & Fournier, S. (1997).
LMC-R : *Epreuve d'évaluation de la compétence en lecture.* Khomsi, A. (1990).
ODEDYS : *Outil de Dépistage des Dyslexies.* Valdois, S., Jacquier-Roux, M., & Zorman, M. (2002).
TDD : *Test de dyslexie.* Griffin, J. R., & Howard, W. (1998).
TNO *: Test du niveau d'orthographe.* Doutriaux, F., & Lepez, R. (1980).
TIMÉ-2 : *Test d'identification du monde écrit de 6 à 8 ans.* Ecalle, J. (2003).
TV-BP : Test de vocabulaire de Binois et Pichot. (1958).
VL-Kh : *Vitesse en Lecture.* Khomsi, A., Pasquet, F., Parbeau-Guéno, & Nanty, I. (2005).
WISC-IV : Échelle d'intelligence de Weschler pour enfants, 4ième édition. (2005).
WPPSI-III : *Échelle d'intelligence de Weschler pour la période préscolaire et primaire 3ième édition* (WPPSI-III). Weschler, D. (2002).

Tableau 3

Nombres de critères remplis par chaque test

Nom du test	Nombre de critères	Critères*
ALOUETTE-R	5	1, 2, 12, 15, 16
BELEC	5	1, 2, 12, 15, 16
BPAL	7	1, 4, 5, 7, 12, 15, 16
BQAL	5	1, 2, 5, 15, 16
BTBC	10	1, 2, 3, 6, 7, 8, 10, 12, 15, 16
BTBC-PS	9	1, 2, 5, 7, 8, 10, 12, 15, 16
CRT	2	12, 15
Cube de Kohs	7	1, 2, 5, 11, 12, 15, 16
DORLEC	4	1, 2, 15, 16
EC-SL-SE	9	1, 2, 4, 5, 7, 11, 12, 15, 16
ECOSSE	4	1, 2, 11, 12
EIHM-10/24	9	1, 2, 4, 7, 8, 11, 12, 15, 16
EIHM-E	8	1, 2, 4, 7, 8, 12, 15, 16
ELO	5	1, 2, 13, 15, 16
EPFL	8	1, 2, 4, 8, 11, 12, 15, 16
EVIP	10	1, 2, 3, 5, 7, 8, 10, 12, 15, 16
IMDC	12	1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 15, 16
ITPA	3	1, 15, 16
Jeannot et Georges	4	1, 2, 12, 15
L2MA	6	1, 2, 11, 12, 15, 16
LAC	3	1, 15, 16
LMC-R	5	1, 2, 7, 15, 16
N-EEL	6	1, 2, 8, 11, 15, 16
ODEDYS	6	1, 2, 11, 12, 15, 16
TDD	7	1, 2, 3, 4, 5, 15, 16
TIMÉ-2	9	1, 2, 5, 7, 8, 11, 12, 15, 16
TNO	8	1, 2, 5, 7, 8, 11, 12, 15
TV-BP	4	1, 2, 12, 15
VL-Kh	5	1, 2, 12, 15, 16
WISC-IV	14	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 15, 16
WPPSI-III	12	1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 15, 16

*Synthèse des critères d'analyse :
Critère 1 : Objectifs du test clairement identifiés
Critère 2 : Définition du ou des construits mesurés par le test
Critère 3 : Information en ce qui a trait à la validité de contenu
Critère 4 : Information en ce qui a trait à la validité de construit
Critère 5 : Information en ce qui a trait à la validité concordante
Critère 6 : Information en ce qui a trait à la validité prédictive
Critère 7 : Information en ce qui a trait à la cohérence interne
Critère 8 : Information en ce qui a trait à la fidélité test-retest
Critère 9 : Information en ce qui a trait à la fidélité inter-juges
Critère 10 : Information en ce qui a trait à l'erreur standard de mesure (ESM)
Critère 11 : Information en ce qui a trait à l'échantillon de normalisation
Critère 12 : Information en ce qui a trait à la taille des échantillons
Critère 13 : Information en ce qui a trait aux effets planchers et plafonds
Critère 14 : Information en ce qui a trait à la manière dont sont représentés les enfants dans les extrêmes
Critère 15 : Information en ce qui a trait à la passation/administration du test
Critère 16 : Information sur l'année de publication et de standardisation de l'échantillon de normalisation

connaissances actuelles dans le domaine du développement de l'enfant et de ses troubles. Par exemple, les découvertes récentes dans les sciences neurologiques et cognitives ont modifié les façons de conceptualiser certains troubles neurologique du développement et par le fait même la manière de les évaluer.

Les résultats obtenus à la suite de la revue des qualités psychométriques de 31 des 110 tests répertoriés suggèrent que la majorité ne répond pas à plusieurs des critères définissant un bon test standardisé. Ainsi, plus de la moitié des outils ne parviennent pas à fournir les preuves empiriques de validité et de fidélité nécessaires pour diagnostiquer avec confiance de la présence ou non d'une déficience du langage ou des autres fonctions associées. On observe que les caractéristiques les plus souvent satisfaites sont celles qui exigent généralement le moins d'investissement financier et de temps, telles que les critères à propos des objectifs du test (critère 1), de la description de l'administration et des qualifications de l'examinateur (critère 15). À l'inverse, les critères les moins souvent remplis sont ceux qui exigent divers investissements – de connaissances psychométriques, de temps et d'argent – tels que les critères reliés aux démonstrations empiriques de validité (critères 3, 4, 5, et 6) et de fidélité (critères 7, 8, et 9). Ces résultats sont reliés principalement à la sévérité des critères qui ont été appliqués lors de l'analyse. Toutefois, même une diminution des exigences n'aurait sans doute pas modifié les résultats obtenus puisque la plupart des échecs observés dans les outils analysés est reliée à une absence de l'information plutôt qu'à une mauvaise performance des tests à un ou plusieurs critères.

Les résultats de la présente recherche sont alarmants puisque la majorité des professionnels œuvrant auprès des enfants font des tests standardisés, l'outil privilégié pour guider les diverses décisions cliniques qu'ils doivent prendre (voir Kerr, Guildford, & Kay-Raining Bird, 2003). Par exemple, ils doivent 1) identifier et diagnostiquer des troubles de langage, 2) établir des objectifs de traitement et finalement 3) mesurer les progrès en cours de traitement. Non seulement les tests standardisés ne sont pas conçus pour répondre efficacement à de tels motifs (spécialement les objectifs 2 et 3; voir McCauley & Swisher, 1984a, 1984b), mais ils deviennent encore moins efficaces lorsque la qualité psychométrique des outils ne peut être établie comme c'est le cas actuellement

avec de nombreux outils. En contexte francophone au Canada, grâce au travail de chercheurs, plusieurs professionnels de l'évaluation du langage sont déjà sensibilisés au fait que les normes d'outils standardisés en anglais ne sont pas directement transférables au français (Lefebvre & Trudeau, 2005; Garcia et al., 2006).

Les conséquences liées à la mauvaise utilisation de tests standardisés sont nombreuses. Non seulement elle compromet la rigueur du processus d'évaluation, la validité de son résultat mais également l'efficacité de l'intervention qui en découle. Le client peut se voir refuser des services dont il a besoin et auxquels il aurait droit ou se faire imposer des services dont il n'a pas besoin. Les coûts sociaux de cette réalité ne sont également pas à négliger. Ceux-ci sont difficiles à quantifier, mais ils sont néanmoins bien réels. Avec les mesures de coupure et de rationalisation toujours plus importantes dans les secteurs médicaux, scolaires et de réadaptation, des traitements et des objectifs thérapeutiques qui ne sont pas nécessaires représentent des pertes économiques énormes de temps, d'argent et de ressources puisque tant le clinicien que l'enfant se voient occupés à travailler sur des objectifs qui ne s'avèrent pas des besoins réels du patient.

Ainsi, rehausser la qualité des outils d'évaluation des troubles du langage accessibles aux professionnels qui oeuvrent auprès de la population pédiatrique canadienne francophone se doit de devenir une priorité puisque le niveau de qualité des services dispensés en dépend et que les conséquences qui découlent d'un tel écart entre la situation d'évaluation actuelle et celle souhaitée sont nombreuses. Malheureusement, les maisons d'édition de tests sont peu sensibles à cette réalité et peu intéressées à ce secteur d'activité entre autres parce que le marché français au Canada est restreint et les profits qui pourraient découler d'un tel investissement sont probablement trop modestes (Garcia & Desrochers, 1997). Par conséquent, les solutions aux problèmes de l'évaluation du langage en français doivent inévitablement passer par une volonté collective des professionnels du Canada d'améliorer la qualité des outils disponibles et d'optimiser leur accessibilité. Pour ce faire, nous croyons qu'il faut orienter nos actions dans trois directions.

Tout d'abord, tel que suggéré par McCauley et Swisher (1984a), il est impératif de continuer à sensibiliser les cliniciens aux conséquences et aux risques associés à une utilisation d'outils aux qualités psychométriques défaillantes. Il faut également s'assurer qu'ils possèdent une connaissance solide de la psychométrie théorique et appliquée, ce qui n'est pas le cas actuellement. En effet, dans un sondage effectué par Kerr et ses collègues (2003), auprès des orthophonistes et audiologistes membre de l'ACOA, seulement 17% des répondants ont affirmé se sentir pleinement confiants en ce qui a trait à leurs connaissances psychométriques et à leur capacité à évaluer la qualité des tests. Les auteurs rapportent également que le niveau de confiance exprimé n'était pas significativement lié à la capacité réelle des participants à identifier les problèmes

liés à l'utilisation de tests. La justesse de leur perception personnelle n'était donc que très peu valable. Nul doute qu'il y a place à de l'amélioration en ce qui concerne les connaissances liées à l'utilisation des tests psychométriques. Bien que les manuels accompagnants les outils d'évaluation fournissent des informations non négligeables, les livres, les articles ainsi que la possibilité de suivre des ateliers de formation sur l'évaluation des tests et l'interprétation qui en découle pourraient s'avérer des ressources intéressantes. Ces ressources devraient être facilement accessibles aux professionnels, idéalement durant leurs heures de travail. La structure de certains programmes de formation universitaire devrait également veiller à offrir aux étudiants la possibilité de s'initier aux principes et à la pratique liée à l'élaboration des outils d'évaluation.

Le développement des outils constitue la seconde direction d'action. Tout d'abord, il faudrait améliorer la communication entre les professionnels du Canada français de manière à éviter le dédoublement d'efforts menant actuellement au développement de plusieurs versions françaises des mêmes tests américains. Le travail effectué par le Groupe de recherche sur l'évaluation des troubles de la communication (GRETCOM) a certainement grandement contribué à une meilleure connaissance de l`état actuel des ressources en français au Canada (Paradis, Desrochers, & Garcia, 2002). Il faudrait également songer à établir des partenariats entre chercheurs qui œuvrent en milieu universitaire et cliniciens. Durant trop longtemps, ces derniers ont dû effectuer la double tâche d'évaluer et de produire des outils. Or, dans les contextes actuels, leurs responsabilités professionnelles, trop importantes et lourdes, les empêchent de faire évoluer aussi rapidement que nécessaire la situation de l'élaboration des outils d'évaluation en français. Finalement, avant d'entreprendre le long processus de traduction/adaptation d'un outil de mesure, il est impératif de se demander dans quelle mesure ce travail en vaut vraiment la peine. En effet, tel que le rappellent Garcia et ses coll. (2006) ainsi que George (1997), il ne faut jamais oublier que même si un outil est valide et justifié pour une population, il ne l'est pas nécessairement pour une autre. Il s'avère donc raisonnable de s'interroger non seulement sur la qualité psychométrique de l'outil d'intérêt mais également sur sa spécificité et sa pertinence culturelle pour une population d'intérêt. C'est pourquoi Sperber, Devellis, et Boehlecke (1994) proposent que les outils jugés pertinents pour diverses populations linguistiques soient développés de façon simultanée dans les deux langues au lieu de traduire à partir d'un outil déjà standardisé dans une des deux langues. En ce qui concerne le développement de nouveaux outils, il est primordial de s'assurer que ceux-ci répondent aux qualités psychométriques. Ils doivent présenter, entre autres, une bonne fidélité et une bonne validité et avoir un bon étalonnage des normes.

Finalement, la troisième et dernière suggestion touche la sensibilisation des gestionnaires et autres partenaires financiers à l'importance et à la nécessité d'investir

davantage dans des fonds destinés à la promotion et au développement d'outils adaptés au Canadien français. La plus grande conscientisation des professionnels demeurera vaine si elle ne se voit pas accompagnée de bourses ou de subventions leur permettant de créer les outils répondant plus adéquatement à leurs besoins.

Conclusion

La présente étude avait comme principal objectif de faire le point sur la situation de l'évaluation du langage et de la parole des enfants francophones du Canada en produisant d'abord un répertoire de 110 outils et en faisant une étude critique de 31 de ces outils. Les résultats obtenus démontrent qu'il existe plusieurs outils à la disposition des professionnels, bon nombre d'entre eux ayant été spécifiquement conçus pour les enfants francophones européens, mais très peu pour les enfants francophones nord-américains. Nos observations mettent également en lumière l'existence d'un écart considérable entre la qualité des outils d'évaluation actuels en français et celle souhaitée selon les standards psychométriques. Nous suggérons ainsi d'appuyer toute démarche susceptible de mener au développement et à l'adaptation d'outils d'évaluation en français. Lorsqu'il y aura une concertation et une collaboration entre plusieurs chercheurs et cliniciens et lorsque les organismes subventionnaires en feront une priorité, il sera alors possible d'espérer pouvoir développer des outils de qualité nécessaires et utiles à l'évaluation de la parole et du langage chez les enfants francophones du Canada.

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Annexe A. Critères d'analyse des outils d'évaluation suivant ceux recommandés par McCauley & Schwiser (1984) ainsi que Hutchison (1994).

Critère 1 : Objectifs du test clairement défini
Le manuel doit mentionner les objectifs du test de manière claire et simple.

Critère 2 : Définition du construit
Le manuel doit définir le construit, i.e. la définition conceptuelle, théorique ou opérationnelle de ce qui est mesuré dans le test, de manière à ce que les utilisateurs puissent comprendre la manière dont les tâches et items s'articulent autour du construit, les rendant ainsi prédictibles et logiques.

Critère 3 : Validité de contenu
Selon des experts du domaine, est-ce l'opérationnalisation du construit représente de manière suffisamment concrète la théorie ou le construit qui est avancé par le test? Est-ce tous les domaines sont présents et suffisamment représentés? Finalement, est-ce que les items représentent bien le domaine auquel ils appartiennent?

Critère 4 : Validité de construit
Le manuel doit inclure une analyse empirique de la validité de construit et déterminer de manière claire la manière utilisée pour l'obtenir (corrélation inter-test, analyse factorielle). Ces analyses devraient pouvoir s'expliquer en lien avec la théorie avancée par le test. Ce n'est donc pas uniquement la valeur du coefficient qu'il importe de regarder mais également son lien avec la définition du construit qu'il sous-tend.

Critère 5 : Validité concordante
Le manuel doit présenter la preuve d'une bonne validité concordante i.e. que le test corrèle bien avec d'autres mesures déjà validées pour mesurer le construit. La validité concordante permet de comparer le résultat du test avec ceux de tests normalisés.

Critère 6: Validité prédictive
Le manuel doit présenter la preuve que le test peut prédire positivement les futures performances d'un enfant dans un test déjà accepté comme mesurant le construit.

Critère 7 : Cohérence interne/homogénéité
Le manuel doit présenter une analyse empirique de la consistance interne et présenter de manière claire la manière utilisée pour l'obtenir (alpha de Cronbach, corrélation inter-items moyenne, corrélation item-total moyenne, « split-half »). La fidélité d'un instrument se détermine entre autres en évaluant dans quelle mesure les items censés mesurer un même construit mènent à des résultats similaires mais également dans quelle mesure ces résultats sont consistants.

Critère 8 : Fidélité test-retest
Selon le construit mesuré, il importe que l'outil soit en mesure de fournir des résultats relativement similaires entre les passations, ce qui assure que les résultats obtenus ne sont pas l'effet du hasard. Le manuel doit donc ainsi fournir des preuves empiriques d'un coefficient test-retest significatif (au moins .90 avec un alpha de 0.05 ou moins).

Critère 9 : Fidélité inter-juge
Les utilisateurs d'un outil espèrent généralement que les résultats obtenus par un examiné soit le reflet de sa performance et non de la perception de l'examinateur. Il importe donc que différents juges soient en mesure d'évaluer les performances de la même manière. Le manuel doit donc fournir des preuves empiriques d'un coefficient de fidélité inter-juge significatif (au moins .90 avec un alpha de 0.05 ou moins).

Critère 10 : Erreur standard de mesure (*Standard Error of Measurement*)
Puisque le résultat obtenu à un test s'avère un reflet imparfait de la réelle performance en raison d'une multitude de sources d'erreurs possible (p. ex, le fait que le test lui-même ne représente pas parfaitement le construit qu'il mesure; l'état de l'examiné le jour de l'évaluation qui ne reflète pas son état habituel, etc…), les auteurs devraient toujours rapporter une marge d'erreur pour chacun des scores de tests.

Critère 11 : Échantillon de standardisation
Il importe que le manuel présente une description précise de l'échantillon de standardisation, de manière à s'assurer que l'individu testé y est bien représenté. Trois informations s'avèrent nécessaires : (1) la localisation géographique/l'origine, (2) le statut socio-économique et finalement (3) la « normalité » des sujets et dans le cas contraire, les caractéristiques « spéciales » des sujets formant l'échantillon.

Critère 12 : Taille de l'échantillon de normalisation
La loi de la limite inférieure exige un minimum de 100 personnes dans chaque sous-groupe (p.ex. par tranche d'âge) pour l'échantillon d'un test normalisé.

Critère 13 : Présence d'effets planchers ou plafonds
Puisque les tests incluent généralement des items qui sont conformes avec l'âge, les niveaux scolaires et les niveaux de développement qu'ils tentent de couvrir, peu d'items permettent d'évaluer adéquatement les enfants situés dans les extrêmes. Il est ainsi possible de retrouver des effets planchers (les items, trop difficiles ne permettent pas de départager efficacement enfants qui se retrouvent dans la partie inférieure de la courbe) et des effets plafonds (les items, trop faciles, ne permettent pas départager les enfants qui ont des performances supérieures et qui se retrouvent dans la partie extrême de la courbe). Il s'avère dont important de rapporter de tels effets ou d'augmenter le nombre d'enfants représentés dans les extrêmes, afin d'assurer leur bonne représentation.

Critère 14 : Comment sont représentés les enfants dans les extrêmes
Puisqu'il y a généralement plus d'enfants dans le centre de la distribution, les extrêmes sont donc souvent moins bien représentés. Le manuel se doit d'expliquer la manière dont les concepteurs s'y sont pris pour représenter les enfants dans les extrêmes (« sur-échantillonnage » dans les extrêmes, extrapolation etc…). De telles techniques permettent ainsi une meilleure estimation des normes pour les extrêmes.

Critère 15 : Administration du test
Le manuel doit fournir suffisamment d'information sur la passation de manière à offrir à un examinateur les moyens de répliquer la procédure d'administration et de cotation originale, qui a été utilisée durant la standardisation.

Critère 16 : Année de publication et de standardisation de l'échantillon de normalisation
Puisque les populations ne constituent pas des entités perpétuellement stables dans le temps, les normes qui datent de plus de 5 ans s'avèrent inappropriées et désuètes pour la comparaison étant donné les changements dans les performances qui peuvent se produire durant cet intervalle de temps. Étant donné la difficulté de mettre à jour les normes dans un délai aussi court, les cliniciens sont appelés à se montrer prudent lorsque l'année de publication et d'adaptation des normes dépassent ce nombre d'années.

Hearing Aid Noise Reduction Algorithms and the Acquisition of Novel Speech Contrasts by Young Children

Algorithmes de réduction du bruit dans les appareils auditifs et acquisition de contrastes nouveaux de la parole chez les jeunes enfants

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Abstract

A previous study by the authors concluded that digital noise reduction (DNR) does not have an influence on the acquisition of a second language in adults. On the basis of results from adult subjects, it was inferred that DNR is not likely to influence language acquisition in pre-verbal infants. The present study serves as an update to determine whether the tasks being modeled could be conducted with younger participants of 4- and 5-years of age, and whether similar results would be found. Two groups of normal-hearing, monolingual English-speaking children were presented with noise-embedded Hindi speech contrasts that were difficult to discriminate. One group listened to both speech items and noise processed with DNR while the other group listened to unprocessed speech in noise. To ensure task appropriateness, these results were also compared to measures from a third group composed of Hindi-speaking children of the same age. Results indicated that Hindi-speaking children performed better than English-speaking children, confirming age-appropriateness of the cross-language task, but that DNR did not enhance nor impair the acquisition of novel speech contrasts by young listeners.

Abrégé

Une étude précédente des mêmes auteurs a mené à la conclusion que la réduction du bruit numérique n'a pas d'influence sur l'acquisition d'une langue seconde chez les adultes. À partir de résultats obtenus auprès de sujets adultes, on a postulé que la réduction du bruit numérique n'était pas susceptible d'influencer l'acquisition d'une langue chez les jeunes enfants à l'étape préverbale. La présente étude se veut un suivi pour déterminer si les tâches démontrées pourraient servir avec de jeunes participants de 4 et 5 ans et si l'on arriverait à des résultats semblables. Dans le bruit, on a présenté à deux groupes d'enfants monolingues anglophones ayant une acuité auditive normale des sons opposés en hindi difficiles à distinguer. Un groupe a écouté les deux sons et le bruit transformés avec la réduction du bruit numérique, tandis que l'autre groupe a entendu les sons sans transformation. Pour assurer la pertinence de la tâche, on a aussi comparé les résultats à des mesures d'un troisième groupe d'enfants parlant le hindi et ayant le même âge. Les résultats montrent que les enfants parlant le hindi ont mieux réussi que les enfants anglophones, ce qui confirme la pertinence de la tâche inter-linguistique pour l'âge, mais la réduction du bruit numérique n'a pas amélioré ni freiné l'acquisition de contrastes de sons nouveaux chez les jeunes.

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A recently published report (Marcoux, Yathiraj, Cote, & Logan, 2006) documents that tasks focusing on language acquisition cannot be enhanced with one version of digital noise reduction (DNR), a processing algorithm commonly found in digital hearing aids and said to increase hearing comfort in situations of competing noise. As proposed by Marcoux et al. (2006), DNR attempts to provide less amplification for noise than for speech, thereby increasing the signal-to-noise ratio (SNR) of the amplified output in hopes of facilitating speech recognition. More specifically, there are four general processes involved in providing this type of output: (a) a prediction is made based on assumptions about the properties of speech and noise envelopes and whether speech and/or noise is represented at the output of each of the hearing aid's frequency-specific bands or channels, (b) a calculation that predicts the SNR based on the classification of inputs is made, (c) an attempt to improve the overall SNR by decreasing gain in channels with low SNRs while maintaining or increasing gain channels with higher SNRs is made, and (d) a calculation to maintain audibility of speech to the utmost level possible without compromising the overall SNR is made. (For a review of digital noise reduction, see Chung, 2004).

In the Marcoux et al. (2006) study, adult listeners were used despite the fact that the possible influence of DNR on speech and language development is more pertinent in the pediatric population. As seen in the pediatric amplification protocol of the American Academy of Audiology (2003), there is much hesitancy to provide DNR to infants amidst audibility-driven approaches (Seewald, Moodie, Scollie, & Bagatto, 2005; Stelmachowicz, Pittman, Hoover, Lewis, & Moeller, 2004). Nonetheless, the authors were able to state a case for studying language development in adult listeners as proxy to preverbal children. First, certain aspects of second language learning in adults can be inferred to primary language learning in children (for a review on cross language speech research, see Strange, 1995). For example, the Hindi retroflex contrasts, ɖ (voiced) and ʈ (unvoiced), are not represented in the English or French languages in Canada and as such would need to be identified and learned in a manner similar to that seen during infant language acquisition prior to being discriminated from the native voiced dental counterparts, d̪ (voiced) and t̪ (unvoiced). Secondly, data can be collected in an adult population at a more rapid rate and with fewer retention pressures to the research schedule.

Results obtained from Marcoux et al. (2006) concurred with observations from several other studies which saw that DNR will not improve the SNR and the resulting speech intelligibility in situations where noise is found overlapping with most of the frequency spectrum of speech (Alcantara, Moore, Künnel, & Launer, 2003; Boymans & Dreschler, 2000; Ricketts & Hornsby, 2005). Furthermore, because of the cross language test paradigm used in Marcoux et al. (2006), the authors were able to provide evidence that DNR did not influence the discrimination of novel (i.e., Hindi) phonemes in an adult population. The authors inferred that DNR would not influence, either positively or negatively, overall phoneme discrimination and language development in children or listening in noise and that the provision of DNR for pediatric hearing aid fittings would not have a significant influence on language outcome.

The purpose of the present study was to determine whether the task could be applied to younger individuals who do not possess the same cognitive biases as the adult groups from Marcoux et al. (2006) and who are more active in their language development. It has been shown in several reports that infants below the age of 1 year are an ecologically valid population for studying phonemic specialization where, as a result of increasing language experience, infants' discrimination is optimized for phonemes specific to the native language and reduced for contrasts that are not. As such, developmental changes occurring during the first year of life result in increased discrimination skills and subsequent language specificity (Werker & Tees, 1984). However, it has also been shown that children of 4 years of age may still be active in learning some of the late-acquired phonemes of their native language (Sundara, Polka, & Genesee, 2006). Hence these children may still be actively honing their discrimination of phonetic information contained in their native language. More practically, it is commonly accepted that children of this age can participate in discrimination tasks of low-context speech items without controlled reinforcement protocols. As such, it can be expected that the groups of children participating in this study could closely represent the function of preverbal children discriminating speech items from their native language without the methodological difficulties associated with testing infants. An inference from these results could inform the effect of DNR during the language development phase of preverbal children. The purpose of the study was (a) to determine whether the cross language task used in Marcoux et al. (2006) could be useful in younger listeners and (b) to assess whether DNR influences language acquisition of a second language independently of the age of the verbal listener.

A subset of the stimuli used in the Marcoux et al. (2006) study were selected for this experiment and were played to normal-hearing children. As with the previous study, the authors acknowledge that a common pitfall of several DNR studies is the recruitment of patients with hearing loss who have a history of hearing aid use. While participants with hearing loss constitute an ecologically valid population, it is difficult to control for the varying degree of hearing loss and hearing aid history (type of previous hearing aids, hearing aid features and settings, and duration of use). This may influence speech intelligibility scores, thereby confounding estimates of DNR-related effects. As well, the cochlea of a normal-hearing individual does not put into play the distortions caused by recruitment and the resulting poor frequency selectivity (Moore, 1996). It is difficult to quantify these distortions to enable the formation of a homogenous group of individuals with hearing loss without processes such as frequency selectivity and auditory sensitivity being measured and paired. To

avoid the logistical complexities of forming such a group of children, the use of a normal-hearing population is a good first step towards understanding the effects of algorithms, such as DNR, on speech and language development.

Methods

Subjects

Nineteen monolingual English-speaking, normal-hearing children between 4.1 and 5.2 years of age, as well as 10 native Hindi normal-hearing children between 4 and 7 years of age, were selected to participate in this experiment. The English-speaking children were randomly assigned to two groups with a similar number of females and males to each group. The control group ($N = 10$; 6 females and 4 males, $M = 4.6$ years) listened to Hindi speech contrasts in noise that had not been processed through DNR. The experimental group ($N = 9$; 5 females and 4 males, $M = 4.7$ years) listened to Hindi speech contrasts in noise that had been processed by DNR. Inclusion factors were the following: (a) little proficiency in the spoken form of a language other than English; (b) no history of speech, language, or hearing disorders; and (c) normal distortion product otoacoustic emissions following a stimulation intensity of 65 dB SPL for frequencies from 1000 Hz to 4000 Hz or audiometric thresholds of less than 20 dB HL for 250 Hz up to 4000 Hz.

The group of Hindi speakers ($M = 5$ years) was selected to ensure that the stimuli were intelligible to native Hindi listeners. Inclusion criteria were identical to those stated above, except that these individuals were monolingual Hindi speakers. As such, these listeners would also provide a gauge as to whether the task was feasible for the groups of Anglophone children and whether DNR influenced speech perception in noise for native listeners. Informed consent was obtained from the parents of all participants and verbal assent was obtained from the children themselves. There were no dropouts resulting from children who were unable to complete the required task.

Stimuli

All stimuli in this experiment were chosen from the existing collection of 90 minimal pair stimuli used in the Marcoux et al. (2006) study. To create this initial set of 90 minimal pairs, a female native Hindi speaker spoke 60 natural speech items containing dental or retroflex stop consonants which differed in voicing: retroflex, ḍ (voiced) and ṭ (unvoiced), and dental, ḏ (voiced) and ṯ (unvoiced). These stop consonants were utilized to create vowel–consonant (VC) and vowel–consonant–vowel (VCV) syllables. All syllables were recorded in digital format with the Creative Wave Studio software (Stirling, Cavill, & Wilkinson, 2000) using 16-bit resolution and a 16 kHz sampling rate and then normalized to equal loudness by means of equating the root mean square of these items.

The intelligibility of all items was assessed in Marcoux et al. (2006). They were played back and assessed by 10 native Hindi adult speakers to assess their intelligibility.

An identification task was used in which listeners typed what they heard using word processing software. The criteria for including a word in the experiment was that it had no more than a 10% error rate across subjects and that no errors were due to the phonemes constituting the minimal pair (i.e., dental or retroflex stops).

For the present experiment, nine pairs of stimuli containing Hindi voiced retroflex or dental consonants (/ḍ/ and /ḏ/, respectively) were chosen from the original 90 pairs selected for the Marcoux et al. (2006) study; these were chosen for different reasons. The stimuli used had phonemic structures corresponding to VCV syllables only and were chosen based on the fact that stop consonants were embedded in VCV combinations, which generally offer transition cues from the neighbouring vowels and render them easier to discriminate. This was supported by the fact that these VCV minimal pairs were some of the most discriminable items from Marcoux et al. (2006). Therefore, these items were selected with the realization that frequency discrimination in children is not as well-defined as in adults (Maxon & Hochberg, 1982). As such, the list for the present study consisted of three pairs of identical voiced dental stops (əḏə–əḏə, eḏe–eḏe, iḏi–iḏi), three pairs of identical voiced retroflex stops (əḍə – əḍə, eḍe–eḍe, iḍi–iḍi), and two pairs of dental–retroflex stop contrasts (əḏə – əḍə, eḏe–eḍe).

An unmodulated International Collegium of Rehabilitative Audiology (ICRA) noise (Dreschler, Verschuure, Ludvigsen, & Westerman, 2001) was integrated into the speech pairs to create an SNR of 0 dB and was gated from 500 ms preceding to 500 ms following the speech pair presentation. The pairs were separated by a 500 ms pause prior to ICRA noise insertion so that subjects could hear noise before, during, and after stimulus presentation. Noise was mixed to produce an SNR of 0 and +5 for all stimulus pairs to create the unprocessed version of the stimulus pairs that were to be played to the control group.

To create the stimulus pairs in the processed condition, which were to be played to the experimental group, stimulus pairs were electrically input into the master program of the Widex Senso Diva hearing aid with active DNR along with 30 seconds of pre-noise (also ICRA) in order to activate the DNR to the maximum effect. The electrical input had an identical RMS value to the level generated by a 65 dB SPL sound through a microphone. The master program was programmed to provide a transparent input/output function and set to omnidirectional mode to ensure that processing functions, other than the DNR algorithm, were inactive. The Senso Diva's DNR analyzes spectral–intensity–temporal patterns of the incoming signal across 15 independent processing channels (Kuk, Ludvigsen, & Paludan-Müller, 2002). Adaptive frequency-weighting in the DNR is based on the Speech Interference Index (American National Standards Institute, 1997), which averages speech-to-noise ratios in a set of frequency bands that approximate the critical bands of hearing. Each channel's SNR and the overall incoming SNR, in

conjunction with the adaptive frequency-weighting function, dictates the amount of gain reduction. The Widex Senso Diva starts gain reduction in a frequency channel only when input levels exceed 50 to 60 dB SPL. This allows for preservation of the signal audibility at low levels and reduces upward spread of masking and distortion at high output levels. When the threshold input for DNR activation has been reached, channels with poor SNR will generally have more gain reduction than channels with high SNR.

Once the processed stimuli were created, the 30 seconds of pre-noise was removed and replaced with 500 ms of noise preceding and following the stimulus pairs so that noise was heard before, during, and after presentation of each pair, to match the duration of the unprocessed versions.

As noted in Marcoux et al. (2006), an electroacoustic analysis of processed speech stimuli revealed that the level of speech was, on average, 5.5 dB lower than that measured for identical items in unprocessed versions. Furthermore, the level of the ICRA noise occurring along with processed speech items was, on average, 6.5 dB lower than that measured for identical occurrences in unprocessed versions. From this simplistic calculation, it was concluded that the DNR used for this study improved the SNR by 1 dB on average.

Procedure

The experiment consisted of training listeners to discriminate the dental from the retroflex voiced Hindi consonants in competing noise. A training session was administered immediately before each of the testing sessions to ensure that the children understood the task. All children recruited for the experiment were able to understand the training task and perform adequately. The procedure of the training session mimicked the formal testing sessions with the exception of the VCV syllables. Those used during training consisted of six different pairs of speech stimuli: four pairs of identical stimuli and two pairs of differing stimuli. The training session was also used to familiarize the children with the response modalities and expected response time so that the formal testing sessions, described below, could be kept to a maximum of 20 minutes, after which children of the selected age range can become distracted and uninterested. Seldom did children become distracted or unfocussed during the testing session. Only in a few instances did the experimenter need to pause the procedure. In such cases, the children were permitted to take a short break and could easily be brought back to the task when reassured that the session would soon be completed. Responses were not recorded during the training session.

Subjects were seated in a quiet room and were positioned in front of a laptop computer during the listening session. Microsoft Visual Studio 2003 was used to present stimuli as well as record subjects' responses. A response box specifically designed for this experiment was constructed and equipped with two arcade-style buttons of differing colours. This box was connected to the laptop and was utilized by the subjects during the discrimination task. Stimuli were presented at 65 dB SPL output through Sony MDR-V600 headphones. Measurement of output was performed using a Brüel and Kjaer 2235 sound level meter coupled to a Brüel and Kjaer 4132 microphone and a Brüel and Kjaer 4153 artificial ear.

Subjects' performance was tested on a two-alternative identification task. The software setup was such that a picture of a human ear was presented when the stimuli were playing. Subjects were instructed to select the button on the response box which corresponded to "same" or "different" if both speech syllables were perceived as identical or if the pair was not perceived to be exactly the same. No time limit was enforced for a response after the presentation of the stimuli, which created a variable inter-trial interval. When the subject answered correctly, a short video (3–8 seconds in length) was displayed on the screen. This served as visual and auditory reinforcement for a correct response. When the subject's answer was incorrect, the participant was audibly instructed to try again and a blank screen appeared on the laptop. This was done in order to limit reinforcement and encourage future correct selections.

Following the participant's response, it was necessary for the examiner to press a "next" button in order for the next stimulus pair to be presented. This allowed for potential commentary from the subjects who were enthusiastic young children. No feedback was given by the examiner post-response. Prior to the next stimulus presentation, the child was asked "Are you ready?" in order to refocus the child to the task.

Once the data collection was ready to begin, stimuli sets were randomly presented, first at 0 dB SNR and then a second time at +5 dB SNR. Signal-to-noise ratios were presented in ascending order in order to determine the onset of speech discrimination within the competing noise floor. The formal testing session lasted approximately 20 minutes.

Results

Percentage correct and incorrect scores were calculated for each testing session. Just as with the Marcoux et al. (2006) study, the nonparametric A′ statistic was used to control for the influence of response bias during the calculation of signal detection indices, such as the more commonly known d′, which compares the proportion of hits to the proportion of false alarms relative to correct rejection non-similar items (Grier, 1971). A′ ranges from 0.5, which indicates that signals (i.e. speech items within item pairs) cannot be distinguished from each other and performance is at chance, to 1, which indicates perfect performance. Values less than 0.5 may arise from task confusion, systematic errors, or sampling errors (Pollack & Norman, 1964).

Analyses for Hindi and English-speaking participants were done separately as Hindi participants rated both processed and unprocessed stimuli whereas Anglophone participants rated either processed or unprocessed stimuli depending on whether they were assigned to the

experimental or control group, respectively. For the Hindi group, a two-way repeated measures ANOVA was conducted to determine the effect of processing (unprocessed vs. DNR-processed) and SNR on the A' measures. For the English-speaking groups, a two-way repeated measures mixed ANOVA was conducted to determine how A' measures were influenced by processing (unprocessed vs. DNR-processed) and SNR. Lastly, two separate two-tailed t-tests were conducted to determine whether the native language (Hindi vs. English) had an influence on the A' measures for both the processed and unprocessed conditions. Degrees of freedom of the repeated measured analysis were adjusted for sphericity violations using the Huynh-Feldt epsilon adjustment. Degrees of freedom were also adjusted using the Levene's test for equality of variances for t-tests. Significance was confirmed at the 0.05 level for all analyses.

A' scores from Hindi participants were not influenced by processing [$F(1, 9) = 0.47$, ns], nor were they influenced by SNR [$F(1, 9) = 1.67$, ns]. Similarly, processing did not have a significant influence on A' scores [$F(1, 17) = 0.05$, ns] for English-speaking participants. Furthermore, the SNR did not influence measures [$F(1, 17) = 3.97$, ns]. Performance across various conditions is illustrated in Figure 1.

Since SNR did not have a significant effect on A' scores, the means for each processing condition were computed with collapsed scores for both the 0 and 5 dB SNR conditions. Between-group analyses for the processed condition indicated a significant difference [$t(17) = 3.59$, $p < .05$] between Hindi and English speakers where Hindi children obtained higher values ($M = .68$, $SE = 0.06$) than English-speaking children ($M = .36$, $SE = 0.07$) when discriminating processed stimuli. Furthermore, a significant group difference was noted for the unprocessed condition [$t(18) = 2.24$, $p < .05$], where Hindi children again obtained higher values ($M = .65$, $SE = 0.07$) than English-speaking children ($M = .43$, $SE = 0.07$). The group means are shown in Figure 2.

Discussion

The results obtained in the present study are in agreement with those obtained from research focusing on the influence of DNR on speech intelligibility in the adult population (Alcantara et al., 2003; Boymans, Dreschler, Schoneveld, & Verschuure, 1999; Boymans & Dreschler, 2000; Marcoux et al., 2006). As such, both young Hindi and English-speaking children did not benefit from DNR to improve discrimination of Hindi speech contrasts in noise. This result is evident in light of the inherent difficulties of modulation-based DNR algorithms in separating speech and noise inputs of similar frequency spectra (Alcantara et al., 2003; Boymans et al., 1999; Boymans & Dreschler, 2000).
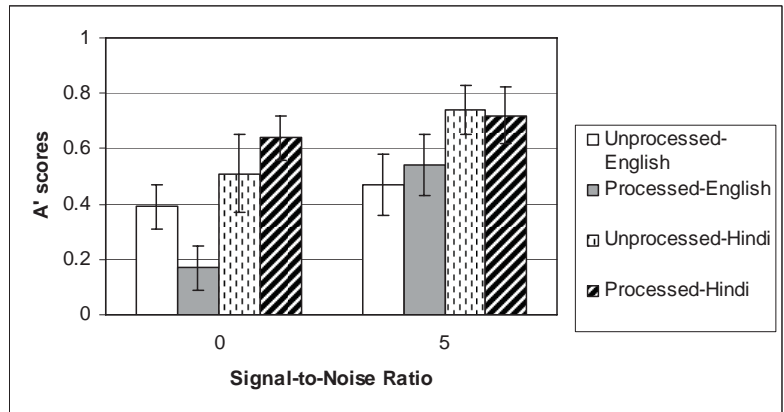

Figure 1. A-prime scores for unprocessed and processed items from English-speaking and Hindi groups for Signal-to-Noise Ratios of 0 and +5.
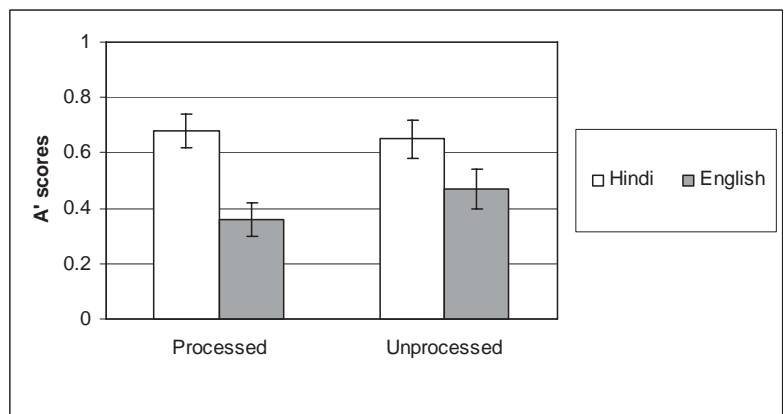

Figure 2. A-prime scores of Hindi-speaking and English-speaking groups for DNR-processed and unprocessed stimuli.

While previous studies on DNR have focused on the inability of DNR to enhance speech discrimination in noise, results from the present study highlight the inability of DNR to also diminish the negative impact on speech discrimination and processes associated with language acquisition. The results from these proxy studies suggest that DNR would not have a significant influence on the acquisition of the maternal/native language of pre-verbal children who are fitted with such technology for hearing impairment.

While this type of study should be adapted to pre-verbal children in future research, it is appropriate to suggest that the DNR algorithm used in this study would not influence language acquisition processes in noisy situations in this population. If findings such as these were also noted with other DNR systems, it may be worthwhile to revisit the strict recommendations from current pediatric hearing aid fitting protocols which do not recommend the use of DNR in light of a lack of evidence (American Academy of Audiology, 2003). Findings have yet to be provided to demonstrate that DNR negatively impacts language acquisition overall. However, considering the various types of DNR available on the market, results from the present study should not be generalized beyond the experimental

conditions documented herein. Further cross language paradigms should be explored with DNR modalities found in other instruments (Bentler & Chiou, 2006). Ultimately, this type of study should be conducted in hearing-impaired children with consideration of variables such as DNR type and SNR, to provide sufficient evidence that an intermittent and dosed feature, such as DNR, could not impact processes as complex as those involved in language acquisition. While the use of a hearing-impaired population will add confounds of aetiology, level, and configuration of loss to the study design, it should also provide a more ecologically founded observation on the benefits, or lack thereof, from DNR.

The authors were able to demonstrate that the use of cross-language paradigms is useful in demonstrating acquisition aspects of a second language in participants of early school age (i.e., ages 4 to 6 years). By using an appropriate conditioned response technique, significant differences in performance between Hindi and English-speaking participants were found. It was demonstrated that Hindi children were able to discriminate between speech contrasts of their native language despite the attention necessary to participate in the visual reinforcement task. The relative difficulty of English-speaking children to discriminate these speech contrasts is unlikely to be related to the level of difficulty of the task, but to be related to a difficulty in discriminating non-native contrasts. It can be seen that cross-language research may be useful to observe the influence of several speech processing parameters, such as DNR, in participants of a wide range of ages.

Conclusions and Summary

The present study offers an update to the novel approach of studying the influence of DNR on aspects of language acquisition described in a previous publication by the authors. In this study using a group of young children, it was demonstrated that one type of DNR does not provide improvements in speech intelligibility in noisy environments, regardless of the age of the individual who has already acquired language abilities. Furthermore, it was shown that the novel cross-language paradigm used to determine these findings could be effectively applied to a younger population.

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■ Clinical Report: Evaluating the Efficacy of a Group Audiologic Rehabilitation Program for Adults with Hearing Loss Using a Goal Attainment Scaling Approach

■ Compte rendu clinique : Se servir d'une approche d'évaluation de l'atteinte des objectifs pour évaluer l'efficacité d'un programme de groupe de réadaptation audiologique pour adultes ayant une perte auditive

Mary Beth Jennings

Abstract

This clinical report describes the application and outcomes of Goal Attainment Scaling (GAS) within a 6-session, group-based audiologic rehabilitation (AR) program for older adults with acquired hearing loss. GAS is a technique that provides a framework for organizing the rehabilitation process by involving all parties (client, clinician, significant others) in setting goals that address the specific difficulties experienced by the client. It provides a means of quantitative and qualitative documentation of rehabilitation outcomes.

Forty-six adults between the ages of 62 and 93 years with hearing loss and hearing aids participated in the program. The 6-session AR program included information, discussion, and training in the use of assistive technologies and communication strategies. GAS goals were set individually prior to group participation and outcomes were monitored within 2 weeks and at 6 months following the completion of the AR program.

AR group participants made gains in goal attainment following AR program participation when compared to pre-program functioning levels and continued to make gains at 6 months post-program. The application of GAS as a framework and a measure of change for current models of AR is discussed. Further research to investigate the efficacy of GAS within group-based AR programs is warranted.

Abrégé

Le présent rapport clinique décrit la mise en œuvre et les résultats d'une approche d'évaluation de l'atteinte des objectifs [Goal Attainment Scaling – GAS] utilisée durant un programme de réadaptation audiologique de groupe en six séances pour des aînés ayant une perte auditive acquise. La GAS fournit un cadre pour organiser le processus de réadaptation en impliquant toutes les parties (client, clinicien, proches) à l'établissement d'objectifs liés à des difficultés précises vécues par le client. Elle fournit un moyen de consigner par écrit les résultats quantitatifs et qualitatifs de la réadaptation.

Quarante-six adultes entre 62 et 93 ans ayant une perte auditive et un appareil auditif ont pris part à ce programme. Le programme de réadaptation de six séances comprenait de l'information, des discussions et de la formation entourant l'utilisation de technologies d'aide de suppléance et de stratégies de communication. On a fixé les buts de la GAS individuellement avant la participation en groupe et on a suivi les progrès durant deux semaines et 6 mois après la fin du programme.

Les participants au groupe de réadaptation audiologique ont fait des progrès vers l'atteinte de leurs objectifs après leur participation au programme quand on compare avec leur niveau de fonctionnement antérieur, et ils ont continué à faire des progrès six mois après le programme. On discute de l'utilisation de la GAS comme cadre et comme mesure de changement pour les modèles actuels de réadaptation audiologique. Il est justifié de poursuivre la recherche sur l'efficacité de la GAS au sein des programmes de groupe de réadaptation audiologique.

Key words: Goal Attainment Scaling (GAS), Audiologic Rehabilitation (AR), older adults, acquired hearing loss

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The purpose of this study was to explore the application of Goal Attainment Scaling (GAS) to adult audiologic rehabilitation.

Hearing loss is highly prevalent internationally, and the number of people with hearing loss is expected to rise, primarily because of the growing global population and longer life expectancies (World Health Organization, 2005). The National Advisory Council on Aging (1997) reports that hearing loss affects an estimated 4 out of every 100 Canadians. It is also one of the most commonly reported chronic disabilities for older adults, affecting approximately 30% of Canadians over the age of 65 and 40–50% of those over the age of 75 (National Council on the Aging, 1999; Public Health Agency of Canada, 2006; Statistics Canada, 1992). In a 2001 survey, The Canadian Hearing Society (2002) found that the average age of persons who experience hearing loss is 51. The fastest growing age group in Canada is persons over the age of 65. Trends in the population growth indicate that in the near future, the elderly will comprise a larger proportion of the Canadian population, with numbers expected to grow to an estimated 6.9 million by the year 2021 (Canadian Council on Social Development for the Division of Aging and Seniors, 1998). The prevalence of hearing loss internationally will grow as the population of elders grows.

"Audiologic/ aural rehabilitation (AR) is an ecological, interactive process that facilitates one's ability to minimize or prevent the limitations and restrictions that auditory dysfunctions can impose on well-being and communication, including interpersonal, psychological, educational, and vocational functioning" (American Speech-Language-Hearing Association, 2001). AR services are provided to adults with hearing loss on an individual basis, in a group setting, or both and often include significant others (Preminger, 2003). AR services follow the initial auditory diagnostic tests performed by an audiologist (Schow & Nerbonne, 2007). Unfortunately, AR services are often not available to older adults with hearing loss. The majority of the services provided by audiologists end after the hearing aid fitting. Typical components of AR services are the provision of technological devices beyond hearing aids, speech perception training, and communication management training. Communication management training includes communication strategies, conversational fluency, assertiveness training, stress management, information, and personal adjustment counseling (Gagné & Jennings, 2008). Currently, there has been a renewed interest in the provision of auditory training to adults with hearing loss (Sweetow & Palmer, 2005).

Contemporary models of AR view it as a process that takes place and evolves over the lifetime of the person with hearing loss. Awareness of hearing difficulties, specific difficulties encountered, and communication demands and needs, all change as a function of time (Garstecki & Erler, 1995; Hétu, 1996; Hyde & Riko, 1994; Kyle, Jones, & Wood, 1985). Although there are common situations in which persons with acquired hearing loss have difficulty (for example, in noisy settings), each individual will have his or her own unique set of situation-specific difficulties related to the types of activities engaged in on a day-to-day basis. As a result, AR must be specific to the issues experienced by the individual in a time-sensitive manner, and the methods used to assess the outcomes of AR must be client-specific (Gagné & Jennings, 2008). The effectiveness of adult group AR programs has been a focus of research for many years. Typically, the outcome measures that are used include hearing handicap scales, diaries, and other questionnaires such as those focusing on quality of life (e.g., Abrams, Chisolm, & McArdle, 2002; Andersson, Melin, Scott, & Lindberg, 1995a, 1995b; Beynon, Thornton, & Poole, 1997; Brickley, Cleaver, & Bailey, 1996; Chisolm, Abrams, & McArdle, 2004; Hallberg & Barrenäs, 1994; Kricos & Holmes, 1996; Norman, George, Downie, & Milligan, 1995). A systematic review of the evidence for the effectiveness of these programs (Hawkins, 2005) concluded that adult group AR participation resulted in short-term decreases in self-perceived hearing handicap and benefits in the use of hearing aids and communication strategies. However, there is limited evidence that these programs provide better benefit than hearing aid provision alone over time.

Goal Attainment Scaling (Kiresuk & Sherman, 1968; Kiresuk, Smith, & Cardillo, 1994) is a technique used with a variety of populations and in a variety of settings. It was originally designed for use in the evaluation of mental health programs and has been used successfully in pediatric therapy programs (Cusick, McIntyre, Novak, Lannin, & Lowe, 2006; King, McDougall, Palisano, Gritzan, & Tucker, 1999; Mailloux et al., 2007; Novak, Cusick, & Lowe, 2007; Sakzewski, Boyd, & Ziviani, 2007; Steenbeek, Ketalaar, Galama, & Gorter, 2007), inpatient rehabilitation and health promotion programs for persons with multiple sclerosis (Becker, Stuifbergen, Rogers, & Timmerman, 2000; Khan, Pallant, & Turner-Stokes, 2008), health promotion programs for independently living elderly adults (Kloseck, 2007), and elderly adults in long-term care facilities (Bravo, Dubois, & Roy, 2005; Gordon, Powell, & Rockwood, 1999; Rockwood, 1995; Stolee, Stadnyk, Myers, & Rockwood, 1999). Goal Attainment Scaling has also been used as an outcome measure for rural health services (Cox & Amsters, 2002; Rockwood et al., 2003), programs to manage chronic pain (Fisher, 2008), and cognitive rehabilitation programs (Rockwood, Joyce, & Stolee, 1997), as well as to assess outcomes in drug trials with Alzheimer's patients (Rockwood, Fay, Gorman, Carver, & Graham, 2007; Rockwood, Fay, Song, MacKnight, & Gorman, 2006). GAS can provide a framework for organizing the rehabilitation process by involving all relevant parties (client, clinician, significant others) in setting goals specific to difficulties as they are encountered. It also provides a means of quantitative and qualitative documentation of rehabilitation outcomes.

In a critical review, Schlosser (2004) pointed out that GAS is rarely used in the field of communication disorders and encouraged its use. Dillon et al. (1991a, 1991b) used GAS to assess specific hearing difficulties at initial

intake with adults who were undergoing hearing testing and hearing aid prescription and fitting. Participants were asked to state their communication needs and to rate their level of functioning at intake, at a final appointment, and again at a 3-month follow-up appointment. Results indicated that most participants made improvements at the final appointment and that these improvements were maintained at follow-up. The potential for the application of goal setting to AR has been described but not studied systematically (McKenna, 1987; Roberts & Bryant, 1992). There is currently no published research that uses GAS in the AR of older adults.

GAS provides a framework for organizing the rehabilitation process for all stakeholders by setting clear rehabilitation goals and defining incremental steps to reach the goals. The framework states clearly who will do what, under what conditions, and to what degree of success. Goals set must be relevant, understandable, measurable, behavioural, and attainable within a specific time frame (McDougall & King, 1999). GAS allows clients and clinicians to collaboratively set individual goals and levels of attainment.

GAS also evaluates change over time (Ottenbacher & Cusick, 1993). The GAS procedure involves specifying a range of levels of attainment, which can be quantified using rating scales. Cardillo and Smith (1994) recommend an ordinal rating scale with five levels ranging from -2 to +2. Baseline performance on a goal becomes a *much less than expected outcome* with a score of -2. A *less than expected outcome* on a goal has a score of -1. The *expected outcome after intervention* on a goal has a score of 0. A *greater than expected outcome* on a goal has a score of +1. A *much greater than expected outcome* on a goal has a score of +2. These levels are presented in Table 1. The intervals between each of the levels of attainment must be perceptually equal. The amount of change between levels must be clinically relevant and specify an observable behaviour (McDougall & King, 1999).

A client's needs and available resources, including time, will influence the number of goals set with a client (McDougall & King, 1999). Each goal selected can be given a relative weight based on prioritizing or ranking of goals

Table 1

Goal Attainment Scaling Containing 5 Levels of Attainment

Goal score	Level of attainment
-2	Baseline performance/much-less than expected outcome after intervention
-1	Less than expected outcome after intervention
0	Expected outcome after intervention
+1	Greater than expected outcome after intervention
+2	Much greater than expected outcome after intervention

(Ottenbacher & Cusick, 1993). However, Cardillo and Smith (1994) strongly advise against differential weighting of GAS goals. A summary score (the average of the GAS final attainment scores) that provides information on the overall goal attainment of the individual can be calculated. If goals are not weighted, a summary score can be converted to an aggregate *T*-score using either a formula or a conversion table developed by Kiresuk and Sherman (1968). The formula for computing the *T*-score assumes a relatively low correlation among goals of .30 and yields a standard deviation of 10 units. Aggregate *T*-scores can be used to compare individuals to others and to compare GAS results to other standardized outcome measures.

Concerns have been raised about GAS related to goal setting, grading, and outcome assessment (Becker et al., 2000; Cytrynbaum, Ginath, Birdwell, & Brandt, 1979; Gordon et al., 1999; Grenville & Lyne, 1995; MacKay, Somerville, & Lundie, 1996; McDougall & King, 1999; Ottenbacher & Cusick, 1993). Those who employ GAS need to understand and to take into consideration the strengths and weaknesses of the procedure. Weaknesses include potential concerns related to reliability (ability of goal setters' judgment to set GAS levels) and validity (GAS has been criticized as being a way for goal setters to set easy, clinically irrelevant goals). In spite of these weaknesses, there is much support for the clinical utility of GAS and its use for assessing performance on personal goals over time (Donnelly & Carswell, 2002; Forbes, 1998; Hurn, Kneebone, & Cropley, 2006; King et al., 1999; Ottenbacher & Cusik, 1993; Stolee, Zaza, Pedlar, & Myers, 1999). In addition, there are ways to improve reliability and validity that include involving experienced goals setters, ensuring goals are well written, using raters who have no personal investment in the outcome score, and supplementing GAS with standardized measures to provide a comprehensive assessment of outcome (McDougall & King, 1999). The development and use of a list of goals that are common to a specific population has also been suggested in an attempt to deal with measurement issues and health care provider time pressures (Tennant, 2007; Yip et al., 1998). The strengths of GAS include the cooperative setting of goals, its ability to evaluate individualized longitudinal change, and its role in the qualitative analysis of services (Gordon et al., 1999; Grenville & Lyne, 1995; MacKay et al., 1996; Malec, 1999; Ottenbacher & Cusick, 1993; Rockwood, 1995; Sheldon & Elliot, 1998).

Purpose

This clinical report describes the outcomes of a group-based AR program for adults with acquired hearing loss using a GAS approach.

Method

Participants

Participants constituted a convenience sample of individuals who elected to participate. They were referred from the community or from the university speech and hearing clinic. Audiologists in the community recruited

participants during appointments. Participants were also recruited through mailing of project information, posting of information in waiting rooms and in public institutions catering to older adults, and advertising in the local media. Individuals were screened over the telephone to confirm that they met the project participation criteria prior to the first interview. The research project was approved by the University of Western Ontario Health Sciences Research Ethics Board.

A total of 46 adults (25 male; 21 female) aged 62 to 93 years ($M = 78.4$, $SD = 7.6$) participated in the AR program and GAS. The majority (76%) of the participants were native English-language speakers, with 24% speaking one or more other language in addition to English. The majority of the participants (96%) had formal education levels at the high school or post-secondary level. Participants in this project represented the heterogeneous nature of hearing loss in the adult population. A summary of the participants' pre-treatment characteristics is presented in Table 2. The high frequency better ear pure tone average (1000, 2000, and 4000 Hz) of participants indicated hearing loss ranging from mild to severe-to-profound. Participants had a wide range of years of living with hearing loss and with using hearing aids, although the majority (65%) had been using hearing aids for fewer than 10 years. A wide variety of styles of hearing aids were used by the participants, and the majority of participants were either in-the-ear (43%) or behind-the-ear (30%) hearing aid owners. Slightly more of the participants (59%) owned binaural hearing aids, compared to monaural (41%) hearing aids, with the majority of hearing aids (80%) being less than 5 years old. Hearing aid ownership was not always indicative of hearing aid use, and a small number of participants (6%) reported never using their hearing aids. The number of occasional users (46%) was similar to the number of consistent users (48%). The majority of participants (52%) owned no additional assistive devices, and 32% of participants owned one additional device.

Audiologic Rehabilitation Program

Because of the receptive communication difficulties of participants with hearing losses, the maximum number of participants in each AR program was limited to 8 per group in order to provide an auditorily accessible communication environment. In total, 10 groups were run, with group size ranging from 4 to 8 participants ($M = 6$). Non-research participant spouses were included in these groups. Two of the groups had no spouses in attendance. Between 1 and 3 spouses attended the other groups ($M = 1.3$). Each group met once a week for between 90 and 120 minutes during a 6-week period.

The AR program developed for this research included standard information components (Gagné & Jennings, 2008). Information presented by the facilitators included the effects of hearing loss on communication and relationships, environmental factors that have an impact on communication, practical aspects and realistic expectations of hearing aid use, the use of assistive listening devices at home

Table 2
Summary of Participants' Pre-treatment Characteristics

	Total (*SD*)	Males (*SD*)	Females (*SD*)
Number of participants	46	25	21
Mean age	78.4 (7.6)	78.5 (8.1)	78.2 (7.0)
Mean years of hearing loss	16.9 (13.5)	20.8 (14.7)	12.3 (10.3)
Mean years of hearing aid use	10.9 (10)	12.8 (10.7)	8.7 (8.7)
Mean better ear high freq PTA	54.3 (12.2)	57.8 (12.0)	49.9 (11.2)

and in public places, obtaining and promoting the use of assistive listening devices, the use of telephone and alerting devices at home and in public places, how to inform others about hearing loss, and communication strategies.

Audiology students who had completed a course in AR in their masters level training program facilitated the program. Facilitators worked in pairs, and a total of 10 students facilitated the groups. The facilitators were trained and supervised by the researcher and followed the curricula developed by the researcher. The researcher was an audiologist with more than 20 years experience in the areas of adult AR and goal setting with adults with acquired hearing loss.

Procedures

All data were collected in an interview format by the researcher. Participants were interviewed at three points in time – initial intake into the study (pre-program), immediately following the AR program (post-program), and 5 to 7 months later (6-months post-program). During the initial intake interview, participants were asked to describe specific situations in which difficulties with communication were encountered. Participants were then asked which of these situations they would like to see improve as a result of attending the AR program. For each of these situations, the participants were asked to describe who was involved in the situation (the person with hearing loss and any other persons), the specific environment in which the situation occurred, and what the participant and any other persons were currently doing to deal with the problem (baseline performance). Next, participants were asked to specifically identify what they would be willing to do to improve communication in the situation by the time they had completed the program (expected outcome). The participant was asked to specifically identify who was responsible for the action, what the specific action was, how often the action would be performed and in what time period, and the environment in which it would be performed. As a result, GAS goals were set and the baseline (pre-program) performance on each goal, as well as the expected outcome on the goal at post-program,

were determined by the researcher in conjunction with the participant and significant other (if in attendance) at the initial interview. The researcher determined the remaining levels of attainment on each goal (less than expected outcome, greater than expected outcome, much greater than expected outcome) based on the criteria set by Cardillo and Smith (1994). Examples of four goals set by participants can be found in Appendix A. King et al.'s (1999) checklist was used to ensure the technical quality of the goal. Attainment of goals was rated by the researcher, the participant, and the significant other (if in attendance) at the two post-program interviews. Goal attainment was monitored based on participant diary documentation of specific examples of behaviour regarding the goal over time. Raw GAS scores could range from -2 (much less than expected outcome, used to define a participant's baseline) to +2 (much better than expected outcome), with a score of zero indicating a participant's expected performance on the goal at post-program. These raw scores were averaged to create a summary score. The summary score and number of goals set by the individual were used to generate a GAS T-score using tabled values (Cardillo & Smith, 1994; Kiresuk & Choate, 1994). The GAS T-score reflected the average goal attainment for each research participant. A GAS summary score of 0 yields a GAS T-score of 50 regardless of the number of goals set; a GAS summary score of -2 yields a GAS T-score of approximately 20 and varies depending on the number of goals set by the participant. GAS summary scores of -1 and -2 indicate that a participant has not attained the expected goal performance after an intervention program.

Results

At the initial interview, the AR program participants set between one and four goals ($M = 1.98$, $SD = 0.91$), with the greatest number of participants (39%) setting two goals. The goals identified by the participants dealt with personal participation restrictions and focused on specific activity limitations within specific environments. The use of strategies to deal with communication in difficult listening environments (such as in groups and meetings) made up 45% of the goals identified by the participants; 20% of the goals were related to the use of strategies to deal with communication over the telephone, 19% of the goals were related to using hearing aids on a more consistent basis, 9% of the goals were related to the use of strategies to deal with one-to-one communication (including with spouses, adult children, and grandchildren), and 7% of the goals were related to the use of strategies to deal with stress, isolation, and self-confidence.

The GAS T-scores post-program and 6-months post-program were compared to participant baseline performance on the goals. These results are illustrated in Figure 1. The mean baseline GAS T-score for the partici-pants was 26.05 ($SD = 3.2$), the mean post-program GAS T-score was 53.97 ($SD = 12.4$), and the mean 6-months post-program GAS T-score was 62.99 ($SD = 11.9$). In total, 75% of participants met or exceeded the expected goal
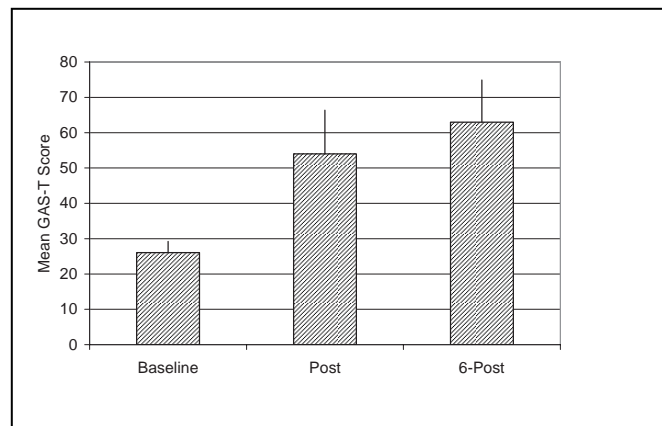

Figure 1. GAS *T*-Scores compared to baseline by time for AR group participants.

performance at post-program, and 90% of participants met or exceeded the expected goal performance at 6-months post-program.

Discussion

Overall, the results suggest that participants made gains in goal performance following AR program participation when compared to pre-program functioning levels and had continued to make gains at 6-months post-program.

GAS is not simply used to evaluate change over time; it also provides a framework for organizing the rehabilitation process. Therefore, it would be difficult to evaluate GAS as simply an assessment tool (Kiresuk, Smith, & Cardillo, 1994). In the current research, only those who participated in an AR program were involved in GAS. As such, it was not possible to compare these results to a group of participants who participated in GAS and not in group AR. The importance of testing inter-rater reliability (Gordon et al., 1999) and the use of an independent examiner (Ottenbacher & Cusick, 1993) who has not been involved in the treatment program or the goal setting process have been discussed as considerations in the use of GAS. Although a checklist was used to ensure the technical quality of the goals (King et al., 1999), inter-rater reliability was not checked in the current research. The researcher who was involved in the initial goal setting was the one who assessed the outcomes in partnership with the research participants. The researcher was not directly involved in the rehabilitation programs with the participants. This procedure was deemed reasonable as the researcher had extensive experience using goal setting with adults with hearing loss and also had extensive knowledge of the unique situation and needs of this population. The research participants were actively engaged in the goal setting procedure and in assessing their own post-treatment performance. Wright (2000) suggests that although clients come to see clinicians with unique, individual concerns, client-specific measures that allow clients to express, rate, rank, and quantify their concerns and treatment outcomes have not been used widely in audiological and AR practice. Contemporary models of AR for older adults with acquired hearing loss describe

AR as a situation-specific, client-specific problem-solving process (Gagné & Jennings, 2008), within which GAS can provide a framework for the rehabilitation process and be used to monitor change over time. The current project is the first to use the GAS procedure with adults with hearing loss as part of a group AR program. Gordon et al. (1999,) suggest that, "… when a clinically relevant but individualized measure is used, the achievement of important goals can be demonstrated when treatment is successful" (p. 279). The results suggest that GAS was an effective technique in the AR of older adults with hearing losses within this project.

Outside of audiology and AR, GAS has been used widely with a variety of populations in a variety of settings. Therefore, audiologists who work in settings that already use GAS can assist supervisors and administrators in understanding AR outcomes within their facility.

GAS has been used to measure change in performance following involvement in interventions that are based on health promotion and self-efficacy theory (Becker et al., 2000; Sheldon & Elliot, 1998). Goal setting has been described as a self-efficacy building technique (Becker et al., 2000; Redland & Stuifbergen, 1993). Bandura (1986) described interventions that build self-efficacy as those that involve participants in graded experiences that provide them with successes and teach them how to manage lack of success. GAS facilitates this process by helping participants focus on realistic, graded goals. By setting goals collaboratively with clinicians, persons with hearing loss can increase their awareness of various actions that might be undertaken in an attempt to deal with difficult listening situations and thus develop greater self-regulation and self-efficacy (Redland & Stuifbergen, 1993). Goal setting is also believed to maintain motivation and adherence to a rehabilitation program because the person who makes an explicit and formal commitment to changing their behaviours will likely be more successful than a person who has not made this commitment (Evans & Hardy, 2002; Redland & Stuifbergen, 1993; Stolee et al., 1999). Goal attainment is also most successful when the goals are short-term, realistic, and set in a partnership between the patient and the clinician (Redland & Stuifbergen, 1993; Sheldon & Elliot, 1998). Bandura (1986) stated that, "When people play a significant role in selecting goals, they hold themselves responsible for progress toward these goals and thereby engage self-evaluative mechanisms in the process" (p. 479). Self-efficacy has been identified as a predictor of positive emotions and goal performance (Bandura, 1989; Becker et al., 2000). Positive experiences and emotions gained during the process of striving to attain goals may also reinforce and maintain goal attainment (Sheldon & Elliot, 1998). The current research supports this notion, as participants continued to make gains on goals in the 6 months following AR program participation.

Persons with hearing loss do not always seek AR services for themselves. In this case, their significant others are often the catalyst for the visit to the audiologist. As a result, the goals may often be decided upon by services providers and significant others. If decisions such as the purchase and the use of a hearing aid do not involve the patient, they may either not be followed through or the result may be a hearing aid that is not used. According to Sheldon and Elliot (1998) goals that are set related to external pressures are goals that will likely be abandoned.

In conclusion, the results of this study support the usefulness of GAS as a framework and a measure of change for the contemporary model of group AR for older adults, as it was used in this project. Further work to investigate the use and procedures for GAS and to document the efficacy of GAS in adult AR is warranted.

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Appendix A.

Examples of 4 goals set using Goal Attainment Scaling for group-based audiologic rehabilitation participants

Raw goal attainment scaling score	Goal one	Goal two	Goal three	Goal four
Much less than expected -2	Answer the telephone 0% of the time when at home alone during the course of one week.	Use the hearing aid telecoil with the telephone 0% of the time at home during the course of one week.	Remind spouse to speak more slowly 25% of the time at home during the course of one day.	Ask for the topic of conversation when entering into a group conversation with family at home 25% of the time during the course of one day.
Somewhat less than expected -1	Answer the telephone 25% of the time when at home alone during the course of one week.	Use the hearing aid telecoil with the telephone 25% of the time at home during the course of one week.	Remind spouse to speak more slowly 50% of the time at home during the course of one day.	Ask for the topic of conversation when entering a group conversation with family at home 50% of the time during the course of one day.
Expected level (program goal) 0	Answer the telephone 50% of the time when at home alone during the course of one week.	Use the hearing aid telecoil with the telephone 50% of the time at home during the course of one week	Remind spouse to speak more slowly 75% of the time at home during the course of one day	Ask for the topic of conversation when entering a group conversation with family at home 75% of the time during the course of one day.
Somewhat better than expected +1	Answer the telephone 75% of the time when at home alone during the course of one week.	Use the hearing aid telecoil with the telephone 75% of the time at home during the course of one week.	Remind spouse to speak more slowly 100% of the time at home during the course of one day.	Ask for the topic of conversation when entering a group conversation with family at home 100% of the time during the course of one day.
Much better than expected +2	Answer the telephone 100% of the time when at home alone during the course of one week.	Use the hearing aid telecoil with the telephone 100% of the time at home during the course of one week.	Remind spouse to speak more slowly 100% of the time in a public place during the course of one day.	Ask for the topic of conversation when entering a group conversation with family in a public place 100% of the time during the course of one day.

Book Reviews/
Évaluation des livres

Neurogenic Communication Disorders:
Life Stories and the Narrative Self
Barbara B. Shadden, Fran Hagstrom, and
Patricia R. Koski

Publisher: Plural Publishing Inc.
Cost: C$87.50
Reviewer: Lynn Ellwood, M.H.Sc
Affiliation: University of Toronto,
             Department of Speech-Language Pathology

As an educator of future professionals in speech-language pathology, this book intrigued me because of the potential for its content to broadly alter and enhance clinical practice. It held further interest for me because of the focus on neurogenic communication disorders, my area of clinical practice for many years.

Together, the three authors of this book explore concepts related to life stories and how these concepts are manifest in people with acquired neurogenic communication disorders, offering advice to clinicians who practice in the field. The book expands our current understanding of these concepts beyond the area of aphasia in which they are most widely applied in the field of speech-language pathology.

In Section I, the book's opening two chapters provide an overview of the existing body of work relating to concepts of self and narrative. From their different fields of speech-language pathology, sociology, and psychology, the authors describe related constructs. They introduce the concept of "narrative self" as a framework with which to explore the impact of neurogenic communication disorders on the individual. For the uninitiated reader, they describe and contrast the four disorder areas that are addressed in later chapters.

In Section II, the authors explore more deeply the various theoretical concepts they believe support the model of narrative self. In three separate chapters, they address self, narrative processes, and temporal/life span considerations.

Section III contains four chapters, each of which explores the impact of a specific disorder on narrative self. Amyotrophic lateral sclerosis, Parkinson's Disease, stroke-related aphasia, and dementia are chosen as illustrative examples, based on the fact that the authors have each had personal experiences with individuals living with these conditions.

Section IV is specifically tailored to speech-language pathologists, presenting each author's personal perspective on implications for clinical practice in a separate chapter. The brief chapter addressing postmodernism is particularly refreshing and thought-provoking. The authors acknowledge that the conceptual framework they have developed is "still in its infancy as applied to neurogenic communication disorders."

This book represents a strong effort to use theoretical concepts to help understand the personal impact of communication disorders on the people who live with them. Because our profession has traditionally borrowed from many related fields, the concepts reviewed in the book will not be new to most practising clinicians, although the framework is new. Familiar ideas relating to adjustment to disability, change management, and client-centered care are recast into a framework for understanding and supporting the client's narrative self.

Unfortunately, the authors' approach to reframe such well established concepts can be confusing for the reader. Aspects of narrative and of self are explored in depth, revisited, illustrated, and juxtaposed without convincing resolution of these two concepts into a singular construct of narrative self. There is only a single diagram, which presents three overlapping circles, illustrating the self-evident notion that impairment in any of motor speech, language, or cognition will disrupt narrative self, each in unique ways. Perhaps additional efforts to illustrate the model of narrative self, incorporating the concepts explored in the text, would have helped to clarify the concept. While written dialogue (such as this book) is a useful method of presenting and reflecting on a challenging topic area, the lack of a defined process for exploration hampered the effectiveness of this approach.

Personal stories from the perspective of the client are always interesting to clinicians, and the words of the individuals represented in this book are no exception. The authors include excerpts informally collected from emails, support groups, and informal interviews to illustrate their various points. Unfortunately, this approach makes it a challenge for the reader to develop a coherent sense of the individuals. A case-based approach might have been more helpful.

The authors have made a daring and commendable attempt to translate important concepts of narrative and self into the clinical realm of speech-language pathology. For readers and researchers interested in exploring the literature on narrative processes and self, the content and the exhaustive references will be helpful. Clinicians whose clients live with the neurogenic disorders addressed in this book will benefit from reading specific chapters in Section III to enhance or refresh their understanding of the personal experience of their clients. As the authors suggest, additional material in the book can then be explored to deepen understanding of underlying concepts of narrative self if desired.

Future efforts to explore the model of narrative self would benefit from a clearer representation of the model and the application of established qualitative research methods.

Together with other recent publications on the topic of narrative processes and health narratives, this book acts as a helpful background resource. Narrative processes are more fully understood and applied in related health fields such as medicine and occupational therapy, so an exploration of these concepts as they apply to speech-language pathology is valuable. Clinicians interested in practical approaches to incorporating narrative processes into clinical practice are encouraged to pursue works by Hinckley (2008) and Holland (2007).

References

Hinckley, J. J. (2008). *Approaches to narrative-based practice in speech-language pathology*. San Diego: Plural Publishing.

Holland, A. L. (2007). *Counseling in communication disorders: A wellness perspective*. San Diego: Plural Publishing.

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Classics in Voice and Laryngology
Ryan C. Branski and Lucian Sulica, Editors

Publisher: Plural Publishing Inc., San Diego, CA
Cost: C$162.50
Reviewer: Tim Bressmann, PhD
Affiliation: University of Toronto,
              Department of Speech-Language Pathology

The purpose of this text is to provide a compendium of seminal texts in clinical laryngology and voice science. The papers identified as classics by Branski and Sulica were compiled using the Scopus bibliographical database and the editors' judgement. In order to be included in the compilation, the paper had to be cited more than 50 times. The authors then vetted and divided the papers into different topical chapters. Each chapter is prefaced with a brief introductory note in which the editors present a historical perspective of the specific topic at hand. The original classic papers are faithfully reproduced, often with an introductory note from an author. The resulting volume comes out just a little under 600 pages, and 38 classic papers and their commentaries have been included.

Laryngology is a field that is shared by otolaryngologists and speech-language pathologists. The selected papers in this book are slanted towards the otolaryngology side: 29 of the 38 papers deal with primarily otolaryngological topics. Obviously, all included papers are interesting and germane to the field of laryngology. The papers that one would expect are all there: Blitzer and Brin's description of the use of botulinium toxin for spasmodic dysphonia, Isshiki's account of laryngeal framework surgery, Ramig et al.'s introduction of Lee Silverman Voice Treatment, Koufman's discussion of laryngopharyngeal reflux,

Verdolini-Marston et al.'s research on the effect of hydration on phonation threshold pressure, and the list goes on. The selection and the quality of the papers are excellent. The author commentaries add human interest and often provide interesting tidbits about the circumstances under which the research was done and the papers were written.

While the selection of papers is impressive, omission of certain classic articles is admitted and explained. In their introduction, the authors give an account of the challenges they faced in putting this volume together. In the end, not all papers that the editors wanted to include could be reproduced because of copyright and compensation issues associated with some of the publishers. The introductory notes for the topical chapters list and discuss all papers that the authors deemed classics and that met the search criteria. The interested reader could then retrieve those missing classics and complete the full set of papers.

The book is well made and the structure is very clear. Since some of the papers are older, the quality of the reproductions is variable. One flaw of the book is that the original paginations of the papers have been removed. This allowed for a larger print area, resulting in better quality of the reproductions; as well, two different page numbers per page would have been visually confusing. However, to cite or reference a specific section or statement, one either has to hand count the pages to figure out the original pagination or else cite the edited reproduction rather than the original paper.

The book would be useful for graduate students or residents who are specializing in vocology and laryngology. It could form the basis for an introductory reading course, and the classics could be juxtaposed with current papers on the same topics. This would allow an interested student to quickly get up to speed with the canon of laryngology. Obviously, while the papers were seminal at their time, it is a hallmark of a classic to be of a certain age. The volume cannot, and is not meant to, replace an up-to-date textbook on voice. Nevertheless, for any serious voice specialist, this is a book that is worth acquiring.

■ ■ ■

Information for Contributors

The Canadian Journal of Speech-Language Pathology and Audiology (CJSLPA) welcomes submissions of scholarly manuscripts related to human communication and its disorders broadly defined. This includes submissions relating to normal and disordered processes of speech, language, and hearing. Manuscripts that have not been published previously are invited in English and French. Manuscripts may be tutorial, theoretical, integrative, practical, pedagogic, or empirical. All manuscripts will be evaluated on the basis of the timeliness, importance, and applicability of the submission to the interests of speech–language pathology and audiology as professions, and to communication sciences and disorders as a discipline. Consequently, all manuscripts are assessed in relation to the potential impact of the work on improving our understanding of human communication and its disorders. All categories of manuscripts submitted will undergo peer-review to determine the suitability of the submission for publication in CJSLPA. The Journal has established multiple categories of manuscript submission that will permit the broadest opportunity for dissemination of information related to human communication and its disorders. The categories for manuscript submission include:

Tutorials: Review articles, treatises, or position papers that address a specific topic within either a theoretical or clinical framework.

Articles: Traditional manuscripts addressing applied or basic experimental research on issues related to speech, language, and/or hearing with human participants or animals.

Clinical Reports: Reports of new clinical procedures, protocols, or methods with specific focus on direct application to identification, assessment and/or treatment concerns in speech, language, and/or hearing.

Brief Reports: Similar to research notes, brief communications concerning preliminary findings, either clinical or experimental (applied or basic), that may lead to additional and more comprehensive study in the future. These reports are typically based on small "*n*" or pilot studies and must address disordered participant populations.

Research Notes: Brief communications that focus on experimental work conducted in laboratory settings. These reports will typically address methodological concerns and/or modifications of existing tools or instruments with either normal or disordered populations.

Field Reports: Reports that outline the provision of services that are conducted in unique, atypical, or nonstandard settings; manuscripts in this category may include screening, assessment, and/or treatment reports.

Letters to the Editor: A forum for presentation of scholarly/ clinical differences of opinion concerning work previously published in the Journal. Letters to the Editor may influence our thinking about design considerations, methodological confounds, data analysis, and/or data interpretation, etc. As with other categories of submissions, this communication forum is contingent upon peer-review. However, in contrast to other categories of submission, rebuttal from the author(s) will be solicited upon acceptance of a letter to the editor.

Submission of Manuscripts

Contributors should use the electronic CJSLPA manuscript submission system at http://cjslpa.coverpage.ca to submit articles. If you are unable to use the electronic system, please send a file containing the manuscript, including all tables, figures or illustrations, and references in MS Word or WordPerfect format via e-mail to the Editor at: tim.bressmann@utoronto. ca. Alternatively, manuscripts may still be submitted by sending five (5) hard copies to:

Tim Bressmann, PhD
Editor in Chief
Canadian Journal of Speech-Language Pathology and
Audiology
Department of Speech-Language Pathology
University of Toronto
160 - 500 University Avenue
Toronto, Ontario M5G 1V7

Along with copies of the manuscript, a cover letter indicating that the manuscript is being submitted for publication consideration should be included. The cover letter must explicitly state that the manuscript is original work, that it has not been published previously, and that it is not currently under review elsewhere. Manuscripts are received and peer-reviewed contingent upon this understanding. The author(s) must also provide appropriate confirmation that work conducted with humans or animals has received ethical review and approval. Failure to provide information on ethical approval will delay the review process. Finally, the cover letter should also indicate the category of submission (i.e., tutorial, clinical report, etc.). If the editorial staff determines that the manuscript should be considered within another category, the contact author will be notified.

All submissions should conform to the publication guidelines of the Publication Manual of the American Psychological Association (APA), 6th Edition. A confirmation of receipt for all manuscripts will be provided to the contact author prior to distribution for peer review. CJSLPA seeks to conduct the review process and respond to authors regarding the outcome of the review within 90 days of receipt. If a manuscript is judged as suitable for publication in CJSLPA, authors will have 30 days to make necessary revisions prior to a secondary review.

The author is responsible for all statements made in his or her manuscript, including changes made by the editorial and/or production staff. Upon final acceptance of a manuscript and immediately prior to publication, the contact author will be permitted to review galley proofs and verify its content to the publication office within 72 hours of receipt of galley proofs.

Organization of the Manuscript

All copies should be typed, double-spaced, with a standard typeface (12 point, noncompressed font) on an 8 ½ X 11 page. All margins should be at least one (1) inch. For paper submissions, an original and four (copies) of the manuscript should be submitted directly to the Editor. Author identification for the review process is optional; if blind-review is desired, three (3) of the copies should be prepared accordingly (cover page and acknowledgments blinded). Responsibility for removing all potential identifying information rests solely with the author(s). All manuscripts should be prepared according to APA guidelines. This manual is available from most university bookstores or is accessible via commercial bookstores. Generally, the following sections should be submitted in the order specified.

Title Page: This page should include the full title of the manuscript, the full names of the author(s) with academic degrees and affiliations, and a complete mailing address and email address for the contact author.

Abstract: On a separate sheet of paper, a brief yet informative abstract that does not exceed one page is required. The abstract should include the purpose of the work along with pertinent information relative to the specific manuscript category for which it was submitted.

Key Words: Following the abstract and on the same page, the author(s) should supply a list of key words for indexing purposes.

Tables: Each table included in the manuscript must be typewritten and double-spaced on a separate sheet of paper. Tables should be numbered consecutively beginning with Table 1. Each table must have a descriptive caption. Tables should serve to expand the information provided in the text of the manuscript, not to duplicate information.

Illustrations: All illustrations included as part of the manuscript must be included with each copy of the manuscript. All manuscripts must have clear copies of all illustrations for the review process. High resolution (at least 300 dpi) files in any of the following formats must be submitted for each graphic and image: JPEG, TIFF, AI, PSD, GIF, EPS or PDF. For other types of computerized illustrations, it is recommended that CJSLPA production staff be consulted prior to preparation and submission of the manuscript and associated figures/illustrations.

Legends for Illustrations: Legends for all figures and illustrations should be typewritten (double-spaced) on a separate sheet of paper with numbers corresponding to the order in which figures/illustrations appear in the manuscript.

Page Numbering and Running Head: The text of the manuscript should be prepared with each page numbered, including tables, figures/illustrations, references, and appendices. A short (30 characters or less) descriptive running title should appear at the top right hand margin of each page of the manuscript.

Acknowledgments: Acknowledgments should be typewritten (double-spaced) on a separate page. Appropriate acknowledgment for any type of sponsorship, donations, grants, technical assistance, and to professional colleagues who contributed to the work but are not listed as authors, should be noted.

References: References are to be listed consecutively in alphabetical order, then chronologically for each author. Authors should consult the APA publication manual (6th Edition) for methods of citing varied sources of information. Journal names and appropriate volume number should be spelled out and italicized. All literature, tests and assessment tools, and standards (ANSI and ISO) must be listed in the references. All references should be double-spaced.

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As part of the submission process, the author(s) must explicitly identify if any potential conflict of interest or dual commitment exists relative to the manuscript and its author(s). Such disclosure is requested so as to inform CJSLPA that the author or authors have the potential to benefit from publication of the manuscript. Such benefits may be either direct or indirect and may involve financial and/or other nonfinancial benefit(s) to the author(s). Disclosure of potential conflicts of interest or dual commitment may be provided to editorial consultants if it is believed that such a conflict of interest or dual commitment may have had the potential to influence the information provided in the submission or compromise the design, conduct, data collection or analysis, and/or interpretation of the data obtained and reported in the manuscript submitted for review. If the manuscript is accepted for publication, editorial acknowledgement of such potential conflict of interest or dual commitment may occur within the publication.

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Each manuscript submitted to CJSLPA for peer-review that is based on work conducted with humans or animals must acknowledge appropriate ethical approval. In instances where humans or animals have been used for research, a statement indicating that the research was approved by an institutional review board or other appropriate ethical evaluation body or agency must clearly appear along with the name and affiliation of the research ethics and the ethical approval number. The review process will not begin until this information is formally provided to the Editor.

Similar to research involving human participants, CJSLPA requires that work conducted with animals state that such work has met with ethical evaluation and approval. This includes identification of the name and affiliation of the research ethics evaluation body or agency and the ethical approval number. A statement that all research animals were used and cared for in an established and ethically approved manner is also required. The review process will not begin until this information is formally provided to the Editor.

Renseignements à l'intention des collaborateurs

La Revue canadienne d'orthophonie et d'audiologie (RCOA) est heureuse de se voir soumettre des manuscrits de recherche portant sur la communication humaine et sur les troubles qui s'y rapportent, dans leur sens large. Cela comprend les manuscrits portant sur les processus normaux et désordonnés de la parole, du langage et de l'audition. Nous recherchons des manuscrits qui n'ont jamais été publiés, en français ou en anglais. Les manuscrits peuvent être tutoriels, théoriques, synthétiques, pratiques, pédagogiques ou empiriques. Tous les manuscrits seront évalués en fonction de leur signification, de leur opportunité et de leur applicabilité aux intérêts de l'orthophonie et de l'audiologie comme professions, et aux sciences et aux troubles de la communication en tant que disciplines. Par conséquent, tous les manuscrits sont évalués en fonction de leur incidence possible sur l'amélioration de notre compréhension de la communication humaine et des troubles qui s'y rapportent. Peu importe la catégorie, tous les manuscrits présentés seront soumis à une révision par des collègues afin de déterminer s'ils peuvent être publiés dans la RCOA. La Revue a établi plusieurs catégories de manuscrits afin de permettre la meilleure diffusion possible de l'information portant sur la communication humaine et les troubles s'y rapportant. Les catégories de manuscrits comprennent :

Tutoriels : Rapports de synthèse, traités ou exposés de position portant sur un sujet particulier dans un cadre théorique ou clinique.

Articles : Manuscrits conventionnels traitant de recherche appliquée ou expérimentale de base sur les questions se rapportant à la parole, au langage ou à l'audition et faisant intervenir des participants humains ou animaux.

Comptes rendus cliniques : Comptes rendus de nouvelles procédures ou méthodes ou de nouveaux protocoles cliniques portant particulièrement sur une application directe par rapport aux questions d'identification, d'évaluation et de traitement relativement à la parole, au langage et à l'audition.

Comptes rendus sommaires : Semblables aux notes de recherche, brèves communications portant sur des conclusions préliminaires, soit cliniques soit expérimentales (appliquées ou fondamentales), pouvant mener à une étude plus poussée dans l'avenir. Ces comptes rendus se fondent typiquement sur des études à petit « *n* » ou pilotes et doivent traiter de populations désordonnées.

Notes de recherche : Brèves communications traitant spécifiquement de travaux expérimentaux menés en laboratoire. Ces comptes rendus portent typiquement sur des questions de méthodologie ou des modifications apportées à des outils existants utilisés auprès de populations normales ou désordonnées.

Comptes rendus d'expérience : Comptes rendus décrivant sommairement la prestation de services offerts en situations uniques, atypiques ou particulières; les manuscrits de cette catégorie peuvent comprendre des comptes rendus de dépistage, d'évaluation ou de traitement.

Courrier des lecteurs : Forum de présentation de divergences de vues scientifiques ou cliniques concernant des ouvrages déjà publiés dans la Revue. Le courrier des lecteurs peut avoir un effet sur notre façon de penser par rapport aux facteurs de conception, aux confusions méthodologiques, à l'analyse ou l'interprétation des données, etc. Comme c'est le cas pour d'autres catégories de présentation, ce forum de communication est soumis à une révision par des collègues. Cependant, contrairement aux autres catégories, on recherchera la réaction des auteurs sur acceptation d'une lettre.

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Pour soumettre un article, les auteurs doivent utiliser le système de soumission électronique de l'ACOA à l'adresse http://cjslpa.coverpage.ca. Si vous ne pouvez pas utiliser le système électronique, veuillez envoyer par courriel un fichier Word ou WordPerfect contenant le manuscrit, y compris tous les tableaux, les figures ou illustrations et la bibliographie. Adressez le courriel au rédacteur en chef à l'adresse tim.bressmann@utoronto.ca. Vous pouvez aussi soumettre cinq (5) exemplaires sur papier à :

Tim Bressmann, PhD
Rédacteur en chef
Revue canadienne d'orthophonie et d'audiologie
Department of Speech-Language Pathology
University of Toronto
160 - 500 University Avenue
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On doit joindre aux exemplaires du manuscrit une lettre d'envoi qui indiquera que le manuscrit est présenté en vue de sa publication. La lettre d'envoi doit préciser que le manuscrit est une œuvre originale, qu'il n'a pas déjà été publié et qu'il ne fait pas actuellement l'objet d'un autre examen en vue d'être publié. Les manuscrits sont reçus et examinés sur acceptation de ces conditions. L'auteur (les auteurs) doit (doivent) aussi fournir une attestation en bonne et due forme que toute recherche impliquant des êtres humains ou des animaux a fait l'objet de l'agrément d'un comité de révision déontologique. L'absence d'un tel agrément retardera le processus de révision. Enfin, la lettre d'envoi doit également préciser la catégorie de la présentation (i.e. tutoriel, rapport clinique, etc.). Si l'équipe d'examen juge que le manuscrit devrait passer sous une autre catégorie, l'auteur-contact en sera avisé.

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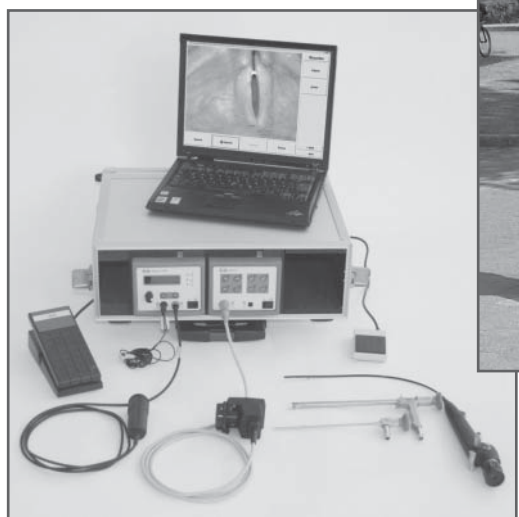
Participants à la recherche – êtres humains et animaux

Chaque manuscrit présenté à la RCOA en vue d'un examen par des pairs et qui se fonde sur une recherche effectuée avec la participation d'être humains ou d'animaux doit faire état d'un agrément déontologique approprié. Dans les cas où des êtres humains ou des animaux ont servi à des fins de recherche, on doit joindre une attestation indiquant que la recherche a été approuvée par un comité d'examen reconnu ou par tout autre organisme d'évaluation déontologique, comportant le nom et l'affiliation de l'éthique de recherche ainsi que le numéro de l'approbation. Le processus d'examen ne sera pas amorcé avant que cette information ne soit formellement fournie au rédacteur en chef.

Tout comme pour la recherche effectuée avec la participation d'êtres humains, la RCOA exige que toute recherche effectuée avec des animaux soit accompagnée d'une attestation à l'effet que cette recherche a été évaluée et approuvée par les autorités déontologiques compétentes. Cela comporte le nom et l'affiliation de l'organisme d'évaluation de l'éthique en recherche ainsi que le numéro de l'approbation correspondante. On exige également une attestation à l'effet que tous les animaux de recherche ont été utilisés et soignés d'une manière reconnue et éthique. Le processus d'examen ne sera pas amorcé avant que cette information ne soit formellement fournie au rédacteur en chef.