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- Typical Performance on Tests of Language Knowledge and Language Processing of French-Speaking 5-Year-Olds
- Effect of Sound Field Amplification on Grade 1 Reading Outcomes
- A Framework for Research and Practice in Infant Hearing
- Atypical Language Development in a Child Adopted from China
- Use of a Dual-Task Paradigm to Measure Listening Effort



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The Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA) is the recognized national professional association of speech-language pathologists and audiologists in Canada. The association was founded in 1964, incorporated under federal charter in 1975 and is committed to fostering the highest quality of service to communicatively impaired individuals and members of their families. It began its periodical publications program 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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Cover illustration

Andrew Young

Review of translation

Benoît Jutras, Ph.D

Université de Montréal

Translation

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Lucette Ferrari

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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.

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Université Laval
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Hamilton Health Sciences
(Évaluation des ouvrages écrits)

Révision de la traduction
Benoît Jutras, Ph.D
Université de Montréal

Illustration (couverture)
Andrew Young

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Geneviève Charbonneau
Lucette Ferrari
Martine Leroux

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From the Editor / Mot du rédacteur en chef

Spring Issue / Numéro de printemps



The first paper in the current issue of the Canadian Journal of Speech-Language Pathology is entitled 'Typical Performance on Tests of Language Knowledge and Language Processing of French-Speaking 5-Year-Olds'. It was written by Elin Thordardottir, Eva Kehayia, Nicole Lessard, Ann Sutton, and Natacha Trudeau. The study presents normative data for 78 5-year-old monolingual speakers of Quebec French regarding vocabulary, morphosyntax, syntax, narrative structure, nonword repetition, sentence imitation, rapid automatized naming, following directions, and short term memory.

The second paper was written by Neil Purcell and Pamela Millett. It has the title 'Effect of sound field amplification on grade one reading outcomes.' In this study, Purcell & Millett examined changes in reading outcomes for Canadian grade one students (N=486) in 24 classrooms, 12 with sound field amplification and 12 without, over one school year.

Elizabeth Fitzpatrick contributed a paper entitled 'A Framework for Research and Practice in Infant Hearing'. This paper develops a theoretical framework based on a population health perspective, with the purpose of informing the implementation of existing and new population hearing screening programs.

The fourth paper in the current issue is entitled 'Développement langagier atypique chez une enfant adoptée de Chine : démarche de raisonnement clinique et évolution des habiletés langagières'. It was written by Élisabeth-Maude McConnell, Audette Sylvestre, and Andrea A.N. MacLeod. This longitudinal case study describes the clinical reasoning used to understand the speech and language development of a young girl adopted from China.

The fifth and final paper by Penny Anderson Gosselin and Jean-Pierre Gagné is entitled 'Use of a Dual-Task Paradigm to Measure Listening Effort' and emphasizes the importance of adding measures of listening effort to clinical audiology.

We have two book reviews in this issue of the Canadian Journal of Speech-Language Pathology. Janine Boutilier reviews 'Practically Speaking', edited by Gloria Soto and Carole Zangari, and Tim Bressmann reviews 'Phonology for Communication Disorders' by Martin J. Ball, Nicole Müller, and Ben Rutter.

Also in the current issue, you may find the program for the upcoming annual conference of the Canadian Association of Speech-Language Pathologists and Audiologists in Whitehorse, Yukon, which will take place from May 19th to 22nd 2010.



Le premier article du présent numéro de la Revue canadienne d'orthophonie et d'audiologie s'intitule « Performance type lors d'examen de connaissances et de traitement du langage chez les enfants francophones de cinq ans ». Il a été écrit par Elin Thordardottir, Eva Kehayia, Nicole Lessard, Ann Sutton, et Natacha Trudeau. L'étude présente des données normatives recueillies auprès de 78 enfants unilingues francophones québécois de cinq ans concernant le vocabulaire, la morphosyntaxe, la syntaxe, la structure narrative, la répétition de non-mots, l'imitation de phrase, la dénomination rapide automatisée, l'application de consignes et la mémoire à court terme.

Le deuxième article, « Effet de l'amplification en champ libre sur les performances de lecture des élèves de première année », a été écrit par Neil Purcell et Pamela Millett. Dans cette étude, Purcell et Millett ont examiné pendant une année scolaire les changements des performances de lecture chez les élèves canadiens de première année (N=486) dans 24 classes, dont 12 avec amplification en champ libre et 12 sans.

Elizabeth Fitzpatrick a collaboré au présent numéro avec son article « Cadre de travail pour la recherche et la pratique concernant les troubles de l'audition chez les enfants ». Cet article élabore un cadre théorique en s'appuyant sur le point de vue de la santé publique, afin de donner des renseignements sur la mise en œuvre des programmes, existants ou nouveaux, de dépistage de troubles auditifs.

Le quatrième article, « Développement langagier atypique chez une enfant adoptée de Chine : démarche de raisonnement clinique et évolution des habiletés langagières », a été écrit par Élisabeth-Maude McConnell, Audette Sylvestre et Andrea A.N. MacLeod. Cette étude de cas longitudinale décrit le raisonnement clinique utilisé pour comprendre le développement langagier chez une enfant adoptée de Chine.

Le cinquième et dernier article a été écrit par Penny Anderson Gosselin et Jean-Pierre Gagné. L'article « Utilisation d'un paradigme de double tâche pour mesurer l'attention auditive » met l'accent sur l'importance de mesurer l'attention auditive en audiologie clinique.

Ce mois-ci, vous trouverez deux comptes rendus de livre dans la Revue canadienne d'orthophonie et d'audiologie. Janine Boutilier analyse « Practically Speaking », publié sous la direction de Gloria Soto et Carole Zangari, et Tim Bressmann analyse « Phonology for Communication Disorders », de Martin J. Ball, Nicole Müller et Ben Rutter.

Vous trouverez aussi dans ce numéro le programme de la conférence annuelle de l'Association canadienne des orthophonistes et audiologistes qui aura lieu à Whitehorse, au Yukon, du 19 au 22 mai 2010.

Tim Bressmann

Editor / Rédacteur en chef

tim.bressmann@utoronto.ca

■ Typical Performance on Tests of Language Knowledge and Language Processing of French-Speaking 5-Year-Olds

■ Performance type lors d'examens de connaissances et de traitement du langage chez les enfants francophones de cinq ans

Elin Thordardottir

Eva Keheyia

Nicole Lessard

Ann Sutton

Natacha Trudeau

Abstract

The evaluation of the language skills of francophone children for clinical and research purposes is complicated by a lack of appropriate norm-referenced assessment tools. The purpose of this study was the collection of normative data for measures assessing major areas of language for 5-year-old monolingual speakers of Quebec French. Children in three age-groups (4;6, 5;0 and 5;6 years, $n=78$) were administered tests of language knowledge and linguistic processing, addressing vocabulary, morphosyntax, syntax, narrative structure, nonword repetition, sentence imitation, rapid automatized naming, following directions, and short term memory. The assessment measures were drawn from existing tools and from tools developed for this study, and included formal tests as well as spontaneous language measures. Normative data are presented for the three age groups. Results showed a systematic increase with age for most of the measures. Correlational analysis revealed relationships of varying strength between the measures, indicating some overlap between the measures, but also suggesting that the measures differ in the linguistic skills they tap into. The normative data presented will facilitate the language assessment of French-speaking 5-year-olds, permitting their performance to be compared to the normal range of typically developing monolingual French-speaking children and allowing the documentation of children's profiles of relative strengths and weaknesses within language.

Abrégé

L'évaluation des capacités langagières des enfants francophones à des fins clinique et de recherche est compliquée en raison du manque d'outils d'évaluation normalisés adéquats. Le but de cette étude était de recueillir des données normatives pour différentes mesures qui évaluent les principaux aspects du langage chez les enfants de cinq ans unilingues francophones québécois. Des enfants de trois groupes d'âge (4;6, 5;0 et 5;6, $n=78$) ont passé des examens sur les connaissances et le traitement du langage concernant : le vocabulaire, la morphosyntaxe, la syntaxe, la structure narrative, la répétition de non-mots, l'imitation de phrase, la dénomination rapide automatisée, l'application de consignes et la mémoire à court terme. Les mesures d'évaluation ont été élaborées à partir d'outils existants et d'outils créés pour la présente étude. Elles étaient composées de tâches formelles ainsi que de mesures du langage spontané. Les données normatives sont présentées pour les trois groupes d'âge. Les résultats de la plupart des mesures ont montré une amélioration systématique avec l'âge. L'analyse corrélationnelle a révélé des relations de forces variées entre les mesures, indiquant un certain chevauchement entre certaines d'entre elles, mais suggérant aussi que les mesures varient en fonction des capacités langagières mises à profit. Les données normatives présentées faciliteront l'évaluation du langage chez les enfants francophones de cinq ans. Elles permettront de comparer leur performance à celles des enfants unilingues francophones dont le développement est dans la norme et de documenter le profil des enfants quant à leurs forces et faiblesses relatives au langage.

Elin Thordardottir, Ph.D.
McGill University
Montreal, Quebec
Centre for Research on
Language, Mind and Brain
(CRLMB)

*Centre de recherche
interdisciplinaire en
réadaptation du Montréal
métropolitain (CRIR)*

Eva Keheyia, Ph.D.
McGill University
Montreal, Quebec
Centre de recherche
interdisciplinaire en
réadaptation du Montréal
métropolitain (CRIR)

Nicole Lessard, Ph.D.
Centre de réadaptation
Marie-Enfant
Montreal, Quebec

Ann Sutton, Ph.D.
Université de Montréal
Montreal, Quebec

Natacha Trudeau., Ph.D.
Université de Montréal
Montreal, Quebec

Key Words: Assessment, evaluation, norms, vocabulary, morphology, syntax, narration, nonword repetition, processing, French

The language assessment of francophone children in Quebec is complicated by the lack of language measures developed and appropriately norm-referenced for this population. This problem is all too well known to Speech-Language Pathologists working with francophone populations, as well as to researchers. Several authors have written about the severity of the situation (e.g. Garcia, Paradis, Sénécal & Laroche, 2006). Given the relative paucity of French language measures, clinical decisions must frequently be made on the basis of subjective criteria, informal tests, as well as translations of formal tests, with results either interpreted informally or reported to normative data collected in another language. A few language tests have been available for French-speaking children in Quebec, such as the *Échelle de vocabulaire en images Peabody* (EVIP, Dunn, Thériault-Whalen, & Dunn, 1993), and an adaptation of the Test for Auditory Comprehension of Language (Carrow-Woolfolk, 1985), with norms collected for a limited age group (Groupe Coopératif en orthophonie, 1999). More tests and assessment procedures are currently being developed. For example, the Quebec version of the MacArthur-Bates CDI (Trudeau, Frank, & Poulin-Dubois, 1999; Boudreault, Cabirol, Trudeau, Poulin-Dubois, & Sutton, 2007) is an important addition to the tests available for preschool children, and a Quebec French adaptation of spontaneous language sample analysis using the clinical SALT software permits norm-referenced analysis of utterance length, as well as lexical and morphosyntactic development (Elin Thordardottir, 2005). Norms for preschool-age children have been collected for a Quebec French version of the Reynell Developmental Language Scales (Boucher, Lavoie & Bergeron, 2004; Reynell & Gruber, 1990), and normative data for phonological development of monolingual French-speaking preschool children have recently been reported (MacLeod, Sutton, Trudeau & Thordardottir (under review)). Further, tools are being developed for bilingual speakers of French (Elin Thordardottir, 2008a). However, even with these developments, there is a serious lack of norm-referenced language tests for francophone children in Quebec and more tests are urgently needed.

The lack of appropriate language measures not only makes clinical assessment of individual children difficult, but also affects the way that language impairment is defined and conceptualized. Without clear, reliable language measures, it is hard (or impossible) to define language impairment in terms of specific linguistic skills that must be found to be lacking for an impairment to be formally identified. As well, the lack of norms (documentation of the mean performance and normal variability) precludes the setting of firm cut-off criteria that separate performance within and outside the normal range, or that indicate levels of severity of the impairment. The lack of measures also makes it difficult to accurately establish a profile of areas of relative strengths and weaknesses for individual children,

which is an important part of selecting and prioritizing clinical goals. Finally, without adequate measures, clinicians are limited in the extent to which they can objectively track children's performance over time to document treatment gains or to monitor the development of children considered at risk.

The present study was undertaken to provide language assessment tools for French-speaking children aged five. This is the age at which many children who experience slow language development are first seen for a formal evaluation in Quebec. A series of measures were selected for this preliminary norming effort. Our intention was to cover a range of language skills to enable a comprehensive assessment of the major domains of language which will permit the establishment of a profile of strengths and weaknesses for individual children and to examine the relationships between areas of language in the development of French. We included assessment of both receptive and productive skills in lexical, syntactic, and morphological development. We also included assessment of narrative skills and language processing measures. The selection of areas to include was guided by previous research on the clinical identification of language impairment (Conti-Ramsden, Crutchley & Botting, 1997; Dollaghan & Campbell, 1998; Ellis Weismer et al., 2000; Tomblin, Records & Zhang, 1996). Research focusing primarily on English has supported the inclusion of a range of language measures for a comprehensive language assessment, but has also identified certain measures particularly accurate clinical markers indicating the presence of language impairment. The existence of normative data on a range of measures will ultimately permit the evaluation of the usefulness of different measures in French. Tomblin et al. (1996) developed an assessment system known as epi-SLI. In that research, the initial choice of language measures was motivated by clinical practice and expert opinion and was designed to cover the major areas of language. Tomblin et al. included a narrative task because of the link between narrative skills and reading and academic achievement. Our test selection is also similar to that used by Conti-Ramsden, Crutchley & Botting (1997). In addition to the areas covered by Tomblin et al., we also use tests of verbal processing in light of the strong relationship that has now been demonstrated between such measures and language test scores, as well as recent findings demonstrating the diagnostic utility of such processing measures in English and in other languages (Bishop et al., 1999; Conti-Ramsden, 2003; Conti-Ramsden, Botting & Faragher, 2001; Dollaghan & Campbell, 1998; Ellis Weismer et al., 2000; Elin Thordardottir, 2008b; Girbau & Schwartz, 2007; Sahlén, Reuterskjöld-Wagner, Nettelbladt & Radeborg, 1999).

It was important to us to assess language skills both with formal tests, which have the advantage of targeting specific language structures, as well as with samples of spontaneous language, which give a less targeted measurement, but by the same token assess the child in a relaxed everyday setting, providing a measure of greater ecological validity. Spontaneous language samples were collected

for this purpose in a conversational context. Analysis of spontaneous language yielding the measures of mean length of utterance (MLU) in words and in morphemes is based on the work of Roger Brown (1973). MLU has been among the most widely used yardsticks of language development. Its use as such is based on the observation that progress in early language development results in lengthening of the utterance. Children progress on one hand from using predominantly one-word utterances to using two-word and three-word utterances etc. Further, if the use of grammatical morphemes is also viewed as additions to the length of the utterance, it becomes possible to track the combination of word use and use of the associated grammatical morphology as increased utterance length. French is considerably richer than English in grammatical morphology. MLU in words and morphemes has been shown to be a developmentally sensitive measure in French (Elin Thordardottir, 2005). The assessment of narrative skills targets a different aspect of spontaneous language than conversational language sampling. Narratives are more structured at the discourse level than conversations, requiring planning and organization of a larger set of utterances. Narratives are increasingly included in clinical assessments to evaluate discourse skills and because of the documented links between narrative skills and academic and reading achievement (Tomblin et al., 1996; Griffin, Hemphill, Camp, & Palmer, 2004).

The usefulness of verbal processing measures has been strongly supported by research and they are becoming increasingly common in clinical assessment protocols. The results of Dollaghan and Campbell (1998) and those of Ellis Weismer et al. (2000) and Conti-Ramsden (2003) support the utility of nonword repetition scores in the correct identification of specific language impairment, as part of a larger diagnostic protocol (see however Archibald & Joanisse (2009) who find nonword repetition to have good sensitivity but fairly low specificity in the identification of specific language impairment). Nonword repetition tests have the advantage of rapid administration and scoring and there are indications that they are relatively immune to dialectal differences (Dollaghan & Campbell, 1998). However, they do not provide accurate results for children who have significant articulation deficits. Similarly, a test as simple as Sentence Imitation has been shown to add significantly to the diagnostic protocol (Conti-Ramsden, Botting, & Faragher, 2001; Archibald & Joanisse, 2009). Additional processing tests included Following Directions, which requires children to comprehend and remember increasingly long and complex instructions, and demonstrate understanding by pointing to pictures or manipulating items. This test emphasized the processing or working memory part of this task, using easily comprehensible vocabulary. Short-term memory and working memory were assessed further by the use of tests of Forward and Backwards Digit Span. A final measure included in our protocol was Rapid Automatized Naming of animals (RAN). This task was included as an assessment of prerequisite skills for reading, given its strong relationship with subsequent word recognition

skills (Catts, 1993). At age 5, most of the children in the study are too young to be tested on reading achievement.

The purpose of the present study was to collect preliminary normative data for the language measures described above for monolingual francophone children aged 5. In order to get a sense of developmental variation around age 5, children aged 6 months younger and 6 months older were included in addition to children aged 5. Our main interest here is to report the normative values for these measures, and discuss their developmental sensitivity in this age range.

Methods

Participants

Participants included 78 monolingual French-speaking children from the Montreal area ranging in age from 49 months to 71 months, with a mean and median age of 59 months. The children were divided into three age groups representing 4 ½ year-olds (49 to 56 months inclusive), 5-year-olds (57 to 63 months inclusive) and 5 ½ year-olds (64 to 71 months inclusive), yielding groups with the following mean ages: 52.41 (SD 1.78), 60.15 (SD 2.23) and 66.2 (SD 2.32). The children were recruited from daycares and preschools in the Montreal area by invitation letter sent home with the children by the daycare staff. Sixty-five of the children were recruited and tested as part of this study. Twelve additional children were tested within other studies conducted by the same team of researchers, using the same methods (Sutton et al., 2009). For this reason, however, some of the measures are not available for all the children (see Table 2). All children were from monolingual French-speaking homes and had no developmental concerns, pre- or perinatal complications, major illnesses or hospitalizations as per parent report (a history of otitis media was not an exclusionary criterion in this study given its relatively high frequency). The children had had no significant regular exposure to languages other than French (defined as less than five hours per week). Nonverbal cognitive development was tested using the Leiter International Performance Scale-Revised Brief IQ (Roid & Miller, 1997). This is a test whose stimuli and administration are entirely nonverbal. The brief IQ measure is based on four subtests: Figure Ground, Form Completion, Sequential Order, and Repeated Patterns. To be included in the study, children were required to obtain a standard score of 70 or higher on this test in order for the sample to represent the normal variation of cognitive levels while excluding children with scores consistent with mental retardation.

A hearing screening was conducted under earphones using a portable audiometer on the day of the test at octave frequencies from 500 to 4000 Hz, to ensure that no significant hearing loss was present. Children passed a screening at 10 dB HL, with some exceptions involving somewhat higher thresholds at individual frequencies. A reliable result could not be obtained at 10 dB HL in many cases due to background noise as the test was not conducted in a sound-proof booth. Children were not tested if their hearing

Table 1

Background Characteristics: Mean and (standard deviations) for age, nonverbal cognition scores and maternal education by age group.

Age group:	4 ½ years	5 years	5 ½ years
Number of girls	14	16	11
Number of boys	13	16	8
Age in months*	52.4 (1.8)	60.2 (2.2)	66.2 (2.3)
Nonverbal cognition (Leiter Brief IQ)	102.4 (14.8)	101.3 (19.1)	102.3 (19.3)
Maternal education (Number of years)	15.7 (2.8)	17.4 (2.9)	16.9 (2.4)

* A significant group difference was found for age

was considered to be impaired based on the screening. Background variables including age, nonverbal cognition and maternal education are reported in Table 1. One-way ANOVA analysis revealed a significant group difference in age ($F(2,74)=240.552, p=.000$), but no significant group difference in maternal education ($p=.074$) or nonverbal cognition (.978).

Procedures

Children were tested individually by trained research assistants who were native speakers of Quebec French. Each child attended one test session lasting approximately 2 to 2 1/2 hours, which was conducted either at their school, at their daycare, or in a research laboratory at McGill University or University of Montreal. Breaks were provided as needed. All testing was audio- and video-recorded. The particular measures used are described below. These include standardized tests that had previously been adapted from English, test procedures adapted from English for the purpose of this study, and procedures developed by members of the research team previously or for this study. It was beyond the scope of this study to develop new test materials in all the areas to be assessed for this preliminary look at the language profile of Montreal francophone children. Several test translations/adaptations have been in wide clinical use in Quebec, with or without normative data. Insofar as such tests 1) are based on well established English tests, 2) include careful adaptation going beyond simple translation, and 3) are supported by clinical experience with francophone populations in Quebec, they were considered potential candidates for inclusion in this study. In other cases, materials were developed for this study. A major goal of the study was to examine the usefulness of these materials. During the test session, children were administered the following measures (the order of tests varied across children):

1. The *Échelle de vocabulaire en images Peabody* (EVIP, Dunn, Thériault-Whalen, & Dunn, 1993) was used to assess receptive vocabulary (comprehension of single words in isolation). This test was originally developed in English, but was adapted for Canadian speakers of French and normed for this group. However, it has been shown that the published norms underestimate the typical skills

of Quebec francophone children (Godard & Labelle, 1995), most likely because the norms included French-speaking children who are monolingual speakers and also bilingual French-speakers from across Canada. We considered the EVIP to be a well established test of receptive vocabulary, however, needing to be reevaluated for the appropriateness of its norms for Quebec. In addition to its wide clinical use, the EVIP is frequently used in research for purposes of participant selection and matching. The EVIP was administered and scored as directed in the manual.

2. The Carrow (Groupe coopératif, unpublished Quebec French adaptation of the Test for Auditory Comprehension of Language [TACL-R]; Carrow-Woolfolk, 1985) was used to assess receptive language skills (vocabulary, morphosyntax and syntax). The Carrow is a Quebec French translation and adaptation, a well-known and widely used test both in clinical practice and research. The adaptation of this test to French involved translation and reordering of items to better reflect the development of French within a previous norming study (Groupe coopératif, 1999). The Carrow has enjoyed considerable clinical popularity in Quebec and the available norms for Kindergarten (maternelle) children indicate that it is sensitive to the development of French within the age range of this study. This test has three subtests: *Classes de mots et relations* [Vocabulary], *Morphèmes grammaticaux* [Grammatical Morphemes], and *Phrases complexes* [Elaborated Phrases and Sentences]. The test was administered and scored using the test materials of the TACL-R (with items reordered as directed in the adaptation) and scored as directed in the TACL-R manual.

3. A spontaneous language sample was collected in a free-play conversational context based on the guidelines of Leadholm & Miller (1992) using age-appropriate toys (such as playmobil hospital and school, and polly pockets). The language samples were transcribed orthographically using the SALT software (Systematic Analysis of Language Transcripts, Miller & Chapman, 1984-2002). Coding of grammatical morphology followed the Quebec-French adaptation of SALT conventions developed by Elin Thordardottir (2005). MLU computed following this procedure has been shown to be developmentally sensitive in French with MLU in morphemes being higher for

French-speaking children than it is for English-speaking age mates, reflecting the greater frequency of grammatical morphemes in French. The measures reported are based on 100 utterances (excluding imitations) and include Mean Length of Utterance in words (MLUw) and in morphemes (MLUm). Those language samples that were not collected as part of this study were rechecked to ensure that the same grammatical coding procedure was applied uniformly to all the samples and that the measures were based on the same transcript cut. Reliability checks were performed by an independent scorer on a randomly selected subset of 23 language samples (29% of the samples). Interrater agreement for MLUw was 96.2 % (SD 3.05) and for MLUm 95.4 (SD 4.2).

4. The Edmonton Narrative Norms Instrument (ENNI), developed by Schneider, Dubé and Hayward (2002-2006), was used in a French adaptation developed within this study (Thordardottir & Gagné, 2006; Gagné & Thordardottir, 2006). A number of measures have been used clinically and in research to assess narratives. Just as with any assessment of spontaneous language, the elicitation context influences the child's productions. Elicitation methods for narratives vary notably in whether they use picture support and in whether the children formulate a story or retell a story. The ENNI, developed recently in Canada, comprises a set of wordless picture stories that are carefully constructed to increase in length and in the complexity of the story grammar. Story grammar refers to the main categories of information that are part of a good story and form the macrostructure of the story (Schneider, Dubé, & Hayward, 2002-2006). A measure of narrative microstructure, First Mentions, is also derived from this instrument. This measure assesses the children's use of referring expressions to introduce characters and objects as they tell the story. In the elicitation procedure, the children are presented novel stories in pictures, but are not told the stories. The procedure, therefore, targets children's ability to formulate the story rather than their ability to retell a story. Schneider et al. have demonstrated that this instrument is sensitive to development with English-speaking children aged 4 to 9 and that significant differences are found on this test between children with and without language impairment. In the ENNI norming study (Schneider et al.), children were administered two sets of stories: A and B. For this study, administration of both stories would have been too time-consuming given the larger protocol of tests. Initially, children were administered either set A or B, counterbalanced across children. However, it became apparent that children responded less well to set B, indicating that the two sets were not equivalent in the French application. In subsequent testing, story set A was administered to all children. This change in procedure accounts for missing data in the ENNI dataset, as data from those children administered stories B were not included.

Each story was administered in the following manner: the child was first shown the entire story such that the examiner does not see them. The child was then shown the pictures

again and asked to tell the story to the experimenter. The child was asked/prompted to say what happened in the story rather than to describe the pictures. The stories were transcribed orthographically and scored in terms of Story Grammar Complexity and First Mentions. This scoring followed the ENNI manual (Schneider et al., 2002-2006), using a French adaptation of the scoring forms developed for this study. The Story Grammar Score gives an indication of the child's ability to include story grammar elements, while First Mentions addresses whether the child provides sufficient information on first mention, subsequently using pronouns to refer to previously presented entities. The full scoring of First Mentions as described in the ENNI manual (Schneider et al., 2002-2006) uses information from stories A and B. Our version of First Mentions is based only on the A set. In the present analysis, only these two scores are reported (additional scores that can be derived include MLU and production of grammatical morphology and complex syntax – however, MLU was obtained from spontaneous samples and the main interest in the ENNI here was in narrative assessment).

5. Nonword repetition, comprising a set of 40 words ranging in length from 1 to 5 syllables was derived from word lists developed expressly for Quebec French by Courcy (2000). The nonwords were administered from a tape and were scored online with subsequent rechecking of the recording of the responses. Scoring followed the procedure of Dollaghan & Campbell (1998), whereby children are credited for the number of correct phonemes produced. Credit is given for phonemes that are produced in a distorted form, and no points are subtracted for phonemes that are added. Children do not receive credit for phonemes that are missing or that are substituted, or for phonemes that appear in the wrong order relative to other phonemes in the nonword.

6. Sentence imitation was tested using an adaptation of the sentence imitation subtest of the CELF-P (Clinical Evaluation of Language Fundamentals-Preschool, Semel, Wiig, & Secord, 1992). This subtest involves a story book entitled *The Moving Scene*, wherein children are told a story as they look at the pictures. The story is then retold by the examiner, and the child is asked to repeat selected sentences. The French adaption of this subtest, *Le grand déménagement*, was developed by Royle & Thordardottir (2003). The adaptation involved a translation of the story and modification of the scoring guidelines. This particular sentence imitation task was selected because the sentences are embedded in a story with picture support, which is appropriate for an imitation task for children in the age range of this study in that it aids their memory and increases their motivation. The appropriateness of this particular story is supported by its long-standing clinical use. Instead of sentences receiving scores ranging from 0 to 3, the adapted scoring reflects the percentage of words repeated, which gives a more finely graded results scale of partial credit for partially repeated sentences.

7. Rapid Automatized Naming (RAN) (Catts, 1993) was tested by presenting a sheet with pictures of a horse (*cheval*), a cow (*vache*) and a pig (*cochon*) in black (*noir*), red (*rouge*) or blue (*bleu*), arranged in random order in 4 rows of 6 animals each for a total of 24 animals. The children were asked to name each picture, naming the animal and its color as fast as they could, going from left to right, and through each row from top to bottom. Before the test, the examiner ascertained that the children recognized the animals and knew their names, as well as the colors. Two scores were derived from this test: the number of errors made by the child, and the time in seconds required for completion (starting from when the child named the first animal and ending when the child had named the last animal), thus addressing both accuracy and speed. In counting the number of errors, only the child's last production for each animal was considered (thus, the child was allowed to self-correct). Unlike in English, the color term comes after the animal name (e.g. *cheval noir* [black horse]). No error was counted where the child named the color and animal in the wrong order.

8. The children's ability to follow auditory directions was assessed using an unpublished preliminary French adaptation of the Following Directions subtest of the Clinical Evaluation of Language Fundamentals-4 (CELF-4, Semel, Wiig, & Secord, 2003) developed by Boulianne & Labelle (2006). This subtest requires children to carry out directions by pointing to picture stimuli. For example, they might be asked to point to item A and then to item B, or to point to item B before they point to item A. Testing started at item 1 for each child and was discontinued after 9 consecutive errors.

9. Digit span was administered using an unpublished preliminary French adaptation of the Forward and Backwards Digit Span subtests of the CELF-4 (Clinical Evaluation of Language Fundamentals-4, Semel, Wiig, & Secord, 2004) developed by Boulianne & Labelle (2006). The two subtests were administered according to the instructions of the CELF-4 manual.

Detailed administration procedures as well as materials and score sheets for those procedures that were developed for this study may be obtained by contacting the first author.

Results

Means and standard deviations for each of the measures are reported for each age group of children in Table 2. EVIP scores are reported as raw scores and as standard scores, referenced to the published norms (Dunn et al., 1993). The scores for the Carrow/TACL-R and the CELF-4 subtests (Following Directions, Forward Digit Span and Backwards Digit Span) are raw scores. The results of Nonword Repetition and Sentence Imitation are reported as percent correct scores. RAN accuracy scores are reported in terms of the number of errors (out of 24 animals to be named) and in terms of the time required to complete the task in seconds.

Mean Length of Utterance in words (MLUw) reflects the average number of words found in each child utterance in the sample, whereas MLU in morphemes (MLUm) reflects the average number of words as well as grammatical morphemes in each utterance. In addition to means and standard deviations, Table 2 reports the number of children for whom data were available for each measure. Smaller sample sizes are seen notably for the youngest age group for Nonword Repetition, Sentence Imitation, Following Directions and Digit Span. This is due to the fact that 12 children in this group came from another study in which these measures were not administered. Other variations in numbers are more minor and are due to children not finishing tasks or experimenter mistakes. Missing data for the ENNI result from the exclusion of story B data, as discussed in the Methods section.

Inspection of Table 2 reveals that the measures in general increase systematically with age, with the exception of RAN time, which decreases with age (reflecting increased speed in completing the task with age). Given that the study covers an age range of less than 2 years (49 to 71 months), some developmental change would be expected in the measures, but this change might not be large for some of the measures, and might vary between measures, reflecting differences in the rate of development of different linguistic skills within this time period. The systematic changes with age suggest that the measures are developmentally sensitive, but the numbers also indicate that some change more in this period than others. A series of one-way ANOVAs were used to examine the effect of age group on mean scores for each of the measures. Thirteen ANOVAs in total were conducted with the critical alpha level set at .05/13, or .004 as a result of a Bonferroni correction for multiple comparisons (for the EVIP, only raw scores were included given that normalized scores are expected to be more stable across age and for the Carrow, only the total score was included to limit the number of comparisons). Significant group effects were further examined with Fischer LSD post hoc comparisons. A significant effect of age group was found for the following measures: EVIP raw score ($F(2,77)=15.86$, $p<.001$, $\eta^2 = .29$), MLUw ($F(2,74)=13.12$, $p<.001$, $\eta^2 = .27$), MLUm ($F(2,74)=12.02$, $p<.001$, $\eta^2 = .25$), ENNI First Mentions ($F(2,68)=8.13$, $p=.001$, $\eta^2 = .20$), ENNI Story Grammar ($F(2,67)=13.20$, $p<.001$, $\eta^2 = .29$), and RAN Time ($F(2,70)=6.63$, $p=.002$, $\eta^2 = .16$). Post hoc tests revealed that for MLUw, ENNI First Mentions and ENNI Story Grammar, the means of all three age groups differed from each other. For the EVIP and RAN time, the youngest group differed from each of the older groups, but the middle and oldest groups were not significantly different from each other. For MLUm, both the youngest and middle groups differed significantly from the oldest group, but the youngest and middle groups did not differ significantly from each other.

The relationship between different measures of language and verbal processing was examined by correlational analysis. With the number of measures administered in this study, inclusion of all the measures in

Table 2

Results of language measures by age group, reported as means and (standard deviations). P values are reported for the age group comparison for each measure.

Age group:	4 ½ years	5 years	5 ½ years	p
EVIP raw	54.6 (16.3)	69.7 (15.4)	78.2 (13.6)	<.001
<i>n</i>	27	32	19	
EVIP ss	111.4 (18.0)	116.2 (17.7)	22.4(13.5)	.101
<i>n</i>	27	32	19	
Carrow total	74.8 (17.0)	82.9 (13.9)	90.2 (11.9)	.006
<i>n</i>	25	29	16	
1. Classes de mots	30.2 (6.1)	32.4 (2.9)	33.9 (2.7)	
2. Morphèmes	24.5 (5.5)	26.7 (6.1)	27.3 (7.4)	
3. Phrases complexes	19.6 (8.5)	23.7 (6.3)	27.4 (4.7)	
MLUw	3.97 (1.1)	4.72 (1.1)	5.89 (1.7)	<.001
<i>n</i>	27	30	18	
MLUm	5.15 (1.3)	5.90 (1.4)	7.59 (2.3)	<.001
<i>n</i>	27	30	18	
ENNI SG	13.7 (4.9)	16.9 (5.3)	21.9 (5.9)	<.001
<i>n</i>	27	24	17	
ENNI FM	13.1 (3.7)	16.9 (5.3)	21.9 (5.4)	.001
<i>n</i>	27	25	17	
Nonword Rep	89.4 (7.5)	86.9 (9.5)	91.8 (4.0)	.149
<i>n</i>	13	27	16	
Sent. Imit.	74.2 (29.2)	76.3 (16.7)	88.7 (10.0)	.057
<i>n</i>	14	30	17	
RAN error	1.0 (2.0)	0.97 (1.3)	1.2 (1.9)	.901
<i>n</i>	25	31	15	
RAN time	112.4 (44.0)	85.4 (24.4)	79.6 (21.8)	.002
<i>n</i>	25	31	15	
Foll. Dir.	24.6 (8.6)	27.3 (9.2)	32.3 (13.3)	.166
<i>n</i>	11	25	14	
F digit span	5.0 (1.6)	5.5 (1.7)	6.7 (2.3)	.053
<i>n</i>	13	32	14	
B digit span	0.7 (1.1)	1.1 (1.4)	1.9 (1.2)	.040
<i>n</i>	13	32	15	

this analysis would have resulted in a prohibitive number of correlations. Therefore, six key measures were selected for this analysis: EVIP raw score, Carrow total score, MLUm, ENNI Story Grammar, Nonword Repetition and Sentence Imitation. These were selected because they address major domains of language skills considered part of a comprehensive evaluation of language (receptive vocabulary, receptive morphosyntax and syntax, syntactic production, and production of narrative discourse structure). As well, Nonword Repetition and Sentence Imitation are increasingly part of clinical evaluation protocols. The correlations between these measures are presented in Table 3. With a total of 15 correlations, the critical alpha level was set at .0038, applying a Bonferroni correction. These correlations need to be interpreted with some caution due to the fact that they are not all based on an equal '*n*' due to missing data, notably for Nonword Repetition and

Sentence Imitation. The Table reveals significant correlations ranging from weak to strong between the EVIP and all the other measures except Nonword Repetition and MLUm. The strongest correlation for the EVIP is with the Carrow ($r=.714$). The Carrow is moderately to strongly correlated with all measures except MLUm. ENNI Story Grammar is significantly moderately correlated with the EVIP and the Carrow. In contrast, MLUm is not significantly correlated with any of the other measures. The two processing measures, Nonword Repetition and Sentence Imitation are correlated with each other and with the Carrow. The correlation with the Carrow is stronger for Sentence Imitation than Nonword Repetition ($r=.741$ vs. $.456$). Sentence Imitation is, in addition, moderately correlated with the EVIP, whereas Nonword Repetition is not.

Table 3

Correlations between language measures: EVIP, MLUm, Carrow, Story Grammar, Nonword Repetition and Sentence Imitation

	EVIP	MLUm	Carrow	SG	NWR	SI
EVIP	-					
MLUm	.319 .005	-				
Carrow	.714 .000*	.216 .074	-			
SG	.594 .000*	.181 .139	.526 .000*	-		
NWR	.314 .018	.091 .504	.456 .001*	.260 .066	-	
SI	.547 .000*	.188 .148	.741 .000*	.370 .005	.595 .000*	-

* correlation significant at the .003 level

EVIP: raw score

MLUm: MLU in morphemes

Carrow: total scores

SG: ENNI story grammar score

NWR: Nonword repetition score

SI: Sentence Imitation

Discussion

This article presents preliminary normative data on a number of measures of language knowledge and language processing for francophone children from the Montreal area between the ages of 4;6 and 5;6. The results are preliminary in that they are based on a relatively small sample of children and cover a fairly limited age range. In addition, the children are all from the Montreal area and therefore, these normative data cannot be assumed to reflect all francophone children in the province of Quebec. For some of these measures, larger datasets targeting this age range or larger age ranges are being collected and analyzed (Elin Thordardottir et al., 2009; Sutton et al., 2009), including children from Quebec city and rural areas. In spite of their preliminary nature, however, these results do represent a useful reference base for the evaluation of language skills in francophone children within this age range for both clinical and research purposes. The age range covered here corresponds to the age at which many children receive their first formal evaluation and in which language impairment is first identified. Some of the data reported here are for tests that are already in clinical use. All of the tests are easy to use clinically and are accessible to clinicians. The existence of normative data for these measures will permit clinicians to compare the scores of individual children to the typical performance of French-speaking children in Quebec and thus to ascertain whether the performance of the child falls within the normal range or significantly below it. The tables provided in the Appendix are designed to facilitate this comparison.

To participate in this study, children had to be monolingual speakers of French and had to have had no serious

developmental concerns or major illnesses. They also had to receive nonverbal cognitive scores within the normal range. The normal range was fairly broadly defined, as encompassing children who score as much as 2 SD below the mean. This was done so as to allow within the sample a typical variability of cognitive levels, rather than using an overly restrictive criterion. The resulting background characteristics indicate that the sample does indeed reflect considerable variability in this respect: The mean cognitive score is right around 100 in each age group, with a standard deviation of 14 to 20 points, which is similar to the norms for this test. Therefore, the results for the participants of this study closely resemble the normative sample for this test and can be seen as providing a good representation of the normal variability of cognitive levels in the population.

The pattern of scores for each of the language measures shows a systematic increase with age, suggesting that each is sensitive to developmental increases in skill. However, the developmental increase was larger for some measures than others, as reflected in that most, but not all of the tests showed a significant effect of age group, and by the fact that some showed significant effects between all adjacent age groups, whereas others did not. This is not unexpected. Different language skills show periods of more rapid vs. slower growth at different ages. Given that this study covers a fairly small age range, the lack of an age effect does not mean that the measure in question would not show developmental changes given a larger age range. Among the measures that had a significant age effect were the EVIP raw score, MLUw and MLUm in spontaneous language, both ENNI measures: Story

Grammar and First Mentions, and RAN time. The strong age progression seen in MLU (with significant difference between all groups for MLUw) is noteworthy given that MLU is regarded by many as having limited developmental sensitivity beyond a certain level, expressed in terms of an age level (age 5) or an MLU level (often considered to be an MLUm of 3.0). Indeed, several studies have reported MLU to increase linearly up to a certain point, defined in terms of age or MLU level, with a subsequent leveling off of the developmental increase (Miller & Chapman, 1981; Rondal, Ghiotto, Bredart, & Bachelet, 1987; Scarborough, Wyckoff, & Davidson, 1986). The present data clearly indicate that MLU in French, both as measured in words and morphemes, continues to show an important systematic increase with age, at least up to the age of 5;6 and an MLU level of 5.9 words and 7.6 morphemes. In fact, the increase between 5;0 and 5;6 is significant for both MLUw and MLUm, suggesting that the developmental curve does not yet show signs of leveling off. This suggests that MLU is a useful measure for French-speaking children in this age range. It should also be noted that in spite of previous results showing nonlinearities in MLU development fairly early in development as noted above, MLU norms for English have been collected up to age 13 (Leadholm & Miller, 1992; Miller & Chapman, 1984-2002), showing developmental increases throughout this age range, especially for narrative samples which require the use of more complex syntax than does conversation. Further, significant group differences in MLU have been documented between groups of English-speaking school-age children with and without specific language impairment (Elin Thordardottir, 2008b), suggesting that even in English, MLU should not be too easily discarded for older preschoolers and school-aged children. Given that French is more highly inflected than English, producing a considerably higher MLU within a given age group (Elin Thordardottir, 2005), and the finding that the acquisition of grammatical morphology is more protracted in French than in English, MLUm in French is likely to show developmental changes longer than it does for English. Continued increase in MLU throughout the school age range has been demonstrated also for Icelandic, another language considerably more highly inflected than English (Elin Thordardottir, 2008b).

The ENNI was another spontaneous measure showing a significant age effect. This indicates that the discourse formulation skills tapped by this instrument are developing at a relatively rapid rate within this age range. We did not expect that this measure would yield identical scores in our French version as it does in the original English version. Story Grammar addresses higher level story organization and inclusion of information, which is a skill relatively independent of language structure as such, and therefore might be expected to yield similar scores across languages. However, cultural variation is also known in story telling style, and it is possible that the picture materials interact in a different way with cultural traditions and knowledge. The ENNI norms are given for children age 4 to 9 at 1-year intervals (Schneider et al., 2002-2006). The closest

comparisons are between our 5 ½ year-olds, who compare closely in age to the normative group of 5-year-olds and between our 4 ½ year-olds and the ENNI 4 year-olds. These comparisons of our data with the English ENNI data show that our 5 ½ year-olds obtain a mean Story Grammar score for story A3 of 21.9 (SD 5.9) compared to 21.25 (SD 4.97) in the ENNI norms. The corresponding comparison for the 4-year-olds is 13.7 (SD 4.9) versus 17.06 (SD 6.45). The French and English results, therefore, appear to agree closely for the 5-year olds, but somewhat less well for the 4-year-olds. This provides preliminary evidence that the tests are fairly comparable in the two languages in terms of Story Grammar scores for Story A. Further examination including exact age matches is required to ascertain whether the observed cross-linguistic differences in scores for the younger group are meaningful. Cross-linguistic comparison with the First Mentions (FM) scores is more problematic due to a difference in procedures. The full ENNI FM score is obtained by scoring elements from both the A and B series of stories. In this study, we administered only the A series. As a result, our FM scores reflect a truncated version in comparison to the FM scores reported in the ENNI norms. Indeed, comparison reveals that our scores are approximately half the ENNI scores. Further comparison is not meaningful due to the differences in administration.

It was of interest as well to compare our EVIP scores to the published norms (Dunn et al., 1993) given previous indications that these norms do not adequately represent monolingual French-speaking children in Quebec (Godard & Labelle, 1995). Table 2 reports raw scores for the EVIP, as well as standard scores, which are obtained by converting raw scores using the published norms. The EVIP standard scores have a mean of 100 and a SD of 15. Thus, the average child is expected to obtain a standard score around 100. Our results for each of the 3 age groups, show standard score means well above 100 (112, 116 and 122, respectively). Thus, the difference between our results and the published norms is on the order of a standard deviation – a non negligible difference. It is unlikely that this finding results from our sample being non-representative of its population. First, we made no effort to include only children with relatively high language abilities. The mean nonverbal cognitive scores and the range of scores both indicate that the sample represents children of various ability levels, with the means for nonverbal cognition close to 100 for each age group, and thus agreeing closely with the published norms for the Leiter test of nonverbal cognition. Secondly, this result constitutes a replication of the findings of Godard and Labelle. This finding has therefore been reported in two independent studies. The difference may result from several factors. The published EVIP norms, in their effort to represent the whole population of francophone children in Canada, included children whose exposure to French varies considerably. This may partly explain why the population that possesses the most advanced French skills – monolingual francophone native speakers, performs better than the nation-wide norm.

In addition, the typical performance may have changed since the EVIP was normed. The clear implication is that the interpretation of the EVIP, when used with this population, must draw on additional local norms. The same may be true of other francophone populations within Canada.

Significant correlations were found between many of the measures, most of which were in the weak to moderate range, but some of which were fairly strong. Strong correlations were found notably between the Carrow and Sentence Imitation and the Carrow and EVIP, and moderate ones between Sentence Imitation and the EVIP and Nonword Repetition, respectively, and between the EVIP and ENNI Story Grammar. Interestingly, MLU_m was not significantly correlated with any other measure. The pattern of correlations indicates that the different language measures do overlap to a certain degree, but at the same time, they also tap different skills. In particular, MLU in spontaneous language appears to tap a different skill than the other measures, not only in comparison to formal tests of receptive language (EVIP and Carrow), but also in comparison to the production of narrative structure (ENNI). The pattern of correlations suggests that in spite of some overlap, these measures do contribute unique information regarding the children's language skills.

Normative data are an important tool for clinicians in Speech-Language Pathology. They allow an individual child's performance to be compared to that of other children of the same age and who have had similar language experiences. Language impairment generally results in significantly low scores in one or more areas of language. Therefore, norm-referenced tests play a key role in accurate identification of language impairment and in the determination of severity levels, the documentation of the child's profile of strengths and weaknesses and the detailed documentation of the current level of functioning used to select appropriate treatment targets. Not all tests are equally well suited for each of these purposes, however. Not all areas of language may be equally severely affected by a language impairment. Further, formal tests are targeted to specific areas of language, but use a more contrived elicitation method than spontaneous measures. Therefore, clinical work is greatly facilitated by the availability of different types of language measures. Normative data are important in guiding treatment decisions in that they provide information on the normal sequence of development, thereby helping to prioritize goals based on the child's needs and level of readiness for new learning. However, norms are not sufficient by themselves to accurately identify the presence of language impairment in all cases. While very severe cases are easily identified by very low scores, decisions are more complicated in moderate and borderline cases. Language tests differ in how sensitive they are to the presence of language impairment (Conti-Ramsden, Botting & Faragher, 2001; Plante & Vance, 1995; Tomblin, Records & Zhang, 1996). Therefore, the next step in this research, aiming to develop an assessment protocol is the verification of how accurately these tests are able to rule in or rule out the presence of language impairment. Such work is currently underway.

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Author Note

Correspondance concerning this article should be addressed to Elin Thordardottir, School of Communication Sciences and Disorders, McGill University, 1266 Pine Avenue West, Montreal, Quebec, H3G 1A8. Email: elin.thordardottir@mcgill.ca.

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Appendix

Scores corresponding to cut-off points of -1 standard deviation, -1.5 standard deviation, and -2 standard deviations for each of the measures, for each of the three age groups. In a normal distribution, the -1 SD point corresponds to the 16th %ile. The -1.5 SD point corresponds roughly

Age 4 ½ years (range 49 to 56 months inclusive)			
	- 1SD	-1.5 SD	-2SD
EVIP raw score	37.30	29.17	21.05
EVIP ss	93.42	84.45	75.47
Carrow total	57.77	49.28	40.78
1. Vocabulary	42.14	21.12	18.09
2. Morphology	19.01	16.27	13.54
3. Syntax	11.11	6.85	2.58
MLUw	2.89	2.35	1.81
MLUm	3.86	3.22	2.57
ENNI First Mention	9.45	7.62	5.79
ENNI Story Grammar	8.72	6.24	3.77
Nonword Repetition	81.95	78.20	74.45
Sentence Imitation	44.89	30.27	15.64
RAN Errors	0	0	0
RAN Time	156.41	178.44	200.36
Following Directions	15.96	11.67	7.38
Forward Digit Span	3.37	2.56	1.74

Age 5 years (range 57 to 63 months inclusive)			
	- 1SD	-1.5 SD	-2SD
EVIP raw score	54.32	46.62	38.93
EVIP ss	98.47	89.61	80.75
Carrow total	70.87	64.88	58.88
1. Vocabulary	29.53	28.10	26.66
2. Morphology	20.59	17.52	14.46
3. Syntax	17.41	14.26	11.11
MLUw	3.66	3.13	2.60
MLUm	4.46	3.74	3.03
ENNI First Mention	11.75	10.13	8.50
ENNI Story Grammar	11.57	8.90	6.23
Nonword Repetition	77.36	72.59	67.82
Sentence Imitation	59.67	51.37	43.07
RAN Errors	0	0	0
RAN Time	109.76	121.97	134.17
Following Directions	18.11	13.53	8.94
Forward Digit Span	3.87	2.92	2.06

Age 5 ½ years (range 64 to 71 months inclusive)			
	- 1SD	-1.5 SD	-2SD
EVIP raw score	64.52	57.70	50.88
EVIP ss	108.86	102.11	95.36
Carrow total	78.20	72.21	66.21
1. Vocabulary	31.21	29.85	28.48
2. Morphology	19.87	16.17	12.46
3. Syntax	22.69	20.35	18.00
MLUw	4.23	3.40	2.57
MLUm	5.27	4.11	2.95
ENNI First Mention	14.30	12.81	11.31
ENNI Story Grammar	16.55	13.86	11.16
Nonword Repetition	87.69	85.64	83.59
Sentence Imitation	78.71	73.71	68.71
RAN Errors	0	0	0
RAN Time	101.33	112.2	123.06
Following Directions	18.99	12.34	5.69
Forward Digit Span	4.36	3.21	2.05

■ Effect of Sound Field Amplification on Grade 1 Reading Outcomes

■ Effet de l'amplification en champ libre sur les performances de lecture des élèves de première année

Pamela Millett
Neil Purcell

Pamela Millett, Ph.D.
Assistant professor
Deaf/Hard of Hearing
Program
Faculty of Education
York University, Toronto,
Ontario

Neil Purcell, M.Ed.
Hastings and Prince
Edward District School
Board
Belleville, Ontario

Abstract

Sound field amplification provides mild amplification and even distribution of a classroom teacher's voice around the classroom as a strategy to improve listening and overcome effects of poor classroom acoustics. Research has documented improvements in attention, behaviour, speech understanding, academic outcomes and teacher vocal health, but few studies have focused on literacy outcomes. This study examined changes in reading outcomes for Canadian grade one students (N=486) in 24 classrooms, 12 with sound field amplification and 12 without, over one school year. Results indicated greater changes in the total percentage of students reading at grade level at the end of the school year in amplified classrooms vs unamplified classrooms, although results were not statistically significant. As well, positive trends were seen in improved reading outcomes for students identified at risk for reading difficulties, although again, not statistically significant.

Abrégé

L'amplification en champ libre augmente légèrement l'intensité de la voix du professeur et la répartie dans la salle de classe afin d'améliorer l'écoute et de surmonter les effets d'une mauvaise acoustique. La recherche a documenté des améliorations au niveau de l'attention, du comportement, de la compréhension de la parole et des résultats scolaires des élèves ainsi qu'au niveau de la santé vocale du professeur. Cependant, peu d'études se sont attardées aux répercussions sur l'alphabétisation. Cette étude a examiné pendant une année scolaire les changements des performances de lecture chez les élèves canadiens de première année (N=486) dans 24 classes, dont 12 avec amplification en champ libre et 12 sans. Bien qu'ils ne soient pas statistiquement significatifs, les résultats ont démontré de plus grands changements au niveau du pourcentage total d'élèves capables de lire en première année à la fin de l'année scolaire dans les classes où il y avait amplification par rapport à celles sans amplification. De plus, de meilleures performances en lecture ont été notées même chez les élèves identifiés à risque d'éprouver des difficultés en lecture. Cependant, les résultats ne sont pas statistiquement significatifs.

Key words: sound field amplification, reading, Developmental Reading Assessment

Providing mild amplification of a teacher's voice and ensuring even distribution of the teacher's voice around the classroom to ensure better hearing, listening and attention, and to overcome the detrimental effects of poor classroom acoustics, has been a strategy used in classrooms since the early 1980s. These amplification and sound distribution systems, typically referred to as "sound field systems," are often recommended for individual students with hearing or auditory processing difficulties; however, they are increasingly being used in regular classrooms to help all children hear and listen more effectively. While the term "sound field amplification" might suggest that the teacher's voice becomes significantly louder, in fact, the primary purpose of the system is to ensure equal distribution of the teacher's voice throughout the classroom (rather than raising the volume, which would only distort the teacher's voice). This does require mild amplification of the teacher's voice but the design and placement of the speakers in the classroom ensures that the teacher's voice is heard at a clear, equal, slightly increased volume for all students, regardless of seating arrangements. The rationale for the use of sound field systems in regular classes is based on an extensive body of literature documenting a higher incidence of ear infections (and related hearing loss) in young children, greater difficulty understanding speech in the presence of noise, and immature listening skills related to neuromaturation of the auditory system well into adolescence (Bluestone, 2004; Gil-Loyzaga, 2005; Moore, 2002; Nelson & Soli, 2000; Stelmachowicz, Hoover, Lewis, Kortekaas, & Pittman, 2000).

As well, studies have found that recommended acoustical standards for noise levels and reverberation times are not achieved in the majority of classrooms, and that classrooms represent poor listening environments for young children (Bess, Sinclair & Riggs, 1984; Crandell & Smaldino, 1994; Crandell & Smaldino, 2000; Pekkarinen & Viljanen, 1991). Researchers have argued that the intersection of poor classroom acoustics, the inherent high demands on listening and auditory processing in classrooms, and the immature listening skills of children due to neuromaturation, create barriers to learning that place all children at educational risk (Anderson, 2004; Flexer, 2004). A possible strategy to address these barriers to learning is the use of sound field amplification. By improving signal to noise ratios (ie. the level of the teacher's voice compared to the level of the background noise), clearer speech signals can be attained (Larsen & Blair, 2008). By raising the level of the speaker's voice slightly above the background noise, his/her voice becomes easier to hear clearly. While the purpose of the system is to improve signal to noise ratio by increasing the signal (the teacher's voice), there are reasons to suggest that there might also be an additional effect of decreasing background noise. While there are no research studies measuring decreased background noise levels in classrooms with sound field amplification, Flexer (2009) reported that in fact, the majority of background noise in classrooms is created by students themselves (although certainly there can be other internal sources of noise such as fans).

Classroom noise levels can therefore be expected to rise when students are inattentive, talking to each other or otherwise unengaged in classroom instruction. If sound field systems can increase student attention, behaviour and engagement, classroom noise would be expected to decrease. This was seen in a recent Canadian study by Rubin, Aquino-Russell, & Flagg-Williams (2007), who conducted a study of 60 New Brunswick classrooms, grades 1 through 3, half of which used sound field amplification. Using the Revised Environmental Communication Profile (as described in Massie, Theodoros, McPherson, & Smaldino, 2004), they found statistically significant increases in student responses to teacher statements, decreases in the number of teacher repetitions, and fewer student initiated communications with peers during instruction in the amplified classrooms. Anecdotally, teachers and students reported a perceptual decrease in background noise levels.

Sound field amplification has been shown to have positive effects on speech discrimination, attention, behaviour, listening and academic outcomes (see Millett, 2008 for review). Studies have found improved scores in speech discrimination tasks and dictated spelling tests (Arnold & Canning, 1999; Burgener & Deichmann, 1982; Zabel & Taylor, 1993). Massie & Dillon (2006) reported statistically significant improvement in ratings of attention, communication and classroom behaviour with sound field amplification, and noted that teachers considered that "sound-field amplification facilitated peer interaction, increased verbal involvement in classroom discussion, and promoted a more proactive and confident role in classroom discussion" (p. 89). Wilson (1989) studied language skills for children enrolled in Head Start programs, and found that while neither sound field amplification nor teacher training in language development alone resulted in measurable changes in language scores for these children, the combination of amplification and training did.

Studies investigating changes in academic outcome measures, such as standardized reading tests, are fewer but suggest a potential positive impact. Given that the strongest predictor of reading skills are early phonological awareness skills (a skill heavily reliant on hearing), and given that improved speech perception might be expected to result in greater potential to benefit from classroom instruction, an argument can be made for a positive relationship between sound field amplification and reading outcomes. Flexer, Biley, Hinkley, Harkema, & Holcomb (2002) studied changes in phonological awareness skills in three groups of kindergarten children; one group taught with the standard curriculum, a second group taught with the standard curriculum plus targeted phonological awareness instruction, and a third group taught with the standard curriculum plus phonological awareness instruction in an amplified classroom. While both the second and third groups showed higher post-test scores on a standardized test of phonological awareness, the third group from the amplified classroom showed the highest scores. At the end of the first semester of kindergarten, 57% of children in

the control group and 43% of the children in the direct instruction group scored in the “at risk” category, compared to 7% of the group receiving direct instruction and sound field amplification.

Allcock (1999) also reported improvement in scores on standardized tests of phonological processing, with 74% of children in amplified classrooms achieving an improvement of 1 stanine or more, versus 46% in unamplified classrooms. Chelius (2004) reported that students in grades 1, 3, 4 and 5 in amplified classrooms achieved better standardized test scores in early literacy, on the Developmental Reading Assessment and in reading fluency. Similarly, a longitudinal study by Gertel, McCarty, & Schoff (2004) found that students in amplified classrooms scored 10% higher on a standardized achievement test than students in unamplified classrooms. Dairi (2000) found first grade students in amplified classrooms to show greater literacy gains as measured by a reading inventory. Long-term outcome measures from the Mainstream Amplification Resource Room Study Project (MARRS) indicated better scores on standardized tests of listening and language skills for kindergarten students, and better scores in the areas of math concepts, math computation and reading for grade 2 and 3 students (Ray, 1992).

Although studies reporting benefits of sound field amplification for students in regular classrooms are numerous, very few of them are Canadian and few focus specifically on literacy outcomes. The present study was undertaken as a pilot project in a Canadian school board to investigate changes in reading performance for grade 1 students related to provision of sound field amplification in the classroom over the course of one school year.

Research questions

The research questions for this study addressed the impact of sound field amplification on reading scores for grade 1 students, specifically:

- (a) Do students in amplified classrooms demonstrate a greater gain in number of reading levels attained than students in unamplified classrooms over the course of a school year? In other words, are students in amplified classrooms able to read materials at a higher level of difficulty than students in unamplified classroom after one school year?
- (b) Do students in amplified classrooms demonstrate a greater change in the percentage of students reading at grade level than students in unamplified classrooms? An alternate outcome measure to be investigated concerned changes in the numbers of students reading at or above grade level. It could be argued that ensuring that students are meeting the benchmark and reading at grade level is the more important outcome measure for the purposes of school boards and ministries of education.
- (c) Is there an interaction between gender and amplification – that is, is there a difference in percentage of males reading at grade level in the amplified classrooms compared to unamplified classrooms? This research question was included as purely exploratory in nature,

based on research which links reading proficiency and gender. Research continues to debate differences in reading performance between girls and boys (Martino, 2008), and in fact, initiatives by the Ontario Ministry of Education addressing boys’ literacy were recently launched based on the three-year Boys’ Literacy Teacher Inquiry Project (Ministry of Education, 2009). Boys’ literacy is an important topic in education in Canada, and therefore, findings that an intervention such as sound field amplification provided particular benefits to boys would be interesting.

- (d) Is there an interaction between at-risk readers and amplification – that is, do students identified as at risk (as defined by provision of Early Reading Intervention in grade 1) show a greater change in reading scores or percentage of students reading at grade level in amplified classrooms? The research on the benefits of sound field amplification for students at risk for learning discussed earlier suggests that sound field amplification may be of particular benefit for children who are struggling academically, perhaps by providing an extra “boost” in focus, attention and speech discrimination. The same rationale may also hold true for students identified as being at risk for reading difficulties (although not identified formally with a reading disability)

Method

Participants

This study took place in the Hastings and Prince Edwards District School Board in eastern Ontario over the 2002-2003 school year; with the exception of two small cities (total population 45,000 people), communities within this board are largely rural. This board has a total of 53 grade 1 classes, of which 24 were selected to participate in the sound field amplification study. Demographic information collected for each student included gender, existence of an Individual Education Plan (IEP), and participation in an Early Reading Intervention (ERI) program in senior kindergarten or grade 1. Parental and teacher consent was obtained prior to the study.

Initially, a total of 514 students were included in the study, in 12 schools. At the time of final testing in May 2003, 28 students had moved to other schools and therefore, complete data was available for 486 students. Of these 28 students, 12 were from amplified classrooms and 16 were from unamplified classrooms. Data for these students was removed prior to analysis. Of the participating schools, 6 had a single grade 1 classroom, 4 had two classrooms, 2 schools had three classrooms and 1 school had four classrooms, for a total of 24.

This study implemented a quasi-experimental, non-equivalent groups (based on lack of random assignment of students to classrooms) design which measured pre-test and post-test reading scores for an experimental group (amplified classrooms) and control group (non-amplified classrooms). Where possible, schools with more than one

Table 1
Demographic information

	Total # students	Gender M	F	Students with IEPs	Hearing screening completed	Refer results on hearing screening	Students receiving ERI in grade 1
Amplified classrooms (N=12)	247 (50.8%)	123 (49.8%)	124 (50.2%)	22	174 (67.2%)	27 (15.5%)	94 (38.1%)
Unamplified classrooms (N= 12)	239 (49.2%)	132 (55.2%)	107 (44.8%)	16	147 (57.7%)	16 (10.9%)	90 (37.7%)
Total (N=24)	486	255 (52.5%)	231 (47.5%)	38 (7.8%)	321 (62.5%)	43 (13.4%)	184 (37.9%)

grade 1 class were selected, to account for potential differences in school size, design or classroom acoustics, and to enable one grade 1 class in the school to be equipped with sound field amplification, and one to remain unamplified. Schools were selected that had similar sizes and geographical locations, and no split grade 1 classes were included.

Sound field amplification systems

Phonic Ear VocaLight infrared sound field amplification systems were installed in 12 grade 1 classrooms. The systems consist of a teacher-worn transmitter, an infrared sensor and receiver, and four wall-mounted speakers. All systems were installed by a professional company contracted by Phonic Ear. All teachers using the systems were inserviced on use, care and maintenance at the beginning of the study.

Hearing screening

In September, hearing screenings were completed using otoacoustic emissions testing by a graduate student in audiology from the School of Human Communication Disorders at the University of Western Ontario. Parental consent was obtained prior to screening. A Maico Ero-Scan (screener model) was used for all screening. A “pass” result on this screening required the presence of otoacoustic emissions at 2000, 3000 and 4000 Hz in both ears; absence of an otoacoustic emission at any frequency in either ear was recorded as a “refer.” Parents were notified of hearing screening results, and provided with information on follow-up for students receiving a refer result. Due to time and financial constraints, not all students in the study were screened (only 321 of 484 students received hearing screenings).

Reading Assessment

The first edition of the Developmental Reading Assessment (DRA) was used in this study, and was administered and scored by each student’s classroom teacher (Beaver, 1999). The DRA is used routinely as the standard reading assessment across the school board, so that all teachers in the study had used the DRA before and were familiar with its use. To further ensure consistency, all teachers received a short inservice on the DRA at the beginning of the study. School board policy required administration of the DRA in

September, January and May. Only data from September and May was used for this study, because of the very short time span between the September to January, and January to May administrations.

Because DRA book levels are not numbered entirely consecutively (e.g., levels are coded as 0, 1, 2, 3, 4, 8,), the book level achieved by an individual student represents data which has characteristics of both nominal and ordinal data and cannot be analyzed as raw data. Therefore, data was analyzed in two different ways. First, data was recoded to indicate number of levels changed between September and May (e.g., a student who achieved a level of 3 in September, and 8 in May showed a gain of 2 levels, not 5). This recoded data was then used to compare mean number of levels increased over the school year between groups. Second, the DRA Benchmarks for first and third terms were used to code each student as reading below grade level or at/above grade level in both terms. Using this data, percentage of students reading at grade level could be calculated for different groups.

Teacher questionnaires

Of the 12 teachers using sound field amplification, 11 completed the Teacher Opinion and Observation List, Voice Subsection, of the Listening Inventory for Education (Anderson & Smaldino, 1998). This instrument is a teacher questionnaire which asks teachers about their experiences with sound field amplification using a 5 item Likert scale (“strongly agree” to “strongly disagree”). Examples of items on the Teacher Opinion and Observation List include “your voice shows less sign of strain at the end of the day” and “you have to repeat yourself less often.”

Results

Demographic information is provided in Table 1, and indicates that the amplified and unamplified classrooms were very similar with respect to number of students, distribution of gender, number of students with IEPs, number of students whose hearing was screened, and number of students receiving Early Reading Intervention (ERI). Overall, 7.8% of students had educational programs which included an IEP, and more than one third (37.9%) of students had been identified by their teachers as being

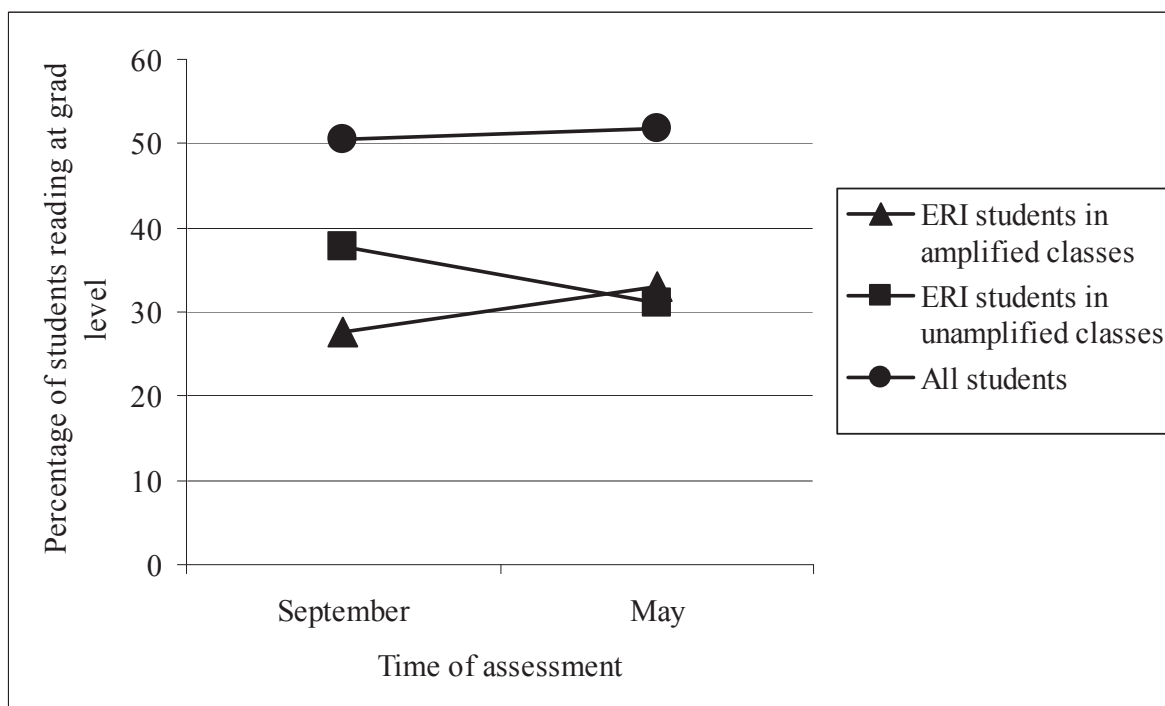


Figure 1: Change in percentage of students at risk at grade level

at risk for reading in kindergarten, and therefore received Early Reading Intervention in grade one.

The first research question addressed changes in mean increase in reading levels between September and May for the experimental vs. control groups. As described previously, data was recoded to reflect total number of levels increased for each student. A one-way analysis of variance (ANOVA) using “number of levels increased from September to May” as the dependent variable indicated a mean change of 5.80 levels (standard deviation=3.02) for the amplified classrooms, and a mean change of 5.89 levels (standard deviation = 2.81) for the control classrooms, a difference which was not statistically significant ($F_{1,471}=.12$, $p>.05$). However, while potentially a useful analysis, comparing changes in number of reading levels increased is complicated by the fact that differences between levels do not represent equal intervals. That is, the level at which a student starts is important. The lower levels (e.g., moving from a Level 1 book to a Level 3 book) does not represent, either quantitatively or qualitatively, the same change in reading competency and skill as does moving from a Level 18 to a Level 20 book. A more useful way of looking at the data is to compare percentage of students reading at grade level, which is, after all, potentially the statistic of most interest to teachers and administrators.

The second research question asked “do students in amplified classrooms demonstrate a greater change in the percentage of students reading at grade level in May than students in unamplified classrooms?” Using the benchmark data from the DRA for first term and third term, each student was identified using his/her September and May scores as reading at/above grade level or reading below grade level. Table 2 illustrates these results for amplified and unamplified classrooms. A Chi-square test was used

to investigate differences between the two groups, and was not found to be statistically significant $\chi^2(2, N = 486) = .48$ $p > .05$. However, a trend showing a greater percentage of students reading at grade level in the amplified classrooms was seen, with an increase of 2.8% in amplified classrooms compared to a decrease of 0.4% in the unamplified classrooms. A post hoc power analysis indicated that this sample size ($N=486$) with $\alpha = .05$ yielded a statistical power of .11, indicating that this study did not have sufficient power to detect an intervention effect size. Since the sample size in this study was relatively large, it may be that the instrumentation used (the DRA) was not sensitive to effects of sound field amplification or that the study duration was not long enough to see such effects.

The third research question, “is there an interaction between gender and amplification?” was included strictly as an investigational question, as no previous sound field research studies have examined questions of gender differences and, as discussed previously, there is at least a theoretical rationale for investigation of this question. A numerical value of 0 was assigned to scores below the benchmark in September and May, and a value of 1 to scores above the benchmark, again for September and May. A two-way analysis of variance demonstrated a significant main effect for gender, ($F_{1,482}=1.97$, $p<.01$), with a greater percentage of girls than boys reading at grade level, but no significant main effect for amplification nor an interaction effect between the two.

The fourth research question, “do students identified as at risk (as defined by provision of Early Reading Intervention in grade 1) show a greater change in reading scores or percentage of students reading at grade level in amplified classrooms?” was investigated using the same analysis method as question 3. A two-way analysis of variance again showed a main effect for ERI (students

Table 2
Changes in percentage of total students reading at grade level

	% of students reading at grade level in September	% of students reading at grade level in May	Change from September to May
Amplified classrooms (N=247)	50.9%	53.7%	+2.8%
Unamplified classrooms (N=239)	50.2%	49.8%	-0.4%

receiving ERI scored lower than other students), but no significant main effect for amplification and no interaction effect. Not surprisingly, students identified at risk showed a mean increase in reading levels of only 4.22 levels, compared to students not receiving ERI, whose reading levels increased on average by 6.81 levels. In September, for the total group of students, 55% of students were reading at grade level. By May, this number had not increased, with only 52.9% reading at grade level. When considered overall, students receiving ERI also showed a slight decrease in percentage of students reading at grade level. These results are discouraging in terms of the efficacy of the Early Reading Intervention program, since no apparent changes in numbers of children reading at grade level were seen overall. However, when at-risk students in amplified and unamplified classrooms are examined more closely, some interesting trends were seen.

In September, a smaller percentage of students reading at grade level was found in the amplified classrooms (27.7% versus 37.8%). In May, results indicated that the percentage of students reading at grade level in amplified classrooms had increased by 5.3%, while for the unamplified classrooms, the percentage of students reading at grade level had decreased by 6.7%. Figure 3 summarizes this trend, in comparison to the performance of all students. A post hoc power analysis was performed and yielded a statistical power of .05, again indicating that this study did not have sufficient power to detect an intervention effect size. As described previously, it may be that the instrumentation used (the DRA) was not sensitive to effects of sound field amplification or that the study duration was not long enough to see such effects.

During the study design phase, it was intended that results for students with hearing loss would be analyzed. However, this proved not to be feasible given the large number of students who could not be screened, the small number of students with refer results, the very unequal sample sizes between students with “pass” and “refer” results, and the fact that the small number of students with refer results were spread over 12 classrooms. Hearing screenings were conducted for 321 of 486 students (62.5%), with 43 students receiving a “refer” result (13.4%). Refer results were obtained for 27 students in amplified classrooms, and 16 students in unamplified classrooms. Comparing reading outcomes for sample sizes of 27 and 16 was not felt to be statistically valid.

Teacher experiences with the sound field systems were extremely positive. The LIFE uses a 5 point Likert scale from “strongly agree” to “strongly disagree.” With respect to vocal strain, 100% of teachers strongly agreed that they showed less vocal strain during the day, and all teachers strongly agreed with the statement “overall you like the impact on your teaching voice and presentation.” Ten of 11 teachers strongly agreed that noise interfered less with teaching. Responses were averaged for each item, and results showed teachers reporting the strongest agreement for statements concerning need for less repetition (average rating = 4.45), less need for clarification (3.91) and less need for time spent in classroom management (3.91). Table 3 indicates the percentage of teachers reporting agreement or strong agreement with each statement.

Discussion

This study indicated positive changes in the percentage of students reading at grade level for students in amplified classrooms, compared to students in unamplified classrooms. Students in unamplified classrooms showed no overall change in the percentage of students reading at grade level between September and May, while amplified classroom results showed an increase of 2.8%, although differences between the two groups were not statistically significant. Two factors can be identified which may explain positive trends but lack of statistical significance, particularly in view of findings of very low statistical power for both the overall group of students and for the students at risk for reading difficulties.

This study represented almost half of all grade 1 classrooms in this school board, and all classrooms consistently showed a very high percentage of students reading below grade level. The fact that many students in this school board appear to be at risk for reading difficulties, even at grade 1, suggests that interventions with this population might be expected to show smaller, or slower effects. The relatively short time span of the study may have also been a factor. Although the study was conducted over the entire time span of grade 1, a single school year seems a relatively short time span to show large changes in reading proficiency, regardless of the nature of the intervention.

A second factor contributing to the lack of statistical significance may be the sensitivity of the instrumentation. The reading instrument used in this study, the DRA,

Table 3
Teacher perceptions of sound field amplification use

L.I.F.E. statement	Percentage of teachers reporting agreement (score of 2) or strong agreement (score of 5) with the statement
Your voice shows less sign of strain during the day	100% - strong agreement
Your voice is more flexible	91% - agreement
Your voice sounds better than before	91% - agreement
Your voice is less vulnerable when you have a cold or allergy	64% - agreement
Noise (from whatever source) is less interfering and disruptive to your teaching	91% - strong agreement 9% - agreement
Your voice feels more like "the real you"	36% - agreement
You have to repeat yourself less often	82% - strong agreement 18% - agreement
Over the school day you speak less	64% - agreement
You feel less tired generally	36% - agreement
You do not have to clarify what you say as often with SFA	64% - strong agreement 36% - agreement
Your voice sounds more confident	82% - agreement
You are less likely to take time off because of laryngitis/ sore throat/ injury	55% - strong agreement
It is easier to get the attention of the whole class	100% - agreement
You spend less time managing behavior and more time focusing on the curriculum	64% - strong agreement 36% - agreement
You have been able to be more adventurous than before	18% - agreement
You need to raise your voice less often	91% - agreement
It is easier to think on your feet	9% - agreement
Overall you like the impact the system has on your teaching voice and presentation	100% - strong agreement

assesses overall reading competence, but does not assess phonological awareness directly, and it may be that an instrument which targets phonological awareness specifically might show different results. At the grade 1 level, the earliest assessment levels incorporate many sight words, but higher levels begin to require greater skill in decoding and greater reliance on the link between phonological awareness and print symbols. Phonological awareness refers to awareness of the sound structure of spoken words, and includes skills such as rhyming, phoneme discrimination, and segmentation, blending and manipulation of phonemes. As such, it is an auditory based skill and therefore, there may be reason to believe that an auditory-based intervention (such as sound field amplification) might have beneficial effects on its development.

Students receiving ERI as a result of identification by teachers as being at risk for reading difficulties showed more improvement in the amplified classrooms. In fact,

the percentage of students reading at grade level in the unamplified classes actually decreased by 6.7%, while percentage of students reading at grade level in the amplified classes increased by 5.3% (a difference of 12% between the two groups), despite provision of the same reading intervention. These results for the unamplified classrooms do not necessarily indicate that students were performing poorer in reading compared to themselves, but that the gap between these students and students reading at grade level was widening in the unamplified classrooms. However, the gap appeared to be closing slightly in the amplified classrooms, with some students achieving age appropriate reading levels over the course of the year.

In both cases (for the group overall and for students at risk for reading difficulties), the increases in numbers of students reading at grade level in amplified classrooms were small, but contrasted with the unamplified condition, in which the number of students either showed no improvement

or actually decreased. For a population of students which already demonstrated weaker reading scores than the rest of the province (as measured by provincial testing), even a small increase is a step in a positive direction. Grade 1 is an important time in the process of learning to read; it is a time when students begin to apply their phonological awareness skills to the process of decoding, and eventually, reading with comprehension. For grade 1 students whose phonological awareness skills are weak, improved access to the teacher's voice as phonics programs are being taught cannot help but be beneficial.

Teacher experiences with the sound field systems were extremely positive, with teachers reporting less vocal strain, less interference from classroom noise, less need for repetition and clarification, and less time spent on classroom management. A potential weakness of this assessment instrument is that statements are often worded in such a way as to suggest a potential bias in favour of sound field benefit (e.g. "your voice sounds better than before"). As well, the possibility that teachers responded more favourably knowing that this was a board-initiated project cannot be discounted. However, certainly the large number of items for which teachers responded "strongly agree" (rather than with a more neutral rating) and indicating high satisfaction levels with the system, is consistent with other reports in the research. A number of other studies have also reported positive effects on vocal health with sound field amplification, a significant benefit in an occupation which has been demonstrated to be high risk for vocal problems (Allen, 1995; Edwards, 2005; Jonsdottir, 2002; Massie & Dillon, 2006). Teachers who experience less vocal strain and lower stress levels because of reduced noise, and more time available for teaching because of better classroom management and student listening, would be expected to have more physical and emotional resources for effective teaching.

A final piece of evidence might be considered. While statistical significance was not achieved in the data analysis, school board administrators were pleased with the results of both the reading assessment data and teacher reports of positive experiences, and subsequently purchased sound field amplification systems for 48 grade one classrooms across the school district. Further studies focusing specifically on the specific area of phonological awareness, both for typical readers and children at risk for learning to read, are recommended.

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Author Note

Correspondance concerning this article should be addressed to Pamela Millett, Assistant Professor, Deaf/Hard of Hearing Program, Faculty of Education, York University, Toronto, Ontario.

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■ A Framework for Research and Practice in Infant Hearing

■ Cadre de travail pour la recherche et la pratique concernant les troubles de l'audition chez les enfants

Elizabeth Fitzpatrick

Abstract

Population-based infant hearing screening has received worldwide attention as an opportunity to improve communication development outcomes for children with hearing loss. While there is evidence that screening can accurately identify infants, less information is available on the effectiveness of early intervention and how to maximize these new opportunities. This paper presents a framework for research and practice in infant hearing. Using the International Classification of Functioning, Disability and Health model as a starting point, this research applied a population health perspective to develop a framework to guide clinical practice and research. The framework was refined on the basis of the literature as well as research relative to the benefits of newborn screening including parents' perspectives of benefits and needs. The new framework defines outcomes from the perspective of families and highlights contextual factors such as access to parent support and coordinated services, which may be important determinants of outcome to consider in program evaluation. Newborn hearing screening programs have received support on the basis that earlier identification of hearing loss will lead to improved communication results. This framework expands these outcomes and can inform the implementation of population hearing screening programs as they continue to expand worldwide.

Abrégé

Le dépistage au sein de la population des troubles auditifs chez les enfants a été perçu dans le monde entier comme une occasion d'améliorer les perspectives de développement de la communication chez les enfants ayant des pertes auditives. Alors qu'il est clair que le dépistage permet d'identifier avec exactitude les troubles auditifs chez les bébés, on retrouve moins d'information sur l'efficacité d'une intervention précoce et sur la façon de maximiser ces nouvelles occasions. Cet article présente un cadre de travail pour la recherche et la pratique concernant les troubles de l'audition chez les enfants. En se référant au modèle de la Classification internationale du fonctionnement, du handicap et de la santé, cette recherche a utilisé le point de vue de la santé publique pour élaborer un cadre afin de guider la pratique et la recherche cliniques. Le cadre a été mis au point à l'aide de la documentation et des recherches concernant les avantages du dépistage chez les nouveaux nés, ainsi que de la vision des parents quant aux besoins et bénéfices. Le nouveau cadre définit les performances du point de vue des familles et souligne les facteurs contextuels tels que le soutien aux parents et les services coordonnés, lesquels peuvent jouer un rôle important au niveau des performances et doivent être considérés dans l'évaluation du programme. Les programmes de dépistage de troubles auditifs chez les nouveaux nés ont reçu beaucoup de considérations, car on croit que l'identification précoce de perte auditive mènera à de meilleures performances en communication. Ce cadre détaille ces performances et donne des renseignements sur la mise en œuvre de programmes de dépistage de troubles auditifs au sein de la population. Ces derniers continuent d'ailleurs de prendre de l'essor mondialement.

Key words: infant hearing, screening, hearing loss, parents, qualitative research

Elizabeth Fitzpatrick, PhD
Faculty of Health Sciences
University of Ottawa
Ottawa, Ontario

Childhood hearing impairment has received increasing attention as a public health issue in the last decade. Hearing loss is one of the most common congenital disorders, affecting 1 to 3 per 1000 children (Fortnum, Summerfield, Marshall, Davis, & Bamford, 2001; Prieve & Stevens, 2000) and can have negative consequences for language, social and academic development. Newborn hearing screening (NHS) has become an important population health intervention aimed at improving the health and education outcomes for children with hearing loss and their families (Joint Committee on Infant Hearing, 2007). Several studies provide support for the benefits of early detection and intervention in achieving better communication outcomes in children with hearing loss (Calderon & Naidu, 2000; Kennedy et al., 2006; Moeller, 2000; Yoshinaga-Itano, Sedley, Coulter, & Mehl, 1998). It is well recognized that screening in itself is insufficient to improve developmental outcomes, that early intervention is crucial to a successful early hearing detection program and that detection without intervention may be of limited value (Jerger, Roeser, & Tobey, 2001; Joint Committee on Infant Hearing, 2007; Yoshinaga-Itano, 2004). It is recommended that newborn hearing screening be embedded in a system of comprehensive family-oriented care that includes the identification of hearing loss, family counseling, fitting of technology and intervention (Canadian Working Group on Childhood Hearing, 2005).

Newborn hearing screening initiatives share the characteristics of many population-based interventions in that they essentially become multiple intervention programs, targeting many levels in the system. Multiple intervention programs are initiatives that target changes (outcomes) at multiple levels (Edwards, Mill, & Kothari, 2004) in that strategies are directed not only at the individual level but at different levels of the socio-ecological system and are delivered to multiple audiences. Hearing screening, in its very simple form, may be viewed as a single intervention aimed at lowering the age of identification of congenital hearing loss for an individual baby. However, as a population health intervention, the ultimate goal of NHS is to improve health outcomes and reduce disparities across members of a population. Increasingly, there is a realization that infant hearing screening cannot be isolated from the subsequent management of hearing loss and family supports (Hyde, 2005; Yoshinaga-Itano, 2004). Accordingly, many NHS initiatives have also targeted deliberately or indirectly changes at structural levels of care, for example, at a programmatic level in terms of resources for additional clinical training and clinical equipment, and at a systemic level in terms of facilitating access to high quality pediatric audiologic services and reducing wait times when there is suspicion of hearing loss (Bamford, Uus, & Davis, 2005; Hyde, 2005). Parents also describe changes such as easier access to diagnostic and rehabilitative audiologic services as benefits of infant hearing screening initiatives (Fitzpatrick, Graham, Durieux-Smith, Angus, & Coyle, 2007). In applying resources to NHS, modifications have been made to the process of infant hearing care that extend

well beyond the mere introduction of screening and the subsequent lowering of age of confirmation of hearing loss. Consequently, when NHS projects are envisioned as multiple interventions, the evaluation of the effectiveness of universal screening programs becomes complex and measuring outcomes using traditional research paradigms can be challenging.

Effectiveness of newborn hearing screening

The historical focus of evaluating the effectiveness of NHS has been on speech and language outcomes (Thompson et al., 2001; Yoshinaga-Itano, 2003a, 2003b). Although there is a considerable body of literature substantiating the effectiveness of population screening for the early detection of childhood hearing loss, the evidence for a clear association between early identification and future communication skills remains inconclusive (Thompson et al., 2001). While some studies have shown an association between age of identification of hearing loss and improved communication outcomes (Kennedy et al., 2006; Yoshinaga-Itano et al., 1998), others have not been able to demonstrate a clear relationship between age of confirmation and speech-language development (Fitzpatrick, Durieux-Smith, Eriks-Brophy, Olds, & Gaines, 2007; Wake, Poulakis, Hughes, Carey-Sargeant, & Rickards, 2005). Such indicators of outcome are typically indirect or partial measures of a complex intervention (Casebeer, Deis, & Daze, 1999). Several researchers have recognized that screening is the first step in a comprehensive care process to minimize the impact of childhood hearing loss on individuals and society. Previous research has served to point out that many child, family and contextual factors may affect communication development (Calderon, 2000; Moeller, 2000; Yoshinaga-Itano, 2003a). Consequently, there has been a shift in the dialogue and more recently, investigators have questioned whether speech and language measures should be the ultimate outcome for evaluating the effectiveness of newborn hearing screening (Durieux-Smith, Fitzpatrick, & Whittingham, 2008; Hyde, 2005).

Family oriented services

Consistent with the escalation of NHS initiatives in Canada and elsewhere, interest has grown in evaluating the real world effectiveness and value of the intervention. The attention on NHS has prompted interest in examining the influence of other factors that work in concert with newborn screening to impact developmental outcomes in young children. The contribution of screening as one component of a hearing health services package aimed at reducing disability may be affected by many family and environmental factors. One such factor which has emerged and is attracting greater attention in the literature is family participation and the ability of the system to meet family needs. In a study of outcomes in early and late identified children, parental involvement was identified as an important predictor of communication outcomes (Moeller, 2000). Recently, a series of studies from the evaluation of the newly implemented newborn hearing screening program in the United Kingdom (UK) emphasized the

importance of family perspectives and family perceived outcomes at various stages in the screening and early assessment process (Tattersall & Young, 2006; Young & Tattersall, 2005; Young & Tattersall, 2007). Professional communication and manner were reported to be the most significant predictors of parents' perspectives of their experiences during the diagnostic process in audiology and medical clinics.

There is also a growing recognition that overall infrastructure and resources related to intervention are critical to positive outcomes in newborn hearing screening initiatives. As the UK embarked on a national screening program, challenges in service provision were identified through a national study of preschool services in which parents identified well-coordinated and high quality services as fundamental to "family friendly" care (Robinson & Evans, 2003). Pairing newborn screening initiatives with quality early intervention in a family friendly context has been described as one of the most important challenges to the success of newborn hearing screening initiatives (Kennedy, 2000).

The implementation of newborn hearing screening represents a paradigm shift where services are moving to more family-oriented approaches with greater inclusion of parents in care and decision-making. There is some evidence from other areas of health care to support that in addition to the actual outcomes of intervention, the process of receiving care is important for individuals (Ratcliffe & Buxton, 1999; Ryan, 2000). There is also evidence from pediatric rehabilitation to suggest that patient satisfaction is related to both the actual care process (i.e., technical competence and quality of care) and organizational aspects of the service delivery model (King, Cathers, King, & Rosenbaum, 2001).

During the early development of NHS initiatives, attention was focused on the effectiveness of screening techniques (e.g., electro-physiologic screening measures) and yield of screening programs in order to provide an evidence-base for universal screening. There is a growing understanding that other aspects of post-screening care such as the appropriateness of service delivery models for families can have an important impact on the outcomes of newborn screening initiatives. The abilities of parents to participate in intervention programs through attendance at a clinic or even in home-based settings may be related to many factors including culture, socio-economic circumstances, geographical disparities, beliefs and supports. Even in countries with socialized medicine, the ability to navigate waiting lists, attend therapy sessions, and pay for certain services such as hearing aids are influenced by individual family resources (Fitzpatrick, Angus, Durieux-Smith, Graham, & Coyle, 2008). These contextual factors, which have received less attention than age of diagnosis in the literature, may place children at risk for poor outcomes despite the potential advantages of early diagnosis through population screening, and may be important determinants of outcome in children with hearing impairment (Watkin et al., 2007).

Rationale and Purpose

Several years ago, the United States Preventive Services Task Force, through a systematic review, concluded that newborn hearing screening leads to earlier diagnosis but that the evidence for improved communication outcomes was inconclusive (Thompson et al., 2001). The review identified the need for an examination of other benefits of screening and noted that there was insufficient evidence to draw conclusions about any potential process outcomes or other benefits for families resulting from early diagnosis and intervention. It has become increasingly clear that screening to improve infant development cannot be detached from intervention services. As indicated in several reports, the effectiveness of newborn hearing screening is intricately linked to the subsequent intervention process which includes audiologic assessment and rehabilitation for confirmed hearing loss (Canadian Working Group on Childhood Hearing, 2005; Joint Committee on Infant Hearing, 2007; Watkin et al., 2007; Yoshinaga-Itano, 2004). Therefore, screening is increasingly viewed as a procedure which must be anchored in a context of clinical support services for affected children and families.

The purpose of this paper is to propose a framework for infant hearing research that offers a structure for the next generation of research and practice in infant hearing screening. The framework was conceptualized based on a comprehensive literature review and the findings from a recent doctoral thesis which have been reported in a series of publications (Fitzpatrick, Durieux-Smith, et al., 2007; Fitzpatrick, Graham, et al., 2007; Fitzpatrick, Coyle, et al., 2007). This research examined the impact of early identification of hearing loss and factors affecting outcome both through objective communication development measures and through the perspective of parents. In particular, the work in this project centered on two broad domains: (a) the benefits of early identification including traditional communication outcomes and other benefits perceived by parents, and (b) aspects of the care model that are important to parents. Specifically, the research examined typical speech and language outcome measures and their contribution to understanding the benefits of early diagnosis of hearing loss. Secondly, the research was directed at identifying parents' perspectives of benefits, their needs for support, and their preferences for the attributes of rehabilitation care models. The overall goal was to examine the complex interaction between the child with hearing loss and numerous contextual factors to provide a more comprehensive perspective of health and well-being for children with hearing loss and their families.

Overall, these studies demonstrated that families of young children with hearing loss, regardless of whether they entered the process through newborn screening or not, value early identification initiatives as a core component of a system of infant hearing services. Although the effectiveness of screening in improving specific communication outcomes could not be quantified through objective measurement tools, (Fitzpatrick, Durieux-Smith, et al., 2007) these studies provided evidence that parents either experienced or

envisioned several positive child and family benefits from early identification. These perceived outcomes, which will be further discussed in the context of the framework, included access to hearing and improved self-esteem for the child as well as better access to care and reduced guilt for families (Fitzpatrick, Graham, et al., 2007). Through interviews and a conjoint analysis survey, parents highlighted well-coordinated services, support from other parents and access to information as important determinants of outcome (Fitzpatrick, Coyle, et al., 2007). These benefits from the perspectives of families, combined with the evidence in the literature for improved access to hearing, provide additional support for universal hearing screening. However, it is important to note that these studies were conducted in the context of a publicly funded health system where more than 90% of families with infants identified through NHS choose oral communication options (personal communication). Accordingly, the proposed framework is shaped by this focus on oral communication development and inclusion with hearing peers.

In addition, the framework was influenced by the research of several other investigators who have examined outcomes in communication development for children who are exposed to early detection and intervention (Calderon & Naidu, 2000; Kennedy et al., 2006; Moeller, 2000; Yoshinaga-Itano et al., 1998). These and other publications (Calderon, 2000; Robinshaw & Evans, 2003; Yoshinaga-Itano, 2004; Young & Andrews, 2001) serve to highlight the potential contribution of numerous other factors, including service provision and parental involvement, to infant hearing development.

The research described above forms the theoretical underpinnings of the model which attempts to both integrate current findings on outcomes in childhood hearing as well as identify factors that are associated with child and family outcomes. The framework is presented as a starting point for thinking about infant hearing in population health, practice and policy. The framework is discussed and interpreted in relation to the conceptual framework of the International Classification of Functioning, which has gained momentum in the area of research in childhood disability.

Development of the Conceptual Framework

Theoretical Basis of the conceptual framework

Newborn hearing screening is the first step in a system of care encompassing hearing and communication development. The framework proposed in this paper builds on the International Classification of Functioning, Disability, and Health (ICF) model which has become widely acknowledged in the literature on disabilities since its introduction by the World Health Organization in 2001 (World Health Organization, 2001). The ICF model differs from previous models of disability in that it embraces a new paradigm where health and well-being are seen as an interaction between the individual and his/her environment. In this model, there are desired activities (outcomes) for the

individual which eventually lead to fuller participation in society. Applying the ICF model to infant hearing, outcomes can be conceptualized as consisting of communication outcomes for the child such as hearing, communication and social skills as well as process and quality of life outcomes for the family, all of which lead to fuller participation in everyday life. Drawing on this broader conception of health outcomes, these outcomes can be envisioned as a complex interplay between the hearing impairment, child characteristics, family characteristics and environmental or contextual factors, acting at the child, family and community level. Effectively, the ICF model is a framework that attempts to capture the notion of multiple outcomes and, consistent with a population health perspective, the model emphasizes contextual factors as contributing to the functional well-being of the individual. Contextual factors such as easy access to quality intervention services, family resources, as well as family and social supports may provide a better opportunity for positive outcomes from early hearing and communication development programs. The model recognizes that an intricate interaction of causal factors can shape the developmental outcomes in infant hearing loss. The ICF model represents a starting point for reflecting on the myriad of factors that interact with early confirmation of hearing loss through population-based screening to influence outcomes for children and families.

This ICF framework served to categorize the published literature and provided a reference for the subsequent research which motivated the development of the new framework. As noted, the proposed framework is informed both by the extant literature and a series of recent studies described above that examined broader outcomes and explored determinants of outcome beyond proximal factors. An important feature of this research is that it privileged the perspective of the parents who are so intricately involved in the care process.

Revised conceptual framework for infant hearing

The new framework proposed in this paper furthers the understanding of infant hearing research in regard to the current focus on early identification. Figure 1 presents a conceptual view of how the new findings and the literature align with and extend the initial ICF framework which guided the research.

The ICF conceptual framework has been reconfigured to integrate and advance this new knowledge (Figure 1). The term "Infant Hearing" rather than hearing loss was selected as the title for the framework in accordance with the terminology adopted by the Canadian Working Group on Childhood Hearing. This task force was commissioned by the Government of Canada, to review evidence and develop a resource document on newborn hearing screening as the country embarked on population-based screening initiatives (Canadian Working Group on Childhood Hearing, 2005).

In the proposed framework, body functions and structures have been retained from the original ICF model and refer

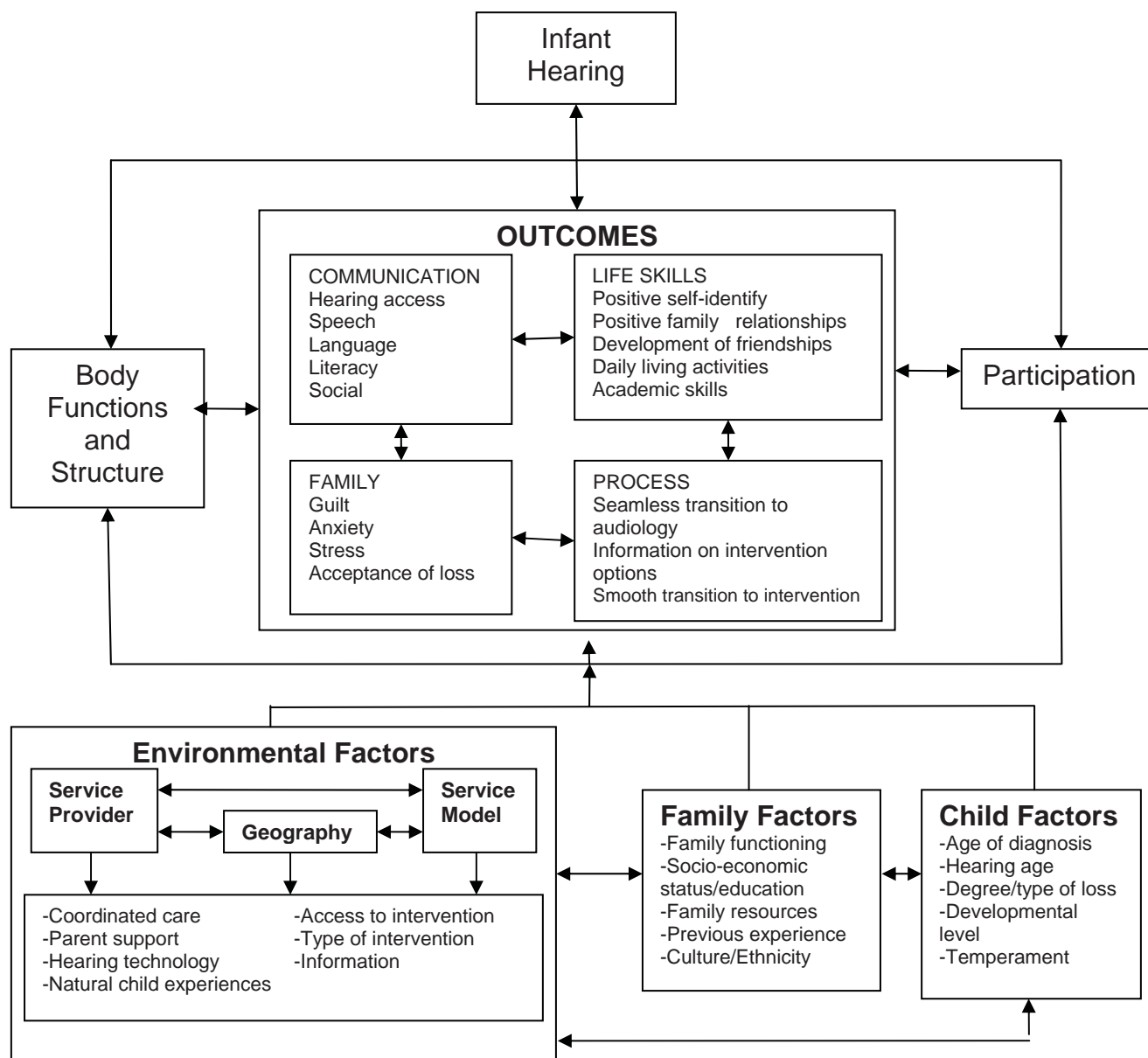


Figure 1: Conceptual framework of outcomes and factors for infant hearing

to the physical/sensory and functional limitations of an individual's disability (World Health Organization, 2001). The outcomes are arranged and defined as four interrelated outcomes: communication outcomes, life skills outcomes, process outcomes, and impact on family outcomes. These categories were selected for presentation in the framework based on recent research which indicated that parents clearly viewed improved communication outcomes and related life skills as the primary reason for newborn screening, followed by benefits related to the process of identification of hearing loss (Fitzpatrick, Graham, et al., 2007). In the modified framework, each outcome category has been further defined to incorporate the findings of the research. The outcomes have been arranged to reflect that they are not discrete and separate phenomena but rather have the potential to interact with each other. For example, in this

research, families who perceived that their children had access to hearing (communication outcome) expected that their children would have positive life skills outcomes such as positive self-identity and family relationships. These families also described the positive impact of early identification of hearing loss on the family whereas some families who were concerned about their child's poor communication skills attributed it to late diagnosis and referred to the increased guilt and anxiety at the family level (Fitzpatrick, Graham, et al., 2007). Although knowing early was perceived as beneficial, families have also described the initial identification of hearing loss as a stressful period for them, (Fitzpatrick, Graham, et al., 2007; Tattersall & Young, 2006). Families who experienced difficulty with the referral process to audiology (process outcome) also associated this experience with increased stress, frustration,

and anxiety for the family and with reduced opportunities for the child to learn through hearing. Although access to services may not traditionally represent an outcome of NHS initiatives, this notion emerged as a powerful theme in parent interviews which led to its inclusion in the framework as a potential outcome (Fitzpatrick, Graham, et al., 2007). Taking the perspective of families, who obtain health care in a socialized medical system, the ease of access to services and subsequent early confirmation of hearing loss can be a useful outcome of screening programs. Delayed or inconsistent access was viewed as a barrier to necessary services, for example, hearing aids/cochlear implants and therapy which directly impact outcome. The definition of outcomes provided by this study attempts to extend the field beyond the narrow and more traditional boundaries common to previous investigations of the benefits of population screening.

The objective evidence for superior language outcomes from early intervention remains inconclusive. This is due to the difficulty in controlling for many other variables such as severity of hearing loss, technological advances in hearing devices, family involvement, type of intervention and type of service models. The findings of the research conducted for this framework and a considerable body of other literature points to the importance of a myriad of factors in influencing outcomes in children (Moeller, 2000; Vohr, Moore, & Tucker, 2002; Wake et al., 2005; Yoshinaga-Itano, 2003a) permit an elaboration of these factors in the framework. In this framework, these factors are classified as environmental factors, family factors, and child factors; they are positioned below the outcomes in accordance with the presentation format in the ICF model (World Health Organization, 2001). The boxes for environmental factors, family factors and child factors have been ordered from left to right as environmental factors appeared to most closely interact with family factors to facilitate or create barriers to meeting families' needs such as technology and intervention services. For example, families who described financial hardship which in turn interfered with timely access to hearing technology described a barrier that is directly influenced by family circumstances (Fitzpatrick et al., 2008). This factor has the potential to impact the child's access to hearing, and eventual outcomes in multiple domains. Second, in particular, the environmental factors box has been rearranged to include and reflect the findings of the study. In this reconfigured framework, service providers, geography and service models are seen as dynamic and interrelated factors that can influence and determine the availability of other components, e.g., hearing technology, access to service, availability of natural child experiences. In addition, coordination of care, parent support, and information access which emerged as strong themes in the qualitative interviews with families (and received high preference values in the conjoint analysis) have been added as characteristics of the environment (Fitzpatrick, Coyle, et al., 2007). Finally, in the category of child factors, hearing age (age at which child begins to hear sound) has been added in addition to age of diagnosis

to reflect this concept, which so strongly emerged in this research, both as a positive consequence of population screening (i.e., access to hearing) and as a contributor to outcome from the perspective of families. Although newborn hearing screening can lead to earlier "access to hearing," research has shown that even in countries with public health care systems, some children still experience delay to the fitting of amplification due to other medical concerns, severity of hearing loss or parental indecision (Durieux-Smith et al., 2008). In addition to child factors related directly to the hearing loss, other child characteristics such as developmental level (e.g., the presence of other disabilities) and temperament contribute to overall outcomes.

Discussion

Population-based infant hearing screening has received worldwide attention as an opportunity to improve developmental outcomes for children with hearing loss. Early detection of hearing loss represents an opportunity for improved and perhaps even age appropriate communication outcomes for children when screening is embedded in a comprehensive system of care (Hyde, 2005; Joint Committee on Infant Hearing, 2007). Providing evidence of the effectiveness of NHS has proved to be daunting and potentially delays the adoption of screening initiatives in some regions. This paper extends the original ICF model to the field of infant hearing research. The modified framework is grounded in a population health perspective which shifts thinking from clinical treatment to determining how population health interventions can have the greatest impact on outcomes (Evans & Stoddart, 2003). A hallmark of a population health perspective is the acknowledgement of the complex and overlapping interactions among the various determinants of health. Applying a population health perspective, the proposed framework defines broader outcomes of early identification of childhood hearing loss from the perspective of families and highlights contextual factors such as access to parent support and coordinated services, which may be important determinants of outcome to consider in the evaluation of screening initiatives. This conception of infant hearing development is consistent with the comprehensive approach to newborn hearing screening and intervention practices supported by the Joint Committee on Infant Hearing (2007).

The synthesis of the findings into a new framework which encompasses multiple outcomes and a diversity of determinants of outcomes provides a common language for audiologists, language and other specialists, program administrators and policy makers interested in population infant hearing practice and research. Assembling the findings in the revised framework brings to light the fact that population infant hearing screening is not a single intervention but rather a catalyst for multiple interventions which potentially affect different levels of the system, including the individual (child), family, service provision and societal levels (Edwards et al., 2004). This further explains why it may be extremely difficult to isolate the effects of lower age of identification through screening

on longer-term communication outcomes as the implementation of universal screening programs have typically translated into multiple interventions at multiple levels of infant hearing care (Bamford et al., 2005; Hyde, 2005). Furthermore, as reflected in this framework, many of the factors (e.g. hearing technology, type of intervention) can be viewed as layered or “nested” within other determinants such as the service model of care (Edwards et al., 2004). Interventions such as universal screening can effectively create synergies which can optimize the impact of screening and ultimately affect the ability of children and families to more fully participate in society.

The purpose of this paper is to present a framework that outlines multiple outcomes and factors which can be used as a guide for future research. The development of a single research design which would incorporate these components was not the intent of the research and is beyond the scope of this project. Yoshinaga-Itano (2004) provides a comprehensive summary of the challenges and limitations of conducting the kind of research that is required to reach the highest levels of scientific evidence. As pointed out by the author, such a research design may be impossible to achieve in this field due to our current inability to reliably measure some of the more complex variables such as parental involvement, and the contribution of other contextual factors. As a first step, this framework attempts to acknowledge and systematically organize the intervening variables. Multiple types of research paradigms using both quantitative and qualitative research methods may help structure and refine future research questions and measures. Despite these limitations, it is hoped that the proposed framework can act as a reflective framework for research and practice.

Although the proposed framework was conceptualized based on the extant literature, it was also largely informed by recent work undertaken in one Canadian province where there is a focus on oral communication development following early identification of hearing loss. Moreover, this research was conducted in the context of publicly funded medical care which translates to challenges in accessing some health services, and therefore certain elements may not be applicable to all settings. Although some of the constructs put forward may be context or region-specific, the framework serves to unite some of the determinants of outcome in child hearing research. Overall, the framework is advanced to stimulate and shape thinking as new evidence is collected in the field of infant hearing, evidence which will serve to fill current gaps in this framework.

In summary, as a population health intervention, infant hearing screening has thrust childhood hearing loss under the public health lens. This visibility brings with it a responsibility to ensure that decisions related to hearing screening and subsequent management of the disorder are grounded in the best available evidence. This framework was developed to contribute to science by offering insights into measurable outcomes, as well as the perceived benefits, needs and values of those who use and are most affected by population-based infant hearing screening. Increasingly,

there is a realization that infant hearing screening cannot be isolated from the subsequent management of hearing loss and family supports. The framework lays the foundation for research on NHS and offers a format to conceptualize questions for the next generation of research. It is hoped that this framework can inform the development, implementation and evaluation of population hearing screening programs as they continue to grow.

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Author Note

Correspondance concerning this article should be addressed to Elizabeth Fitzpatrick, Faculty of Health Sciences, University of Ottawa, Ottawa, Ontario K1H 8M5. Email address: elizabeth.fitzpatrick@uottawa.ca.

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■ Développement langagier atypique chez une enfant adoptée de Chine : démarche de raisonnement clinique et évolution des habiletés langagières

■ Atypical language development in a child adopted from China : Clinical reasoning and evolution of language abilities

Élisa-Maude McConnell

Audette Sylvestre

Andrea A.N. MacLeod

Abrégé

L'adoption internationale est devenue une pratique de plus en plus courante pour les nord-américains désireux de fonder une famille. Or, le développement langagier de ces jeunes enfants pose un certain nombre de questions. Cette étude de cas longitudinale a comme objectif de rendre compte du raisonnement clinique emprunté face à l'évolution du langage d'une enfant d'origine chinoise adoptée par une famille francophone de Montréal, au Québec (Canada) à l'âge de 19 mois. Son langage a été évalué en trois temps et la dernière évaluation correspond au début de la scolarisation. Lors de chacun des temps de mesure, l'évaluation a été réalisée à l'aide de mesures standardisées et de l'analyse d'un échantillon de langage spontané. L'analyse des données a permis de montrer que le développement langagier de cette enfant est caractéristique d'un trouble développemental du langage comme l'indiquent ses difficultés morphosyntaxiques alors que le développement du lexique et de la phonologie se situe dans les limites de la normale. Le contexte d'adoption ne peut toutefois pas être tenu responsable de la problématique présentée. La description d'une démarche de raisonnement clinique face au parcours développemental atypique de cette enfant permet l'ajout de données pertinentes à un corpus de recherches encore limité sur l'examen des troubles développementaux du langage dans un contexte d'adoption internationale.

Mots clés : adoption internationale, développement langagier, trouble développemental du langage, raisonnement clinique

Abstract

As international adoption has become more common for North-Americans wishing to start a family, a number of questions have arisen regarding the language development of these young children. This longitudinal case study describes the clinical reasoning used to understand the speech and language development of a young girl adopted from China at the age of 19 months. Her development was studied at three time points, the last of which corresponds with the beginning of schooling. Her speech and language were studied using standardized measures and an analysis of her spontaneous speech. Data analysis has shown that this child's language development is characteristic of a specific language impairment as indicated by difficulties in the acquisition of morphosyntax but lexical and phonological development that was within normal limits. The specific language impairment cannot be explained by the adoption context. The description of a clinical reasoning approach regarding atypical developmental paths of the child allows the addition of relevant data to a body of research that remains limited on the review of developmental disorders of language in a context of international adoption.

Key words : international adoption, language development, specific/primary language impairment, clinical reasoning

Élisa-Maude McConnell,
M.Sc. orthophonie
Centre Hospitalier
Universitaire de Québec
Centre Hospitalier de
l'Université Laval
Québec (Québec)

Audette Sylvestre, Ph.D.
Programme de maîtrise en
orthophonie
Département de
réadaptation
Université Laval
Québec (Québec)

Andrea A.N. MacLeod,
Ph.D.
Programme de maîtrise en
orthophonie
Département de
réadaptation
Université Laval
Québec (Québec)

Introduction

Au cours de la dernière décennie, l'adoption internationale est devenue une alternative largement répandue pour plusieurs nord-américains souhaitant fonder une famille (Conseil d'adoption du Canada, 2006; Département d'état des États-Unis, 2006). Ces enfants adoptés internationalement sont souvent confrontés à des perturbations sociales, émotionnelles, culturelles et linguistiques bien particulières (Glennen, 2002; Ladage, 2009; Wilson, 2009). Leur développement langagier constitue un domaine d'intérêt retenant l'attention d'un nombre grandissant de chercheurs. L'identification d'un trouble du langage chez les enfants exposés à deux ou plusieurs langues présente un défi de taille pour les orthophonistes en raison de la variabilité de la chronologie du développement en bas âge et des écarts attendus dans le niveau des compétences langagières dans différentes langues (Kohnert, Windsor et Ebert, 2008; Roberts et Scott, 2009). Par conséquent, il est fréquent que les difficultés des enfants aux parcours langagiers multiples soient sous-estimées ou, au contraire, que ces enfants soient pris en charge à tort pour une intervention orthophonique (Crutchley, Botting et Conti-Ramsden, 1997; Judge, 1999; Roseberry-McKibbin, 1995; Salameh, Nettelbladt, Håkansson et Gullbert, 2002; Stow et Dodd, 2003). Il apparaît donc essentiel que les orthophonistes qui rencontrent des enfants confrontés à cette réalité appliquent une démarche de raisonnement clinique rigoureuse afin d'être en mesure de détecter les troubles du langage chez les enfants exposés à deux ou plusieurs langues.

Par ailleurs, les orthophonistes qui rencontrent des enfants connaissant un cheminement particulier comme celui des enfants adoptés internationalement doivent, comme avec tout autre enfant, s'appuyer sur des balises précises pour confirmer ou non la présence d'un trouble développemental du langage (Glennen, 2008). Différents travaux de recherche ont permis l'identification d'un certain nombre de ces critères. Ainsi, il a été montré que les enfants francophones présentant un trouble développemental du langage (TDL) produisent une syntaxe peu variée et répétitive (Thordardottir et Namazi, 2007) et utilisent peu de phrases complexes (Comblain, 2004; Piérart, 2004). La diversité lexicale est limitée (Thordardottir et Namazi, 2007). Lorsque comparés aux enfants ayant un développement typique, ils font plus d'erreurs au niveau des flexions temporelles, du genre, du nombre et de l'utilisation des pronoms personnels (Comblain, 2004; Piérart, 2004; Roulet-Amiot et Jabukowicz, 2006; Thordardottir et Namazi, 2007). L'omission des pronoms compléments est considérée une caractéristique prédominante d'un TDL en français (Hamann et al., 2003). Au plan réceptif, on relève des difficultés de compréhension de différents types de phrases complexes (Comblain, 2004). Ces données montrent que les difficultés de construction et la consolidation des représentations morphologiques et syntaxiques nécessaires au traitement du langage de niveau de complexité croissant présentent la caractéristique distinctive du TDL (Rice, Tomblin, Hoffman, Richman et Marquis,

2004; van der Lely, 2005). D'autres résultats de recherches soulignent également la présence de difficultés d'ordre pragmatique, le plus souvent secondaires aux déficits des aspects structuraux du langage (Bishop, 2000). L'ensemble de ces difficultés se manifeste de façon particulière lors de l'entrée à l'école compte tenu des exigences spécifiques à ce contexte de communication, en particulier au plan social (Cain et Oakhill, 2007; Ullman et Pierpont, 2005).

La présente étude vise deux objectifs face à la situation d'une enfant d'origine chinoise adoptée par une famille francophone de Montréal, au Québec (Canada) à l'âge de 19 mois. Le premier objectif est de rendre compte du raisonnement clinique emprunté dans un contexte d'adoption internationale. Le deuxième objectif vise à décrire l'évolution du langage de cette enfant à travers trois temps de mesure dont le dernier correspond au début de la scolarisation. Le compte rendu d'une démarche de raisonnement clinique et celle du parcours développemental de cette enfant permet l'ajout de données pertinentes à un corpus de recherches encore limité sur l'examen des troubles développementaux du langage dans un contexte d'adoption internationale.

Présentation du cas clinique

L'enfant dont il est question dans la présente étude de cas a été recrutée dans le cadre d'une étude de cohorte menée à l'Université McGill (Gauthier et Genesee, en cours). Pour participer à cette étude, les fillettes devaient (a) être d'origine chinoise, (b) être adoptées par une famille franco-québécoise et (c) présenter un développement cognitif dans les limites de la normale tel que confirmé à l'aide du *Leiter International Performance Scale Revised* (Leiter-R; Roid et Miller, 1997) au premier temps de mesure.

Léa (nom fictif) a vécu en orphelinat de sa naissance jusqu'au moment de son adoption. Aucune information n'est disponible concernant son histoire périnatale, ses antécédents familiaux ou le contexte social et socio-sanitaire précédant l'adoption. L'enfant ne présentait aucun problème de santé particulier au moment de sa mise en adoption. À son arrivée au Québec, elle parlait et comprenait le mandarin, langue inconnue des membres de sa nouvelle famille. Donc, dès que Léa est arrivée au Québec à l'âge de 19 mois, l'exposition au mandarin s'est arrêtée. Concomitamment au français, elle a aussi été exposée à l'anglais à partir de l'âge de quatre ans. Chez les enfants adoptés en bas âge, le développement n'est considéré bilingue que pour un court laps de temps. En effet, la dominance linguistique change radicalement de la langue initiale à la langue du milieu d'adoption et les habiletés de la langue pré-adoption s'estompent très rapidement jusqu'à l'effacement complet (Glennen, Rosinsky-Grunhut et Tracy, 2005). C'est pourquoi le français est considéré être la première langue de cette enfant et l'anglais, la deuxième, bien que le mandarin soit la langue initiale.

Selon les propos rapportés par sa mère adoptive, Léa aurait rapidement progressé dans l'apprentissage du français. Ainsi, elle aurait produit ses premiers mots à l'âge

de 20 mois, soit un mois après son arrivée dans la famille, ses premières combinaisons de deux mots à 24 mois et ses premiers énoncés de plusieurs mots à 36 mois. À partir de l'âge de 4 ans, Léa a été intégrée à un environnement bilingue dans lequel se côtoyaient le français (3 jours/semaine) et l'anglais (2 jours/semaine) et ce, jusqu'à sa première année scolaire où elle était alors majoritairement scolarisée en anglais (4 jours/semaine).

Le développement du langage de Léa en français a été évalué à deux reprises dans le cadre de l'étude de cohorte menée par Gauthier et Genesee (en cours). La première collecte des données a été réalisée alors qu'elle était âgée de 4 ans 8 mois, soit plus de trois ans suivant son arrivée dans sa famille d'adoption et huit mois après l'introduction de l'anglais. Les résultats indiquaient un profil développemental atypique. L'évaluation faite à 5 ans 11 mois a montré le maintien de ces difficultés langagières. Une troisième évaluation a eu lieu dans le cadre de la présente étude en janvier de la première année du primaire. Les trois entrevues de collecte des données d'une durée de deux heures chacune ont été faites dans les locaux de l'Université McGill.

Objectif 1 — Processus de raisonnement clinique : Méthodologie

Le premier objectif poursuivi est de présenter le processus de raisonnement clinique emprunté dans un contexte d'adoption internationale. Le cas clinique de Léa soulève des questionnements compte tenu de son parcours complexe (c.à.d., changement de milieu linguistique suivant l'adoption et bilinguisme) et des difficultés langagières mises en évidence dès la première évaluation. À première vue, différentes hypothèses pouvaient être envisagées pour expliquer le profil langagier atypique de cette enfant. En effet, les difficultés langagières observées pouvaient être attribuables (a) au changement d'environnement linguistique inhérent au processus d'adoption internationale, (b) à l'apprentissage d'une deuxième langue, l'anglais, introduite avant l'entrée à l'école ou (c) à un TDL. C'est par un examen minutieux des écrits scientifiques que l'une ou l'autre de ces possibilités a pu être ou non confirmée. Une recension des écrits portant sur les liens entre (a) l'adoption internationale, (b) l'apprentissage d'une langue seconde et (c) les troubles développementaux du langage a ainsi été effectuée dans les banques de données informatisées.

Objectif 1 — Processus de raisonnement clinique : Résultats

D'entrée de jeu, la première hypothèse qui propose que les difficultés langagières observées puissent être attribuables au changement d'environnement linguistique inhérent au processus d'adoption internationale a été écartée. Plusieurs résultats de recherche ont permis de montrer que pour une majorité d'enfants adoptés de Chine avant l'âge de 24 mois, l'apprentissage de la nouvelle langue progresse rapidement au cours des deux années suivant la date d'adoption pour rejoindre le niveau de développement langagier atteint par des pairs non adoptés au cours de la

période préscolaire (Glennen et Masters, 2002; Krakow, Tao et Roberts, 2005; Pollock, 2005; Pollock et Price, 2005; Roberts, Pollock, Krakow, Price, Fulmer et Wang, 2005; Tan et Yang, 2005). Ce phénomène a également été observé chez des enfants adoptés dont les performances langagières étaient initialement déficitaires (Roberts, Pollock et Krakow, 2005). Ces données de recherche indiquent que le langage de l'enfant sous investigation aurait dû être normalisé bien avant le moment de l'évaluation initiale.

La seconde hypothèse voulant que les difficultés puissent être attribuables à l'apprentissage d'une deuxième langue introduite avant l'entrée à l'école a également été réfutée. En effet, les résultats de plusieurs recherches menées auprès d'enfants bilingues dont l'apprentissage des deux langues se fait de façon séquentielle, c'est-à-dire lorsqu'une deuxième langue est acquise après la langue maternelle, suggèrent que le développement de la première langue se poursuit, plafonne ou se détériore lors de l'introduction de la deuxième langue (Anderson, 2004; Francis, 2005; Jia et Aaronson, 2003; Jia, Kohnert, Collado et Aquino-Garcia, 2006; Kan et Kohnert, 2005; Kohnert et Bates, 2002; Kohnert, Bates & Hernandez 1999; Leseman, 2000). Or, pour que la première langue plafonne ou se détériore, il est nécessaire que l'enfant ait été exposé de façon systématique à la deuxième langue pour une durée minimale de sept ans (Bolonyai, 2007; Kohnert et Bates, 2002). Les lacunes observées en français au cours de la période d'observation ne peuvent donc pas s'expliquer par l'introduction de l'anglais, la durée d'exposition n'ayant pas été suffisamment longue.

Ainsi, la troisième hypothèse selon laquelle cette enfant présente un TDL restait la seule plausible. Il s'avérait alors très intéressant de suivre cette enfant lors de l'entrée à l'école pour caractériser l'évolution de son langage au fil du temps et déceler d'éventuelles difficultés pragmatiques à ce moment.

Objectif 2 — Évolution du langage chez Léa : Méthodologie

Le deuxième objectif de cet article est de décrire l'évolution du langage de Léa en incluant la première année de scolarisation. Pour ce faire, un troisième temps de mesure a été réalisé à 7 ans 3 mois dans le cadre de la présente étude.

Procédures de collecte des données

Tel que mentionné par Roberts et Scott (2009), l'évaluation des habiletés langagières d'un enfant adopté internationalement devrait inclure plusieurs procédures notamment (a) des tests normalisés, (b) des questionnaires à compléter par les parents et les enseignants et (c) des échantillons de langage et de narration spontanés. De plus, ces auteures soulignent l'importance de suivre le développement langagier de l'enfant de façon longitudinale pour permettre l'identification continue de ses forces et de ses faiblesses. Le français a été employé comme langue d'évaluation pour chacune des entrevues respectant ainsi la première langue et la langue dominante de l'enfant.

Les instruments choisis afin de mesurer le développement langagier de Léa à chacun des trois temps de mesure sont présentés dans le tableau 1. La version française des instruments a été utilisée en tout temps. La batterie d'évaluation est constituée de l'échelle de vocabulaire en images Peabody (EVIP; Dunn, Thériault-Whalen et Dunn, 1993) et de l'échelle *Expressive One-Word Picture Vocabulary Test Revised* (EOWPVT-R; Brownell, 2000; version traduite et normée par le groupe coopératif en orthophonie région Laval-Laurentides-Lanaudière, 1995) qui permettent respectivement la mesure du vocabulaire réceptif et expressif. Le *Preschool Language Scale Third Edition* (PLS-3; Zimmerman, Steiner et Pond, 1992) a été utilisé au premier temps de mesure pour évaluer les habiletés langagières réceptives et expressives, notamment le vocabulaire et les concepts de base, la morphologie, la syntaxe et le raisonnement verbal. Cet instrument a été remplacé par certains sous-tests du *Clinical Evaluation of Language Fundamentals Revised* (CELF-R; Semel, Wiig et Secord, 1987) lors des deuxième et troisième temps de mesure afin de respecter l'âge chronologique de l'enfant. Au troisième temps de mesure, les habiletés langagières sollicitées lors de l'entrée à l'école ont été évaluées, notamment la compréhension auditive à l'aide du *Test of Auditory Comprehension of Language* (TACL; Carrow-Woolfolk, 1985, version traduite et normée, groupe coopératif en orthophonie région Laval-Laurentides-Lanaudière, 1995) et le discours narratif par une tâche extraite de la batterie Nouvelles Épreuves pour l'Examen du Langage (N-EEL; Chevrie-Muller et Plaza, 2001). Les habiletés pragmatiques ont quant à elles été mesurées avec le *Children's Communication Checklist-2*¹ (CCC-2; Bishop, 2003) à l'intention des parents et des enseignants afin de rendre compte des habiletés présentées par Léa à la fin du préscolaire et au milieu de la première année du primaire. Un score composite dérivé du CCC-2, le *Social Interaction Difference Index* (SIDI)², facilite le diagnostic différentiel entre les enfants présentant un TDL et ceux présentant un trouble envahissant du développement (TED). Enfin, divers matériels ludiques ont été proposés à la mère et à l'enfant pour collecter des échantillons de langage spontané au cours d'une période de jeu de 30 minutes lors de chacun des temps de mesure. Il s'agit d'un ensemble de vaisselle et de nourriture jouet (1er temps de mesure), d'une maison de poupée avec personnages variés (2e temps de mesure) et d'un ensemble de pâte à modeler avec instruments de manipulation (3e temps de mesure). Aux deux premiers temps de mesure, les versions françaises de certains tests standardisés ont été interprétées à l'aide des normes américaines (EOWPVT-R, PLS-3, CELF-R) en l'absence de normes francophones. Lorsque possible, les normes francophones ont été employées au troisième temps de mesure.

Traitement et analyse des données

Tous les instruments de mesure ont été codifiés par la première auteure, alors finissante au 2e cycle en orthophonie. Des extraits de 10 minutes ont été prélevés des corpus langagiers de 30 minutes recueillis à chacun des temps de mesure (section médiane comprise entre la dixième et la vingtième minute des corpus). Ces extraits ont été transcrits et analysés à l'aide du programme *Systematic Analysis of Language Transcripts* (SALT; Miller et Chapman, 2002) et d'une procédure de codification développée pour l'analyse du franco-québécois (Thordardottir, 2005). La longueur moyenne des énoncés (LMÉ) mesurée en mots et en morphèmes a servi d'indicateur du développement morphosyntaxique. Le *Type Token Ratio* (TTR), correspondant au rapport entre le nombre de mots différents et le nombre de mots utilisés, a été employé pour mesurer la diversité lexicale et sémantique. Finalement, deux mesures de précision phonologique ont été prises à partir de 50 énoncés dans chacun des trois corpus, soit le pourcentage de consonnes produites correctement (PCC) et le pourcentage de consonnes et de formes syllabiques (PCFS) respectées dans chaque mot comparativement à la cible (proximity of whole-word proximity; Ingram, 2002). La fidélité interjuges a été établie à partir d'un échantillon de 50 énoncés codifié par la première auteure de l'article et par une assistante de recherche également formée en orthophonie. Elle s'élève à 80% pour l'ensemble des mesures. Ce taux est considéré excellent (Rosner, 2006).

Objectif 2 — Évolution du langage chez Léa : Résultats

Les résultats sont présentés en deux sections et sont regroupés dans les tableaux 2 et 3. La première section rend compte du développement langagier de Léa lors des deux premiers temps de mesure. La deuxième section porte sur les résultats obtenus au troisième temps de mesure, soit lors de la période scolaire.

Premier et deuxième temps de mesure

Les résultats du premier temps de mesure, alors que Léa est âgée de 4 ans 8 mois, montrent que le vocabulaire réceptif se situe dans les limites de la normale alors que le vocabulaire expressif se trouve nettement sous les normes. Le portrait langagier se distingue également par d'importants déficits aux plans réceptif et expressif tels qu'évalués par le PLS-3. À cet égard, l'analyse qualitative des tâches montre que Léa éprouve des difficultés à parler d'événements qui ne sont pas dans l'ici et maintenant. En effet, les verbes sont conjugués au présent ou maintenus à l'infinitif (« Pas traverser la rue »). La répétition de phrases simples s'avère par ailleurs impossible.

1- La grille du CCC-2 comprend 70 items répartis en 10 sous-échelles. Les quatre premières sous-échelles évaluent la forme du langage (phonologie, syntaxe, sémantique, cohérence), les quatre suivantes sont consacrées aux aspects pragmatiques (amorces de communication, langage stéréotypé, utilisation du contexte conversationnel, communication non verbale) tandis que les deux dernières sous-échelles évaluent des aspects non linguistiques du comportement tels les relations sociales et les centres d'intérêt de l'enfant. Chacune des sous-échelles est convertie en scores normalisés et en rangs centiles (Bishop, 2003).

2- Le *Social Interaction Difference Index* (SIDI) est calculé en soustrayant les résultats aux quatre sous-échelles évaluant la forme du langage du total des sous-échelles « amorces de communication », « communication non verbale », « relations sociales » et « centres d'intérêt ». Des scores SIDI supérieurs à 10 correspondent à ceux obtenus par les enfants ayant un TDL alors que ceux inférieurs à -10 sont indicateurs d'un TED.

Tableau 1

Instruments d'évaluation du langage utilisés aux trois temps de mesure

	Temps 1	Temps 2	Temps 3
Vocabulaire réceptif	Échelle de vocabulaire en images Peabody (EVIP; Dunn et al., 1993). Normes francophones	Échelle de vocabulaire en images Peabody (EVIP; Dunn et al., 1993) Normes francophones	Échelle de vocabulaire en images Peabody (EVIP; Dunn et al., 1993) Normes francophones
Vocabulaire expressif	Expressive One-Word Picture Vocabulary Test Revised (EOWPVT-R; Brownell, 2000). Normes américaines (anglophones)	Expressive One-Word Picture Vocabulary Test Revised (EOWPVT-R; Brownell, 2000) Normes américaines (anglophones)	Expressive One-Word Picture Vocabulary Test Revised (EOWPVT-R; Brownell, 2000) Normes francophones
Habiletés globales réceptives et expressives	Preschool Language Scale 3 (PLS-3; Zimmerman, Steiner et Pond, 1992) Normes américaines (anglophones)	Clinical Evaluation of Language Fundamentals Revised (CELF-R; Semel, Wiig et Secord, 1987) Normes américaines (anglophones)	Clinical Evaluation of Language Fundamentals Revised (CELF-R; Semel, Wiig et Secord, 1987) Normes américaines (anglophones) Épreuve de Compréhension Carrow-Woolfolk (1985, version traduite et normée, groupe coopératif en orthophonie, région Laval-Laurentides-Lanaudières, 1995) Normes francophones
Discours narratif & développement pragmatique			Nouvelles Épreuves pour l'Examen du Langage (N-EEL; Chevrie-Muller et Plaza, 2001). Normes francophones Children's Communication Checklist-2 (CCC-2; Bishop, 2003) Normes britanniques (anglophones)

D'autre part, l'analyse du corpus langagier basée sur 151 énoncés révèle une structure syntaxique simple dans laquelle l'ordre des mots n'est pas toujours respecté. Des constituants morphosyntaxiques tels les sujets, les compléments ou les prépositions peuvent par ailleurs être omis et les mots questions sont absents des phrases interrogatives (« Madame e veut madame? » pour « Madame qu'est-ce que tu veux madame? »). La longueur moyenne des énoncés se situe largement en deçà de ce qui est attendu pour l'âge chronologique de l'enfant que ce soit en mots ou en morphèmes (Thordardottir et al., 2005). Inversement, le niveau de diversité lexicale paraît suivre les normes développementales. Finalement, les résultats indiquent que Léa produit des formes phonologiques précises ainsi que des mots longs et complexes.

Alors que Léa est âgée de 5 ans 11 mois, l'étendue du vocabulaire réceptif demeure dans les limites de la normale et le vocabulaire expressif a atteint les normes. Les performances au CELF-R confirment des habiletés réceptives se situant dans la moyenne pour la compréhension des concepts linguistiques et des consignes orales, alors que le niveau de compréhension des structures syntaxiques se situe à la limite inférieure de la normale. Des lacunes

apparaissent notamment au chapitre des phrases interrogatives (mots-questions), des phrases d'action avec temps de verbes, des phrases avec prépositions et des phrases complexes (C.O.I, relatives, subordonnées).

Sur le plan expressif, les performances au CELF-R témoignent d'une incapacité à construire un énoncé à partir d'un mot donné et à répéter des phrases de structures syntaxiques variées. Ces observations sont en partie explicables par le fait que Léa n'arrive pas à manipuler les structures syntaxiques complexes qu'elle n'a pas encore maîtrisées. Ses productions spontanées calquent la structure canonique sujet-verbe-complément et sont mises en échec dès qu'elles s'en éloignent. De plus, la LMÉ mesurée en mots et en morphèmes, demeure en deçà des normes attendues pour l'âge. L'analyse du corpus de langage spontané basée sur 127 énoncés révèle un nombre très limité de phrases complexes; seules quelques occurrences de phrases coordonnées et relatives maladroitement construites sont relevées. De plus, les quelques phrases complexes produites comprennent plusieurs erreurs morphosyntaxiques et l'ordre des constituants est souvent altéré. Les verbes sont parfois maintenus à l'infinitif et des erreurs de genre sont notées. Les phrases interrogatives sont presque exclusive-

Tableau 2

Résultats à chacun des trois temps de mesure

	Temps 1 (4;8)	Temps 2 (5;11)	Temps 3 (7;3)
Habiletés réceptives			
PLS-3 (rg centile)	3		
CELF-R (rg centile)		Concepts linguistiques : 50 Consignes : 37 Structures syntaxiques : 16	Concepts linguistiques : 37 Consignes : 50 Structures syntaxiques : 7
TACL (rg centile)			Phrases complexes : 76 Morphologie grammaticale : <1
EVIP (rg centile)	53	55	56
Habiletés expressives			
PLS-3 (rg centile)	1		
CELF-R (rg centile)		Formulation de phrases : 2 Répétition de phrases : 1	Formulation de phrases : 1 Répétition de phrases : 1
EOWPVT-R (rg centile)	6	19	40
N-EEL			Récit niveau 2
LMÉ mots (normes ¹)	2,6 (4,6)	4,3 (5,8)	4,3
LMÉ morphèmes (normes ¹)	3,6 (6,0)	5,5 (7,7)	5,8
TTR (normes ¹) [nb mots différents/ nb total de mots]	0,32 (0,26) 80/250 [134/514]	0,31 (0,25) 122/394 [127/499]	0,31 130/414
PCC (normes ²)	85,5 % (95,3)	90,0 %	94,5 %
PCFS (normes ²)	91,0 % (97,8)	94,0 %	92,0 %

¹ Normes franco-québécoises pour les enfants de 4 ans 5 mois et 5 ans 5 mois (Thordardottir, en préparation)² Normes franco-québécoises pour les enfants de 4 ans 6 mois (MacLeod, Sutton, Trudeau et Thordardottir, soumis)

Troisième temps de mesure

Habiletés générales réceptives et expressives

Lorsque Léa atteint l'âge de 7 ans 3 mois, l'écart entre le vocabulaire réceptif et expressif se réduit. De même, les performances au CELF-R témoignent désormais d'habiletés réceptives se situant dans les limites de la normale pour toutes les épreuves administrées soit les concepts linguistiques, les consignes orales et les structures syntaxiques. La compréhension des phrases complexes est également intacte lorsque mesurée par le TACL, mais d'importantes difficultés de compréhension de la morphologie grammaticale sont décelées. L'analyse qualitative des performances révèle que ce sont les pronoms personnels et compléments ainsi que les marqueurs de temps de verbes qui sont les plus largement déficitaires. Ces derniers sont abondamment représentés dans la tâche de morphologie grammaticale comparativement à celle des phrases complexes. Les performances obtenues à la tâche de phrases complexes du TACL paraissent donc préservées par le nombre plus important d'énoncés comportant des substantifs, ceci ayant pour effet de réduire la quantité de pronoms avec référents (exemple

ment marquées par l'intonation en raison de la sous-utilisation des locutions est-ce que / qu'est-ce que. On observe également plusieurs phrases dont la construction inhabituelle laisse croire à une réutilisation inadéquate de phrases figées (« le matin est là ! » au lieu de « c'est le matin ! »). Le niveau de diversité lexicale et les mesures de précisions phonologiques indiquent que le développement de ces aspects se poursuit de façon adéquate.

La comparaison des résultats aux deux premiers temps de mesure indique une progression de certaines habiletés langagières tandis que d'autres sont demeurées au même stade. Ainsi, sur le plan réceptif, les résultats attestent d'habiletés se situant désormais dans les limites de la normale quoique certaines faiblesses soient relevées au chapitre de la compréhension des structures syntaxiques complexes. Sur le plan expressif, la complexification des énoncés est désormais amorcée bien qu'en occurrence limitée et marquée de nombreuses erreurs. Les habiletés expressives demeurent largement déficitaires si l'on excepte l'étendue du vocabulaire expressif qui s'est normalisée au deuxième temps de mesure.

Tableau 3

Résultats aux différentes sous-échelles et scores composites du CCC-2, rapportés en rangs centiles

Répondants (âge enfant)	Forme du langage				Pragmatique				Aspects non linguistiques		SIDI
	Phonologie	Syntaxe	Sémantique	Cohérence	Amorces de communication	Langage stéréotypé	Utilisation du contexte	Communication non verbale	Relations sociales	Centres d'intérêt	
Maternelle (5;11)	0,4	0,1	1	1	1	1	5	1	0.4	2	3
Mère (7;3)	5	9	25	25	37	25	50	25	84	9	9
Gardienne (7;3)	1	2	16	9	25	25	50	37	25	63	16
1 ^{ère} année (7;3)	1	2	2	16	63	25	5	37	84	98	28

de phrases complexes : La femme mange une banane et l'homme boit du lait, L'homme parle à la mère de la fille qui est dans l'auto).

Sur le plan expressif, les performances au CELF-R indiquent que les difficultés morphosyntaxiques persistent. Léa éprouve de grandes difficultés en ce qui a trait à la construction et à la répétition de structures syntaxiques simples (interrogatives, négatives) et complexes. Les performances obtenues en répétition de phrases auraient pu pointer vers un déficit de la mémoire auditive. Toutefois et tel que mentionné précédemment, la compréhension des phrases complexes au TACL est réussie même lorsque les phrases sont longues, ce qui infirme cette hypothèse.

Corpus de langage spontané

L'analyse du corpus de langage spontané basée sur 136 énoncés permet à nouveau de constater que Léa produit un nombre limité de phrases complexes dans lesquelles l'ordre des mots n'est pas toujours respecté. Bien qu'au-delà de quatre mots la LMÉ ne soit plus un indicateur précis du stade morphosyntaxique atteint par l'enfant (Vinter, 2001), on constate néanmoins une augmentation relativement faible par rapport au dernier temps de mesure. La LMÉ se situe désormais à 4,3 mots et à 5,8 morphèmes tandis que la diversité lexicale reste identique à celle mesurée au deuxième temps de mesure (aucune norme franco-québécoise n'est disponible pour ce groupe d'âge). On observe toujours des erreurs de genre et l'absence de certaines prépositions, telles *de* et *avec*. Les locutions est-ce que / qu'est-ce que ne sont pas encore acquises étant donné l'emploi du pronom interrogatif *quoi* dans les phrases interrogatives (ex : « C'est quoi l'a dit ? »). Les scores sur les mesures de précisions phonologiques indiquent que, compte tenu de l'âge, Léa produit plus d'erreurs que ce qui est attendu et les erreurs les plus fréquentes sont la simplification des groupes consonantiques. De plus, elle fait quelques omissions de la fricative uvulaire /ʁ/ et de la

vélaire occlusive /k/ lorsque cette dernière est en position finale de mots.

Habiletés discursives

Au même âge, la tâche de récit sur images de la batterie N-EEL fait ressortir un discours séquentiel simplifié prenant la forme d'une énumération. La chronologie est respectée, tel qu'attendu chez 92% des enfants de 7 ans (Chevrie-Muller et Plaza, 2001), mais seule l'information essentielle est transmise et très peu de liens sont observés entre les événements. Les liens logiques ne sont pas clairement établis, même dans la simple juxtaposition des énoncés. Selon les méthodes de cotation de la N-EEL, le type de récit construit par Léa est produit par moins du quart des enfants de cet âge (Récit niveau 2 : Chevrie-Muller et Plaza, 2001).

Habiletés pragmatiques

Les données sur le développement de la pragmatique sont présentées dans le tableau 3. Les résultats obtenus auprès de l'enseignant du préscolaire, alors que Léa est âgée de 5 ans 11 mois, dépeignent un portrait aux habiletés linguistiques, pragmatiques et sociales largement déficitaires. En effet, des difficultés sont relevées sur l'ensemble des dimensions évaluées par le CCC-2. Or, lors de l'évaluation en début de première année, la mère de Léa souligne davantage les difficultés proprement linguistiques, c'est-à-dire celles touchant la prononciation et les transformations phonologiques de même que la syntaxe. Elle relève également la présence d'atypies dans la variété et la nature des intérêts exprimés, tandis que la dimension pragmatique se situe dans la norme. À l'exception des aspects non linguistiques jugés adéquats, l'estimation de la gardienne s'apparente à celle de la mère. L'enseignante de première année signale aussi d'importantes difficultés au chapitre de la forme du langage alors que, pour la pragmatique, des déficits sont relevés uniquement pour l'utilisation du contexte, notamment la réaction aux blagues et l'interprétation du

langage figuré. Les résultats au SIDI, au-delà de 10 pour la gardienne et l'enseignante et approchant le seuil de 10 pour la mère, indiquent que le portrait de Léa lors du passage en première année s'apparente significativement à celui des enfants TDL. Dans les faits, les difficultés qui perdurent dans la structure linguistique ont un impact sur les habiletés générales de communication de l'enfant.

Discussion

La présente étude de cas longitudinale suggère une démarche de raisonnement clinique dans un contexte d'adoption internationale complexifié par l'ajout d'une langue seconde. Elle décrit l'évolution atypique du langage de Léa, une enfant adoptée de Chine à l'âge de 19 mois par une famille québécoise francophone, jusqu'à la première année scolaire. Les résultats font clairement ressortir un profil langagier caractéristique d'un TDL. Tel que décrit précédemment, le TDL se caractérise par un certain nombre de critères dont les cinq suivants : (a) une syntaxe simplifiée; (b) des erreurs morphologiques qui touchent les flexions temporelles, le genre, le nombre; (c) l'omission des pronoms compléments; (d) la difficulté de compréhension de phrases complexes; et (e) une diversité lexicale limitée.

Les lacunes morphosyntaxiques persistent sur le plan réceptif et expressif lors des trois temps mesures. Sur le plan réceptif, Léa éprouve d'importantes difficultés avec le traitement des phrases comportant des morphèmes grammaticaux, particulièrement les flexions verbales. De plus, Léa démontre une difficulté à comprendre des phrases complexes. La manipulation des règles morphologiques impliquées dans le traitement des pronoms ainsi que des marqueurs de temps de verbes demeure déficitaire. Sur le plan expressif, l'usage de phrases simples est privilégié au détriment de phrases complexes qui, lorsque présentes, sont incomplètes ou dont l'ordre des mots n'est pas respecté. Le discours de Léa est peu élaboré et souffre d'un manque de liens logiques. Tel que démontré par l'analyse du corpus et de la tâche de récit sur images, Léa se montre peu habile à construire son message et à établir une séquence élaborée.

Léa présente d'importantes difficultés se manifestant de façon persistante au chapitre de la morphologie, notamment par de nombreuses erreurs affectant les temps de verbes et le genre. Ces erreurs morphologiques ne peuvent toutefois s'expliquer par la phonologie ou le lexique compte tenu du développement acceptable de ces dimensions.

L'ensemble des habiletés langagières de Léa accuse un important retard dès le premier temps de mesure à l'exception du développement typique du vocabulaire réceptif. Dans les faits, le vocabulaire réceptif constitue une force du profil langagier de l'enfant et exerce un effet d'entraînement sur le développement du vocabulaire expressif, lequel s'est normalisé au troisième temps de mesure. Le fait que Léa ait de bonnes habiletés lexicales est le seul aspect qui ne soit pas caractéristiques d'un TDL.

En plus des caractéristiques centrales au TDL, les habiletés pragmatiques de Léa à la maternelle et en première année ont été évaluées. Cette évaluation a mis en évidence des difficultés significatives au niveau préscolaire s'apparentant clairement à un TDL par la suite. Une progression a néanmoins été notée. En première année, Léa est désormais en mesure de mieux soutenir l'échange requis pour établir des relations sociales adéquates. Toutefois, les difficultés linguistiques portent toujours ombrage aux habiletés de communication de l'enfant et se manifestent davantage dans l'utilisation du contexte et de la cohérence dans l'organisation des idées.

Les difficultés relevées pourraient entraver la poursuite du cheminement scolaire de l'enfant. En effet, des résultats de recherche montrent que des difficultés au plan de la morphologie et de la compréhension se répercutent dans le développement et la maîtrise des mécanismes nécessaires à l'acquisition et au développement du langage oral et écrit lors des premières années de scolarisation (Casalis, Colé et Sopo, 2004; Egan et Pring, 2004). Lors de l'entrée à l'école, l'enfant doit comprendre des inférences, soit interpréter un message en l'absence d'éléments explicites (Cain et Oakhill, 2007), et manipuler des règles morphologiques et syntaxiques complexes (Ullman et Pierpont, 2005). Ainsi, des difficultés de traitement du langage oral compromettent grandement la réussite scolaire des enfants (Snowling et Hulme, 2005).

Les lacunes identifiées au chapitre de la morphologie et du discours narratif sont particulièrement préoccupantes. L'analyse morphologique est fondamentale pour avancer dans l'apprentissage de la lecture. Elle permet d'amener peu à peu l'enfant à reconnaître les éléments constitutifs des mots et à perfectionner ses habiletés de décodage à l'écrit en plus d'élaborer son vocabulaire (Casalis, Colé et Sopo, 2004; Egan et Pring, 2004). La narration, quant à elle, en étant plus structurée que la conversation exige davantage de planification et d'organisation de nombreux énoncés entre eux. Or, les tâches scolaires requièrent un niveau avancé de perfectionnement des habiletés discursives en ce qui a trait à la structure et à la cohérence dans la sélection et l'organisation des idées (Paul, 2007). Compte tenu des liens étroits établis entre les habiletés exigées par le discours narratif, la réussite scolaire et la lecture, les difficultés importantes de Léa à ce chapitre augmentent significativement le risque qu'elle présente des difficultés académiques (Fey, Catts, Proctor-Williams, Tomblin et Zhang, 2004).

L'entrée à l'école engendre des exigences pragmatiques importantes puisque, en classe, le langage est souvent utilisé sans le soutien du contexte, les consignes sont données oralement et l'enfant reçoit une attention partagée de la part de l'enseignant(e). Les caractéristiques singulières de ce contexte de communication exigent aux enfants présentant un TDL une charge cognitive plus importante comparativement à leurs pairs. Leurs difficultés de traitement du langage peuvent limiter les ressources disponibles

à leur adaptation aux exigences pragmatiques élevées que requiert l'enseignement en classe. Comme c'est le cas pour Léa, ces enfants peuvent présenter des difficultés à exprimer leurs incompréhensions, à s'aider des indices de l'environnement et à s'ajuster à ce contexte.

Cette étude de cas unique présente des limites. En effet, certains instruments utilisés ne disposent pas de normes spécifiques pour le français québécois et ont été interprétés sur la base de normes anglophones. De plus, aucune évaluation des habiletés langagières de Léa n'a été effectuée dans sa deuxième langue, l'anglais. Par ailleurs, l'instrument utilisé pour mesurer les habiletés pragmatiques peut comporter un biais. Un effet de désirabilité sociale a notamment été perçu chez la mère, ce qui a pu influencer les résultats dans un sens positif. Il aurait par ailleurs été pertinent d'administrer des tâches de traitement métalinguistique lors du troisième temps de mesure. Celles-ci auraient permis d'évaluer plus finement l'incidence éventuelle des habiletés déficitaires au plan du langage oral sur l'apprentissage du langage écrit (Demont et Gombert, 2007). Néanmoins, l'utilisation d'une batterie précise de tests formels, de questionnaires remplis par les parents et enseignants en plus des périodes de jeu interactif mère-enfant pour déterminer et décrire la présence de difficultés langagières, constitue une force indéniable de cette étude. De plus, la perspective théorique empruntée pour réfléchir sur les causes du portrait langagier de cette enfant offre un éclairage judicieux sur la problématique du développement langagier dans un contexte d'adoption internationale.

Implications cliniques

Le développement langagier des enfants adoptés de l'étranger comporte un niveau de complexité sociolinguistique qui commande une démarche de raisonnement clinique systématique et prudente. L'évaluation des habiletés langagières doit prendre en considération les impacts potentiels de l'adoption sur le développement. Ce contexte particulier constitue un facteur de risque pour certains enfants. En effet, bien que le développement langagier d'une grande majorité des enfants adoptés avant l'âge de 24 mois rattrape celui de leurs pairs non adoptés durant les deux années suivant l'adoption, cette progression langagière ne s'applique pas à tous. Certains enfants ont un retard important deux ans suivant l'adoption. Le développement des habiletés langagières de ce sous-groupe d'enfants devrait faire l'objet d'une surveillance particulière et, lorsque nécessaire, une évaluation orthophonique approfondie suivie d'une intervention thérapeutique devraient être mises en place. Cette mise en garde est d'autant plus importante lorsque le tableau clinique se complique par l'apprentissage séquentiel d'une autre langue. L'emploi d'une approche longitudinale s'avère essentiel chez les enfants adoptés internationalement si on veut s'assurer que des difficultés s'apparentant à un TDL ne soient pas négligées. Si tel est le cas toutefois, ces difficultés seront traitées comme un réel trouble de langage de la même manière que chez les enfants

non adoptés (Glennen, 2008). Cette étude de cas unique montre à quel point l'orthophoniste peut jouer un rôle important dans le contexte de l'adoption internationale.

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Author Note

La correspondance concernant cet article devrait être adressée à Audette Sylvestre, Programme de maîtrise en orthophonie, Département de réadaptation, Université Laval, 1050, Avenue de la Médecine, bureau 4485, Québec (Québec) G1V 0A6. Courriel : audette.sylvestre@rea.ulaval.ca.

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■ Use of a Dual-Task Paradigm to Measure Listening Effort

■ Utilisation d'un paradigme de double tâche pour mesurer l'attention auditive

Penny Anderson Gosselin
Jean-Pierre Gagné

Penny Anderson Gosselin,
M.Cl.Sc.
Graduate student (Ph.D.)
École d'orthophonie et
d'audiologie
Université de Montréal
Montréal, Québec

Jean-Pierre Gagné, Ph.D.
Professeur titulaire
École d'orthophonie et
d'audiologie
Université de Montréal
Montréal, Québec

Abstract

Listening effort is an important dimension of speech understanding. Despite the fact that a significant amount of speech understanding involves cognitive processes, much of clinical audiology remains focused on assessing the auditory periphery. As speakers age, their sensory, perceptual and cognitive functions decline. It has been speculated that older adults exert increased listening effort compared to younger adults but this effect is still poorly understood. Listening effort refers to the attention and cognitive resources required to understand speech. Listening effort can be evaluated indirectly in clinical practice through self-report, or it can be quantified more objectively using a dual-task paradigm. This paper emphasizes the importance of measuring listening effort and reviews the literature. The review focuses on dual task paradigms which have been used to investigate the effort related to understanding speech. The paper concludes with a discussion of the clinical importance of measuring listening effort.

Abrégé

L'attention auditive est une dimension importante de la compréhension de la parole. Même si la compréhension de la parole repose essentiellement sur des processus cognitifs, l'audiologie clinique se concentre en grande partie sur l'évaluation de la périphérie auditive. En vieillissant, les fonctions sensorielles, perceptives et cognitives des locuteurs diminuent. Il a été spéculé que les adultes plus âgés se fatiguent davantage lorsqu'ils doivent faire preuve d'une plus grande attention auditive comparativement aux adultes plus jeunes, mais cette hypothèse quant aux effets de l'âge est encore mal compris. L'attention auditive désigne l'attention et les ressources cognitives nécessaires pour comprendre la parole. Cet effort peut être évalué indirectement en pratique clinique à l'aide d'une auto-évaluation, ou il peut être quantifié de façon plus objective en utilisant un paradigme de double tâche. Cet article met l'accent sur l'importance de mesurer l'attention auditive et passe en revue la littérature. La présente revue est axée sur les paradigmes de double tâche qui ont été utilisés pour étudier l'attention liée à la compréhension de la parole. L'article se termine par une discussion sur l'importance clinique de mesurer l'attention auditive.

Key words: listening effort, dual-task paradigm, cognition, aging, speech perception, hearing loss, hearing aids, rehabilitation

Abbreviations

A: Auditory
 ANL: Acceptable Noise Level Test
 AV: Audio-visual
 BKB-SIN: Bamford-Kowal-Bench Speech in Noise Test
 BNL: Background noise level
 CHABA: Committee on Hearing and Bioacoustics and Biomechanics
 CID: Central Institute for the Deaf
 HHIA: Hearing Handicap Inventory for Adults
 HHIE: Hearing Handicap Inventory for the Elderly
 HINT: Hearing in Noise Test
 ICF: International Classification of Functioning, Disability and Health
 IOI-HA: International Outcome Inventory for Hearing Aids
 MCL: Most comfortable level
 pDTC: Proportional dual task cost
 QuickSIN: Quick Speech in Noise Test
 SNR: Signal-to-noise ratio
 SSQ: Speech, Spatial and Qualities of Hearing Scale
 SVIPS: Speech and Visual Information Processing System
 WHO: World Health Organization
 WIN: Words in Noise Test

Hearing and listening are different

Audiologists routinely measure hearing ability. However, there is more to communication than simply hearing. The process of communication involves not only perceptual factors like the ability to hear but also cognitive factors (Kiessling et al., 2003; Worrall & Hickson, 2003). In 2001, the hearing aid company Oticon assembled an international panel of experts to discuss the delivery of audiological services to older adults. Taking inspiration from the World Health Organization's International Classification of Functioning, Disability and Health (ICF; WHO, 2001), the group found that the traditional term "hearing" must be understood to involve hearing, listening, comprehending and communicating (Kiessling et al., 2003). This expanded definition of "hearing" recognizes the contributions of peripheral and central factors and acknowledges the fundamental difference between hearing and listening. Hearing is a sense (a passive function) but listening is a skill that requires attention and intention to access and use the information that is heard. Comprehension involves the reception and interpretation of the meaning and intent of the information. Communicating involves the effective use and transfer of information.

This paper focuses on the distinction between hearing and listening with an emphasis on the listening effort involved with listening comprehension. The importance of measuring listening effort and the influence that age and hearing impairment have on listening effort is explained. Subjective and objective measures of listening effort are

detailed, including the mechanics of dual task-paradigms that can be used as an objective means to assess listening effort behaviourally. Next, a review of the literature related to the dual-task paradigm as a measure for the effort related to speech understanding is presented. The paper concludes with a discussion of the clinical importance of measuring listening effort.

The importance of measuring listening effort

To illustrate the importance of distinguishing hearing from listening, let us consider two hypothetical (but realistic) case studies with similar hearing ability but varying degrees of difficulty in day-to-day listening and communication situations. Client A has a moderate sensorineural hearing loss bilaterally and wears two hearing aids. Masked word discrimination ability was measured at 68% and 72% for the right and left ears respectively. Even with amplification, Client A has marked difficulties understanding speech in noisy situations and hearing the television clearly at a normal volume level. Over the years, Client A has slowly started to withdraw from social situations as he feels tired and stressed at the end of the day, when he has had to concentrate hard on listening. In contrast, a second Client B has a moderate to severe sensorineural hearing loss bilaterally and uses a combination of hearing aids and assistive listening devices. Her word discrimination ability is equivalent to Client A. Client B has minimal difficulties hearing in noise because she uses an FM system. Client B continues to have some difficulties hearing telephone conversations clearly, even when using her telecoil settings and volume control. She continues to work full-time and has a very active family and social life.

If we use the ICF model (WHO, 2001) to interpret these hypothetical cases, we find that Client A has more activity limitations and participation restrictions than Client B. However, these important differences would be invisible to an audiologist who only relied on traditional measures such as the audiogram or standardized speech tests.

In clinical practice, speech understanding is evaluated using a standardized word recognition test (e.g., CID W-22 lists; (Hirsh et al., 1952)) in which the percentage of words repeated correctly constitutes the score. More recently, standardized speech-in-noise protocols have emerged, such as the Bamford-Kowal-Bench Speech in Noise Test (BKB-SIN; Bench, Kowal, & Bamford, 1979), the Quick Speech in Noise Test (QuickSIN; Killion, Niquette, Gudmundsen, Revit, & Banerjee, 2004), the Hearing in Noise Test (HINT; Nilsson, Soli, & Sullivan, 1994) and the Words in Noise Test (WIN; Wilson & Burks, 2005). In these tests, the score is the signal-to-noise ratio where a listener recognizes the speech materials correctly for a fixed percentage of the presentations (e.g., 50%).

As shown in our hypothetical example, it is often possible that two listeners could receive an identical score even though one of the listeners may find that listening in typical day-to-day situations is extremely challenging and requires great effort. Researchers involved with telephone

engineering have long recognized that intelligibility testing (i.e., observing how many words are correctly reported by a listener at the other end of the line) does not differentiate in a situation where a listener may score within a region of high intelligibility but report that the voice was unintelligible and required considerable 'mental effort' to discriminate (Broadbent, 1958; Fletcher, 1953).

The challenge faced by clinicians is that on the basis of the audiogram and speech test results, listeners with equal scores may be provided with similar audiological rehabilitative services such as amplification despite the fact that there could be large differences in the amount of listening effort. We therefore argue that listening effort is an important dimension of speech understanding, yet much of clinical audiology remains focused on assessing hearing impairment even though a significant amount of listening, comprehending and responding involves the cognitive system (Baltes & Lindenberger, 1997; Edwards, 2007; Pichora-Fuller & Singh, 2006; Sweetow & Henderson-Sabes, 2004). Listening effort refers to the attention and cognitive resources required to understand speech (Bourland-Hicks & Tharpe, 2002; Downs, 1982). In contrast, 'ease of listening' refers to the listener's perceived difficulty of the listening situation (Bourland-Hicks & Tharpe, 2002; Feuerstein, 1992).

The influence of age on listening effort

Age is an important factor to consider in terms of an individual's ability to listen and communicate because as adults age, their sensory, perceptual and cognitive functions decline (Baltes & Lindenberger, 1997; Lindenberger & Baltes, 1994; Pichora-Fuller & Singh, 2006; Scialfa, 2002). These declines affect the ability to understand speech, especially in noisy situations. Most normal hearing older adults perform more poorly than younger adults on speech comprehension tasks, especially in noise (CHABA, 1988). In terms of day-to-day listening, many older adults indicate that listening in noisy situations is a challenging and often exhausting experience. Although it has been speculated that older adults exert increased listening effort compared to younger adults, very few studies have actually evaluated listening effort experimentally (Larsby, Hallgren, & Lyxell, 2005; Tun, Benichov, & Wingfield, 2008).

Larsby et al. (2005) examined how different speech or speech-like background noises may interact with cognitive processes important for speech understanding in young and elderly listeners with and without hearing loss. The cognitive processes evaluated included tests from the Speech and Visual Information Processing System (SVIPS) test battery (Hallgren, Larsby, Lyxell, & Arlinger, 2001). In general, Larsby et al. (2005) found that relative to younger adults, the elderly subjects were more distracted by noise with temporal variations and were especially affected by noise with meaningful content. The components of the test battery that were most affected by these noise variations involved the non-word category of the lexical decision making test. For this test, participants were asked to judge

whether a combination of three letters represented a real word or a non-word. However, despite the performance differences for the lexical test in terms of accuracy and reaction time scores, interestingly, the elderly listeners did not report a higher degree of perceived effort than younger subjects in these situations. Larsby et al. (2005) interpreted this finding as being due to the fact that the elderly are less prone to complain.

In terms of response time findings, research by Tun et al. (2008) demonstrated similar results. Using a sentence comprehension task, Tun et al. (2008) showed that older adults were slower than younger adults when processing speech at low sound intensities or when processing speech with difficult syntax. The increased response time results were then used to infer increased processing effort and difficulties for older adults though effort was never explicitly measured.

The influence of hearing impairment on listening effort

In addition to the influence of age on listening effort, hearing impairment can exacerbate difficulties with listening, particularly in noise (Hallgren et al., 2001; Hallgren, Larsby, Lyxell, & Arlinger, 2005; Larsby et al., 2005; Tun et al., 2008; Worrall & Hickson, 2003). A common complaint among people with hearing loss is the effort required to understand speech in noisy situations. Since the CHABA (1988) report, a comprehensive review of twenty experimental studies involving both normal hearing listeners and those with hearing loss was undertaken to examine the relationship between speech understanding in noise and cognitive abilities (Akeroyd, 2008). Akeroyd (2008) concluded that while hearing loss emerged as the primary factor in determining one's speech recognition ability in noise, cognition was secondary. Further, while no single cognitive test emerged across all the studies reviewed, Akeroyd found that measures of working memory were significantly correlated to speech understanding ability in noise (Akeroyd, 2008). For a further review of the effects of age on cognitive ability and hearing loss, readers are directed to Pichora-Fuller & Singh (2006).

The debilitating effects of hearing loss can be manifested as both auditory fatigue and as extra effort which is needed to listen to understand speech and to concentrate (Bourland-Hicks & Tharpe, 2002; Héту, Riverin, Lalande, Getty, & St-Cyr, 1988; Kramer, Kapteyn, Festen, & Kuik, 1997). Hearing loss can dramatically alter one's social interactions and quality of life due to the increases in effort, stress, and the fatigue of coping (Demorest & Erdman, 1986). Stephens and Héту (1991) have suggested that the World Health Organization's classification of auditory handicap (WHO, 1980) be extended to include the effects of effort and fatigue.

Humes (1999) examined the multidimensional nature of hearing aid outcome. In this study, principal component analyses were used to evaluate functional associations between different outcome parameters. Interestingly, the notion of "effort" emerged as a separate aspect of hearing

aid outcome that was distinct from aided speech recognition performance.

Compared to normal hearing listeners, Larsby et al. (2005) found that listeners with hearing loss had more problems completing the SVIPS test battery in noises with a high degree of temporal variations (i.e., a single or multi-talker babble noise compared to a steady state noise). Collapsing the data across younger and older adults, the perceived effort ratings of listeners with hearing loss were significantly higher than the perceived effort ratings of normal hearing listeners (Larsby et al., 2005). The highest effort ratings for listeners with hearing loss were obtained for tasks that were administered in an auditory-only modality, followed by audiovisual conditions. Text-based tests required the least effort (Larsby et al., 2005).

Tun et al. (2008) used response latency data to demonstrate that older adults with hearing loss were slower than older adults with normal hearing and even younger adults with hearing loss. Subjects were asked to verify the accuracy of sentences presented at either low levels or with complex syntactic structure. While effort was not explicitly measured, these findings were used to conclude that older adults with poor hearing are slower at processing sentences under challenging conditions (e.g., low sound intensity, difficult syntax) due to increased processing effort (Tun et al., 2008).

Subjective measures of listening effort

Questionnaires

Given the importance of measuring listening effort, the question for practicing clinicians is how to obtain a reliable measure of listening effort? Currently, if listening effort is evaluated in audiological practice, it is done with self-reports or rating scales designed to measure handicap reduction, acceptance, benefit, and satisfaction with hearing-aid amplification (Humes & Humes, 2004). Two examples of questionnaires that quantify handicap due to hearing loss and measure change in perceived handicap after the fitting of hearing aids include the Hearing Handicap Inventory for Adults (HHIA; Newman, Weinstein, Jacobson, & Hug, 1991) and the Hearing Handicap Inventory for the Elderly (HHIE Weinstein, Spitzer, & Ventry, 1986). One promising new questionnaire which can be administered in an interview format is the Speech, Spatial and Qualities of Hearing Scale (SSQ; Gatehouse & Noble, 2004). The 80 questions of the SSQ are designed to measure both dynamic and static aspects of hearing function. The questionnaire includes items to assess hearing disabilities and handicap as they relate to auditory attention, perceptions of distance and movement, sound-source segregation, prosody, sound quality and listening effort. The items that specifically target listening effort include questions 14, 18 and 19 from the Qualities scale (Gatehouse & Akeroyd, 2006):

Qualities 14: Do you have to concentrate very much when listening to someone or something?

Qualities 18: Do you have to put in a lot of effort to

hear what is being said in conversation with others?

Qualities 19: Can you easily ignore other sounds when trying to listen to something?

In a recent study designed to determine the benefits of binaural amplification, the SSQ was used (Gatehouse & Akeroyd, 2006). In addition to the expected dynamic benefits of binaural amplification relative to monaural amplification, the SSQ was able to show a significant reduction in the effort needed to communicate effectively (Gatehouse & Akeroyd, 2006).

According to Kricos (2006), it is essential that clinicians document how successful a program of audiological rehabilitation has been in reducing listening effort as this represents a unique aspect of hearing aid outcome which is separate from aided speech recognition. In the absence of a formalized questionnaire, Kricos suggests that an estimate of listening effort could be obtained by asking clients to rate their ease of listening on a scale from 0 to 100 with 100 representing very easy listening (Kricos, 2006).

As evidence-based practice paradigms require clinicians to demonstrate that their hearing aid fittings are providing real-world benefit, self-reports of outcome are now becoming a new standard measure for reporting treatment effectiveness, in addition to clinic-based measures of hearing aid benefit and aided speech recognition (Cox, 2003; Humes, 1999; Humes & Humes, 2004).

Acceptable Noise Level Test (ANL)

The Acceptable Noise Level Test (ANL) adds an interesting nuance to the notion of listening effort as an essential component of the test is to measure the maximum level of background noise that a listener is willing to “put up with” without becoming tired or tense while listening to a story (Nabelek, Freyaldenhoven, Tampas, Burchfield, & Muenchen, 2006; Nabelek, Tampas, & Burchfield, 2004). To obtain an ANL, a recorded story is adjusted to a listener’s most comfortable listening level (MCL). Next, background noise is increased to the maximum level that the listener will tolerate while listening to the story (i.e., the background noise level, BNL). The ANL is calculated as the difference between the two subjective measures (i.e., $ANL = MCL - BNL$).

The literature has reported that one’s willingness to tolerate background noise is a predictor for successful hearing aid use (Nabelek et al., 2006; Nabelek et al., 2004; Plyler, 2009). According to investigators, the ANL test can identify with 85% accuracy those individuals who will wear and use their hearing aids (Nabelek et al., 2006). Individuals that are able to “put up with” high levels of background noise (i.e., have low ANL scores) are more likely to be successful hearing aid users compared to individuals who cannot deal with background noise (i.e., have high ANL scores). ANL scores have received attention in literature because they have been shown to be reliable and consistent over time for both people with normal hearing as well as those with hearing loss (Nabelek et al., 2006; Nabelek et al., 2004; Plyler, 2009). Since ANL scores do not change with

hearing aid use, it is possible that they can be measured before hearing aids are fitted and used as a predictor of hearing aid use (Nabelek et al., 2006; Nabelek et al., 2004). The unaided ANL has also been shown to be significantly related to outcome as measured by the International Outcome Inventory for Hearing Aids (IOI-HA; Taylor, 2008). However, it must be noted that the starting point of the ANL is based on two subjective level-setting measures (i.e., MCL and BNL).

Limitations of subjective measures

While self-report through questionnaires may be effective for many adult clients, several studies have shown that in the case of older adults, discrepancies exist between self-report and objective measures (Saunders & Forsline, 2006; Shulman, Pretzer-Aboff, & Anderson, 2006). Older adults tend to overestimate their capabilities and underestimate their degree of impairment (Ford et al., 1988; Uchida, Nakashima, Ando, Nino, & Shimokata, 2003).

In a similar way, the ANL test could also be underestimated by many people. Elderly people in particular may indicate a greater tolerance for speech in noise even though it may result in poorer speech comprehension. Larsby (2005) observed that the elderly are less likely to report a high degree of perceived effort than younger adults despite measurable performance differences (i.e., accuracy and response time measures). This was interpreted as evidence that the elderly are less prone to complain. This finding could also apply to the ANL. On a final note, while the ANL asks listeners to indicate when the noise is too loud, listeners are never asked any questions regarding the passage they heard. In other words, there is no actual measure of comprehension. For these reasons, an objective measure of the listening effort involved with listening comprehension would be beneficial.

The dual-task paradigm – A means to quantify listening effort

We argue that a dual-task paradigm provides a quantitative measure to assess listening effort during a specific listening condition (Bourland-Hicks & Tharpe, 2002; Broadbent, 1958). In a dual-task paradigm, participants are asked to perform two tasks (a primary and a secondary task) separately and then concurrently. To assess listening effort, the primary task typically involves a listening activity such as word recognition in quiet or in noise at a predetermined signal-to-noise (SNR) ratio. Participants are told that recognizing speech is the primary task and that any additional task is secondary. The secondary task may involve a memory task, a probe reaction time task, or a tactile pattern recognition task (Bourland-Hicks & Tharpe, 2002; Downs, 1982; Downs & Crum, 1978; Feuerstein, 1992; Fraser, Gagné, Alepins, & Dubois, 2007, 2009; Rabbitt, 1966; Rakerd, Seitz, & Whearty, 1996). Research has shown that individuals are able to prioritize one task over another based on verbal instruction (Bourland-Hicks & Tharpe, 2002; Crossley & Hiscock, 1992; Pashler, 1994; Somberg & Salhouse, 1982).

Dual-task paradigms make the implicit assumption that the cognitive system has a limited capacity of resources available at any given point in time (Kahneman, 1973). When individuals are required to divide their attention between two tasks, it is this limited processing capacity that is being tested. For the last century, psychologists have been interested in people's ability to perform two or more activities concurrently. By overloading a system, it can be determined what the parts of a system are and how they function together (Pashler, 1994). The principles from Lavie's cognitive load theory can be applied to dual task research paradigms (Lavie, 1995, 2005). Under conditions of low load, spare capacity from the primary task spills over to the secondary task, with no performance decrements to either task when they are performed in combination. However, under conditions of high load, where processing capacity is exceeded, decrements to secondary task performance will be observed when the tasks are performed together (Lavie, 1995).

With the dual-task paradigm, it is assumed that performance on the primary listening task utilizes the required mental capacity, and performance on any secondary task utilizes any spare or left-over mental capacity (Kahneman, 1973). Accordingly, any increase in effort or load associated with performing the primary task (e.g., adding noise to a listening task) leads to decreases in performance on the concurrent secondary task (Broadbent, 1958). As a result, declines in secondary task performance are interpreted as increases in listening effort (Downs, 1982).

Other assumptions of the capacity theory include: (a) a more difficult task requires more resources or mental capacity for execution, (b) dual task performance assumes that the two tasks compete for resources from a unique general-purpose structure and, (c) as one system is taxed more (e.g., the bottom-up perceptual systems), other systems (e.g., the top-down cognitive systems) have their capabilities negatively impacted (Edwards, 2007; Kahneman, 1973). For a complete review of the nature of dual-task interference, the processing resources involved in attention, and the impact of load on dual task performance, interested readers are referred to the following additional references: Lavie (1995, 2005); Pashler (1994); and Wickens (1984).

Studies in which a dual-task paradigm has been used to investigate aspects of speech understanding are summarized in Table 1. Broadbent (1958) was one of the first to advocate for more than just intelligibility scores to assess communication ability. His pioneering work demonstrated that while it was possible for listeners to maintain equal percent correct scores across various distorted listening conditions, it came at the expense of unequal amounts of effort exerted by the listener. The effort involved in listening was reflected by a reduction in efficiency for the simultaneously performed secondary task involving visual tracking (Broadbent, 1958).

In three studies, a memory test was used as the secondary task. In each case, the memory test was presented sequentially (i.e., after the primary task) rather than concurrently, as

Table 1
Literature Review

Author	Participants	Primary Task Description	Secondary Task Description	Significant Finding
Broadbent, 1958	6 NH adults	Word recognition using List 3 of the W-22 at 0, -200 Hz and -300 Hz downward transposed conditions each at 0 and 660 Hz high-pass filtering.	High speed visual tracking in which participants were required to keep a pointer on a line of contacts.	Under various conditions of distorted speech: 1) speech intelligibility scores were maintained for the primary task, and, 2) visual tracking accuracy performance decreased (especially with frequency transposition).
Rabbitt, 1966	Exp 1: 29 NH adults (19-53, M=39) Exp 2: 14 NH adults (17-25, M=23)	Word recognition in quiet and noise (i.e., +10 dB SNR)	Memory for primary task words	When noise was added, intelligibility remained high for the primary task but errors on the memory task increased.
Downs & Crum, 1978	49 NH adults (18-25)	Word recognition at 20, 35, 50 dB SL reference to each participant's PTA in quiet and at +6 dB SNR	Reaction time to respond to light probe	Reaction times to the light probe were significantly longer in the noise condition compared to the quiet condition irrespective of the sensation level.
Downs, 1982	23 adults with hearing loss (29-68, M=51) – with and without hearing aids	Speech recognition at 45 dB HL and 0 dB SNR, with and without hearing aids	Reaction time to respond to light probe	When adults with hearing loss wore their hearing aids, speech recognition was better and response time for the secondary task was significantly shorter, compared to the unaided condition.
Feuerstein, 1992	48 NH young adults (M=19) who simulated a hearing loss with an earplug	Speech recognition at 65 dB SPL and +5 SNR	Reaction time to respond to light probe	Binaural listening produced better word recognition and better ease of listening ratings. Response times to the light probe were shorter with binaural listening compared to monaural indirect listening (when noise was directed to the ear that was not plugged). Binaural and direct listening (when noise was directed to the ear with the earplug) were equivalent.
Rakerd et al., 1996	Exp 1: 8 NH young adults and 9 young adults with hearing loss Exp 2: 11 NH young adults (21-29, M=24) and 11 adults with hearing loss (52-73, M=62)	Noise listening task for 60 seconds and speech listening task for 60 seconds followed by 5 comprehension test questions, at 65 dB SPL for NH adults and at MCL for adults with hearing loss	Visually presented serial digit recall	Participants with hearing loss had more difficulty with digit memorization than NH listeners. More digits were forgotten when the memory retention interval was filled with speech compared to noise for those with NH and with hearing loss but those with hearing loss had more difficulty.
Bourland-Hicks & Tharpe, 2002	14 NH children (5-11) and 14 children with hearing loss (6-11)	Speech recognition of PBK word lists presented at 70 dBA at +20, +15, +10 SNR and quiet conditions	Reaction time to respond to light probe	Primary task performance remained over 80% for both listener groups but the response times for the secondary task were significantly longer for children with hearing loss compared to NH children.
Fraser et al., 2007	Exp 1: 30 NH young adults (18-41, M=25) Exp 2: 30 NH young adults (18-45, M=25)	Speech recognition in auditory (A) and auditory-visual (AV) modalities with speech at 57 dB SPL and noise at 68 and 76 dB SPL	Accuracy and response time to tactile pattern recognition task	Exp 1: When noise was presented at the same level in the AV condition relative to the A condition, speech accuracy improved and tactile response times decreased. Exp 2: When 10 dB more noise was added to the AV condition relative to the A condition, tactile response times slowed.
Choi et al., 2008	64 NH children (7-14)	Word recognition with PBK word lists presented at 65 root mean square (RMS) and +8 dB SNR	Visually presented serial digit recall	Regardless of instruction for which task should receive priority, significant dual-task decrements were seen for serial recall but not for word recognition. 7-8 year old children showed the greatest improvement in word recognition with the greatest decrease in serial recall.

is usually the case with dual task studies. Rabbit (1966) showed that while the addition of white noise did not affect the number of words correctly shadowed in the primary task, it did have a significant impact on the number of words that could be recalled in the secondary task. Later, Rakerd (1996) demonstrated that listeners with hearing loss were more adversely affected by noise than normal hearing listeners on a secondary task which involved digit memorization. Also, when the memory retention interval was filled with a speech passage (which required participants to listen for understanding) rather than noise, listeners with hearing loss had more difficulty with digit memorization than normal hearing listeners. In a more recent study, Choi et al. used a secondary task that involved serial digit recall (Choi, Lotto, Lewis, Hoover, & Stelmachowicz, 2008). Participants were instructed to remember sets of three or five numbers in the exact order of presentation. Primary and secondary task assignment was manipulated by instruction to investigate how young children could allocate their attention. Interestingly, regardless of which task was given priority, dual task decrements in performance were only associated with serial digit recall and not with word recognition. Choi found that children aged 7-8 years old showed the greatest improvement in word recognition but at the expense of the greatest decrease in digit recall during dual-task trials (Choi et al., 2008).

Most of the remaining studies summarized in Table 1 used a probe reaction-time test for the secondary task. This technique commonly involves the visual modality as a light signal is presented at random intervals during the primary task and the participant is required to press a button as quickly as they can to indicate that they are aware of the probe signal. Longer reaction times to the probe are associated with greater processing demands on the primary task (Downs & Crum, 1978). On the basis of this observation, Downs and Crum (1978) concluded that normal listeners required extra effort to listen in noise. Studies using this technique with people who had hearing loss found that hearing aid use can improve speech recognition and speech understanding as well as reduce listening effort (Downs, 1982). In a study by Feuerstein (1992), listeners simulated a unilateral hearing loss by inserting an earplug in one ear. The probe reaction time results indicated that binaural listening and the direct listening condition (in which noise was directed to the plugged ear) produced equivalent results. These conditions were judged to require less effort relative to the indirect listening condition (in which noise was directed to the unplugged ear). More recently, Bourland-Hicks & Tharpe (2002) demonstrated that even when children with mild to moderate or high frequency sensorineural hearing loss wore their hearing aids, they expended more effort than normal hearing children when listening in noise.

Many probe reaction time studies of listening effort also included a subjective measure of this construct. Downs and Crum (1978) incorporated a seven-point scale to indicate learning task difficulty. They found that although participants were good judges of learning accuracy, they

were poor judges of how much effort was involved in the learning task. Feuerstein (1992) used a rating scale ranging from difficult (e.g., 0) to easy (e.g., 100) to indicate the perceived difficulty of the listening situation by the listener. Like Downs and Crum (1978), Feuerstein (1992) found that while ease of listening and performance accuracy on the primary speech recognition task were positively correlated, performance on the secondary response time task (i.e., listening effort) was not correlated with the subjective ease of listening measures. In a similar study, Bourland-Hicks and Tharpe (2002) asked children to rate the word-repetition task from 1 ("not hard at all") to 5 ("very hard"). Even though the secondary task reaction time data indicated that children with hearing loss expended more effort than children with normal hearing, the two groups' ratings of perceived effort did not differ significantly. Taken together, these studies suggest that objective and subjective measures of listening effort are not correlated in adults or children (Bourland-Hicks & Tharpe, 2002; Downs & Crum, 1978; Feuerstein, 1992). Therefore, caution is needed when measuring listening effort by subjective measures only (Bourland-Hicks & Tharpe, 2002). This further supports the case for developing an objective clinical measure of listening effort.

Of all of the studies summarized in Table 1, only one involved a non-visual and non-auditory secondary task (Fraser et al., 2007, 2009). The purpose of the study was to compare the listening effort associated with auditory vs. audiovisual speech perception in young adults. While the primary task involved closed-set sentence-recognition, the secondary task consisted of tactile or somatosensory pattern recognition. By using a secondary task unrelated to the primary tasks' sensory modalities, Fraser et al. (2009) excluded the possibility of structural interference (i.e., overlapping demands on the same perceptual system) (Kahneman, 1973).

In the first experiment, where the same signal-to-noise (SNR) was used for both the auditory (A) and the auditory-visual (AV) modalities, adding visual speech cues improved AV speech recognition performance and listeners rated their performance as requiring less effort. In the second experiment, the level of performance to complete the speech recognition task in isolation was equated across the A and AV modalities. This was accomplished by adding 10 dB more noise to the AV vs. the A condition. With the increased noise level in the AV modality, reaction times for both tasks were slower and tactile task accuracy was poorer. Despite these performance differences, participants ratings of perceived effort did not differ between the two modalities, which again emphasizes need for an objective test of listening effort (Fraser et al., 2007, 2009).

Clinical Implications

With the current trends of population aging, it is estimated that by 2050 approximately 59% of the overall audiology caseload will consist of older adults (Worrall & Hickson, 2003). Systematic testing of dual task paradigm performance would give clinicians an additional

performance index over and beyond traditional word recognition scores. In addition, the dual task paradigm provides a more ecological approach to test speech recognition performance as it is often the case that we have to process speech and perform other tasks at the same time (e.g., listen to a lecture and take notes simultaneously). An objective measure of listening effort that takes into account a listener's cognitive capacity can provide a sensitive means to differentiate listener outcomes – especially for older adults who may demonstrate equivalent hearing sensitivity and word recognition performance.

More than 50 years ago, Broadbent (1958) concluded that there was a need for multiple criteria in assessing communication channels and that more than the speech recognition scores should be used to assess communication ability. However, it has only been recently that investigators have begun to explore the relationships between cognitive ability, listening conditions and hearing aid settings. Research has demonstrated that the results from a reading span test can be used to optimize the compression settings of hearing aids (Foo, Rudner, Ronnberg, & Lunner, 2007; Gatehouse, Naylor, & Elberling, 2003, 2006; Lunner, 2003; Lunner & Sundewall-Thoren, 2007; Rudner, Foo, Ronnberg, & Lunner, 2007). Other researchers have used dual-task paradigms to evaluate the effectiveness of different noise reduction algorithms incorporated in hearing aids (Edwards, 2007; Sarampalis, Kalluri, Edwards, & Hafer, 2006, 2009). In these studies, the primary task involved either word or sentence recognition at various signal-to-noise ratios. The secondary tasks involved either holding words in short-term memory or responding to a complex visual reaction-time task in which a driving game was used to gauge the mental effort involved with speech understanding. The results of these studies suggest that noise reduction algorithms reduce listening effort and free cognitive resources for other tasks (Sarampalis et al., 2006, 2009).

To our knowledge, use of a dual-task paradigm has never been used to quantify the listening effort related to understanding speech by older adults. Clinically, the use of this approach could be beneficial because the current means of assessing listening effort involves self-report scales. Research findings have revealed discrepancies between self-report ratings by seniors and related objective or behavioural measures (Saunders & Forsline, 2006; Shulman et al., 2006). Specifically, older adults tend to overestimate their capabilities and underestimate their degree of impairment (Ford et al., 1988; Uchida et al., 2003). Taken together, this underscores the importance of developing an objective test that can be implemented clinically to evaluate listening effort.

In addition to aided speech recognition scores and measures of subjective benefit, in the future, an objective measure of listening effort or cognitive benefit could be used by clinicians (a) as an assessment tool, (b) as an outcome measure to differentiate listeners, (c) to target clients that would benefit from aural rehabilitation and (d) to optimize an individual's hearing aid settings to improve speech understanding (Humes, 1999; Humes & Humes, 2004; Sarampalis et al., 2009).

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Author Note

Please address all correspondence to Penny Anderson Gosselin, M.Cl.Sc., (Ph.D. candidate), École d'orthophonie et d'audiologie, Université de Montréal, C.P. 6128, succursale centre-ville, Montréal (Québec) H3C 3J7. Email: penny.anderson@umontreal.ca.

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Book Reviews/ Évaluation de livres

Phonology for Communication Disorders

Martin J. Ball, Nicole Müller and Ben Rutter

Publisher: Psychology Press
Cost: 115.50 (hardcover), \$51.95 (softcover)
Reviewer: Tim Bressmann
Affiliation: University of Toronto

Linguistic phonology is an area of study that should be of interest to speech-language pathologists. Unfortunately, modern phonological theory is often encrypted in a dense and impenetrable code that is only accessible to the initiated. Non-members of the tribe will be made to feel their outsider status whenever there is an animated debate whether the setting $*!$ for Dep-IO outranks $*!*$ for Max-IO (Optimality Theory), or whether D:L \rightarrow R or D:R \rightarrow L when F:LH (Metrical Phonology). This propensity for obscuring the subject with notation systems and formalisms is unfortunate because it limits the reach and the practical impact of most phonological theories.

With "Phonology for Communication Disorders", Martin J. Ball, Nicole Müller and Ben Rutter are providing the CliffsNotes to the main phonological theories of our day. The textbook is written for students of Speech-Language Pathology. It is the companion book to "Phonetics for Communication Disorders" by the same authors. The aim of the book is to give Speech-Language Pathology students solid background knowledge in contemporary phonological theory, so that they may be able to understand and apply phonology in the diagnosis and treatment of communication disorders.

The book begins with a short and concise introductory chapter about the general purpose of phonology. The following chapters each introduce and discuss a specific school of thought. The order of the chapters is roughly chronological, demonstrating how different theories build on each other. The first chapters describe classic concepts in phonology, such as sonority, features and early generative phonology. The later chapters feature more recent theories such as Natural Phonology, Optimality Theory, or Government Phonology, to name but a few. Each chapter begins with a description of where the theory fits into the overall pedigree and offers a short digest of some of the major scholarly works. Since the text is aimed at students, each chapter comprises a number of practical exercises that require the reader to dissect phonological structures or draw diagrams or tableaux. The solutions to the exercises are provided in an appendix. There are also short sections in each chapter that describe possible clinical applications of the theory in question and direct the reader to research publications on different clinical populations. The authors provide short concluding sections in which they comment on the perceived benefits and shortcomings of each of the

theories. Each chapter closes with review questions and suggested topics for further study.

The book closes with a thoughtful chapter on the benefits and shortcomings of current phonological theory, with a special focus on applications in speech-language pathology. The authors argue that linguistic phonology tends to cling to a division of phonological structure and phonetic output that does not hold up in the face of recent research on speech disorders and articulatory errors. While linguistic phonologists will often be content to classify phonological paraphasias as segmental substitutions, speech motor research has demonstrated that what may perceptually sound like a segmental substitution will often result from confused articulatory gestures, i.e., subphonemic errors. Consequently, the authors favour those theories that are based on articulatory and psycholinguistic research, most notably Articulatory Phonology, over generative approaches that recur to a hypothetical Universal Grammar. Ball, Müller and Rutter specify desiderata for a clinical phonological theory, such as the ability to identify error commonalities, explain error patterns, measure severity or deviation in a metric, and guide the planning of clinical interventions.

Unlike many of the original works in linguistic phonology, this book is an absolute pleasure to read. The writing is engaging and concise, and the argument is very clear and structured. Concepts are illustrated with well-chosen examples, and the frequent references to clinical applications bring the subject to life for speech-language pathologists. This clarification does not result in simplification or dumbing-down of the subject, and the authors use exercises and study questions to challenge the reader to actively digest the materials presented. The critical commentary for each of the phonological theories is measured and well balanced. The authors' own enthusiasm for phonology and its clinical application comes through in their writing.

Practically Speaking: Language, Literacy & Academic Development for Students with AAC Needs

Edited by: Gloria Soto and Carole Zangari

Publisher: Brookes Publishing
Cost: \$39.95
Reviewer: Janine Boutilier
Affiliation: Chignecto Central Regional School Board, Nova Scotia

“Practically Speaking: Language, Literacy & Academic Development for Students with AAC Needs” is a new publication that is dedicated to working with school-aged students who are AAC users. Speech-language pathologists working in the public school system will often have students on the caseload who are AAC users. Knowing just how to assess, support and program for these students can be challenging. This book serves as an excellent resource.

The book was written in the US, which means there are references to American educational laws and policies. However, the information regarding assessment and intervention practices with AAC users is very relevant to S-LPs involved with the educational system in Canada.

The book is divided into three sections: Assessment, Instruction & Intervention, and Supports. The Assessment section consists of five chapters addressing topics ranging from overall educational assessment issues to assessing higher level language comprehension and writing skills in AAC users. Throughout the book, real case studies are used to provide practical examples for the reader. Case studies are chosen from all grade levels (pre-kindergarten through to high school). These case studies help the reader envision how he or she might apply the information in the text to a real student on the caseload. June E. Downing, author of the “Assessment of Early Communication Skills” chapter, promotes an all encompassing view of the AAC user. Observations must be made in various settings not only within the educational context but also outside of school as well. Lynn Proctor and Carole Zangari (“Language Assessment for Students who use AAC”) discuss standardized tests and subtests that are applicable to AAC users. The authors argue that while vocabulary is often the key focus of assessment for AAC users, pragmatics should be the focus of both assessment and intervention. Two chapters are devoted to assessment of literacy skills of AAC users. The authors argue that all AAC users should be considered candidates for learning to read and write independently. In all chapters, the authors outline how assessment results can be linked to instructional objectives in the school curriculum and the Individualized Program Plan.

The Instruction and Intervention section consists of seven chapters on topics such as general academic adaptations, addressing communication needs in the classroom and supporting literacy. The authors provide information and case studies about a range of abilities and school ages. A chapter that was of particular interest to this reviewer

was “Academic Adaptations for Students with AAC Needs” by Gloria Soto. Soto outlines adaptations that may be required for AAC users on everything from classroom set up to the curriculum. While we typically develop Individualized Program Plans for AAC users, Soto reminds us that, often, our AAC users are quite capable of handling the regular curriculum once provided with the proper adaptations. .

Another chapter of particular interest was “Integrating Assistive Technology with Augmentative Communication” (Yvonne Gillette). The author does an excellent job of merging educational AT with the AAC world. Gillette provides some helpful suggestions and checklists to facilitate the organization and application of AT into the AAC users successful day at school.

The final two chapters in the Supports section of the book provide further considerations to those school-based professionals working with AAC students. One chapter provides suggestions and ideas to engage in collaborative practices with the school teams and the families of AAC users (Nancy Robinson and Patti Solomon-Rice) and the other purports consideration of the student’s cognitive, attentional and emotional demands in the use of aided AAC systems (Krista Wilkinson and Shannon Hennig). While the collaboration chapter provides some interesting suggestions, the final chapter by Wilkinson and Hennig seems to have been just stuck in at the end of the book because it did not fit anywhere else.

In summary, if you are a Speech Language Pathologist or other professional working in the public school system and you have AAC users on your caseload, this book would be a worthwhile read. It is a book you might like to have on your shelf for frequent reference. It is packed with suggestions, ideas, and relevant case studies that will help guide your own practice working with school aged children. It really is just the type of book I have been looking for in my own practice.

CASLPA Conference 2010

Abstracts

Whitehorse, Yukon

May 19 to 22, 2010

Preconference Workshops

Audiology

Otology Clinic

Dr. Manohar Bance, Dalhousie University, Halifax, NS; Capital Health and IWK Childrens Hospital, Halifax, NS

Baha: Bone anchored hearing aids have a defined and important role in hearing rehabilitation. They are used for conductive hearing loss and single sided deafness. I will discuss the physiology of bone conduction, selection criteria, surgery, outcomes and complications of these devices, as well as recent technology devices from our laboratory.

Sup Canal Dehiscence: Superior canal dehiscence syndrome can mimic conductive hearing loss, patulous Eustachian tube, several causes of vertigo and protean other symptoms. I will discuss the pathophysiology, audiologic diagnosis, surgical management and important audiologic pitfalls with this disorder.

Eustachian tube disorders: Eustachian tube disorders are very poorly understood. They can result in middle ear disease via a variety of mechanisms. They interact with behaviours such as sniffing, and patulous Eustachian tube can be a puzzling hearing complaint. I will discuss our management in our Eustachian tube clinic, including new audiologic tests such as nasal audiometry, sonotubometry and sniffing tympanometry

Middle ear disorders: I will discuss the physiology of the middle ear mechanics, and the transduction of sound. I will also discuss middle ear hearing reconstruction, our work from our middle ear laboratory on measuring ear vibrations, outcomes measures for hearing benefit after middle ear surgery, and the impact of asymmetric hearing loss.

Vertigo: I will provide an overview of an otologists approach to vertigo, with simple rules to help you determine the likely causes, and the uses of testing such as ENG, posturography or rotation chair testing in these disorders.

Speech-language pathology

“Netting” for FREE Information and Intervention Materials

Judith Kuster, CCC/SLP, Minnesota State University, Mankato, MN

This session will demonstrate practical ways to find reliable information for clients and their families, evidence-based treatment resources and creative ways to use Internet resources in any clinical setting. It will feature information on both the visible and invisible web and how to find relevant and reliable professional information. Specific clinical applications will be demonstrated.

Learning objectives: The participants will be able to:

1. identify search strategies to find information and materials quickly and responsibly, on both the invisible and visible web;
2. identify ways to connect with professional colleagues; and
3. identify how to access and utilize a variety of therapy materials available on the Internet.

Muscle Placement & Movement Patterns for Speech Clarity & Feeding Safety

Sara Rosenfeld-Johnson, M.S., CCC-SLP

In this presentation, Sara Rosenfeld-Johnson will explain her unique program of using oral-motor therapy in association with traditional speech therapy to improve nutrition, feeding safety and speech clarity. Sara's techniques are based on a hierarchy of oral placement and movement in the abdomen, jaw, lips and tongue. The therapy targets the “feel” of speech and is motivating for children and adults of all ages and ability levels.

Speech-Language Pathology and Audiology Workshops

Counseling, Consultation: Expanding our Skills

Carolyn Edwards, M.Cl.Sc., M.B.A., Auditory Management Services, Toronto, ON and Gestalt Institute of Toronto, Toronto, ON
Consultation and counseling are at the heart of our work with children and adults in habilitative programs. Our ability to confront emotions is one of the least discussed topics in training and is often only addressed indirectly in our work with individuals and families. Yet it can be pivotal to the success of the communication between clinicians, team members and clients and ultimately the success of the clinical interventions. Addressing resistance is also essential to clients' development of self worth and self advocacy. This highly interactive course is a unique and exciting opportunity to develop a working understanding of strategies and tools to address emotions and resistance in clients and colleagues through theory and experiential work. Case studies and actual scenarios will be explored throughout the day. Come away with new perspectives and new strategies for clearer and more honest communication with children, adults, families and colleagues.

Ensuring Cultural Safety in Services for Children and Families

Jessica Ball, M.P.H., Ph.D., University of Victoria, BC

Regardless of how culturally sensitive, attuned or informed we think we have been in our work with a child or family, the concept of cultural safety asks: How safe did the service recipient perceive their encounter with us in terms of being respected and assisted in having their cultural location, goals and ways of life taken into account in the service encounter? Many speech-language pathologists and audiologists have experienced uncertainty about how to effectively promote a sense of cultural safety, particularly among indigenous and other minoritized children and families who have often been poorly served by mainstream professionals. This presentation explores the concept and indicators of cultural safety and how we can promote a sense of cultural respect and intercultural collaboration as a foundation for optimal service outcomes.

Audiology Workshops

Away from Audiology... Adjunctive Methods of Investigating Ear Disease

Dr. Julian Savage, Dalhousie University, Halifax, NS

Radiology and serological investigations besides from audiology are two other means of investigating possible causes of both conductive and sensorineural hearing loss. This session encompasses the principles of different types of radiological investigation and gives examples. Serological investigations are also discussed.

Physiologic Characterization of Auditory Function in Infants and Children

Linda Hood, Ph.D., Vanderbilt University, Nashville, TN, National Center for Childhood Deafness, TN

Physiologic characterization of auditory function in infants and children will include information about new stimulus and analysis approaches, clinical protocols and the current status of ANSD in the context of the overall topic of applications of physiologic approaches in characterizing auditory function both at peripheral and cortical levels.

Think Inside the Box

Pediatric specific testing techniques

Bill Campbell, MCISc, Reg CASLPO, Thunder Bay District Health Unit, Thunder Bay, ON

The profession and the clinical practices of audiology have deep roots. However, the single biggest impact on test procedures comes from the US Military. Audiologic tests have their origins in the assessment of adults and historically have been modified in attempts to obtain results from children. Test equipment is also based on adult test designs. An audiology clinic is generally designed around this equipment and most clinics also tend to be adult friendly, with modifications for pediatric testing. For clinics specializing in pediatric practice and particularly for smaller clinics, this type of practice can hinder the clinician's ability to obtain meaningful results in an efficient manner. This presentation will present tips and techniques to move the clinician away from the mainstream clinical practice and introduce some novel means for making a child friendly clinic.

Telehealth Applications in an Early Hearing Detection and Intervention (EHDI) Program

Bill Campbell, MClSc, Reg CASLPO, Thunder Bay District Health Unit, Thunder Bay, ON

This presentation describes the implementation of a pilot project intended to deliver infant assessment to families in isolated, remote and rural areas of Ontario, Canada. In such areas, access to audiologists with the necessary training and skills are constrained due to geography and population base. Hearing assessment protocols for infants who fail universal newborn hearing screening (UNHS) include computer-based diagnostic testing with auditory evoked potentials (AEPs) and otoacoustic emissions (OAE) performed by specially trained audiologists. The project objective is to improve the accessibility and quality of such assessments. The assessing audiologist is located at a "host" site and performs the assessment on the infant located at a "remote" site. The host site uses a videoconference and internet link to observe and to control the test equipment at the remote site. Currently, this project has successfully implemented assessments at a multiple of site across northwestern Ontario. Infants who would otherwise experience several barriers to access of services are now being seen at an appropriate age.

The use of telemedicine to deliver computer-based assessment of hearing in infants was speculated about almost a decade ago but until recently, technical limitations had prevented implementation. The conjunction of the program environment, evolution in diagnostic instrumentation and access to high-bandwidth telemedicine networks, has resulted in the conjecture becoming a reality. Additional benefits of this project include audiologist training, quality improvement such as by means of procedural audit, second opinion consultation, technical support and troubleshooting of clinical instrumentation and systems.

New Frontiers in Genetics: Implications for clinical practice

Susan Stanton, MClSc in Audiology, PhD, National Centre for Audiology, London, ON

This presentation begins with an introduction to basic genetic concepts for audiologists and speech-language pathologists. In the second half, the revolution in genetics and hearing loss during the previous decade is reviewed. Finally, the implications for hearing health care and a summary of future directions for research will be presented.

Understanding Ototoxicity, Ototoxicity Monitoring, and New Otoprotective Agents for Ototoxic and Noise-Induced Hearing Loss

Kathleen Campbell, Ph.D., Southern Illinois University School of Medicine, Springfield, IL

This workshop will first review terminology and mechanisms relevant to ototoxic and noise-induced hearing loss. Ototoxins in current clinical use will be reviewed, including therapeutic purposes, side effects, risk factors, patient considerations and methods for ototoxicity monitoring. Lastly, the latest research in pharmacologic otoprotective agents for noise and ototoxic-induced hearing loss will be reviewed.

Acoustic Measures of Hearing Aid Processing

Lorienne Jenstad, Ph.D., Aud(C), School of Audiology and Speech Sciences, University of British Columbia, Vancouver, BC
Appropriate fitting of hearing aids depends on accurate and meaningful acoustic measures. In this session, some important acoustic measurements and related research findings will be reviewed, particularly for understanding advanced features found with many new hearing aids. Clinically feasible ways of verifying advanced features will be described.

Speech-Language Pathology Workshops

Swallowing and Respiration in Individuals with ALS: Current concepts in clinical care

Stuart Cleary, Department of Speech Pathology and Audiology, University of Alberta, Edmonton, AB

After participating in this workshop, learners will be able to do the following:

1. Understand key concepts and issues related to the coordination and integration of swallowing, respiration and secretion management in patients with neuromuscular-induced respiratory insufficiency.
2. Explain the basic mechanisms of airway protection and volitional airway clearance of food, fluids and secretions in patients with neuromuscular disease.
3. Implement neuromuscular swallowing and respiratory management programs that include a variety behavioral airway clearance techniques, cough augmentation therapies and other compensatory swallowing techniques.
4. Understand options for managing excessive saliva in patients with ALS including: pharmacological approaches, Botox® and radiation therapy.
5. Measure outcomes of swallowing and airway management programs for individuals with ALS and other neuromuscular diseases.
6. Describe a variety of clinical research projects on improving airway clearance in patients with ALS at the University of Alberta.

In this presentation, the speaker will discuss evaluation and treatment of airway clearance and secretion management of patients with amyotrophic lateral sclerosis (ALS). Swallowing, eating and airway protection are significantly compromised in ALS and pose challenges to clinicians who work with patients to maximize function and quality of life. New behavioural treatments are emerging to meet these challenges. The presenter will provide an overview of the problem, evidence-based interventions and outcome measures appropriate for this population.

Shifting Paradigms: Treating Swallowing and Eating Problems in Individuals with Dementia

Stuart Cleary, Department of Speech Pathology and Audiology, University of Alberta, Edmonton, AB

After participating in this workshop, learners will be able to do the following:

1. Understand common causes, basic risks and complications associated with feeding and swallowing problems in individuals with dementia.
2. Describe the influence of the WHO-ICF model on assessment and treatment of swallowing disorders.
3. Explain the importance of informal assessment measures in the evaluation of dysphagia among individuals with dementia.
4. Discuss the relationship between dysphagia and cognitive impairments in dementia.

Collaborating with Teachers to Facilitate Emergent Literacy and Oral Language Skills in Preschoolers with Speech and Language Impairment

Dr. Jeanne Wilcox, Arizona State University in Tempe, AZ

The purpose of this session is to present a new curriculum that is designed to promote improved early literacy and language outcomes in preschoolers with speech and language impairment as well as their typically developing peers. The curriculum, entitled Teaching Early Literacy and Language across the Curriculum (TELL +), has undergone initial evaluation with promising results. These results will be reviewed with specific discussion of strategies for S-LP-teacher collaborations that result in positive changes in children's language and early literacy skills.

Learning Outcomes:

1. Participants will understand the relationship between oral language and early reading success as well as the growing role of the S-LP in promoting positive literacy outcomes
2. Participants will learn strategies to collaborate with preschool teachers to facilitate children's emergent literacy and oral language abilities
3. Participants will develop the foundation and skills to implement early literacy and oral language interventions within preschool classrooms

Providing Culturally & Linguistically Relevant S-LP Services to First Nations

Sharla Peltier, Education Department, Nipissing First Nation, North Bay, ON

The First Nation population of Canada is diverse – today there are more than 600 First Nations communities and 56 indigenous languages. Each community has a unique culture, language, political and spiritual tradition, form of government, and history of contact with colonial settlers. Contemporary relations with federal and provincial governments vary. Speech and language pathologists who work in First Nations communities are few and far between and are faced with challenges on a daily basis regarding service delivery. This workshop is presented by one of several known Aboriginal speech and language pathologists in Canada. The facilitator has worked extensively with Anishinabek communities located on Lake Huron in Ontario over the past 20+ years. Experiences and stories will be shared to increase participants' awareness and understanding of the service delivery issues. Tools for evaluating and facilitating communication skills will be presented. The goal of this workshop is to increase cultural sensitivity and understanding of First Nations English dialects for professionals. This will inform practice and support the development of relevant services for the First Nations communities that we serve.

Reference & Regulate™ - A New Approach to Effective Intervention for Children with Autistic Spectrum Disorders

David Loyst, Loyst and Associates, BC; Kate Chase, Loyst and Associates, BC

This workshop reviews current models of autism intervention and research. Clinical experience, research data and pre-post intervention videos will be used to present R&R™, a successful remedial program for children with ASD. R&R™ is based on developmental models of social cognition, communication and play in typical children.

Measuring & Maximizing Children's Speech Intelligibility

Megan Hodge, University of Alberta, Edmonton, AB

This session will demonstrate procedures for measuring speech intelligibility in children three years of age and older and report intelligibility scores expected for children with typical speech development. Case examples will be used to illustrate intervention goals and longitudinal change in intelligibility scores of children with speech disorders.

Filling Your Fluency Files Affordably

Judith Kuster, CCC/SLP, Minnesota State University, Mankato, MN

This workshop is designed to be both theoretical and very practical. Treatment needs to be based on strategies that are efficacious. The Internet has excellent information about evidence-based treatment, if the clinician knows how to find it. The Internet is also one of the tools that clinicians in the field use to keep up with innovations. Because of this, they need to feel comfortable with search strategies to find the best evidence. Specifically focused on fluency disorders, this session will demonstrate online collaborations for finding evidence-based treatment for fluency disorders, focused bibliographies about fluency disorders research, free or inexpensive online continuing education offerings related to fluency disorders and appropriate search strategies for uncovering additional information and materials about fluency disorders. Numerous freely available online diagnostic and treatment materials will be demonstrated. Interactive connections will also be highlighted where clients and their families can find support, clinicians can collaborate on difficult cases, and fluency enhancing strategies can be practiced.

In this workshop, participants will:

1. identify a variety of diagnostic and treatment materials for fluency disorders;
2. identify online strategies for finding evidence-based treatment for fluency disorders; and
3. identify interactive connections for client support and professional collaboration.

Introduction to Dynamic Assessment

Ingrid Jeffrey, MSc, Mediated Learning Academy, BC

Dynamic Assessment focuses on the assessment of cognitive processes. Participants will be introduced to the principles and goals of Dynamic Assessment, supported by a demonstration of selected assessment instruments. An overview of assessment tools will be provided. Possible assessment outcomes will be linked to speech-language therapy and goals.

The Role of the S-LP in Palliative Care

Candace Myers, MSc, S-LP(C), CancerCare Manitoba, Winnipeg, MB

This session will focus on the philosophy of end-of-life/palliative care; the role of the SLP in end-of-life care as contrasted with traditional rehabilitation medicine; practical strategies for providing appropriate S-LP intervention in the areas of dysphagia and communication management; and references, resources, and directions for continuing education and involvement in interdisciplinary care teams.

Assessment and Intervention Strategies for Infants and Toddlers with Special Needs

Dr. Louis Rossetti, University of Wisconsin, Oshkosh, WI

Developmental Assessment of Infants and Toddlers with Special Needs (morning session)

The overall purpose of this session is to discuss relevant issues related to developmental assessment of infants and toddlers with special needs. Topics to be discussed include the status of infant-toddler assessment, recipients of assessment activity, general and specific assessment concerns, choosing assessment instruments, developmental domains to be assessed, and the correct interpretation and reporting of assessment results. This session is highly clinical in nature. Common problems faced by the assessor will be discussed. Participant participation is encouraged.

Early Intervention Practices (afternoon session)

This session will alert early intervention professionals to a variety of issues related to intervention for children with special needs and their families. Issues to be discussed include models of service delivery, models of team functioning, intervention with parents and caregivers, intervention in the home, center and neonatal intensive care nursery, and measuring program efficacy. This session is highly clinical in nature. Participant discussion will be encouraged.

Educational Objectives

1. To familiarize participants with current infant-toddler assessment techniques and procedures.
2. To familiarize participants with the concept of serial assessment and patterns of developmental change over time.
3. To familiarize participants with current practice relative to the assessment of low incidence infants and toddlers.
4. To familiarize participants with the concepts of infant state; correction for prematurity; predictive ability of infant-toddler assessment; and various assessment instruments.
5. To familiarize participants with current practice relative to developmental intervention in the neonatal intensive care nursery.
6. To familiarize participants with current practice relative to transdisciplinary play based intervention services.
7. To familiarize participants with current information relative to the efficacy of early intervention activities based in model of service delivery.

Speech-Language Pathology and Audiology Contributed Papers

How Do We Know Our Intervention is Making a Difference?

Kathryn M. Wishart, LCST M.Sc, BC Centre For Ability, Vancouver, BC; Dianne Cameron, MRSc, Vancouver, BC

Children with special needs often face lifetime challenges and access a variety of therapy and support services. With the move towards evidence-based practice and increasing accountability to consumers and funders, we need to utilize a framework to evaluate the effectiveness of our services at a client and program level.

Audiology Contributed Papers

Clinical Decisions for Children with Mild Bilateral/Unilateral Hearing Loss

Elizabeth Fitzpatrick, PhD (Registered Audiologist, CASLPO), University of Ottawa, Ottawa, ON

Historically, treatment decisions for children with mild bilateral/unilateral hearing loss were largely based on the child's functioning. Newborn hearing screening raises questions about the optimal intervention for these children. This study aimed to examine practices regarding amplification and to elicit practitioners' perspectives on the management of this new clinical population.

The Importance of Early Intervention for Children with Hearing Loss

Noreen R. Simmons, Ph.D., S-LP (C), BC Family Hearing Resource Centre, Surrey, BC; Tamara Pelletier, M.Sc., SLP (C), BC Family Hearing Resource Centre, Surrey, BC

This presentation will increase SLPs' awareness of the benefits of early intervention services for infants and babies with hearing loss. Knowledge on comprehensive and coordinated services offered by a team of professionals (e.g., speech pathologists, teachers of persons who are deaf) with expertise in early intervention and hearing loss will be highlighted.

Speech-Language Pathology Contributed Papers

Cued Speech and the Child with Down Syndrome

Marianne Flanagan, B.Ed., MA, Calgary, AB

Cued Speech is an easy to learn, multisensory, phonemically-based communication system that makes the spoken language clear through vision. Children with Down syndrome frequently have hearing loss and auditory processing problems. Their teachers' and parents' Cued Speech will be understood accurately by these visual learners. When the children cue, their unintelligible speech can be understood accurately.

Oral Motor and Articulation Therapy for the ASD Population

Jacqueline M. Glance, Masters in Communication Disorders, University of North Dakota, Ottawa, ON; Debi J. Maniloff, Masters in Communication Disorders, University of Maine, Stittsville, ON

An oral motor and articulation therapy program can be successfully integrated with an Intensive Behavioral Intervention (IBI) program. Clinical supervisors, senior IBI therapists, junior IBI therapists and parents can be successfully trained to implement this step-by-step program within the behavioral model resulting in facilitation of functional verbal communication.

Teaching Phonological Awareness Skills to a French Language-Impaired Child (this session will be presented in French)

Daphne A. Ducharme, Professeur adjointe, Université, d'Ottawa, Ottawa, ON; Judith Lafleur, Orthophoniste; Lisabelle Lemay, Orthophoniste; Véronique Quann, étudiante, Université, d'Ottawa, Ottawa, ON; Dominique Pelland, étudiante, Université, d'Ottawa, Ottawa, ON; Maude St-Pierre, étudiante, Université, d'Ottawa, Ottawa, ON

This study explores the improvement of phonological awareness skills over a 14-month period, with two eight-week intervention programs. The study is a single subject case study with a French-English bilingual six-year-old boy whose diagnosis was severe SLI. His phonological awareness skills were assessed with the N-EEL (Nouvelles Épreuves pour l'Examen du Langage), before and after eight weeks of intervention. This protocol was repeated one year later. Sessions took place three times a week in the child's home, during the summer months. The results suggest that with practice, a child with SLI can develop strong phonological awareness skills, despite a severe oral language deficit.

French Immersion Centres – An Innovative Service Delivery Model for School Speech-Language Pathologists

Jacqueline M. Gance, Speech/Language Pathologist, Ottawa Carleton District School Board, Nepean, ON; Debi J. Maniloff, Masters in Communication Disorders, Ottawa Carleton District School Board, Nepean, ON

The Ottawa Carleton District School Board provides early and middle French immersion programs in addition to their English programs. These programs exist in dual or triple track schools in addition to 14 French immersion Centres. How can these Centres receive Speech and Language Services efficiently and effectively?

Neuro-Plasticity, Neuro-Rehabilitation and Computer Intervention

Kim Bradley, Ph.D., University of Toronto, Toronto, ON

A case study of an adult aphasic patient's use of Posit Science's Brain Fitness software will be presented in the context of the ten principles of neural plasticity as put forward by Kleim and Jones. The principles of neural plasticity will be examined for the guidance they provide for speech and language rehabilitation following neurological damage.

TeleSpeech Service Delivery Model for Remote Areas in Canada

Deborah G. Anderson, Speech-Language Pathologist, Anderson Speech Consultants, Burlington, ON; Sarah Aljas, Speech-Language Pathologist, Anderson Speech Consultants, Burlington, ON; Elizabeth Sommerville, Communication Disorders Assistant, Anderson Speech Consultants, Burlington, ON; Mari-Joy Fernhout, Speech-Language Pathologist, Anderson Speech Consultants, Burlington, ON; Jennifer McKeeman, Speech-Language Pathologist, Anderson Speech Consultants, Burlington, ON; Patti Male, Speech Assistant, Yellowknife, NT

Anderson Speech Consultants will discuss service delivery solutions in remote areas of Canada with an emphasis on an innovative TeleSpeech model. Practical methods of developing and implementing a service delivery model that incorporates a culturally-sensitive approach to assessments, treatment and outcomes as well as capacity building will be explored.

Supervision of S-LP Students on Worldwide Clinical Placements

Kim Bradley, Ph.D. Assistant Professor/Private Practice, University of Toronto, Toronto, ON; Lynn Elwood, Coordinator of Clinical Education/Senior Lecturer, Dept. of Speech Language Pathology, Univ. of Toronto, Toronto, ON; Penny Parnes, DSP Executive Director, International Centre for Disability and Rehabilitation, Toronto, ON; Fern Westernoff, Ed.D MHS Sc Speech Pathologist, Toronto District School Board, Toronto, ON

The College of Speech Language Pathologists and Audiologists of Ontario (CASLPO) provides specific guidelines for the supervision of student SLPs as do the degree-granting institutions. While both occupational therapists and physiotherapists in the University of Toronto send up 40 students on international clinical placements in their final year, only four student speech pathology international clinical placements have been completed to date. The challenges for international SLP student placements are examined. An international student clinical placement has advantages for the developing country where a student is placed, for Canada and for the individual SLP. A model for remote supervision of the student therapist using the Internet as developed by members of the Communication Disorders Group of the International Centre for Disability and Rehabilitation is discussed.

Understanding Perspectives in Linguistically and Culturally Diverse Clinical Interactions

Noreen R. Simmons, Ph.D., S-LP (C), BC Family Hearing Resource Centre, Surrey, BC; Jeff A. Small, Ph.D., University of British Columbia, Vancouver, BC

This study will discuss some of the challenges encountered and strategies used by monolingual English speaking SLPs during their clinical encounters with Indo-Canadian adult aphasic clients. Clients, family members, and interpreters' perspectives of the interaction will also be enunciated.

SMART Career Planning: Seasoned, Mature And Ready for Take-off!

Betty Norman Bray, M.A. R-SLP, SLP(C), CCC-SLP, Carewest Day Hospital, Calgary AB

Career Planning: This interactive presentation will help seasoned speech-language pathologists and audiologists determine what they need in the next phase of their careers. Should you continue working, consider retirement, or plan a sabbatical/leave of absence or golden gap year? Participants will work through a self-evaluation and determine their own outcomes.

Integrated Speech/Language Yoga Programs

Lisa M. Dymond, B.A., M.Sc., S-LP, University of British Columbia

In this session people will be introduced to the integration of speech/language skills into a yoga program through case studies of two yoga students with autism and their families. Student and family experiences will be described. The topic concludes with the suggestion to expand the value of yoga as a therapeutic medium.

Clinical Research in Adult Motor Speech Disorders and Fluency

Sarah Smits-Bandstra, Ph.D., McGill University, Montreal, QC; Kim Bauerly, M.Sc., University of Toronto, Toronto, ON; Robert Kroll, Ph.D., University of Toronto, Toronto, ON; Vince Gracco, Ph.D., McGill University, Montreal, QC; Luc De Nil, Ph.D., University of Toronto, Toronto, ON

Results of several multi-site studies with adults who stutter and adults with Parkinson's disease suggest that minor adjustments to already established treatment programs may serve to maximize learning, retention, and individual benefits of treatment. Designing and implementing clinical research for this purpose will be the focus of the presentation.

Development and Implementation of the Communikit - For Individuals with Impaired Communication

Holly Sloan, Speech-Language Pathologist, Trillium Health Centre, Mississauga, ON

The speech-language pathology service at Trillium Health Centre developed a comprehensive, portable tool kit to facilitate effective communication. This presentation will review the development and implementation of the Communikit in an acute care hospital and its transferability across the continuum of care.

Poster Sessions

Speech-Language Pathology and Audiology

Beyond Auditory Processing

Penelope Bacsfalvi, MA, PhD, CCC-SLP(C), UBC & Provincial Resource Programme Auditory Outre, Burnaby, BC; Sue Wastie, MA, SLP(C), Provincial Resource Programme-Auditory Outreach

Currently, many students present with a deficit that is difficult to define and may appear to be an auditory processing disorder. This poster will present the case study of a young girl diagnosed by a team of audiologist and speech-language pathologists of suspected CAPD. Jane, aged 6 years and 6 months, presented with age appropriate comprehension and receptive vocabulary. However, her narrative, syntactic and expressive language were delayed. Because of difficulties with short term auditory memory that seemed to be underlying language difficulties, the team suspected a central auditory processing disorder. This poster will document the surprising co-morbid disorder that was revealed by further assessment in the visual processing domain, and the intervention approach and progress.

Active Learning about Professional Ethics

Lynn Ellwood, M.H.Sc., B.Sc.(C.D.), S-LP(C), Reg. CASLPO, University of Toronto, Toronto, ON; Carla J. Johnson, Ph.D., University of Toronto, Toronto, ON; Catriona M. Steele, Ph.D., M.H.Sc., S-LP(C), CCC-SLP, BRS-S, Reg. CASLPO, Toronto Rehabilitation Institute, Toronto, ON; Susan J. Wagner, B. Sc. (SPA), M.Sc. (CD), Reg. CASLPO, S-LP(C), University of Toronto, Toronto, ON

This poster describes unique methods used to teach about professional ethics in the final academic unit of a university speech-language pathology program. The integrative learning experience utilizes principles of adult education and addresses practical content areas. A program evaluation protocol is proposed to provide evidence to guide future modifications.

Course Development Concerning Practice with Aboriginal People: The Student Perspective

Erynne K. Green, Master of Science Student, Speech-Language Pathology, University of British Columbia, Vancouver, BC; May Bernhardt, PhD, University of British Columbia, Vancouver, BC; Heather L. Wood, Master of Science student, speech-lang. path., University of British Columbia, Vancouver, BC

Most speech-language pathologists and audiologists have received minimal training concerning service to Aboriginal people. In 2009, a course was initiated at the School of Audiology and Speech Sciences (UBC) to address this training gap. The poster will present student perspectives on the development, implementation and evaluation of this course.

Audiology

DPOAEs- An Early Predictor of Hearing Loss in Call-Centre Employees

Kuryakose Joseph, B.Sc. Speech Language Pathology and Audiology, ISS Institute of Speech and Hearing, Mysore, Mysore South, Karnataka, India; Shimil Ulahannan, B.Sc. Speech Language Pathology and Audiology, ISS Institute of Speech and Hearing, Mysore, Mysore South, Karnataka, India; Narthana Yuvraj, B.Sc. Speech Language Pathology and Audiology, ISS Institute of Speech and Hearing, Mysore, Mysore South, Karnataka, India; Shruti Kaul, Lecturer in Audiology (M.Sc. Audiology), ISS Institute of Speech and Hearing, Mysore, Mysore South, Karnataka, India

This study aimed at evaluating the effectiveness of distortion product otoacoustic emissions in assessing the effects of long duration telephonic transactions carried by call-centre employees, on their hearing status. Call-centre employees showed reduced DP responses; more in the higher frequencies, indicating their susceptibility to hearing loss.

Speech-Language Pathology

Cross-Linguistic Study in Protracted Phonological Development: Preliminary Manitoba French Data

Daniel Berube, PhD Candidate, SASS, University of British Columbia, Vancouver, BC; Barbara M. Bernhardt, PhD, SASS, University of British Columbia, Vancouver, BC; Stephanie Harvey, M.A., Communication Disorders, Division Scolaire Franco-Manitobaine, Lorette, MB; Diane Dacquay, M.Sc., Speech Language Pathology, Division Scolaire Franco-Manitobaine, Lorette, MB; Joseph P. Stemberger, PhD, Linguistics, University of British Columbia, Vancouver, BC; Stefka H. Marinova-Todd, Ed.D., SASS, UNiversity of British Columbia, Vancouver, BC

This study of Manitoba French-learning children with protracted phonological development is part of an investigation documenting the frequency of common and uncommon phonological patterns across languages. Preliminary data indicate that children may show similar markedness constraints across languages, but have different solutions reflecting individual variation and their native language.

Speech Outcomes for Partial Glossectomy Surgery: Measures of Speech Articulation and Listener Perception

Tim Bressmann, PhD, University of Toronto, Toronto, ON; Hannah Jacobs, BA, University of Toronto, Toronto, ON; Janette Quintero, BA, University of Toronto, Toronto, ON; Jonathan Irish, MD, Princess Margaret Hospital, Toronto, ON

Twenty-two glossectomees underwent an articulation screening and ratings of speech acceptability and social perception. Pre-surgical speech acceptability and defect size predicted 74.2% of the variance of the postoperative data. A defect size of 20.4% was the cut-off for poorer speech acceptability. There was no change in rated social perceptions.

Survey of Canadian S-LP Service Delivery to Linguistically Diverse Clients

Claudette D'Souza, BSc., Candidate MSc., Dalhousie University, Ajax, ON; Elizabeth Kay-Raining Bird, PhD, Dalhousie University, Halifax, NS

Results will be presented from a survey of 384 speech-language pathologists on current service delivery to Canada's diverse multilingual population. Clinician respondent demographics, existing resources and the challenges faced in serving such a population will be reviewed. Implications for professional practice will be discussed.

Aphasia and Return to Work in Younger Stroke Patients

Ross Graham, Masters of Science (candidate), University of Western Ontario / SJHC, London, ON; Shelilah Pereira, Masters of Science (candidate), University of Western Ontario / SJHC, London, ON; Robert Teasell, MD - Chair PMR/Stroke Rehab, University of Western Ontario / SJHC, London, ON

Aphasia is a barrier to an individual's ability to return to work (RTW) post-stroke. However, the amount of aphasic stroke patients who successfully regain meaningful employment is unclear. This study identified all pertinent published research and found a weighted mean of 28.4% stroke patients with aphasia successfully RTW.

Communication Treatment in Acute Care: A Pilot Project

Charlene C. Lahey-Thiessen, R.SLP (C), Foothills Medical Centre, Calgary, AB; Andrea L. Kos, MS, R-SLP, CCC-SLP, Foothills Medical Centre, Calgary, AB; Rae-Anne S. Kerr, R.SLP (C), Foothills Medical Centre, Calgary, AB

In the acute care setting, high caseload demands and staff shortages have resulted in speech-language pathologists (SLP) spending the majority of their time managing patients with dysphagia. Unfortunately patients in acute care with communication needs rarely receive treatment given the hope for expedient transfer to a rehabilitation setting. Yet as capacity is quickly reached in rehabilitation settings, patients are waiting longer in acute care beds. In an attempt to address this discrepancy, the SLPs at the Foothills Medical Centre in Calgary have launched a pilot project. This project set out in September 2008 to implement communication treatment while effectively managing the dysphagia caseload. The project designated 1.0 FTE out of 6.2 FTE to provide diagnostic communication treatment. This poster will discuss specifics of staff allocation, patient assessment and selection as well as preliminary feedback from key interdisciplinary team members. To date this project has not only ensured speech-pathology services to patients with moderate-severe impairments but also enhanced awareness of the larger scope of practice offered by acute care SLPs.

Multisyllabic Word Production at Age Five: Consistent and Variable Patterns

Glenda K. Mason, Master of Speech-Language Pathology; PhD student, University of British Columbia, West Kelowna, BC; B. May Bernhardt, PhD, University of British Columbia, Vancouver, BC; Julie J. Masterson, PhD, Missouri State University, Springfield, MO; Sarah Blois, MSc in Speech-Language Pathology, University of British Columbia, Vancouver, BC

Few studies have addressed multisyllabic word development. Yet the ability to read long words quickly and accurately is highly linked to reading success. This presentation will report on the typical development of multisyllabic words in English-speaking BC kindergarten children, showing consistent and variable patterns of production within and across participants.

An International Perspective on Communication Disorders

Penny Parnes, DSP, University of Toronto, Toronto, ON; Kim Bradley, PhD, University of Toronto, Toronto, ON

The International Centre for Disability and Rehabilitation (ICDR) located in the Rehabilitation Sciences Sector of the University of Toronto seeks to address global issues related to Disability and Rehabilitation. The Centre came into being five years ago in response to an acute worldwide need to address the issues faced by people with disabilities in poor countries. People with disabilities make up 10% of the world's population and 80% live in the developing world. They face the adversity of stigma, poverty, attitudinal/physical barriers and lack of services. The poster will highlight the work of ICDR in attempting to address some of these issues by undertaking projects which build human resource capacity in developing countries and in Canada through education, research, service delivery and networking. In particular, communication disorders in developing countries and the response of ICDR and Canadian communication professionals will be highlighted.

Centralized Parent Education: Involving Families While Waiting for Therapy

Janet P. Simpson, M.S., S-LP(C), CCC-SLP, Winnipeg Regional Health Authority, Winnipeg, MB

This presentation describes a centralized parent education program, provided to parents of toddlers and pre-school children waiting for assessment and therapy. Adult education principles and a coaching approach are used to empower families. Positive outcomes include decreased wait times, less direct therapy time, and enhanced parent-child interactions.

Exploring Behavioural Voice Change Methods in the Transgendered Population

Janice W. Bennett, MHSc, SLP(C), Reg CASLPO, St. Joseph's Health Centre, Toronto, ON

Three case studies will be used to demonstrate how knowledge of voice treatment techniques may be used to assist transgendered people (male to female) in achieving voice change, and subsequently improving quality of life. Implications for the role of the speech-language pathologist in serving this population will be discussed.

Senior Kindergarten Speech Language Intervention Program: A New Model

Karen E. Ivings, M.Cl.Sc. (Speech Pathology); B.Ed., University of Western Ontario; University of Ottawa, Ottawa, ON; Nancy E. Lubert, M.Sc. (Applied) Human Communication Disorders, McGill University, Ottawa, ON

Within an Ottawa school board, a new speech-language pathology program was designed to support severely to profoundly language-impaired senior kindergarten students in their home schools. Pre/post measures and parent/teacher questionnaires indicated positive responses and student gains in specifically targeted language areas and social communication.

Developing an Interface between Interprofessional Collaboration and Interprofessional Education: Bringing the Workplace to the Students

Susan J. Wagner, M.Sc., Reg. CASLPO, S-LP (C), University of Toronto, Toronto, ON; Sylvia Langlois, M.Ed., University of Toronto; Euson Yeung, M.Ed., University of Toronto

Exemplar community health care teams that demonstrate excellent collaboration can serve as a bridge between academic and clinical settings. This session describes the use of such teams in an interprofessional education curriculum that has resulted in positive evaluations and student learning. We will describe our methods and engage participants in discussion of these in their own contexts.

The Severity Question Through the Eyes of Clinicians Across Canada

Carolyn Cronk, M.A., M.O.A., SLP(C), Montreal, QC

The results of a brief survey concerning judgments of severity of impairment among Canadian SLPs and audiologists will be presented as well as ways of defining severity used in various other professions; participants will have ample opportunity to discuss important questions around the issue of arriving at useful severity judgments.

Ultrasound Imaging of Vowel-Consonant-Vowel Sequences in Patients with Partial Glossectomies

Bianca Herold, BA, University of Bielefeld; Tim Bressmann, PhD, University of Toronto, Toronto, ON; Janette Quintero, BA, University of Toronto, Toronto, ON; Martina Hielscher-Fastabend, PhD, University of Bielefeld; Prisca Stenneken, PhD, University of Bielefeld; Jonathan Irish, MD, Princess Margaret Hospital

The tongue movement of 19 patients was recorded with ultrasound before and after glossectomy. We found a significant increase in the post-surgical tongue height for all target consonants. This effect was statistically significant for "r", "s" and "sh". The results are interpreted as evidence for active and hypermetric articulatory compensation.

Congrès de l'ACOA 2010

Abrégés

Whitehorse (Yukon)
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Ateliers antérieurs au congrès

Audiologie

Clinique d'otologie

Dr Manohar Bance, Dalhousie University, Halifax (N.-É.); Capital Health et IWK Children's Hospital, Halifax (N.-É.)

Les Baha : Les prothèses auditives fixées sur l'os (BAHA ou Bone anchored hearing aids) jouent un rôle précis et important dans la rééducation auditive. On les utilise dans les cas d'hypoacousie conductive et de surdité unilatérale. J'aborderai la physiologie de la conduction osseuse, les critères de sélection, la chirurgie, les résultats et les complications que peuvent provoquer ces appareils, ainsi que les aides technologiques mises au point récemment dans notre laboratoire.

La déhiscence du canal supérieur : Le syndrome de déhiscence du canal supérieur peut imiter l'hypoacousie conductive, la trompe d'Eustache étalée, plusieurs causes de vertige et d'autres symptômes d'altération. Je parlerai de la pathophysiologie, du diagnostic audiolinguistique, de la gestion de la chirurgie et des pièges audiolinguistiques importants de ce trouble.

Les troubles de la trompe d'Eustache : Les troubles de la trompe d'Eustache sont très mal compris. Ils peuvent provoquer une maladie de l'oreille moyenne par divers mécanismes. Ils ont un effet sur certaines réactions comme le reniflement et la trompe d'Eustache étalée peut être un problème auditif difficile à expliquer. J'expliquerai notre gestion à la clinique de la trompe d'Eustache, notamment les nouveaux tests audiolinguistiques tels que l'audiométrie nasale, la sonotubométrie et la tympanométrie du reniflement.

Les troubles de l'oreille moyenne : J'expliquerai la physiologie de la mécanique de l'oreille moyenne et la transduction du son. Je parlerai aussi de la reconstruction auditive de l'oreille moyenne, de notre travail au laboratoire de l'oreille moyenne sur la mesure des vibrations de l'oreille, de la mesure des résultats de l'amélioration auditive après une chirurgie de l'oreille moyenne et de la répercussion de la perte auditive asymétrique.

Les vertiges : Je passerai en revue l'approche du vertige par l'otologie avec des règles simples pour vous aider à trouver les causes probables, et le recours aux tests tels que l'ENG, la posturographie ou le test de rotation pour ces troubles.

Orthophonie

Utilisation du "Net" pour obtenir GRATUITEMENT des informations et des matériels d'intervention

Judith Kuster, CCC/SLP, Minnesota State University, Mankato, MN

Au cours de cette session, on donnera des indications pratiques pour trouver des renseignements fiables pour les clients et leur famille, des ressources pour des traitements fondés sur l'expérience clinique et des façons originales d'utiliser les ressources d'Internet dans n'importe quel milieu clinique. On donnera des renseignements sur le Web visible et invisible, et sur la façon de trouver des informations professionnelles pertinentes et fiables. On fera aussi la démonstration d'applications cliniques données.

Objectifs d'apprentissage : les participants pourront :

1. identifier des stratégies de recherche pour trouver l'information et les matériels rapidement et de façon responsable, tant sur le Web invisible que visible;
2. identifier des façons d'entrer en contact avec des collègues;
3. identifier des manières pour accéder à divers matériels thérapeutiques disponibles sur Internet en vue de les utiliser.

Placement des muscles et modèles de mouvement pour une élocution plus claire et une alimentation plus sécuritaire

Sara Rosenfeld-Johnson, M.S., CCC-SLP

Dans cet exposé, Sara Rosenfeld-Johnson expliquera son programme spécial d'utilisation de la thérapie oromotrice en association avec l'orthophonie traditionnelle pour améliorer la nutrition, la sécurité de l'alimentation et la clarté de l'élocution. Les techniques de Sara reposent sur la hiérarchie du placement et du mouvement au niveau de l'abdomen, de la mâchoire, des lèvres et de la langue dans l'expression orale. Cette thérapie vise le fait de "ressentir" l'expression et est motivante pour les enfants et les adultes de tout âge ayant des capacités variables.

Ateliers communs d'orthophonie et d'audiologie

Amélioration de nos compétences en counselling ou consultation

Carolyne Edwards, M.Cl.Sc., M.B.A., Auditory Management Services, Toronto ON et Gestalt Institute of Toronto, Toronto (Ont.)

La consultation et le counselling sont essentiels à notre travail avec les enfants et les adultes qui participent à des programmes d'éducation. Notre capacité de faire face aux émotions est l'un des sujets les moins discutés au cours de la formation et on n'en parle souvent qu'indirectement dans notre travail avec les personnes et les familles. Et pourtant, cela peut être primordial pour une bonne communication entre les cliniciens, les membres de l'équipe et les clients, et en bout de ligne pour le succès des interventions cliniques. Tenir compte de la résistance est aussi essentiel pour permettre aux clients de se valoriser et de plaider leur propre cause. Ce cours très interactif est une occasion unique et excitante pour acquérir une compréhension pratique des stratégies et des outils qui permettent de faire face aux émotions et à la résistance des clients et des collègues grâce à la théorie et au travail expérientiel. Tout au long de la journée, on procédera à des études de cas et on approfondira des expériences réelles. Vous en sortirez outillés d'optiques et de stratégies nouvelles qui vous permettront d'avoir une communication plus claire et plus honnête avec les enfants, les adultes, les familles et les collègues.

Garantir la sécurité culturelle dans les services destinés aux enfants et aux familles

Jessica Ball, M.P.H., Ph.D., University of Victoria (C.-B.)

Même si nous pensons avoir été culturellement sensibles, en accord ou informés dans notre travail avec un enfant ou une famille, la notion de sécurité culturelle exige qu'on se demande dans quelle mesure le bénéficiaire du service a jugé la rencontre pour ce qui est d'être respecté et aidé parce qu'on a pris en compte son lieu, ses buts et son mode de vie culturels? Nombreux sont les orthophonistes et audiologistes qui ne savent pas vraiment comment favoriser efficacement un sentiment de sécurité culturelle, surtout chez les enfants et les familles autochtones et chez ceux qui appartiennent à d'autres groupes minoritaires qui ont souvent reçu de piètres services de la part des professionnels du groupe dominant. On approfondit dans cet exposé la notion et les indicateurs de la sécurité culturelle et on essaie de voir comment on peut favoriser un sentiment de respect culturel et de collaboration interculturelle sur lequel se fonder pour obtenir des résultats optimaux dans nos services.

Ateliers d'audiologie

Méthodes supplémentaires, outre l'audiologie, pour étudier une affection auriculaire

Dr Julian Savage, Dalhousie University, Halifax (N.-É.)

En dehors de l'audiologie, les examens radiologiques et sérologiques constituent deux autres moyens de rechercher les causes possibles d'une hypoacousie conductive ou neurosensorielle. Cette session portera sur les principes des différents types d'examen radiologique qui seront illustrés par des exemples. On y abordera aussi les examens sérologiques.

Caractérisation physiologique de la fonction auditive chez les bébés et les enfants

Linda Hood, Ph.D., Vanderbilt University Nashville, TN, National Center for Childhood Deafness, TN

La caractérisation physiologique de la fonction auditive chez les bébés et les enfants comprendra des informations sur les nouvelles approches des stimuli et de l'analyse, les protocoles cliniques et la situation actuelle de l'ANSD dans le contexte du sujet général des applications des approches physiologiques dans la caractérisation de la fonction auditive aux niveaux périphérique et cortical.

Techniques d'évaluation spéciales pour enfants

Bill Campbell, MClSc, Reg CASLPO, Thunder Bay District Health Unit, Thunder Bay (Ont.)

La profession et les pratiques cliniques d'audiologie remontent loin, mais c'est l'armée américaine qui a le plus influencé les procédures d'évaluation. Les tests audiologiques tirent leur origine de l'évaluation des adultes et ont traditionnellement été modifiés pour essayer d'obtenir des résultats avec les enfants. L'équipement pour les tests a aussi été conçu pour les adultes. La conception des cliniques d'audiologie se fait généralement autour de cet équipement et la plupart des cliniques cherchent à être adaptées aux adultes, et on apporte des modifications pour les tests pédiatriques. Ce type de pratique peut réduire la capacité du clinicien d'obtenir des résultats probants de façon efficace dans les cliniques spécialisées en pratique pédiatrique et surtout dans les petites cliniques. Nous donnerons au cours de cet exposé des conseils et des techniques pour permettre au clinicien de s'écarter de la pratique clinique courante et présenterons des moyens originaux de rendre une clinique plus adaptée à la clientèle enfantine.

Applications en télémédecine d'un programme de dépistage et d'intervention auditifs précoces

Bill Campbell, MCLSc, Reg CASLPO, Thunder Bay District Health Unit, Thunder Bay (Ont.)

Nous décrirons au cours de cet exposé la mise en oeuvre d'un projet pilote conçu pour évaluer les bébés dans les régions isolées et les zones rurales de l'Ontario, au Canada. Dans ces secteurs, l'accès à des audiologistes ayant obtenu la formation et les compétences voulues est limité en raison de la situation géographique et démographique. Les protocoles d'évaluation auditive des bébés qui ont présenté des problèmes au dépistage auditif universel des nouveau-nés (UNHS, universal newborn hearing screening) comprennent des tests de diagnostic informatisés pour les potentiels évoqués auditifs (AEP, auditory evoked potentials) et les émissions oto-acoustiques (ÉOA ou OAE, otoacoustic emissions) qui sont effectués par des audiologistes spécialement formés. Ce projet vise à améliorer l'accessibilité et la qualité de ces évaluations.

L'audiologiste qui procède à l'évaluation est situé à un point "central" et évalue le bébé qui se trouve au site "éloigné". Le point central dispose d'un système de vidéoconférence et d'un lien Internet pour observer et contrôler l'équipement d'évaluation du site éloigné. Jusqu'ici, ce projet a permis de réussir des évaluations dans de nombreux sites du Nord-Ouest de l'Ontario. Des bébés qui auraient autrement eu à franchir plusieurs obstacles pour accéder à ces services sont maintenant suivis au bon moment.

Conclusions

Le recours à la télémédecine pour réaliser des évaluations informatisées de l'acuité auditive des bébés n'était qu'une hypothèse il y a environ dix ans et, jusqu'à une date récente, les limites techniques empêchaient sa concrétisation. La combinaison de l'instauration du programme, de l'évolution des instruments de diagnostic et de l'accès à des réseaux de télémédecine à larges bandes supérieures a fait que cette conjecture est devenue réalité. Ce projet offre des avantages supplémentaires, la formation des audiologistes, l'amélioration de la qualité notamment grâce à la vérification des procédures, aux consultations pour avoir une autre opinion, au soutien technique et au dépannage des instruments et des systèmes cliniques.

Implications des découvertes génétiques pour la pratique clinique

Susan Stanton, MCLSc in Audiology, PhD, National Centre for Audiology, London (Ont.)

Cet exposé commencera par la présentation des notions fondamentales de génétique pour les audiologistes et les orthophonistes. Dans la deuxième moitié de l'atelier, on passera en revue la révolution de la génétique et de l'hypocousie de la dernière décennie. On présentera pour finir les répercussions de cette révolution sur les soins de santé auditive et on résumera l'orientation future de la recherche.

Comprendre l'ototoxicité et la surveiller; les nouveaux agents de protection de l'oreille contre la perte d'audition d'origine ototoxique ou due au bruit

Kathleen Campbell, Ph.D., Southern Illinois University School of Medicine, Springfield IL

Au cours de cet atelier, on commencera par passer en revue la terminologie et les mécanismes pertinents pour la perte de l'audition d'origine ototoxique ou due au bruit. On examinera ensuite les ototoxines dans l'usage clinique actuel, en parlant notamment de leur objectif thérapeutique, de leurs effets secondaires, des facteurs de risque, de la prise en compte des opinions des patients et des méthodes de surveillance de l'ototoxicité. On abordera pour finir les travaux de recherche les plus récents sur les agents pharmacologiques de protection de l'oreille contre la perte de l'audition due au bruit ou d'origine ototoxique.

Mesure acoustique du traitement des appareils auditifs

Lorienne Jenstad, Ph.D., Aud(C), School of Audiology and Speech Sciences, University of British Columbia, Vancouver (C.-B.)

L'ajustement voulu des appareils auditifs dépend de mesures acoustiques exactes et utiles. Au cours de cette session, on passera en revue des mesures acoustiques importantes et les résultats correspondants de la recherche, notamment pour comprendre les fonctions novatrices de nombreux nouveaux appareils auditifs. On décrira des possibilités de réaliser en clinique la vérification des caractéristiques perfectionnées.

Ateliers d'orthophonie

Déglutition et respiration chez les personnes souffrant de SLA : notions actuelles de soins cliniques

Stuart Cleary, Department of Speech Pathology and Audiology, University of Alberta, Edmonton (Alb.)

Résultats d'apprentissage : Après avoir pris part à cet atelier, les participants pourront faire ce qui suit :

1. Comprendre les notions et problèmes importants liés à la coordination et à l'intégration de la déglutition, à la gestion de la respiration et de la sécrétion chez les patients souffrant d'insuffisance respiratoire d'origine neuromusculaire.
2. Expliquer les mécanismes de base de la protection des voies aériennes et du dégagement volontaire des aliments, liquides et sécrétions dans les voies aériennes chez les patients atteints d'une maladie neuromusculaire.
3. Mettre en oeuvre des programmes de gestion neuromusculaire de la déglutition et de la respiration qui comprennent un grand nombre de techniques comportementales de dégagement des voies aériennes, des thérapies d'augmentation de la toux et autres techniques compensatoires de déglutition.

4. Comprendre les options pour gérer la production excessive de salive chez les patients souffrant de SLA, notamment les approches pharmacologiques, le Botox® et la radiothérapie.
5. Mesurer les résultats des programmes de gestion de la déglutition et des voies aériennes chez les personnes souffrant de SLA et d'autres maladies neuromusculaires.
6. Décrire un grand nombre de projets de recherche clinique sur l'amélioration du dégagement des voies aériennes chez les patients atteints de SLA à l'université de l'Alberta.

Dans cet exposé, le conférencier discutera de l'évaluation et du traitement du dégagement des voies aériennes et de la gestion des sécrétions des patients atteints de sclérose latérale amyotrophique (SLA). La déglutition, l'alimentation et la protection des voies aériennes sont grandement compromis dans la LSA et constituent des défis pour les cliniciens qui travaillent avec des patients pour maximiser le fonctionnement et la qualité de vie. De nouveaux traitements comportementaux apparaissent pour remédier à ces problèmes. Le conférencier décrira rapidement les problèmes, les interventions fondées sur l'expérience clinique et la mesure des résultats indiquée pour cette population.

Changement de paradigmes : Le traitement des problèmes de déglutition et d'alimentation chez les personnes souffrant de démence

Stuart Cleary, Department of Speech Pathology and Audiology, University of Alberta, Edmonton (Alb.)

Résultats d'apprentissage : Après avoir pris part à cet atelier, les participants pourront faire ce qui suit :

1. Comprendre les causes courantes, les risques fondamentaux et les complications liées aux problèmes d'alimentation et de déglutition chez les personnes souffrant de démence.
2. Décrire l'influence du modèle de la CIF de l'OMS pour l'évaluation et le traitement des troubles de la déglutition.
3. Expliquer l'importance des mesures officielles dans l'évaluation de la dysphagie chez les personnes souffrant de démence.
4. Discuter des relations entre la dysphagie et les déficiences intellectuelles dans la démence.

Collaboration avec les enseignants pour faciliter l'acquisition naissante de capacités de lecture et d'écriture et d'expression orale chez les enfants d'âge préscolaire ayant des troubles de la parole et du langage

Dr Jeanne Wilcox, Arizona State University, Tempe AZ

Le but de cette session est de présenter un nouveau programme d'étude conçu pour favoriser l'amélioration des résultats de l'acquisition de la lecture, de l'écriture et du langage chez les enfants d'âge préscolaire ayant des troubles de la parole et du langage ainsi que chez leurs camarades ayant un développement normal. Ce programme, intitulé Teaching Early Literacy and Language across the Curriculum (TELL + ou Enseignement de la lecture, de l'écriture et du langage chez tous les jeunes enfants), a subi une évaluation initiale et les résultats sont prometteurs. Ces résultats seront examinés et on discutera plus particulièrement de stratégies de collaboration orthophoniste-enseignant qui aboutissent à une évolution positive des capacités d'apprentissage de la lecture, de l'écriture et du langage des enfants d'âge préscolaire.

Résultats de l'apprentissage :

1. Les participants comprendront la relation entre l'expression orale et la lecture précoce ainsi que le rôle croissant de l'orthophoniste pour favoriser les résultats positifs dans l'apprentissage de la lecture et de l'écriture.
2. Les participants apprendront des stratégies pour collaborer avec les éducateurs préscolaires en vue de faciliter l'acquisition des capacités naissantes de lecture, d'écriture et d'expression orale des enfants.
3. Les participants acquerront les bases et les compétences pour mettre en oeuvre en milieu préscolaire les interventions précoces d'acquisition de la lecture, de l'écriture et de l'expression orale.

Fourniture de services d'orthophonie pertinents sur le plan culturel et linguistique aux Premières Nations

Sharla Peltier, Service d'éducation, Première Nation de Nipissing, North Bay (Ont.)

Les membres des Premières Nations du Canada constituent une population différente. Il y a à l'heure actuelle plus de 600 collectivités de Premières Nations et 56 langues autochtones. Chaque collectivité a une culture, une langue, une tradition politique et spirituelle, une forme de gouvernement et une histoire du contact avec les pionniers de la colonie qui lui sont propres. Les relations actuelles avec les gouvernements fédéral et provinciaux varient. Les orthophonistes qui travaillent avec les collectivités des Premières Nations sont très peu nombreux et éparpillés, et sont confrontés chaque jour à des défis pour la prestation de services. Cet atelier est offert par l'une des quelques orthophonistes autochtones connus du Canada. L'animatrice a beaucoup travaillé dans les localités anishinabek situées autour du lac Huron en Ontario depuis plus de 20 ans. Elle relatera ses expériences et des histoires aux participants afin de les sensibiliser et leur faire mieux comprendre les problèmes de prestation de service. Elle présentera des outils pour évaluer et favoriser les compétences de communication. Cet atelier vise à sensibiliser davantage les professionnels à la culture et à leur faire mieux comprendre les dialectes anglais des Premières Nations. Ces connaissances seront utiles pour la pratique et faciliteront la création de services pertinents pour les collectivités des Premières Nations que nous servons.

Reference & Regulate™ – Nouvelle approche pour intervenir efficacement auprès des enfants ayant des troubles du spectre autistique (TSA)

David Loyst, Loyst and Associates (C.-B.); Kate Chase, Loyst and Associates (C.-B.)

Nous passons en revue, au cours de cet atelier, les modèles actuels d'intervention et de recherche pour l'autisme. On aura recours à l'expérience clinique, aux données de la recherche et à des vidéos filmés avant et après l'intervention pour présenter R&R™, programme de rééducation qui a fait ses preuves pour les enfants ayant des TSA. R&R™ repose sur les modèles de développement de la cognition sociale, de la communication et du jeu chez des enfants normaux.

Mesure et maximisation de l'intelligibilité de la parole des enfants

Megan Hodge, université de l'Alberta, Edmonton (Alb.)

On fera la démonstration, au cours de cette session, de procédures permettant de mesurer l'intelligibilité de la parole des enfants de trois ans et plus, et on indiquera les notes attendues pour l'intelligibilité des enfants qui ont un développement normal de la parole. On donnera des exemples de cas pour illustrer les objectifs de l'intervention et l'évolution longitudinale des notes d'intelligibilité chez les enfants ayant des troubles de la parole.

Pour compléter vos dossiers de fluidité verbale à peu de frais

Judith Kuster, CCC/SLP, Minnesota State University, Mankato MN

Cet atelier est censé être à la fois théorique et très pratique. Le traitement doit reposer sur des stratégies efficaces. Internet offre d'excellentes informations sur le traitement fondé sur l'expérience clinique, si le clinicien sait comment les trouver. Internet est aussi l'un des outils que les cliniciens de ce domaine utilisent pour se tenir au courant des innovations. Pour cela, ils doivent savoir utiliser les stratégies de recherche qui leur permettront de trouver les meilleures expériences probantes. On montrera, au cours de cette session qui est plus particulièrement consacrée aux troubles de fluidité verbale, des collaborations en ligne pour trouver des traitements reposant sur les expériences cliniques probantes pour ces troubles, des bibliographies pertinentes sur la recherche portant sur ces troubles, des possibilités de formation continue en ligne gratuites ou peu coûteuses en rapport avec ces troubles et des stratégies utiles de recherche pour découvrir d'autres informations et matériels sur ces troubles. On montrera plusieurs matériels de diagnostic et de traitement disponibles gratuitement en ligne. On indiquera aussi des liens interactifs où les clients et leur famille peuvent trouver de l'aide, où les cliniciens peuvent collaborer pour les cas difficiles et où on peut pratiquer des stratégies pour améliorer la fluidité verbale.

Résultats de l'apprentissage – Les participants :

1. identifieront divers matériels de diagnostic et de traitement pour les troubles de fluidité verbale;
2. identifieront des stratégies en ligne pour trouver des traitements reposant sur l'expérience clinique pour les troubles de fluidité verbale;
3. identifieront des liens interactifs d'aide aux clients et de collaboration professionnelle.

Évaluation dynamique : une introduction

Ingrid Jeffrey, MSc, Mediated Learning Academy (C.-B.)

L'évaluation dynamique porte sur l'évaluation des processus cognitifs. On présentera aux participants les principes et les objectifs de l'évaluation dynamique en les illustrant d'une démonstration d'instruments donnés d'évaluation. On passera en revue les outils d'évaluation. On fera le lien entre les résultats possibles de l'évaluation et l'orthophonie et ses objectifs.

Le rôle de l'orthophoniste dans les soins palliatifs

Candace Myers, MSc, S-LP(C), CancerCare Manitoba, Winnipeg (Man.)

Cette session portera sur la philosophie des soins aux personnes en fin de vie ou soins palliatifs, le rôle de l'orthophoniste dans les soins aux personnes en fin de vie par opposition à la médecine de réadaptation traditionnelle, les stratégies pratiques pour offrir l'intervention orthophonique voulue pour gérer la dysphagie et la communication, les références, les ressources et les orientations pour la formation continue et la participation à des équipes interdisciplinaires.

Titre du programme : Amélioration des services aux bébés et aux tout-petits ayant des besoins spéciaux

Dr Louis Rossetti, University of Wisconsin, Oshkosh WI

Évaluation du développement des bébés et des tout-petits ayant des besoins spéciaux

(session du matin)

Le but général de cette session est de discuter des questions pertinentes en rapport avec l'évaluation du développement des bébés et des tout-petits ayant des besoins spéciaux. Parmi les sujets discutés, il sera question de la situation de l'évaluation des bébés et des tout-petits, des bénéficiaires de l'activité d'évaluation, des préoccupations générales et particulières relatives à l'évaluation, du choix des instruments d'évaluation, des domaines du développement à évaluer et de l'interprétation et de la communication voulues des résultats de l'évaluation. Cette session est de nature hautement clinique. On discutera des problèmes courants que rencontre l'évaluateur. On encourage les participants à s'impliquer.

Pratiques d'intervention précoce (session de l'après-midi)

Au cours de cette session, on signalera aux professionnels de l'intervention précoce divers problèmes de l'intervention auprès des enfants ayant des besoins spéciaux et de leur famille. On discutera entre autres des modèles de prestation de service, des modèles de travail en équipe, de l'intervention avec les parents et les gardiens, de l'intervention à domicile, dans un centre et dans une pouponnière de soins néonataux intensifs, et de la mesure de l'efficacité du programme. Cette session est de nature hautement clinique. On encourage les participants à s'impliquer.

Objectifs de la formation :

1. Familiariser les participants avec les techniques et procédures actuelles d'évaluation des bébés et des tout-petits.
2. Familiariser les participants avec la notion de série d'évaluations et de schémas d'évolution du développement avec le temps.
3. Familiariser les participants avec les pratiques actuelles d'évaluation des bébés et tout-petits peu touchés.
4. Familiariser les participants avec les notions d'état des bébés; avec la correction pour les prématurés; avec la valeur de prévision de l'évaluation des bébés et des tout-petits; avec divers instruments d'évaluation.
5. Familiariser les participants avec la pratique actuelle d'intervention sur le développement dans les pouponnières de soins néonataux intensifs.
6. Familiariser les participants avec la pratique actuelle pour les services d'intervention transdisciplinaire axée sur le jeu.
7. Familiariser les participants avec l'information actuelle relative à l'efficacité de l'intervention précoce axée sur les activités dans le modèle de prestation de service.

Articles présentés en orthophonie et audiologie**Comment savoir si notre intervention porte des fruits?**

Kathryn M. Wishart, LCST, M.Sc., BC Centre For Ability, Vancouver (C.-B.); Dianne Cameron, MRSc, Vancouver (C.-B.)

Les enfants ayant des besoins particuliers sont souvent confrontés à des défis durant toute leur vie, et ils auront besoin de toute une série de thérapies et de services de soutien. Avec l'évolution vers des pratiques factuelles et la nécessité croissante de rendre des comptes aux consommateurs et aux bailleurs de fonds, nous devons utiliser un cadre pour évaluer l'efficacité des services offerts à nos clients et de nos programmes.

Articles présentés en audiologie**Décisions cliniques touchant les enfants atteints d'une perte bilatérale ou unilatérale légère de l'audition**

Elizabeth Fitzpatrick, Ph.D. (audiologiste accréditée auprès de l'OAOO), Université d'Ottawa, Ottawa (Ont.)

Par le passé, les décisions concernant le traitement des enfants ayant une perte bilatérale ou unilatérale légère de l'audition se fondaient largement sur leur capacité de fonctionnement. Le dépistage néonatal soulève des questions sur l'intervention optimale auprès des nouveau-nés. La présente étude vise à examiner les pratiques entourant l'amplification et à obtenir le point de vue des praticiens au sujet de cette nouvelle population clinique.

L'importance d'une intervention précoce auprès des enfants ayant une perte auditive

Noreen R. Simmons, Ph.D., O(C), BC Family Hearing Resource Centre, Surrey (C.-B.); Tamara Pelletier, M.Sc., O(C), BC Family Hearing Resource Centre, Surrey (C.-B.)

Cet exposé fera mieux connaître aux orthophonistes les avantages des services d'intervention précoce auprès des pouspons et des nouveau-nés atteints d'une perte auditive. On y présentera le savoir concernant des services complets et coordonnés offerts par une équipe de professionnels (p. ex. : des orthophonistes, des enseignants auprès des personnes sourdes) possédant des connaissances spécialisées en intervention précoce et en perte auditive.

Articles présentés en orthophonie**Le langage parlé complété et l'enfant atteint du syndrome de Down**

Marianne Flanagan, B.Éd., M.A., Calgary (Alb.)

Le langage parlé complété constitue un système de communication multisensoriel et phonémique facile à apprendre qui clarifie la langue parlée en faisant appel au sens de la vue. Les enfants atteints du syndrome de Down connaissent souvent une perte d'audition et des troubles du traitement auditif. Ces apprenants visuels arriveront à bien comprendre le langage parlé complété de leurs enseignants et de leurs parents. Les enfants qui emploient un tel langage arrivent à faire comprendre avec précision leurs paroles inintelligibles.

Une thérapie axée sur la fonction oro-motrice et l'articulation pour les personnes atteintes des troubles du spectre autistique

Jacqueline M. Glance, maîtrise en troubles de la communication, University of North Dakota, Ottawa (Ont.); Debi J. Maniloff, maîtrise en troubles de la communication, University of Maine, Stittsville (Ont.)

Un programme de thérapie axée sur la fonction oro-motrice et l'articulation peut facilement s'intégrer à un programme d'intervention comportementale intensive (ICI). Avec une formation, les superviseurs de la formation clinique, les principaux thérapeutes de l'ICI, les thérapeutes subalternes de l'ICI et les parents peuvent réussir à mettre en œuvre ce programme par étapes pour faciliter la communication verbale fonctionnelle.

Enseigner la conscience phonologique à un enfant francophone atteint d'un trouble du langage (séance présentée en français)

Daphné A. Ducharme, professeure adjointe, Université d'Ottawa, Ottawa (Ont.); Judith Lafleur, orthophoniste; Lisabelle Lemay, orthophoniste; Véronique Quann, étudiante, Université d'Ottawa, Ottawa (Ont.); Dominique Pelland, étudiante, Université d'Ottawa, Ottawa (Ont.); Maude St-Pierre, étudiante, Université d'Ottawa, Ottawa (Ont.)

Cette étude porte sur l'amélioration de la conscience phonologique. D'une durée de 14 mois, elle comprend deux programmes d'intervention de huit semaines. Il s'agit d'une seule étude de cas menée auprès d'un garçon bilingue (français-anglais) de six ans atteint d'un trouble diagnostiqué grave du langage spécifique. Les Nouvelles épreuves pour l'examen du langage (N-EEL) ont servi à évaluer sa conscience phonologique avant et après une intervention de huit semaines. Cette même démarche a été reprise l'année suivante. Les séances ont eu lieu trois fois par semaine chez l'enfant au cours de l'été. Les résultats laissent entendre qu'un enfant atteint d'un tel trouble peut acquérir une conscience phonologique forte en dépit de son déficit aigu du langage oral.

Un modèle novateur de prestation de services pour les orthophonistes en milieu scolaire : les centres d'immersion en français

Jacqueline M. Glance, orthophoniste, Ottawa Carleton District School Board, Nepean (Ont.); Debi J. Maniloff, maîtrise en troubles de la communication, Ottawa Carleton District School Board, Nepean (Ont.)

L'Ottawa Carleton District School Board [conseil scolaire du district d'Ottawa-Carleton] offre des programmes d'immersion en français aux cycles élémentaires et intermédiaires. Ces programmes sont offerts dans des écoles à deux ou à trois régimes pédagogiques en plus de 14 centres d'immersion. Comment ces centres peuvent-ils bénéficier de services d'orthophonie efficaces et utiles?

La plasticité synaptique, la neuroréadaptation et l'intervention au moyen de l'ordinateur

Kim Bradley, Ph.D., University of Toronto, Toronto (Ont.)

Cette séance présentera une étude de cas menée auprès d'un utilisateur aphasique adulte du logiciel Brain Fitness de la société Posit Science et fondée sur les dix principes de plasticité neurale postulés par Kleim et Jones. Ces principes seront examinés pour voir l'orientation qu'ils donnent aux services d'orthophonie à la suite d'un accident neurologique.

Le modèle de prestation de services TeleSpeech pour les régions éloignées au Canada

Deborah G. Anderson, orthophoniste, Anderson Speech Consultants, Burlington (Ont.); Sarah Aljas, orthophoniste, Anderson Speech Consultants, Burlington (Ont.); Elizabeth Sommerville, aide à la communication, Anderson Speech Consultants, Burlington (Ont.); Mari-Joy Fernhout, orthophoniste, Anderson Speech Consultants, Burlington (Ont.); Jennifer McKeeman, orthophoniste, Anderson Speech Consultants, Burlington (Ont.); Patti Male, aide-orthophoniste, Yellowknife, (T.N.-O.)

Les représentantes d'Anderson Speech Consultants examineront des solutions de prestation de services pour des régions éloignées du Canada et mettront l'accent sur le modèle novateur TeleSpeech. Elles présenteront des méthodes pratiques pour élaborer et mettre en œuvre un modèle de prestation de services adaptés à la culture pour l'évaluation, le traitement et l'établissement d'objectifs. Elles aborderont aussi le renforcement des capacités.

La supervision d'étudiants en orthophonie en stage partout dans le monde

Kim Bradley, Ph.D., professeure adjointe/cabinet privé, University of Toronto, Toronto (Ont.); Lynn Elwood, coordonnatrice de la formation clinique/maître de conférences, département d'orthophonie, University of Toronto, Toronto (Ont.); Penny Parnes, DSP, directrice générale, International Centre for Disability and Rehabilitation, Toronto (Ont.); Fern Westernoff, Ed.D., M.Sc. S. orthophonie, Toronto District School Board, Toronto (Ont.)

L'Ordre des audiologistes et des orthophonistes de l'Ontario (OAOO) a des lignes directrices précises pour la supervision d'étudiants en orthophonie, tout comme l'établissement conférant le grade universitaire. Les programmes d'ergothérapie et de physiothérapie de l'Université de Toronto ont déjà envoyé 40 étudiants en stage à l'étranger lors de leur dernière année du grade, mais seulement quatre étudiants en orthophonie ont fait un tel stage jusqu'à maintenant. Cette séance se penche sur les défis des stages à l'étranger pour les étudiants en orthophonie.

Ce type de stage présente des avantages pour le pays en développement qui accueille le stagiaire, pour le Canada et pour l'orthophoniste. Cette séance traitera d'un modèle de supervision à distance du thérapeute étudiant par l'intermédiaire d'Internet. Ce modèle a été mis au point par les membres du groupe des troubles de la communication à l'International Centre for Disability and Rehabilitation.

Comprendre le point de vue de chacun dans un cadre clinique varié sur les plans linguistique et culturel

Noreen R. Simmons, Ph.D., O(C), BC Family Hearing Resource Centre, Surrey (C.-B.); Jeff A. Small, Ph.D., University of British Columbia, Vancouver (C.-B.)

Cette étude traite des défis que doivent relever les orthophonistes unilingues anglophones et des stratégies qu'ils emploient en consultation clinique avec des clients aphasiques adultes indo-canadiens. Elle aborde aussi le point de vue des clients, des membres de la famille et des interprètes sur l'interaction.

La planification de carrière pour les professionnels mûrs, chevronnés et prêts pour la prochaine étape

Betty Norman Bray, M.A. R-SLP, O(C), CCC-SLP, Hôpital Carewest Day, Calgary (Alb.)

La planification de carrière : Cette séance interactive aidera les orthophonistes et audiologistes chevronnés à déterminer ce dont ils ont besoin pour la prochaine étape de leur carrière. Devriez-vous continuer à travailler, songer à prendre votre retraite ou planifier de prendre un congé sabbatique ou une année de transition? Les participants feront une auto-évaluation de leur situation et déterminer leurs propres résultats.

Programmes de yoga intégrant la parole et le langage

Lisa M. Dymond, B.A., M.Sc., orthophoniste, University of British Columbia

Cette présentation traite de l'intégration d'habiletés de la parole et du langage dans un programme de yoga et présente des études de cas sur deux personnes autistiques qui apprennent le yoga et leur famille. Le point de vue de ces personnes y est décrit. La présentation se termine en suggérant de ne pas négliger la valeur du yoga comme moyen thérapeutique.

La recherche clinique chez les adultes ayant des troubles moteurs de la parole et de fluidité

Sarah Smits-Bandstra, Ph.D., Université McGill, Montréal (Qué.); Kim Bauerly, M.Sc., University of Toronto, Toronto (Ont.); Robert Kroll, Ph.D., University of Toronto, Toronto (Ont.); Vince Gracco, Ph.D., Université McGill, Montréal (Qué.); Luc De Nil, Ph.D., University of Toronto, Toronto (Ont.)

Les résultats de plusieurs études menées à divers endroits auprès d'adultes bègues et d'adultes atteints de la maladie de Parkinson laissent entendre que des modifications mineures à des programmes de traitement déjà établis peuvent permettre de maximiser l'apprentissage, l'assimilation des connaissances et les bienfaits du traitement. Cette séance s'attardera à la conception et à la mise en œuvre de recherches cliniques à cet effet.

L'élaboration et la mise en œuvre de la trousse Communikit pour les personnes atteintes d'un trouble de la communication

Holly Sloan, orthophoniste, Trillium Health Centre, Mississauga (Ont.)

Le service d'orthophonie au Trillium Health Centre a conçu une trousse d'outils complète et portable pour faciliter la communication efficace. Cette séance passera en revue les efforts d'élaboration et de mise en œuvre de cette trousse, baptisée la CommuniKit, dans un hôpital de soins aigus et sa portabilité dans la chaîne de soins.

Affiches

Orthophonie et audiologie

Au-delà du traitement auditif

Penelope Bacsfalvi, M.A., Ph.D., CCC-SLP(C), University of British Columbia et Provincial Resource Programme – Auditory Outreach, Burnaby (C.-B.); Sue Wastie, M.A., O(C), Provincial Resource Programme – Auditory Outreach

Actuellement, bon nombre d'étudiants ont une déficience difficile à cerner, mais qui semble être un trouble du traitement auditif. Cette affiche décrit une étude de cas sur une fillette présentant un trouble présumé du traitement auditif central diagnostiqué par une équipe d'audiologistes et d'orthophonistes. Jane, âgée de 6 ans et 6 mois, affiche une compréhension et un vocabulaire compris qui correspondent à son âge. Toutefois, sa capacité narrative, sa syntaxe et son langage expressif accusent un retard. Vu les difficultés au niveau de la mémoire auditive à court terme qui semblent être sous-jacentes aux troubles du langage, l'équipe a soupçonné un trouble du développement auditif central. Cette affiche présente l'étonnante comorbidité détectée par une évaluation poussée du traitement visuel ainsi que la démarche de l'intervention et les progrès accomplis.

L'apprentissage actif de l'éthique professionnelle

Lynn Ellwood, M.Sc.S., B.Sc. (C.D.), O(C), accréditée auprès de l'OAOO, University of Toronto, Toronto (Ont.); Carla J. Johnson, Ph.D., University of Toronto, Toronto (Ont.); Catriona M. Steele, Ph.D., M.Sc.S., O(C), CCC-SLP, BRS-S, accréditée auprès de l'OAOO, Toronto Rehabilitation Institute, Toronto (Ont.); Susan J. Wagner, B.Sc. (SPA), M.Sc. (C.D.), accréditée auprès de l'OAOO, O(C), University of Toronto, Toronto (Ont.)

Cette affiche décrit les méthodes uniques employées pour enseigner l'éthique professionnelle dans la dernière étape d'un programme universitaire en orthophonie. L'expérience d'apprentissage par intégration utilise des principes de l'éducation aux adultes et aborde des aspects pratiques. L'affiche propose un protocole d'évaluation du programme pour fournir des données qui orienteront les prochaines modifications.

L'élaboration d'un cours sur l'exercice professionnel auprès des Autochtones : le point de vue des étudiants

Erynne K. Green, étudiante de maîtrise en orthophonie, University of British Columbia, Vancouver (C.-B.); May Bernhardt, Ph.D., University of British Columbia, Vancouver (C.-B.); Heather L. Wood, étudiante de maîtrise en orthophonie, University of British Columbia, Vancouver (C.-B.)

La plupart des orthophonistes et des audiologistes ont reçu à peine une formation de base entourant la prestation de services aux Autochtones. En 2009, la School of Audiology and Speech Sciences de l'University of British-Columbia a lancé un cours pour palier cette lacune. Cette affiche présente le point de vue des étudiants sur l'élaboration de ce cours, sa mise en œuvre et son évaluation.

Audiologie

Les émissions oto-acoustiques évoquées par produits de distorsion : des indicateurs précoces d'une perte auditive chez le personnel de centres d'appels

Kuryakose Joseph, B.Sc. orthophonie et audiologie, JSS Institute of Speech and Hearing, Mysore, Mysore Sud, Karnataka, Inde; Shimil Ulahannan, B.Sc. orthophonie et audiologie, JSS Institute of Speech and Hearing, Mysore, Mysore Sud, Karnataka, Inde; Narthana Yuvraj, B.Sc. orthophonie et audiologie, JSS Institute of Speech and Hearing, Mysore, Mysore Sud, Karnataka, Inde; Shruti Kaul, chargé de cours en audiologie (M.Sc. audiologie), JSS Institute of Speech and Hearing, Mysore, Mysore Sud, Karnataka, Inde

L'étude présentée vise à établir l'efficacité des émissions oto-acoustiques évoquées par produits de distorsion pour évaluer les effets des transactions téléphoniques à long terme sur l'audition du personnel de centres d'appel. Ces personnes ont montré une diminution de l'amplitude des produits de distorsion, particulièrement à de hautes fréquences, ce qui indique qu'elles sont susceptibles de connaître une perte d'audition.

Orthophonie

Une étude interlinguistique chez des enfants accusant un retard de développement phonologique : données préliminaires du français au Manitoba

Daniel Bérubé, aspirant au doctorat, School of Audiology and Speech Sciences, University of British Columbia, Vancouver (C.-B.); Barbara M. Bernhardt, Ph.D., School of Audiology and Speech Sciences, University of British Columbia, Vancouver (C.-B.); Stephanie Harvey, M.A., Troubles de la communication, Division scolaire franco-manitobaine, Lorette (Man.); Diane Dacquay, M.Sc., Orthophonie, Division scolaire franco-manitobaine, Lorette (Man.); Joseph P. Stemberger, Ph.D., Linguistique, University of British Columbia, Vancouver (C.-B.); Stefka H. Marinova-Todd, Ed.D., School of Audiology and Speech Sciences, University of British Columbia, Vancouver (C.-B.)

Cette étude menée auprès d'enfants apprenant le français au Manitoba et accusant un retard de développement phonologique fait partie d'une enquête sur la fréquence des formes phonologiques courantes et non courantes d'une langue à l'autre. Les données préliminaires indiquent que les enfants peuvent présenter des contraintes de marque similaires d'une langue à l'autre, mais qu'ils ont des solutions différentes qui reflètent la variation individuelle et leur langue maternelle.

Effets sur la parole d'une glossectomie partielle : mesures de l'articulation de la parole et de la perception de l'auditeur

Tim Bressmann, Ph.D., University of Toronto, Toronto (Ont.); Hannah Jacobs, B.A., University of Toronto, Toronto (Ont.); Janette Quintero, B.A., University of Toronto, Toronto (Ont.); Jonathan Irish, M.D., Hôpital Princess Margaret, Toronto (Ont.)

Vingt-deux personnes glossectomisées ont subi un test d'articulation et une évaluation de l'acceptabilité de leur parole et de la perception sociale. L'acceptabilité de leur parole avant la chirurgie et la taille du défaut ont permis de prédire 74,2 % de la variation des données postopératoires. Un défaut de 20,4 % est la limite pour que l'acceptabilité de la parole soit diminuée. Il n'y a aucun changement dans les perceptions sociales relevées.

Enquête sur la prestation de services en orthophonie au Canada à des clients de groupes linguistiques divers

Claudette D'Souza, B.Sc., aspirante à la maîtrise en science, Dalhousie University, Ajax (Ont.); Elizabeth Kay-Raining Bird, Ph.D., Dalhousie University, Halifax (N.-É.)

Cette présentation porte sur une enquête auprès de 384 orthophonistes sur la prestation actuelle de services à la population multilingue variée du Canada. Elle passe en revue des données démographiques sur les cliniciens répondants, les ressources existantes et les difficultés à surmonter pour desservir cette population. Elle aborde aussi les conséquences à en tirer pour l'exercice professionnel.

L'aphasie chez les jeunes victimes d'un accident cérébro-vasculaire (ACV) et leur retour au travail

Ross Graham, *aspirant à la maîtrise en science, University of Western Ontario / SJHC, London (Ont.)*; Sheliah Pereira, *aspirante à la maîtrise en science, University of Western Ontario / SJHC, London (Ont.)*; Robert Teasell, M.D. – *directeur de Physical Medicine and Rehabilitation/Stroke Rehabilitation, University of Western Ontario / SJHC, London (Ont.)*

L'aphasie limite la capacité d'une personne de reprendre le travail après un ACV. On ne connaît cependant pas avec certitude le nombre de victimes d'un ACV qui réussissent à reprendre un travail constructif. Cette étude a recensé toutes les publications pertinentes et a établi qu'une moyenne pondérée de 28,4 % des victimes aphasiques d'un ACV recouvrent une aptitude au travail.

Le traitement de la communication en soins aigus : un projet pilote

Charlene C. Lahey-Thiessen, R.SLP (C), *Foothills Medical Centre, Calgary (Alb.)*; Andrea L. Kos, M.S., R-SLP, CCC-SLP, *Foothills Medical Centre, Calgary (Alb.)*; Rae-Anne S. Kerr, R.SLP (C), *Foothills Medical Centre, Calgary (Alb.)*

En milieu de soins aigus, la charge de travail élevée et la pénurie de personnel ont fait en sorte que les orthophonistes passent la plupart de leur temps à s'occuper de patients dysphagiques. Malheureusement, les patients en soins aigus qui ont des besoins en matière de communication bénéficient rarement de traitement puisqu'on espère qu'ils seront transférés rapidement dans un milieu de réadaptation. Or, puisque ces milieux se remplissent rapidement, les patients attendent de plus en plus longtemps en milieu de soins aigus. Pour tenter de résoudre cette problématique, les orthophonistes du Foothills Medical Centre de Calgary ont lancé un projet pilote en septembre 2008 afin de mettre en œuvre un traitement de la communication sans négliger les cas de dysphagie. Ce projet a affecté 1,0 équivalent à temps plein sur 6,2 au traitement diagnostique de la communication. Cette affiche présente la distribution du personnel, l'évaluation et la sélection des patients ainsi que les premières réactions de membres clés de l'équipe interdisciplinaire. À ce jour, ce projet a permis non seulement d'assurer des services d'orthophonie aux patients atteints d'un trouble moyen à grave, mais aussi de faire connaître l'ampleur du champ de la pratique des orthophonistes en soins aigus.

La prononciation de mots multisyllabiques à 5 ans : formes régulières et variables

Glenda K. Mason, *maîtrise en orthophonie, aspirante au doctorat, University of British Columbia, West Kelowna (C.-B.)*; B. May Bernhardt, Ph.D., *University of British Columbia, Vancouver (C.-B.)*; Julie J. Masterson, Ph.D., *Missouri State University, Springfield (Missouri)*; Sarah Blois, M.Sc. en orthophonie, *University of British Columbia, Vancouver (C.-B.)*

Peu d'études ont abordé l'acquisition des mots multisyllabiques. Or, la capacité de décoder de longs mots rapidement et avec précision est étroitement liée à la capacité de lire. Cette présentation traite de l'acquisition classique des mots multisyllabiques chez des enfants anglophones d'une maternelle de la Colombie-Britannique et montre des formes régulières et variables de prononciation chez un même participant et entre eux.

Une perspective internationale sur les troubles de la communication

Penny Parnes, DSP, *University of Toronto, Toronto (Ont.)*; Kim Bradley, Ph.D., *University of Toronto, Toronto (Ont.)*

L'International Centre for Disability and Rehabilitation (ICDR) situé dans le secteur des sciences de la réadaptation de l'University of Toronto cherche à aborder des questions mondiales touchant la déficience et la réadaptation. Le Centre est né il y a cinq ans en réaction à un besoin criant à l'échelle mondiale de s'occuper des obstacles que doivent surmonter les personnes handicapées dans les pays pauvres. Les personnes handicapées composent 10 % de la population mondiale, et 80 % d'entre elles habitent dans le monde en développement. Elles doivent composer avec la perception honteuse de leur handicap, la pauvreté, des obstacles comportementaux ou physiques, et le manque de services. Cette affiche met en vedette le travail de l'ICDR pour tenter d'aborder certaines de ces questions par le renforcement des capacités en ressources humaines dans les pays en développement et au Canada par l'éducation, la recherche, la prestation de services et la constitution de réseaux. L'affiche traite aussi des troubles de la communication dans les pays en développement et de la réponse de l'ICDR et des professionnels de la communication au Canada.

La formation centralisée des parents : faire participer les familles en attente de thérapie

Janet P. Simpson, M.S., O(C), CCC-SLP, *Office régional de la santé de Winnipeg, Winnipeg, MB*

Cette présentation décrit un programme centralisé de formation offert aux parents de tout-petits et d'enfants d'âge préscolaire en attente d'une évaluation et d'une thérapie. Les principes de l'éducation des adultes et l'encadrement servent à habilitier les familles. Ce programme a permis de raccourcir les délais d'attente, de réduire le temps en thérapie directe et d'améliorer les interactions entre parents et enfants.

Explorer des méthodes comportementales de changement de la voix chez la population transgenre

Janice W. Bennett, M.Sc.S., O(C), *accréditée auprès de l'OAAO, St. Joseph's Health Centre, Toronto (Ont.)*

Trois études de cas illustrent comment le fait de connaître les techniques de traitement de la voix peut servir à aider les personnes transgenres (d'un homme à une femme) à changer leur voix et, par conséquent, à améliorer leur qualité de vie. La présentation aborde les incidences sur le rôle de l'orthophoniste qui dessert cette population.

Un programme d'intervention en orthophonie auprès d'enfants du jardin : un nouveau modèle

Karen E. Ivings, M.Sc.cl. (orthophonie); B.Éd., University of Western Ontario; Université d'Ottawa, Ottawa (Ont.); Nancy E. Lubert, M.Sc. (appliquées) troubles de la communication humaine, Université McGill, Ottawa (Ont.)

Un nouveau programme d'orthophonie a été élaboré pour un conseil scolaire d'Ottawa afin de venir en aide aux enfants du jardin dans leur école qui sont atteints d'un trouble grave ou profond du langage. Des mesures prises avant et après le programme et des questionnaires auxquels ont répondu les parents et les enseignants montrent des réactions positives et des améliorations chez les élèves au niveau des aires du langage expressément visées et de la communication sociale.

Concevoir une interface entre la collaboration interprofessionnelle et la formation interprofessionnelle : amener le milieu de travail aux étudiants

Susan J. Wagner, M.Sc., accréditée auprès de l'OAOO, O(C), University of Toronto, Toronto (Ont.); Sylvia Langlois, M.Éd., University of Toronto; Euson Yeung, M.Éd., University of Toronto

Les équipes exemplaires de soins de santé communautaires qui montrent une excellente collaboration peuvent servir de pont entre le milieu universitaire et le milieu clinique. Cette présentation décrit un recours à de telles équipes dans un programme de formation interprofessionnelle qui a mené à des évaluations positives et a enrichi l'apprentissage des étudiants. Nous décrivons nos méthodes et inviterons les participants à en discuter dans leur milieu.

La question de la sévérité aux yeux des cliniciens partout au Canada

Carolyn Cronk, M.A., M.O.A., O(C), Montréal (Qué.)

Cette présentation montre les résultats d'une brève enquête sur les jugements de la gravité d'une déficience posés par des orthophonistes et des audiologistes canadiens. Elle aborde aussi des façons de déterminer la gravité utilisées par différentes professions. Les participants auront largement l'occasion de débattre des enjeux entourant l'établissement d'un degré utile de gravité.

L'imagerie par ultrasons de séquences voyelle-consonne-voyelle chez des patients ayant subi une glossectomie partielle

Bianca Herold, B.A., University of Bielefeld; Tim Bressmann, Ph.D., University of Toronto, Toronto (Ont.); Janette Quintero, B.A., University of Toronto, Toronto (Ont.); Martina Hielscher-Fastabend, Ph.D., University of Bielefeld; Prisca Stenneken, Ph.D., University of Bielefeld; Jonathan Irish, M.D., Hôpital Princess Margaret

Le mouvement de la langue de 19 patients a été saisi par ultrasons avant et après la glossectomie. Nous avons relevé une augmentation considérable de la hauteur de la langue après l'opération pour toutes les consonnes visées. Cet effet était statistiquement significatif pour le « r », le « s » et le « ch ». Ces résultats indiquent une compensation active du mouvement articulaire et une hypermétrie.

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), 5th 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 CJSPLA 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 (5th 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.

Potential Conflicts of Interest and Dual Commitment

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 CJSPLA 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.

Participants in Research Humans and Animals

Each manuscript submitted to CJSPLA 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, CJSPLA 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.

Présentation de manuscrits

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
Toronto, Ontario M5G 1V7

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.

Toutes les présentations doivent se conformer aux lignes de conduite présentées dans la publication *Manual of the American Psychological Association (APA)*, 5^e Édition. Un accusé de réception de chaque manuscrit sera envoyé à l'auteur-contact avant la distribution des exemplaires en vue de la révision. La RCOA cherche à effectuer cette révision et à informer les auteurs des résultats de cette révision dans les 90 jours de la réception. Lorsqu'on juge que le manuscrit convient à la RCOA, on donnera 30 jours aux auteurs pour effectuer les changements nécessaires avant l'examen secondaire.

L'auteur est responsable de toutes les affirmations formulées dans son manuscrit, y compris toutes les modifications effectuées par les rédacteurs et réviseurs. Sur acceptation définitive du manuscrit et immédiatement avant sa publication, on donnera l'occasion à l'auteur-contact de revoir les épreuves et il devra signifier la vérification du contenu dans les 72 heures suivant réception de ces épreuves.

Organisation du manuscrit

Tous les textes doivent être dactylographiés à double interligne, en caractère standard (police de caractères 12 points, non comprimée) et sur papier 8 ½" X 11" de qualité. Toutes les marges doivent être d'au moins un (1) pouce. L'original et quatre (4) copies du manuscrit doivent être présentés directement au rédacteur en chef. L'identification de l'auteur est facultative pour le processus d'examen : si l'auteur souhaite ne pas être identifié à ce stade, il devra préparer trois (3) copies d'un manuscrit dont la page couverture et les remerciements seront voilés. Seuls les auteurs sont responsables de retirer toute information identificatrice éventuelle. Tous les manuscrits doivent être rédigés en conformité aux lignes de conduite de l'APA. Ce manuel est disponible dans la plupart des librairies universitaires et peut être commandé chez les libraires commerciaux. En général, les sections qui suivent doivent être présentées dans l'ordre chronologique précisé.

Page titre : Cette page doit contenir le titre complet du manuscrit, les noms complets des auteurs, y compris les diplômes et affiliations, l'adresse complète de l'auteur-contact et l'adresse de courriel de l'auteur contact.

Abrégé : Sur une page distincte, produire un abrégé bref mais informateur ne dépassant pas une page. L'abrégé doit indiquer l'objet du travail ainsi que toute information pertinente portant sur la catégorie du manuscrit.

Mots clés : Immédiatement suivant l'abrégé et sur la même page, les auteurs doivent présenter une liste de mots clés aux fins de constitution d'un index.

Tableaux : Tous les tableaux compris dans un même manuscrit doivent être dactylographiés à double interligne sur une page distincte. Les tableaux doivent être numérotés consécutivement, en commençant par le Tableau 1. Chaque tableau doit être accompagné d'une légende et doit servir à compléter les renseignements fournis dans le texte du manuscrit plutôt qu'à reprendre l'information contenue dans le texte ou dans les tableaux.

Conflits d'intérêts possibles et engagement double

Dans le processus de présentation, les auteurs doivent déclarer clairement l'existence de tout conflit d'intérêts possibles ou engagement double relativement au manuscrit et des auteurs. Cette déclaration est nécessaire afin d'informer la RCOA que l'auteur ou les auteurs peuvent tirer avantage de la publication du manuscrit. Ces avantages pour les auteurs, directs ou indirects, peuvent être de nature financière ou non financière. La déclaration de conflit d'intérêts possibles ou d'engagement double peut être transmise à des conseillers en matière de publication lorsqu'on estime qu'un tel conflit d'intérêts ou engagement double aurait pu influencer l'information fournie dans la présentation ou compromettre la conception, la conduite, la collecte ou l'analyse des données, ou l'interprétation des données recueillies et présentées dans le manuscrit soumis à l'examen. Si le manuscrit est accepté en vue de sa publication, la rédaction se réserve le droit de reconnaître l'existence possible d'un tel conflit d'intérêts ou engagement double.

Illustrations : Toutes les illustrations faisant partie du manuscrit doivent être incluses avec chaque exemplaire du manuscrit. Chaque manuscrit doit contenir des copies claires de toutes les illustrations pour le processus de révision. Il faut envoyer un fichier électronique pour chaque image et graphique en format JPEG, TIFF, AI, PSD, GIF, EPS ou PDF, compression minimale 300 ppp. Pour les autres types d'illustrations informatisées, il est recommandé de consulter le personnel de production de la RCOA avant la préparation et la présentation du manuscrit et des figures et illustrations s'y rattachant.

Légendes des illustrations : Les légendes accompagnant chaque figure et illustration doivent être dactylographiées à double interligne sur une feuille distincte et identifiées à l'aide d'un numéro qui correspond à la séquence de parution des figures et illustrations dans le manuscrit.

Numérotation des pages et titre courant : Chaque page du manuscrit doit être numérotée, y compris les tableaux, figures, illustrations, références et, le cas échéant, les annexes. Un bref (30 caractères ou moins) titre courant descriptif doit apparaître dans la marge supérieure droite de chaque page du manuscrit.

Remerciements : Les remerciements doivent être dactylographiés à double interligne sur une feuille distincte. L'auteur doit reconnaître toute forme de parrainage, don, bourse ou d'aide technique, ainsi que tout collègue professionnel qui ont contribué à l'ouvrage mais qui n'est pas cité à titre d'auteur.

Références : Les références sont énumérées les unes après les autres, en ordre alphabétique, suivi de l'ordre chronologique sous le nom de chaque auteur. Les auteurs doivent consulter le manuel de l'APA (5^e Édition) pour obtenir la façon exacte de rédiger une citation. Les noms de revues scientifiques et autres doivent être rédigés au long et imprimés en italiques. Tous les ouvrages, outils d'essais et d'évaluation ainsi que les normes (ANSI et ISO) doivent figurer dans la liste de références. Les références doivent être dactylographiées à double interligne.

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'êtres 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.



CALL FOR PAPERS

CASLPA Conference 2011
Montreal, Quebec
April 27–30, 2011

**Deadline for receipt of all program submissions:
September 15, 2010**

**Online abstract submissions at:
www.caslpa.ca/english/events/conference.asp**

The Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA) 2011 conference will be held in Montreal, Quebec. CASLPA invites program submissions to the annual conference.

Clinicians from all practice settings are encouraged to share their insight, experience, methods, and research. CASLPA invites submissions of papers, poster sessions, scientific exhibits, mini-seminars, and videotapes. Multidisciplinary presentations will be considered. Sessions will be scheduled daily from April 28–30, 2011.

SESSION TYPES

Paper Presentations: A paper presentation should be based on current research that has not been published, clinical experience, or case studies (45 minutes in duration).

Mini-seminars: These sessions are designed to provide opportunity for interactive discussion of clinical practice and professional issues (90 minutes in duration).

Poster Sessions: Poster presentations should stand alone in conveying information. Each display should contain title and author(s), statement of purpose, methodology, results, and conclusions. Posters must be in landscape format, no larger than 2.4 m x 1.2 m. Authors are required to be present at designated times to respond to questions and discussion.

Scientific Exhibits: These sessions will be incorporated with the poster presentations. Exhibitors are required to be present at designated times to describe and discuss the exhibit. A table of approximately 1.8 m x .75 m and a poster board of approximately 2.4 m x 1.2 m will be available. Exhibitors are responsible for providing all equipment that will be required.

DVD Presentations: DVDs may be presented on clinical topics, case studies, agencies, therapy procedures, or other topics.

- Themes:**
- ☐ Clinical Practice in Multilingual Contexts
 - ☐ Partnerships with First Nations Communities
 - ☐ Neuroplasticity in Research and Practice
 - ☐ New Technologies in Audiology Practice
 - ☐ Other

The complete call for papers including conditions for acceptance, instructions and request for presentation form, can be downloaded from our website at: www.caslpa.ca/english/events/conference.asp You can submit online or contact michelle@caslpa.ca to have a hard copy e-mailed, faxed, or mailed to you.



APPEL POUR COMMUNICATIONS

Congrès de l'ACOA 2011
Montréal (Québec)
du 27 au 30 avril 2011

**Date limite de réception des propositions :
le 15 septembre 2010**

**Vous pouvez soumettre votre proposition de communication en ligne au :
www.caslpa.ca/francais/events/conference.asp**

Le congrès annuel 2011 de l'Association canadienne des orthophonistes et audiologistes (ACOA) se tiendra à Montréal (Québec). L'ACOA vous invite donc à soumettre vos propositions de communication pour son programme du congrès annuel 2011.

Les cliniciens de tous genres de pratique sont encouragés à partager leurs réflexions, leurs expériences, leurs méthodes et leurs recherches. L'ACOA souhaite recevoir des propositions de communications, de communications affichées, d'expositions scientifiques, de mini-séminaires de formation et de vidéocassettes. Les présentations multidisciplinaires seront également prises en considération. Les sessions se tiendront pendant le jour, du 28 au 30 avril 2011.

TYPES DE SESSION

Présentation de communication : Une présentation de communication devrait être basée sur une recherche courante, une expérience clinique ou sur une étude de cas, être récente et ne pas avoir été publiée (durée de 45 minutes).

Mini-séminaires : Ces séances sont conçues de manière à susciter des discussions interactives au sujet de la pratique clinique et des problèmes professionnels (durée de 90 minutes).

Séances d'affichage : La présentation des affiches doit suffire, à elle seule, à fournir de l'information. Chaque présentoir doit contenir le titre et le nom du ou des auteurs, l'énoncé de principe, la méthodologie, les résultats et conclusions. Les affiches doivent être présentées sous format en largeur et selon des dimensions ne dépassant pas 2.4 m par 1.2 m. Lors de périodes établies à l'avance, les auteurs devront être présents pour répondre aux questions et participer aux échanges (discussions).

Expositions scientifiques : Ces activités seront incorporées aux sessions d'affichage. Lors de périodes établies à l'avance, les exposants devront être présents pour décrire et discuter de leur exposition. Une table mesurant approximativement 1.8 m par .75 m et un tableau d'affichage de 2.4 m x 1.2 m seront mis à la disposition des exposants. Les exposants doivent fournir tout autre équipement nécessaire.

Présentations de DVDs : Les DVDs peuvent présenter des sujets cliniques, des études de cas, des agences, programmes, procédures de thérapie ou autres.

- Themes:**
- ☐ La pratique clinique dans un contexte multilingue
 - ☐ Les partenariats avec les collectivités des Premières Nations
 - ☐ La plasticité synaptique dans la recherche et dans la pratique
 - ☐ Les nouvelles technologies dans la pratique de l'audiologie
 - ☐ Autre

Le formulaire pour soumettre les propositions de communications, les conditions et les instructions peuvent être téléchargés à partir du site Web de l'ACOA au www.caslpa.ca/francais/events/conference.asp. Vous pouvez soumettre votre demande en ligne ou en communiquant avec nick@caslpa.ca pour obtenir un formulaire et informations par envoi postal ou électronique ou par télécopieur.

2010 CASLPA Conference

Whitehorse, Yukon

May 19 - 22, 2010

Early bird registration deadline

April 15, 2010

www.caslpamembership.ca/caslpa_meetings/



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