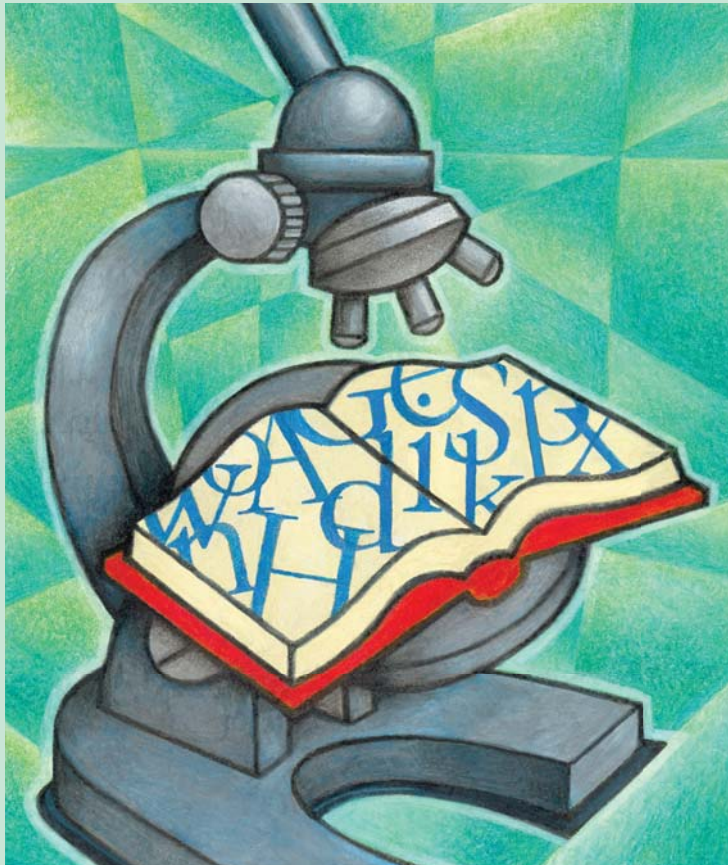


# CJSLPA • RCOA

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d'audiologie***



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## **Special Issue On Language And Literacy Research In Canada**

- ▶ ***Promoting Early Literacy Skills: Effects of In-Service Education for Early Childhood Educators***  
Heather Flowers, Luigi Girolametto, Elaine Weitzman and Janice Greenberg
- ▶ ***Phonological Awareness Intervention for Preschoolers with Speech and Sound Disorders***  
Meghann Grawburg and Susan Rvachew
- ▶ ***Les Inventaires MacArthur du développement de la communication : validité et données normatives préliminaires***  
Marie-Claude Boudreault, Élise-Ariane Cabirol, Natacha Trudeau, Diane Poulin-Dubois et Ann Sutton
- ▶ ***Temporal Processing Skills of Children with and without Specific Language Impairment***  
Simon Grondin, Ginette Dionne, Nathalie Malenfant, Marilyn Plourde, Mariève Cloutier and Catherine Jean

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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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## 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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# From the Editor

## Spring Issue

### Special Issue on Language and Literacy Research in Canada



Welcome to our first issue bearing the new name of the journal, the Canadian Journal of Speech-Language Pathology and Audiology. The name change highlights the Journal's role as a showcase for research and other educational information with a Canadian focus.

It is fitting that the first issue with this new name focuses on a unique Canadian research network. The articles in this issue report on research conducted by researchers across Canada and funded by The Canadian Language and Literacy Research Network, also known as the Network or CLLRNet. The Network was formed by a group of Canadian researchers with an interest in language and literacy. The Network has been funded by the Government of Canada's Networks of Centres of Excellence Canada (NCE) since 2001. One goal of the Network is to develop the knowledge base on language and literacy skills in Canadian children, leading to ways to help them develop these skills. Another important goal is to create an integrated network of researchers, practitioners and government policy makers in early childhood literacy and learning in Canada that will persist even after NCE support ends. Most of the research funded by the Network involves teams of researchers working together across the country. More information about the Network can be obtained on their website, <http://www.cllrnet.ca>.

Our first article in the issue is by Heather Flowers, Luigi Girolametto, Elaine Weitzman, and Janice Greenberg. Their article describes a study in which preschool personnel were trained in ways to interact with children in book reading interactions that would encourage story comprehension and attention to print and sound. The study is part of a larger project investigating strategies that can be used by early educators, parents, and speech-language pathologists to help young children with language disorders and other disabilities to develop their linguistic skills.

The second article is a study of phonological awareness intervention for children with speech sound disorders, authored by Meghann Grawburg and Susan Rvachew. The intervention program resulted in significant gains in phonological awareness by the 10 participants. The authors emphasize the role that speech-language pathologists can play in improving the emergent literacy skills of young children with speech and language impairments. This work is part of a larger program focusing on basic and applied research on children's phonological skills and reading.

Marie-Claude Boudreault, Élise-Ariane Cabirol, Natacha Trudeau, Diane Poulin-Dubois, and Ann Sutton are the authors of our third paper. Other research by some members of this team has addressed the scarcity of information on language development of francophone children by adapting a widely-used instrument, the MacArthur Communicative Development Inventories. The current study investigated the validity of the French version and found it to be sensitive to children's language development.

Our fourth paper, by Simon Grondin, Ginette Dionne, Nathalie Malenfant, Marilyn Plourde, Mariève Cloutier and Catherine Jean, describes a study of the temporal processing skills of children with and without specific language impairments. Also investigated was the ability of the processing tasks to predict group membership. The project is related to a large Network study of subtypes of language and reading impairment.

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# De la rédactrice en chef

## Numéro du printemps

### Numéro spécial consacré à la recherche sur le langage et sur l'apprentissage de la lecture et de l'écriture au Canada



Voici le premier numéro de notre revue publiée sous son nouveau nom : la Revue canadienne d'orthophonie et d'audiologie. Ce changement de nom souligne le rôle de cette publication pour mettre en valeur la recherche et l'information éducative de facture canadienne.

Il est tout indiqué que ce premier numéro mette l'accent sur un réseau de recherche canadien. Les articles présentent des études menées par des chercheurs des quatre coins du Canada et financées par le Réseau canadien de recherche sur le langage et l'alphabétisation. Ce Réseau a été constitué par un groupe de chercheurs de pointe canadiens qui partageaient un intérêt pour le langage et l'alphabétisation. Il est financé par les Réseaux de centres d'excellence (RCE) du gouvernement du Canada depuis 2001. L'un de ses objectifs consiste à créer un bassin de connaissances sur le langage et l'alphabétisation chez les enfants du Canada en vue de les aider à perfectionner leurs compétences linguistiques. Le Réseau a aussi pour objectif de créer un réseau intégré de chercheurs, d'intervenants et de responsables gouvernementaux de l'élaboration de politiques en matière d'apprentissage de la lecture et de l'écriture chez les jeunes enfants au Canada qui perdurera même une fois que le financement des RCE sera terminé. La plupart des études financées par le Réseau sont menées par des équipes de chercheurs de partout au pays. Pour de plus amples renseignements, consultez le site <http://www.cllrnet.ca>.

Notre premier article provient de Heather Flowers, Luigi Girolametto, Elaine Weitzman, et Janice Greenberg. Il décrit une étude où des éducatrices d'enfants d'âge préscolaire ont reçu une formation pour encourager les enfants à comprendre et à porter attention à l'imprimé et aux sons lors de la lecture d'un livre. Cette étude s'inscrit dans une vaste initiative examinant les stratégies que peuvent utiliser les éducatrices, les parents et les orthophonistes pour aider les jeunes enfants ayant des troubles du langage et d'autres incapacités à perfectionner leurs compétences linguistiques.

Le deuxième article, de Meghann Grawburg et Susan Rvachew, porte sur une étude de la conscience phonologique chez les enfants ayant des troubles de la parole et de perception des sons. Le programme d'intervention qui y est décrit a mené à une amélioration considérable de la conscience phonologique chez dix participants. Les auteures ont mis l'accent sur le rôle que peuvent jouer les orthophonistes pour améliorer l'acquisition de compétences en lecture et en écriture chez les jeunes enfants ayant des troubles de la parole et du langage. Cette étude s'inscrit dans une grande initiative portant sur la recherche de base et appliquée traitant des compétences phonologiques et en lecture des enfants.

Marie-Claude Boudreault, Élise-Ariane Cabirol, Natacha Trudeau, Diane Poulin-Dubois, et Ann Sutton sont les auteures du troisième article. D'autres recherches menées par des membres de cette équipe ont fait ressortir la rareté des renseignements sur l'acquisition du langage chez les enfants francophones. Pour cette raison, elles ont adapté un questionnaire très fréquemment utilisé, soit les Inventaires MacArthur du développement de la communication. La présente étude analyse la validité de la version française et montre qu'elle est sensible au développement linguistique des enfants.

Le quatrième article, de Simon Grondin, Ginette Dionne, Nathalie Malenfant, Marilyn Plourde, Mariève Cloutier et Catherine Jean, décrit une étude sur les compétences de traitement temporel chez les enfants avec et sans trouble spécifique du langage. Les auteurs se sont aussi penchés sur la capacité des tâches de traitement à prédire l'appartenance à l'un des groupes. Cette recherche s'inscrit aussi dans un vaste réseau d'études sur les sous-types de troubles du langage et de lecture.

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## ■ Promoting Early Literacy Skills: Effects of In-Service Education for Early Childhood Educators

## ■ Favoriser les capacités précoces de lecture et d'écriture : effets d'une formation en exercice des éducatrices de la petite enfance

Heather Flowers  
Luigi Girolametto  
Elaine Weitzman  
Janice Greenberg

### Abstract

This study examined the effects of in-service education on educators' use of story comprehension utterances, narrative models, and print/sound references during interactive book reading. Participants included sixteen early childhood educators with groups of four typically-developing children, aged 18 to 67 months. Eight educators in the experimental group were taught to engage in story-related discussion to promote children's early literacy skills. At posttest, the experimental group significantly increased their use of abstract story comprehension utterances and narrative action utterances relative to the control group. In turn, children in the experimental group responded more frequently to Level 3 story comprehension utterances. At follow-up, the educators did not maintain their posttest changes. The results support the viability of this type of in-service education for early child care settings but suggest the need for more intensive training and support in order for educators to maintain their gains in the longer term.

### Abstré

Cette étude a examiné les effets de la formation des éducatrices en exercice sur leur utilisation d'énoncés de compréhension d'une histoire, de modèles de narration et de références imprimées ou sonores durant la lecture interactive d'un livre. Les participants comprennent seize éducatrices de la petite enfance avec des groupes de quatre enfants ayant un développement type, âgés entre 18 et 67 mois. On a enseigné à huit éducatrices du groupe expérimental à lancer une discussion liée à l'histoire pour favoriser l'acquisition de compétences en lecture et en écriture chez les enfants. Lors du test après la formation, le groupe expérimental a augmenté de manière significative son utilisation d'énoncés de compréhension abstraite d'une histoire abstraite par rapport au groupe de contrôle. Quant aux enfants du groupe expérimental, ils ont réagi plus fréquemment aux énoncés de compréhension de niveau 3. Lors du suivi, les éducatrices n'ont pas conservé les changements après leur formation. Les résultats indiquent la viabilité de ce type de formation en exercice dans les milieux de la petite enfance, mais montrent aussi la nécessité d'offrir une formation plus intensive et un soutien pour que les éducatrices conservent leurs gains à long terme.

**Key Words:** child care, children, early literacy, interactive book reading, early childhood education

The purpose of this study was to investigate the effects of an in-service education program on early childhood educators' interactive book reading. Specifically, this study examined the efficacy of a short intervention on educators' models of story comprehension, narrative structure, and print/sound references while they were reading to small groups of preschoolers. In addition, this study examined the preschoolers' verbal engagement with their educators. Interactive book reading refers to an activity during which an adult reads a storybook to one or more children while encouraging the children's participation, providing feedback to the children, and adapting the reading style to the children's linguistic and cognitive abilities (Arnold, Lonigan,

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Whitehurst, & Epstein, 1994; Hargrave & Senechal, 2000; Whitehurst, Arnold, Epstein, Angell, & Fischel, 1994; Whitehurst & Lonigan, 1998). Several interventions have been based on interactive book reading with the objective of developing children's expressive language competence and have reported significant improvements in receptive and expressive vocabulary (Arnold et al., 1994; Reese & Cox, 1999; Wasik & Bond, 2001; Whitehurst, Arnold et al., 1994; Whitehurst & Lonigan, 1998).

Increasingly, large numbers of children attend child care centres where their developmental progress is facilitated by early childhood educators. Educators are in an ideal position to facilitate the development of language and early literacy skills because they have the opportunity to engage small groups of children in interactive book reading on a daily basis. Moreover, child care facilities afford environments in which books are easily accessible (e.g., in book centres) and book reading is an integral part of children's daily routines (e.g., during circle time, rest time, and free play). Investigations of interactive book reading conducted in child care centres have illustrated positive outcomes for children's vocabulary and language development (Senechal, 1997; Valdez-Menchaca & Whitehurst, 1992; Whitehurst, Arnold et al., 1994; Whitehurst, Epstein et al., 1994; Whitehurst et al., 1988).

This study investigates the effects of interactive book reading on educators' models of story comprehension, narrative structure, and print/sound references, all of which predict proficient reading ability at school age (Dickinson & Tabors, 2001; Scarborough & Dobrich, 1994; Wells, 1985). Story comprehension skills are promoted when educators expose children to varying levels of abstract language during discussion about the story's events and characters (e.g., Sorsby & Martlew, 1991). Children who hear abstract linguistic models may develop conceptual knowledge that goes beyond the "here and now" and is required for reading comprehension in later academic grades (e.g., inferring, predicting, and perspective-taking). Because stories are abstract by nature, they demand active participation on the part of the child for adequate comprehension to occur (Reese & Cox, 1999). Thus, educators who maximize opportunities for story talk that goes beyond the here and now create an environment for children to learn how to construct and interpret the story's events. Previous studies have examined the association between story comprehension utterances and children's language outcomes during storybook reading. Two studies demonstrated that interactive book reading and increased analytical talk during story reading with 4-year-old children were highly correlated with children's gains in story comprehension skills at five years of age (Dickinson & Smith, 1991; Haden, Reese, & Fivush, 1996). A subsequent study by van Kleeck et al. (van Kleeck, Gillam, Hamilton, & McGrath, 1997) indicated that a higher frequency of talk that included both low and high levels of abstraction was associated with better performance one year later on the Preschool Language Assessment Instrument (PLAI) (Blank, Rose, & Berlin, 1978). Although this latter study focused on parent-child interactions, educator-child interactions also

have the potential to model abstract language.

A second benefit of interactive book reading is the provision of narrative structure models that expose children to the essential elements of stories (e.g., Hoggan & Strong, 1994; Klecan-Aker, 1993). Incidental modelling of narrative structure exposes children to important information about the setting, the problem, the character's actions to resolve the problem, and the resolution. By highlighting and talking about these structures, children implicitly learn about key features of narratives, including the internal organization of stories and expectations for how the content is sequenced. When early childhood educators engage in interactive book reading, they may transfer their implicit knowledge of narrative structure to children based on cultural norms and expectations. Unfortunately, there is a paucity of literature addressing adults' models of narrative structure or the mechanism by which narrative competencies are learned. Dickinson & Keebler (1989) noted that during interactive book reading, early childhood educators make little reference to elements of narrative structure such as the climax and resolution. Yet, by the age of six years, children are expected to produce a classic oral narrative involving a clear delineation of the setting (e.g., stating who, what, and where) and at least three core elements of narrative structure (i.e., initiating event, action, and resolution) (McCabe & Rollins, 1994).

Finally, interactive book reading also provides opportunities for early childhood educators to use print and sound references, such as explicit remarks that alert children to the location of print on a page, letter knowledge, sounds of letters, or word reading (e.g., "This word says *big*"). Explicit references may direct children's attention to print directionality, alphabet knowledge, and sound awareness, thereby facilitating the acquisition of important precursors to decoding word-level text (Justice & Ezell, 2000, 2002; Lomax & McGee, 1987; Storch & Whitehurst, 2002). Few adults spontaneously refer to print and/or sounds during book reading (van Kleeck, 2003). Nonetheless, several studies have demonstrated the effectiveness of print/sound referencing interventions, including pointing to or tracking print, commenting about print concepts (e.g., "This word says *big*"), and asking questions about sounds (e.g., "What sound does 'big' start with?") (Ezell & Justice, 2000; Justice & Ezell, 2000, 2002; McCormick & Mason, 1986). Following such interventions, children made specific gains on measures of print and sound recognition. One can conclude from these findings that when adults make explicit reference to print and sounds during interactive book reading, children's knowledge and awareness of these specific skills is heightened.

This exploratory study is a follow-up to a previous study that examined the efficacy of in-service education on interactive book reading strategies of early childhood educators in child care centres (Girolametto, Weitzman, & Greenberg, 2003). In this previous study, the authors reported that educators engaged the children in conversation about stories more often following the in-service program.



The primary objective of the current study was to examine whether the inservice program also increased qualitative aspects of the educators' conversations, including the use of abstract story comprehension utterances, narrative models, and print and/or sound references. To date, there are few investigations on the value of interactive book reading intervention for modelling these precursors to conventional literacy (van Kleeck, 1998). The current study adds to the growing body of literature on interactive book reading interventions by investigating the effects of a short intervention for child care staff focusing on three areas of early literacy facilitation. Moreover, this study examines children's responses to story comprehension utterances of increasing abstraction. Previous studies conducted in child care centres have not specifically investigated children's immediate responses to low versus high level story comprehension utterances.

This study is presented as exploratory work because of the small sample size and lack of information from the existing literature to guide some of the hypotheses. Therefore, this study is focused on determining the viability of the inservice training program for centre-based child care environments and on identifying questions for future research on educator-child interactions. The study addressed three specific research questions: (a) What changes do educators make in their models of story comprehension, narrative structure, print/sound references following a brief intervention? (b) Are changes maintained at follow-up? (c) If educators make changes to their models of story comprehension, what is the impact on children's rate of responses? Given the lack of existing information on educator-child interaction, the hypotheses are guided by the available literature on parent-child interaction and outcomes following parent training. We hypothesized that educators in the experimental group would increase their use of abstract story comprehension utterances, narrative models, and print/sound references. We also hypothesized that they would maintain these changes at follow-up, 9 months following the end of the in-service program. These hypotheses are based on the explicit goals of the in-service training program and findings from previous investigations (Justice, Chow, Capellini, Flanigan, & Colton, 2003; Justice & Ezell, 2000). We also hypothesized that the children would demonstrate greater responsiveness to story comprehension utterances than children in the control group.

## Method

### Participants

**Early Childhood Educators.** The participants in this study were 16 early childhood educators who worked in four licensed child care centres in the metropolitan area of Toronto. All educators had completed high school as well as 2 years of postsecondary education resulting in a diploma in early childhood education. All educators were female and had at least 2 years experience in child care settings. Two educators worked in toddler classrooms (one each in the experimental and control groups) and the remainder

worked in preschool classrooms. The toddler classrooms included children aged 18 to 30 months and had an adult-child ratio of 1:5 whereas the preschool classrooms included children up to 72 months of age and had an adult-child ratio of 1:8 as mandated by law in the province of Ontario. The educators were randomly assigned to experimental and control groups by centre so that colleagues could attend the in-service program together. This was also done to prevent experimental and control group members from talking to each other and influencing the outcomes. Two centres (i.e., eight educators) were randomly assigned to receive the in-service program and two centres (i.e., eight educators) were randomly assigned to a waiting list control group. Therefore, the design of this study must be considered quasi-experimental.

Descriptive data on the pretest characteristics of the early childhood educators can be found in Table 1. There were no significant differences between the experimental and control groups for the number of years of education. However, despite random assignment, the educators in the experimental group were older and had more work experience,  $t(14) = 2.52, p \leq .05$  and  $t(14) = 2.76, p \leq .05$ , respectively. Because of this pretest difference, the results of this study must be interpreted cautiously.

**Children.** Each early childhood educator was videotaped in interaction with a small group of four children from her classroom. The group size was set at four children because previous research indicated that adult language input was adversely affected by larger group sizes (Pellegrino & Scopesi, 1990) and that young children were more interactive in small rather than large group settings (McCabe et al., 1996). The educator was asked to select four children from her classroom who exhibited typical development and whose parents consented to the study. The same children were involved in both the pretest and posttest videotapes. All children had age-appropriate speech and language development as determined by parent report and the educators' completion of the Speech and Language Assessment Scale (Hadley & Rice, 1993). Most of the children attended the facility on a full time basis (i.e., at least 40 hours per week) and attended the particular child care centre for at least 2 months prior to the study. At pretest, the children ranged in age from 18-67 months and the experimental and control groups did not differ from each other statistically in terms of the children's chronological age. Summary data describing the characteristics of the children can be found in Table 2.

At the follow-up test, 9 months after the posttest, the early childhood educators in the original experimental group took part in a final set of adult-child interactions. A new group of children was recruited because the original children had either transferred to different classrooms or had left the child care centre. Children in the follow-up group were selected in the same manner described above and did not differ in age or gender from those in the initial experimental group at pretest. The characteristics of the follow-up group are also displayed in Table 2.

**Table 1***Characteristics of the Early Childhood Educators*

Variable		Experimental Group (n = 8)	Control Group (n = 8)
Age (in years):	M (SD)	38.3 (4.2)	31.5 (6.3)
	Min-Max	35-48	25-45
Years of Education:	M (SD)	14.5 (0.5)	14.8 (0.7)
	Min-Max	14-15	14-17
Years of Experience:			
< 10 years		0	5
11 – 19 years		6	2
> 20 years		2	1

assessed at pretest and posttest using the same procedures as the experimental group, and participated in the in-service training program once the posttests were concluded. No suggestions were provided to this group during the 4-month control phase. The control group received in-service training after the posttest; however, their own posttest data were not collected because data for a non-treated control group was not available for comparison.

The early childhood educators worked in four child care centres that were on a waiting list to receive an in-service training program entitled Learning Language and Loving It - The Hanen Program for Early Childhood Educators (Weitzman, 1992). A speech-language pathologist from The Hanen Centre, who delivered the training program, contacted the supervisors of the four child care centres to confirm their interest in participating in the program. The clinician then conducted a 1-hour orientation session at each of the four centres to describe the in-service training requirements and the research components of the program. The educators who agreed to participate in the study completed a brief questionnaire that requested demographic information (e.g., age, training, years of experience). They were given copies of research information and consent forms to distribute to the parents of all the children in their classroom.

One to 2 weeks after the orientation session, a research assistant visited each of the centres to meet the early childhood educators, collect all parent consent forms, and make appointments for filming

adult-child interactions. The educators completed the Speech and Language Assessment Scale (Hadley & Rice, 1993) separately for each of these children in order to ensure that their speech and language development

**Table 2***Characteristics of the Children in the Experimental, Control and Follow-up Groups*

Variables		Experimental Group (n = 32)	Control Group (n = 32)	Follow-up Group (n = 28) <sup>1</sup>
Age (months):				
	M (SD)	37.8 (10.6)	39.6 (10.4)	37.8 (10.6)
	Min-Max	20 - 67	18 - 57	23 - 59
Gender	Male	14	19	14
	Female	18	13	14
Time in Child Care: <sup>2</sup>				
2- 6 months		10	2	9
7-12 months		10	13	8
13 months +		12	17	11
Attendance:				
Full-time		29	26	28
Part-time		3	6	0

<sup>1</sup>One educator did not participate in the follow-up test and consequently the total number of children was reduced by four.

<sup>2</sup>Length of time in months that child has attended the particular child care centre.

### Design and Procedure

The study utilized a quasi-experimental design with random assignment to experimental and control groups. The early childhood educators in the control group were

was progressing typically. The research assistant filmed a ten-minute segment of adult-child interaction during an ongoing, unplanned activity. This was conducted to familiarize the educators and children with the videotaping procedures and these videotapes were not used for analysis. Only the children participating in the study were videotaped; the other children played with similar materials in another room, or in a different area of the same classroom, or participated in outdoor play.

The second visit (pretest) for all 16 early childhood educators occurred immediately before the experimental program. A portable camera with a directional microphone was used to permit the research assistant to position herself so that the behaviours of the educator and the children could be videotaped simultaneously. The groups were videotaped for 15 minutes in a book reading activity that took place on the floor of the designated book centre. Typically, the educator and children sat on a carpet or on pillows, in a circle. The research assistant provided the educator with a set of four books, *When the TV Broke* (Ziefert, 1989), *Just Me and My Babysitter* (Mayer, 1986), *When I'm Sleepy* (Howard, 1985), and *Good Dog, Carl* (Day, 1986). The latter book differed from the others by virtue of being wordless. The educators started with a book that was available in the child care centre and familiar to the children, then used one or more of the books that were provided. The order and number of books were not constrained. The same procedure was used for videotaping the adult-child interactions at posttest 4 months later (immediately following the in-service program), and at follow-up, 9 months after the posttest.

Following each visit, the early childhood educators completed an informal questionnaire that asked them to rate their impressions of the representativeness of their interactions on a 5-point scale (1 = very typical; 3 = typical; 5 = not typical). At pretest, all educators rated their amount of talk and rate of speech as typical (mean rating = 2.6 and 3.0, respectively). In addition, the educators determined that their comfort level was typical of unobserved interaction (mean rating = 3.1). Similar ratings were obtained at posttest (amount of talk, 2.6; rate, 2.9; and comfort level, 3.0). Thus, these ratings provided some assurance that they believed their interactions during book reading to be similar to other unobserved book reading interactions in the child care centre.

### **In-service Education Program**

The in-service education program, *Learning Language and Loving It*, was delivered by an experienced speech-language pathologist, certified by The Hanen Centre to administer this program. The 14-week program included eight group evening sessions to teach program strategies and six individual sessions in the child care centre, each consisting of a 5-minute videotape of adult-child interaction followed by 30 minutes of individual feedback and discussion regarding the use of program strategies. The group sessions were 2.5 hours long and took place in the evening after the child care centre was closed. Each

session included various learner-centred activities such as interactive lectures, observation and analysis of videotapes that illustrated program techniques, large and small group discussions, and role-plays of program techniques. During the individual visits, the speech-language pathologist videotaped the educators interacting with children in the context of ongoing activities and provided on-the-spot coaching as necessary. The educator subsequently reviewed these videotapes and the speech-language pathologist provided immediate feedback on the use of program strategies.

One 2.5-hour session and one entire videotaping consultation were devoted to interactive book reading. The video consultation was held one week after the session and provided the educator with specific and immediate feedback on her use of interactive book reading strategies. Educators also read Chapter 10 of *Learning Language and Loving It* (Weitzman, 1992), which focused on interactive book reading and included three main groups of strategies. First, educators were taught to extend the children's background knowledge, relate story events to their personal experiences, and predict story events from pictures or text. Second, educators were encouraged to introduce preschool children to more complex stories that involved key components of narrative structure such as the setting, problem, response, action/attempt, direct consequence, and the reaction of main characters. Third, educators were taught to reference print and sounds by indicating the title, author, or illustrator, commenting on words (e.g., strange-looking words, long words, short words), and highlighting syllables and sounds when reading words. A summary of these strategies can be found in the Appendix.

### **Outcome Measures**

**Transcription and Reliability.** The 15-minute book reading videotapes were transcribed using the Systematic Analysis of Language Transcripts (SALT) (Miller & Chapman, 1998). Transcripts included the adult's utterances and all intelligible utterances spoken by each of the four children on separate speaker lines. Transcripts were prepared by a research assistant and each transcript was verified by a second research assistant, a graduate student in speech-language pathology, following a procedure used by Johnston (2001). Agreement reliability was conducted on a random selection of 25% of the transcripts (i.e., a total of 180 minutes of interaction) using the following formula:  $\text{number of agreements} / (\text{the number agreements} + \text{disagreements}) \times 100$  (Sackett, 1978). Agreement reliability for the educators was 98% for utterance boundaries and 99% for words. Reliability for the children was 98% for utterance boundaries and 97% for words.

**Coding System and Reliability.** All utterances of the early childhood educators were coded for story comprehension level, narrative structure, and print/sound references. The coding system was not mutually exclusive; educators' utterances received multiple codes if they met the criteria for more than one area. Utterances that did not fit any of the criteria (e.g., imperatives used to control



children's behaviour or off-topic comments) and utterances that were read directly from the text were not coded.

**A. Story Comprehension Codes.** The coding system for story comprehension was an adaptation of previously published protocols that examined the level of abstraction in adults' utterances during book reading (Dickinson & Smith, 1994; Haden et al., 1996; Van Kleeck & Beckley-McCall, 2002). Story comprehension included the following four codes.

Level 1. Picture Description - comments or questions that provided picture descriptions or elicited responses focused on picture description. Picture description included labeling objects, describing actions, or locating objects (e.g., "It's called a crib." or "What's mommy doing in this picture?").

Level 2. Text and Story Awareness - comments or questions that (a) prompted children for specific words in the text (e.g., "And the doggie ate the ...."), (b) asked children to repeat or paraphrase lines of text (e.g., "What did the doctor say?"), or (c) asked children factual questions to verify text comprehension (e.g., "What did the dog eat?").

Level 3. Background Knowledge - comments or questions that (a) utilized children's relevant background knowledge or prior experiences (e.g., "What does mommy put on your pizza at home?"), (b) encouraged children to enact story events (e.g., "Show me how you yawn."), or (c) asked children to make simple judgments about story events (e.g., "Do you think the doggie is naughty?").

Level 4. Integration - comments or questions that promoted analysis and evaluation of story events, including (a) speculating about or predicting events in the story (e.g., "What's going to happen next?"), (b) hypothesizing or imagining alternatives or solutions (e.g., "What if the mother had come home sooner?"), or (c) taking a character's perspective (e.g., "How does Jeffrey feel about that?").

**B. Narrative Structure Codes.** The coding system for narrative structure was adapted from existing descriptions of children's story grammar (Liles, Duffy, Merriitt, & Purcell, 1995; Paul, Hernandez, Taylor, & Johnson, 1996). The educators' utterances that were directly related to the story were assigned one of six codes:

1. Setting - utterances that described the location, the characters, and the overarching time frame of the story.

2. Initiating Event - utterances that described a problem that propelled the main character to act. A character may cause an initiating event (e.g., the parents go out and leave a babysitter) or the event may occur spontaneously (e.g., the TV breaks).

3. Internal Response - utterances that described a character's feelings about the problem that has occurred (e.g., "But is his sister crying?" or "Is she having a good time?").

4. Action - utterances that included an attempt to resolve the problem on the part of the main character. This may be a single event or a series of events (e.g., "She's breaking the dishes." or "She made macaroni and cheese

for dinner.").

5. Direct Consequence or Resolution - utterances that described the direct consequence resulting from the characters' actions that ultimately resolved the problem (e.g., "And the TV was fixed, but he didn't miss it at all.").

6. Reaction - utterances that referred to a character's reaction to the resolution. The character's reaction is an expression of his/her internal state or feelings about a situation (e.g., "When she comes home, how is mommy going to feel?").

**C. Print/Sound Reference Codes.** The coding system for print/sound awareness was adopted from the work of Justice and Ezell (2002). It included the following four codes:

1. Book Reading Concepts - utterances containing words such as "letter, print, read, spell, illustrator, author, alphabet, lines, rhyme, sentence, symbol, title/name, word, write" as well as book handling conventions (e.g., "It's upside down" or "You turn the pages this way").

2. Form Segmentation - utterances that informed children about word awareness (e.g., indicating where a word began or ended, commenting on the length of a word). It also included alphabet knowledge (e.g., mentioning a letter name or counting letters in a word).

3. Word Reading - utterances that included requesting children to locate a specific word in the text, pointing out how to read a word (e.g., "This word says *big*."), or asking a child to read a specific word.

4. Phoneme Awareness - utterances that commented on sounds in words (e.g., "The word *book* starts with the /b/ sound"). It was also used when educators pointed out grapheme-phoneme correspondences (e.g., "This letter makes the sound /b/" or "The first letter in the word *book* is a /b/").

**Children's Response Codes.** Children's responses to the educators' story comprehension utterances were coded as either a response or no response. Responses were accepted if they used at least one intelligible word and immediately followed the educators' story comprehension utterance.

The reliability of the adult and child coding systems was computed by randomly selecting 20% of the transcripts to be recoded by a research assistant who was blind to the assignment of subjects to groups and was unaware of the research questions. Interrater reliability was calculated using the formula: number of agreements / (the number of agreements + disagreements) x 100 (Sackett, 1978). Interrater reliability for each of the four print/sound awareness codes was 100% ( $n = 23$  codes). Interrater reliability for the four story comprehension codes ranged from 86% to 91% with overall reliability achieving 89% ( $n = 797$  codes). Overall interrater reliability for the six individual narrative codes ranged from 83% to 100% with overall reliability reaching 96% ( $n = 400$  codes). Finally, overall interrater reliability for the children's responses was calculated for 20% of the transcripts and was 96% ( $n = 239$  responses).



## Results

The results are presented in four sections: (a) pretest comparisons of experimental and control groups, (b) outcomes for the child care educators, (c) outcomes for the children, and (d) follow-up data and individual profiles for the child care educators. Comparisons between the two groups were conducted on difference scores, that is, the gain between the pretest and the posttest. This was done to control for the variation in pretest scores of the two groups. Statistical analyses of the difference scores were made using nonparametric statistics because the sample size was small and it could not be assumed that the data were normally distributed. Because all hypotheses were directional, the posttest comparisons were assessed using a series of Mann-Whitney U tests with a one-tailed probability level set at .05.

### Pretest Analyses

No significant differences were found between the two groups of child care educators for any of the following dependent variables at pretest: story comprehension utterances, narrative structure models, or print/sound references. Moreover, there were no significant differences at pretest between the two groups of children on responses to the four levels of story comprehension utterances.

### Outcomes for Child Care Educators

The first question asked whether child care educators in the experimental and control groups differed in their use of story comprehension utterances from pretest to posttest. Story comprehension utterances were coded from concrete (Levels 1 and 2) to more abstract levels (Levels 3 and 4). Table 3 displays the summary statistics for the percentage of story comprehension utterances at each level. A series of Mann-Whitney U tests were conducted on the difference scores (posttest-pretest) for each of the four levels of story comprehension utterances. There were significant differences for the difference scores of Levels 1 and 3 utterances only,  $U = 14.5$ ,  $p = .033$  and  $U = 11.0$ ,  $p = .014$ , respectively. An examination of the data in Table 3 indicates that the educators who received the experimental intervention decreased their use of Level 1 utterances and increased their use of Level 3 utterances in comparison to the control group. There were no significant differences for Level 2 or Level 4 story comprehension utterances.

The second question asked if child care educators in the experimental group made greater gains in narrative structure models than child care educators in the control group. These data are displayed in Table 4. All utterances within one complete story were coded for narrative structure for each child care educator. One child care provider in the experimental group (Subject 01) did not read a complete story during the posttest session and was excluded from the following analyses. A series of Mann-Whitney U tests were conducted on the difference scores (posttest – pretest) for the six subtypes of narrative models. Child care educators in the experimental group made significantly greater gains in Action utterances than the control group at posttest,  $U = 8.5$ ,  $p = .011$ . There were no significant differences for any of the other five narrative structure utterance types.

The third question asked whether child care educators in the experimental and control groups differed in their use of print/sound references (i.e., print concepts, sound awareness, word reading, and form segmentation) at posttest. Print concepts included all utterances that included a reference to print. Sound awareness referred to sounds that letters make. Word reading referred to utterances that explicitly read a word (e.g., “What does this word say?”). Form segmentation referred to utterances that pointed out letters and sounds in words. Table 5 lists the summary data for the frequency of these codes. The data in Table 5 indicate that the educators used very few print/sound references overall and there were few changes from pretest to posttest. There were no significant differences for the difference scores of the two groups for these variables.

**Table 3**

*Means and Standard Deviations for the Frequency of Educators' Utterances at each Level of Story Comprehension*

Variable		Experimental Group	Control Group	<i>U</i> and <i>p</i> values <sup>1</sup>
		Mean (SD)	Mean (SD)	(one-tailed)
# SC Level 1 <sup>2</sup>	Pre	66.6 (23.3)	43.9 (33.1)	
	Post	39.4 (22.1)	44.3 (24.4)	$U = 14.5$ , $p = .033$
# SC Level 2 <sup>2</sup>	Pre	10.8 (6.3)	8.3 (7.2)	
	Post	12.8 (9.9)	13.1 (9.0)	$U = 28.0$ , $p = .363$
# SC Level 3 <sup>2</sup>	Pre	35.4 (16.1)	33.0 (14.3)	
	Post	52.5 (19.8)	27.5 (13.3)	$U = 11.0$ , $p = .014$
# SC Level 4 <sup>2</sup>	Pre	8.4 (5.2)	4.1 (2.1)	
	Post	9.0 (8.6)	7.4 (3.3)	$U = 20.5$ , $p = .117$

Note: Pre = pretest; Post = posttest; SC = Story Comprehension utterances; SC Level 1 = story comprehension utterances at Level 1, etc.

<sup>1</sup>Analyses were conducted on difference scores (e.g., T2 – T1).

<sup>2</sup>The frequency of Levels 1, 2, 3, 4 story comprehension utterances is calculated from a standard 10 minutes of book reading.

**Table 4***Summary Data for the Frequency of Narrative Models used by Educators<sup>1</sup>*

Variable		Experimental Group <sup>2</sup> Mean (SD)	Control Group Mean (SD)	U and p values <sup>3</sup> (one-tailed)
# Setting	Pre	8.8 (6.5)	5.0 (3.5)	$U = 27.5, p = .478$
	Post	7.3 (5.2)	5.1 (4.8)	
# Initiating Event	Pre	4.0 (4.0)	4.5 (4.8)	$U = 19.5, p = .168$
	Post	7.4 (5.4)	5.6 (2.0)	
# Internal Response	Pre	0.8 (1.2)	0.0 (0.0)	$U = 27.0, p = .478$
	Post	1.0 (1.9)	0.3 (0.7)	
# Action	Pre	33.6 (16.2)	30.3 (25.3)	$U = 8.5, p = .011$
	Post	66.6 (32.4)	24.4 (21.2)	
# Direct Consequence	Pre	6.4 (10.3)	5.8 (7.4)	$U = 16.5, p = .095$
	Post	8.3 (5.8)	5.6 (8.9)	
# Reaction	Pre	1.9 (4.5)	0.4 (0.5)	$U = 22.0, p = .268$
	Post	0.4 (1.1)	0.6 (1.1)	

Note: Pre = pretest; Post = posttest.

<sup>1</sup>The utterances from one complete story for each educator were used for this analysis.<sup>2</sup>One educator in the experimental group did not read a full story and was excluded from these analyses.<sup>3</sup>Analyses were conducted on difference scores (e.g., T2 – T1).**Table 5***Summary Data for the Frequency of Print/Sound References used by the Educators*

Context/Variable		Experimental Group Mean (SD)	Control Group Mean (SD)	U and p values <sup>1</sup> (one-tailed)
# Book Reading	Pre	2.0 (3.5)	3.1 (3.3)	$U = 32.0, p = .500$
	Post	2.3 (2.6)	3.1 (2.6)	
# Word Reading	Pre	0.0 (0.0)	0.1 (0.4)	$U = 24.0, p = .221$
	Post	0.0 (0.0)	0.5 (0.8)	
# Form Segmentation	Pre	0.0 (0.0)	0.0 (0.0)	$U = 28.0, p = .361$
	Post	0.0 (0.0)	0.6 (1.8)	

Note: Pre = pretest; Post = posttest.

<sup>1</sup>Analyses were conducted on difference scores (e.g., T2 – T1).

## Outcomes for the Children

The final set of analyses examined children's responses to the educators' story comprehension utterances. There were significant differences in the difference scores for responses to Level 1 and Level 3 utterances only,  $U=15.5, p=.042$  and  $U=15.0, p=.042$ , respectively. The children in the experimental group decreased their responses to Level 1 utterances and increased their responses to Level 3 utterances from pretest to posttest. Table 6 indicates that, at posttest, the children in the experimental group provided twice as many responses to Level 3 story comprehension utterances than the children in the control group.

## Program Gains and Maintenance - Individual Data

The individual profiles of the educators in the experimental group were examined to uncover patterns of program gains and maintenance of these gains at follow-up (i.e., 9 months following the posttest). The posttest and follow-up data for three key variables are displayed in Table 7. A gain was arbitrarily defined as an increase over the pretest score by at least 10% (or an increase of at least two print/sound references). Four of the eight educators made gains in their use of Levels 3 and 4 story comprehension utterances from pretest to posttest. However, only two of these educators (IDs 5 and 9) maintained these gains at follow-up. Four educators made pretest – posttest gains in their use of print/sound references; however, none of them maintained these gains. Finally, in terms of narrative models, three educators demonstrated gains from

**Table 6**

*Means and Standard Deviations for the Frequency of Children's Responses to the Educators' Story Comprehension Utterances*

Variable		Experimental Group Mean (SD)	Control Group Mean (SD)	U and p values <sup>1</sup> (one-tailed)
# Responses to SC Level 1	Pre	30.1 (17.0)	15.0 (11.7)	
	Post	18.6 (9.0)	16.8 (5.4)	$U = 15.5, p = .042$
# Responses to SC Level 2	Pre	3.4 (2.6)	2.0 (1.1)	
	Post	5.6 (5.3)	4.4 (5.0)	$U = 31.5, p = .480$
# Responses to SC Level 3	Pre	18.4 (6.8)	15.1 (8.9)	
	Post	27.6 (13.9)	13.4 (7.9)	$U = 15.0, p = .042$
# Responses to SC Level 4	Pre	3.6 (3.7)	1.6 (1.8)	
	Post	3.9 (3.3)	2.8 (2.9)	$U = 23.0, p = .191$

Note: Pre = pretest; Post = posttest; SC = story comprehension utterances at Levels 1, 2, 3, and 4. The frequency of responses was based on the total number of responses to each level of story comprehension utterances (i.e., Level 1, 2, 3, or 4).

<sup>1</sup>Analyses were conducted on difference scores (e.g., T2 – T1).

pretest to posttest and two of them (IDs 2 and 5) maintained these gains at follow-up. Taken together, it appears that educators did not maintain the gains they made in the specific measures examined in the experimental group.

## Discussion

The results of this exploratory study indicate that, following intervention, the educators in the experimental program (a) adopted story comprehension strategies designed to promote a high level of abstraction and (b) used more action-related utterances during interactive book reading relative to a control group. These findings extend the results of a previous study (Girolametto et al., 2003) in which the same educators increased the overall amount of conversational talk, waited for children to initiate, and encouraged dialogue during the storybook reading. The current results confirm that, in comparison to a control group, the quality of the educators' utterances also improved as a result of their participation in an in-service education program.

One explanation for the selective increase in Level 3 utterances may be due to their age-appropriate content. These utterances integrate children's life experiences into conversations about the story, involve them in making judgments about story events, and help them express world knowledge related to the story. In contrast, it is possible that Level 4 utterances did not increase because they were above the developmental level of some of the preschool-aged children in the experimental group, which ranged from 20 months to 57 months of age. Level 4 utterances encourage children to make hypothetical predictions,

problem-solve, and explain concepts and may have been too difficult for children under 36 months of age. For example, in a study by van Kleeck et al. (van Kleeck et al., 1997), in which parents used Level 4 utterances more frequently, the children were all above 3 years of age (i.e., between 42 and 49 months). In addition, small group interactions in child care centres may elicit different patterns of interaction than dyadic book reading, in which adults can more finely tune their language to the children's competencies.

The changes in educators' use of Level 3 story comprehension utterances were accompanied by an increase in the children's responses to Level 3 utterances during interactive story reading. These responses included content that was at a higher level of abstraction (i.e., they took the character's perspective, made judgments, related personal experiences connected to the story, or compared similarities and differences). The findings for children are a positive indication that with in-service education educators can increase the overall frequency of children's responses to abstract language relative to a control group. From a practical perspective, this information may be a powerful motivator for supervisors of child care centres to promote in-service education and for the educators themselves to adopt and maintain program strategies. From a theoretical perspective, the findings reported in this study concerning increases in the frequency of children's Level 3 utterances are promising. Social interactionist theories of language acquisition posit that increased language productivity may facilitate language development by providing more occasions to practice language forms and receive feedback on communicative attempts (Bohannon & Bonvillian,

**Table 7**

*Individual Pretest, Posttest and Follow-up Values for educators in the experimental group on measures of early literacy.*

ID	Time	SC Utterances Levels 3 & 4	# Print/Sound References <sup>1</sup>	% Narrative Models
No Posttest Gains or Maintenance				
1	Pre	9%	0	53%
	Post	8%	0	n/a <sup>2</sup>
	F-up	18%	0	54%
Posttest Gains in One or Two Areas with No Maintenance				
4	Pre	18%	0	44%
	Post	16%	2 +	50%
	F-up	17%	0	38%
7 <sup>3</sup>	Pre	21%	2	46%
	Post	35% +	0	43%
	F-up	n/a	n/a	n/a
3	Pre	17%	0	61%
	Post	34% +	4 +	42%
	F-up	21%	0	44%
8	Pre	34%	0	37%
	Post	22%	7 +	51% +
	F-up	37%	0	46
Posttest Gains in One or Two Areas with Maintenance in at Least One Area				
5	Pre	20%	4	50%
	Post	49% +	0	66% +
	F-up	40% +	0	66% +
2	Pre	18%	10	22%
	Post	28% +	4	49% +
	F-up	24%	1	36% +
9	Pre	24%	0	34%
	Post	44% +	1	39%
	F-up	46% +	0	52%

Note: Pre = pretest; Post = posttest; F-up = follow-up test. Change was defined as a gain of 10% in Story Comprehension Utterances at Levels 3 & 4 and in Narrative Models; or by at least 2 occurrences of Print/Sound References. Maintenance was defined as a gain of at least 10% relative to the pretest score.

<sup>1</sup> Print/sound references includes print concepts, sound awareness, word reading, and form segmentation.

<sup>2</sup> This participant did not read a complete story during the posttest.

<sup>3</sup> This participant relocated and did not participate in the follow-up test.

1997). The use of abstract language has been associated with better abstract language skills and story comprehension abilities in the school years (Dickinson & Tabors, 2001; van Kleeck et al., 1997). Whether the frequency of abstract language use improves over time and facilitates story comprehension was not addressed by this study and needs to be assessed in future studies of this approach.

This study is the first to examine the effects of an interactive book reading intervention on narrative models. The data reveal that action utterances receive the most emphasis both prior to and following intervention. Following the intervention, the educators increased the number of narrative models that highlighted actions taken by the main character to resolve the problem. Educators may have emphasized actions because they are key concepts that are easy to relate to the children's everyday experiences. For example, in the case of *When the TV Broke* (Ziefert, 1989), educators asked the children what happened when their TV sets broke or what activities they liked to do when not watching TV. Thus, the concomitant increases in Level 3 utterances and action utterances were likely related. Future research is needed to determine whether adults' narrative models influence children's story productions, as the mechanism by which children acquire competency in narrative structure is unclear.

There were no differences between the two groups of educators in terms of verbal strategies that modelled print/sound references. Print/sound references included book reading concepts (e.g., "read", "write", "author", "illustrator"), word reading (e.g., "This word says *big*."), sound awareness (e.g., "this word starts with /t/") and form segmentation (pointing out letters or sounds in words). Previous studies have reported significant gains in this area following interventions that specifically target print/sound references (Justice & Ezell, 2000, 2002). The educators in this study may have avoided print/sound references because they tend to interrupt the flow of the story and detract from conversations on the story's topic. Alternatively, it is possible that the educators believed



the children in this study were too young to benefit from print/sound references. It may be valuable for consultants to stress the importance of print/sound referencing and provide examples of different references that may be conducted as pre-reading or post-reading activities (e.g., examining the words in the book's title, pointing out sounds in the main character's name, writing letters to the main character). The feasibility of these suggestions needs to be confirmed by future studies that survey educators' knowledge of and attitudes toward early literacy in pre-school environments.

Unfortunately, the follow-up findings indicated that the educators in the experimental group did not maintain the gains they had made in story comprehension and narrative structure models over the 9-month follow-up period. It must be noted that the follow-up observation was conducted with a new group of children, which may have affected the educators' ability to generalize their new skills. Nonetheless, the finding that educators did not maintain gains over a follow-up period has been reported by other intervention studies conducted in child care centres (Girolametto, Weitzman, & Greenberg, 2004; Whitehurst, Epstein et al., 1994). This suggests that additional booster sessions or further training may be required to help educators maintain their gains over time. Alternative models of in-service education, such as a collaborative model in which educators and speech-language pathologists work side-by-side, may more effectively integrate early literacy instruction into preschool classrooms (e.g., Justice & Kaderavek, 2004; Kaderavek & Justice, 2004).

Several limitations must be noted in interpreting the findings of this study. First, all educators in this study had diplomas in early childhood education, elected to participate in the training program, and were supported in this endeavour by their supervisors. Thus, the outcomes of this study may not reflect the gains that might be made by child care assistants or other untrained educators. A second limitation is that the educators in the experimental group were older and more experienced. These educators may have incorporated the suggested changes but then settled back into habitual routines of story reading. Future ethnographic studies may contribute to our understanding of how background, experience, education, and attitudinal variables of educators may interact with in-service training. A third limitation of the present study is that a small number of educators were observed in a group situation that had a restricted number of children. Moreover, the assignment of educators and children to experimental and control groups was not entirely random. Replication involving random assignment, more educators, larger groups of children, and diverse literacy activities is needed to construct a complete picture of the potential effects of the in-service education on early childhood educators' language input.

This study yields important implications for speech-language pathologists and literacy consultants who consult to early childhood settings. First, educators may be counselled about the value of using utterances at higher levels of abstraction in discussing stories with young

children. Asking questions that invite children to think and imagine is a strategy that may require additional emphasis during story reading as the majority of story talk utterances used in this study reflected low levels of abstraction. Second, educators may be counselled to increase the saliency and frequency of core aspects of narrative structure other than action, such as problem statements and resolutions. This study did not evaluate children's uptake of the incidental models of narrative structure that educators provided during conversations about the story. Future research needs to examine the impact on children's narrative productions. Third, the lack of maintenance of the in-service education strategies between posttest and follow-up indicates the need to follow individual educators more closely in order to identify those who require additional coaching and feedback to help them use these strategies. Research is needed to identify alternative models of consultation that may provide more durable results. Finally, it may be important to discuss the individual's underlying beliefs and knowledge about early literacy to provide the consultant with insight about individualizing the in-service training to meet the learner's needs.

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## Appendix

### Content of the Session on Sharing Books

#### I. Strategies for Building Story Comprehension

- (a) Observe children's reactions to books, wait for them to initiate, and follow their lead.
- (b) Encourage children to make sense of the book by relating it to their experiences.
- (c) Extend the story by asking children to predict, imagine, or project themselves into the story events (e.g., wonder aloud to promote prediction).
- (d) Ask children for an emotional response to the story.

#### II. Strategies for Increasing Print and Sound References

- (a) Point out print in the environment and in books (e.g., first words in a story, strange-looking words, long words, and short words).
- (b) Encourage children to figure out the meaning of novel words from the pictures and context.
- (c) Point out syllables and sounds in words (e.g., "My name is so long. Listen: 'Chris- ti- na'" or "Cat. Cut. These two words both start with /k/").

#### C. Strategies for Promoting Narrative Structure Awareness

- (a) Choose more complex stories that introduce setting and main characters, problem, response, outcome of the attempt, and reaction from the main characters.
- (b) Explain the story's events and the character's actions.

## ■ Phonological Awareness Intervention for Preschoolers with Speech and Sound Disorders

## ■ Intervention pour améliorer la conscience phonologique chez les enfants d'âge préscolaire ayant des troubles de la parole et de la perception des sons

Meghann Grawburg  
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### Abstract

Phonological awareness (PA) development is related to the development of decoding and reading skills. PA can be measured in young children before the commencement of school and formal reading instruction. Compared to normally developing children, these children with speech sound disorders (SSD) are at increased risk for delayed PA. Children with poor PA, who are at-risk for developing poor decoding skills, can be identified and treated before poor PA negatively impacts their future literacy development. This intervention program was developed as a form of early intervention for preschool-aged children with delayed PA. Ten 4-year-old children with poor PA and SSD participated in the study. The program consisted of eight sessions, which included both a PA and a speech perception component. The PA portion focused on matching words that shared either the same onset or rime. The speech perception portion focused on the identification of correctly articulated or misarticulated words containing the target onset. Participants made significant improvements in their PA, raising their post-treatment test scores to the level of normally developing children. The unique and important role of speech-language pathologists in the stimulation of PA in children prior to the commencement of formal schooling is highlighted.

### Abrégé

La conscience phonologique est liée au perfectionnement des aptitudes de décodage et de lecture. Il est possible de mesurer cette conscience chez les jeunes enfants avant le début de l'école et de l'apprentissage officiel de la lecture. Par comparaison avec les enfants qui se développent normalement, les enfants ayant des troubles de la parole et de la perception des sons ont un risque accru d'accuser un retard de la conscience phonologique. Il est possible de repérer les enfants qui ont une mauvaise conscience phonologique (et qui risquent par conséquent d'acquérir de faibles aptitudes de décodage), et ce, avant que ce trouble n'affecte leur capacité d'apprendre à lire et à écrire. Ce programme a été élaboré pour servir de méthode d'intervention précoce auprès des enfants d'âge préscolaire accusant un retard de la conscience phonologique. Dix enfants de 4 ans accusant un retard de la conscience phonologique et ayant des troubles de la parole et de la perception des sons ont participé à l'étude. Le programme comportait huit séances, qui comprenaient chacune un volet sur la conscience phonologique et un autre sur la perception de la parole. Le premier volet demandait aux enfants de jumeler les mots qui partagent la même attaque ou la même rime. Le second leur demandait d'identifier les mots contenant l'attaque cible qui sont bien articulés et ceux qui ne le sont pas. Les participants ont considérablement amélioré leur conscience phonologique, les résultats de leur test après le traitement ayant augmenté pour atteindre le même niveau que ceux d'enfants qui se développent normalement. Cet article fait ressortir le rôle unique et important des orthophonistes dans la stimulation de la conscience phonologique chez les enfants avant qu'ils ne commencent officiellement l'école.

**Key Words:** phonological awareness intervention, preschoolers, phonological disorders, speech sound disorders

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## What is Phonological Awareness?

**P**honological awareness (PA) is the explicit knowledge that spoken words can be segmented into smaller parts. Words can be broken down into syllables, which can be divided into onsets and rimes, and divided further into individual phonemes. PA is important because of the predictive nature of the relationship between PA and prospective decoding and reading skills (Bradley & Bryant, 1983).

## Phonological Awareness in Preschoolers

A variety of techniques have been used to measure PA, depending on the age and abilities of the children being tested. Test targets also vary with age, illustrating the developmental progression of PA, beginning with sensitivity to larger phonological units, such as words and syllables, progressing to smaller units, such as onsets and rimes, and finally, to phonemes (Anthony, Lonigan, Burgess, Driscoll, Phillips, & Cantor, 2002).

PA is measured in preschoolers as young as 3 years old using simple tasks. For example, Chaney (1992) demonstrated that 3-year-old children successfully performed word segmentation (i.e., segmenting the words *balloontreeshirt*), phonological play involving purposeful mispronunciation and substitution of words, and judgment and correction of phonemes (i.e., shown a picture of a *pie* and asked if it was a “*sie*”). Other techniques commonly used to measure PA in preschoolers include: clapping for each syllable in a word; identifying which word, from a group of words, does not belong (e.g., *cat, hat, soup, mat*); identifying the first sound of a word; or to judge whether or not two words “start the same”. By engaging children in these types of tasks, Burt, Holm, and Dodd (1999) determined that 4-year-olds have the ability to segment words into syllables and that they demonstrate an awareness of onset and rime.

Since PA can be measured in young children, delays can be identified early. However, limited time and resources may constrain the number of children that can realistically be tested. Therefore, it is necessary to identify those children who are most at risk for delayed PA and at greatest risk for future reading difficulties through the use of simple yet effective testing.

## Phonological Awareness and Speech Sound Disorders

Children with speech sound disorders (SSD) have been observed to achieve significantly lower scores on tests of PA than children with typical speech skills. The risk of PA delay is greatest when the SSD persists into school age and when there is a concomitant language delay (Nathan, Stackhouse, Goulondris, & Snowling, 2004). However, difficulties with PA have been observed even when the child's speech normalized during the preschool period (Raitano, Pennington, Tunick, Boada, & Shriberg, 2004) and in the absence of concomitant language delay (Rvachew, Ohberg, Grawburg, & Heyding, 2003). The association between speech development and PA may be an indirect one. If the

relationship between these variables was direct, one would expect the severity of the SSD to predict the severity of the PA delay; however, this is not the case (Larrivee & Catts, 1999; Rvachew, et al., 2003). Furthermore, speech therapy alone has not been shown to improve PA (e.g., Gillon, 2000) and PA interventions that focus on articulatory movements do not lead to superior outcomes relative to approaches that focus on listening to sounds (Castiglioni-Spalten, & Ehri, 2003; Wise, Ring, & Olsen, 1999). In order to treat PA, it is necessary to understand the complex relationship between speech production skills and PA, and the potential contribution of other variables.

## Phonological Awareness and Speech Perception

Speech perception has also been found to be related to the development of PA. Children's ability to identify different tokens of speech sounds as belonging to one speech sound category (e.g., “s”) or another (e.g., “sh”) improves with age as children gain experience with their native language and learn to attend to and integrate the acoustic features (Hazan & Barrett, 2000; Nitttrouer, 2002).

Children with relatively poor speech perception skills have greater difficulty with PA tasks (Nitttrouer, 1996). Rvachew et al. (2003) found that children with SSD and delayed PA also have significantly poorer speech perception abilities than normally developing children. They also found that good speech perception skills were necessary but not sufficient for the development of PA, illustrating the indirect nature of the relationship between these variables.

It is likely that measures of speech perception will prove useful for identifying children at risk for delayed PA given the demonstrated relationship between these two variables. Additionally, since poor speech perception is associated with poor PA, remediation of speech perception skills may be an important element in remediation of PA deficits. However, the full benefit of identifying children with delayed PA can be realized only if there is effective remediation available.

## Other Phonological Awareness Intervention Programs

PA intervention has been shown to be successful for preschoolers and prereaders with SSD (Gillon, 2000; Hesketh, Adams, Nightingale, & Hall, 2000; Roth, Troia, Worthington, & Dow, 2002; van Kleeck, Gillam, & McFadden, 1998). These programs all targeted children with SSD, likely because of their susceptibility to delayed PA, but none of these programs implemented speech perception testing or teaching. Variability existed in the duration of these programs, ranging from 9 to 20 hours, and in the type and number of skills targeted, including identification, matching, and manipulation of syllables, onset, rime, and phonemes. For the most part, the design of these programs was not consistent with Ehri et al.'s (2001) recommendations for conducting PA intervention for 5 to 18 hours, while focusing on one or two specific PA skills.

## Summary

The development of PA during the preschool period is related to the normal development of speech production and speech perception skills. Preschool aged children who have difficulty with the perception and production of speech sounds may demonstrate delayed development of PA skills and thus are at risk for subsequent deficits in reading ability. Intervention programs have been successfully developed to improve PA skills in children. However, none of these programs combined speech perception and PA intervention to improve PA skills of preschoolers with SSD. The purpose of this project was to determine the effectiveness of an intervention program in which speech perception and PA were directly targeted in 4- and 5-year-old preschoolers with SSD.

## Method

### Participants

To determine the effectiveness of the intervention program, a group of preschool children who received treatment (Treated-SSD group) was compared to two non-experimental comparison groups who did not undergo treatment. One comparison group included children with SSD who did not participate in the PA intervention (Untreated-SSD). The other consisted of children with normal speech, who also did not participate in the intervention program (Untreated-Typical).

Children with SSD disorders were referred by speech-language pathologists (S-LPs) working at a large children's hospital. The existence of SSD was confirmed with a score below the 16th percentile on the Goldman-Fristoe Test of Articulation-Second Edition (GFTA-2; Goldman & Fristoe, 2000). SSD describes delayed development of age-appropriate speech sounds impacting upon overall speech intelligibility, not caused by structural or functional issues or a known syndrome. The nature of the speech disorder (i.e., phonetic or phonological) was not evaluated. Clinicians were asked not to refer children with speech sound disorders in cases of significant structural problems, soft motor signs (i.e., excessive drooling), and evident dysarthria. Hospital records indicated that all children had normal hearing and oral-motor structure and function and no other known concomitant delays or disabilities.

The Untreated-Typical group was recruited from suburban preschool programs. Normal hearing and oral-motor skills was assumed for the Untreated-

Typical comparison group because these children achieved age-appropriate scores on measures of speech production, speech perception, and receptive vocabulary. All of the children in all three groups spoke English as their first language.

Table 1 displays the participant characteristics by group. Each group was composed of 10 preschool children. Frequency matching was used to ensure the groups were similar with respect to age, socio-economic status, and receptive vocabulary. Socioeconomic status was based on the Blishen score (Blishen, Carroll, & Moore, 1987) and receptive vocabulary was based on scores from the Peabody Picture Vocabulary Test-Third edition (PPVT-III; Dunn & Dunn, 1997). The groups with SSD were also equated for severity of their SSD, as measured by the GFTA. All testing and intervention was conducted by the first author, who was at the time a graduate student in speech-language pathology.

### Design

All three groups participated in an initial assessment to determine their receptive language and early literacy skills and their baseline PA, speech production, and speech perception skills. Within one week of the initial assessment, the Treated-SSD group commenced participation in eight weekly PA intervention sessions. Following the intervention sessions, the Treated-SSD group was reassessed in the areas of PA, speech production, and speech perception, as these were the outcome measures for determining the effectiveness of the intervention program.

## Procedure

### Assessment

The initial assessments took approximately 60 to 90 minutes. The following areas were measured for all groups in order to further describe the participant characteristics and measure the degree of homogeneity of the groups.

**Table 1**

*Mean (and standard deviation) and Analysis of Variance of Participant Characteristics by Group*

Participant Characteristics	Untreated-SSD	Treated-SSD	Untreated-Typical	F
SES	50.80(8.48)	51.3(7.06)	58.2(11.35)	2.05
Age	57.6(3.1)	56.7(3.3)	56.7(4.19)	.21
PPVT	103.2(9.39)	109.1(11.66)	107.9(10.25)	.89
GFTA	6.4(4.27)	5.4(4.74)	41.6(18.96)	31.87**

*Note.* SES = Socio-economic status (Blishen Score, Blishen, Carroll, & Moore, 1987); Age is in months; PPVT = Peabody Picture Vocabulary Test-Third Edition, standard score; GFTA-2 = Goldman-Fristoe Test of Articulation-Second Edition, percentile rank.

\*\*The mean difference is significant at the .01 level.

**Receptive Vocabulary Assessment.** Receptive vocabulary was assessed using the PPVT-III (Dunn & Dunn, 1997).

**Early Literacy Assessment.** The children's early literacy and prereading skills were assessed using the Early Literacy Assessment, adapted from Johns (1997). The test was composed of three subtests. The first subtest, alphabet knowledge, involved asking the child to name uppercase and lowercase letters. In the second subtest, literacy knowledge, the child was shown a book and asked questions about functional reading skills (e.g., "Where do you start reading?") and questions about book structure (e.g., "Where is the title?"). The third subtest, basic word knowledge, involved asking the child to read sight words (e.g., *a, the, was*).

**Standardized Articulation Assessment.** Speech production was assessed using the GFTA-2 (Goldman & Fristoe, 2000).

The following tests were administered to all groups during the initial assessment and to the Treated-SSD group post-treatment in order to measure any pre-treatment to post-treatment changes that may have occurred in these areas for children participating in the intervention program.

**Phonological Awareness Assessment.** PA was assessed using a test developed by Bird, Bishop, & Freeman (1995). The three components of this test included rime matching, onset matching, and onset segmentation. Each section included several training items, during which corrective feedback was given when necessary. No corrective feedback was given for test items. Split-half reliability for this test has been determined to be .98 (using an odd-even split) based on 87 prior administrations in which total scores ranged from 0 to 100 percent correct.

**Speech Perception Assessment.** The Speech Assessment and Interactive Learning System (SAILS; Avaaz Innovations, 1994) was used to assess speech perception. The computer program contrasts correct and incorrect productions of the sounds /l/, /k/, /r/, and /s/ in the word initial position. For example, half of the stimuli from each block were articulated correctly, e.g., *cat* → [kæt], while the other half were articulated incorrectly, e.g., *cat* → [tæt]. Children were required to point to a picture of the item when it was spoken in the correct way or a picture of an X when it was mispronounced. Training items preceded test items to ensure task comprehension.

**Articulation Probe.** The articulation probe was administered to children in the Treated-SSD group prior to the first treatment session. The articulation probe included 64 items which targeted the sounds /k/, /l/, /r/, /s/, /f/, /θ/ through picture labelling and sentence repetition. These sounds were selected as targets as they are commonly misarticulated. The articulation probe was administered in order to measure any change in articulation that occurred over the treatment period.

## Intervention

Each child in the Treated-SSD group participated in eight weekly PA intervention sessions, composed of four parts: (1) rime matching, (2) speech perception training, (3) onset matching, and (4) homework and review. Each part was targeted for 10 to 15 minutes per session, depending on each child's pace. The same number of responses was elicited for each participant. Therefore, each session took between 45 minutes and 1 hour, for a total of 6 to 8 hours of intervention. Homework assignments took 5 to 10 minutes to complete, resulting in additional practice time of 40 to 80 minutes over the course of the intervention period.

The weekly target items progressed from least to most difficult, encompassing both articulatory difficulty and the difficulty of the target sound contrasts. For example, the first onset targeted was /m/ which is early developing and rarely misarticulated while the remaining onset targets, /s/ and /k/, are more commonly misarticulated by young children. During the first session /m/ was contrasted with /t/, a contrast differing in place, manner, and voicing. During the second session, /m/ was contrasted with /p/, a contrast differing in only manner and voicing.

**Rime Matching.** Rime matching tasks involved sorting pictures of items into objects with the same rime. For instance, in the second session, the picture cards (e.g., *fan, ran, men, ten*) were sorted into either a garbage can or a plastic hen. Various techniques were used to make the rime more salient. For example, previously sorted items were re-stated or similarities were described. For example, "They have the same sound at the end." and "Those words both end with *en*."

**Speech Perception Training.** Each speech perception lesson targeted the same word-initial sound as the onset matching activity for the session using SAILS. The sound /m/ was targeted first for two sessions, followed by /s/ and /k/ for three consecutive sessions each. Children pointed to pictures on a computer screen corresponding to correctly articulated or misarticulated words containing the target sounds listed above (e.g., *mitt* for /m/, *Sue* for /s/, and *cat* for /k/). Corrective feedback was provided. In the case of *mitt*, the experimenter might say, "No, that word did not sound like *mitt*. Listen again." When a mistake was made, the word was replayed and the child was given another chance to respond.

**Onset Matching.** A variety of different onset matching activities were implemented, including sorting and matching activities based on similar word onset (i.e., memory, bingo, board games, etc.). Corrective feedback was provided in the form of repetition, emphasis, listing of previously sorted items, such as "*mitt, mop, man, moon, milk*" and task review. For example: "He likes to eat things that begin with the sound /m/." "*Mmmop* begins with /m/ so he likes to eat the mop." and "Listen, *mmmop* has the /m/ sound at the beginning."

**Homework and review.** Homework assignments included review of the target onset and rime for each week. Homework activities included rime matching and onset



identification tasks. Parents were responsible for supervising completion of homework; then assignments were reviewed by the examiner at the beginning of the next session.

### Outcome Measures Reassessment

Only children in the Treated-SSD group were reassessed, following the completion of the PA intervention program. The reassessment included administration of the phonological awareness test, the articulation probe, and the SAILS test, which served as the outcome measures for the study.

## Results

### Pre-Treatment Analyses

The results of the ANOVA revealed a significant difference in GFTA-2 percentile rank scores between the three groups,  $F(2, 27) = 31.87, p < .000$ . Tukey's post-hoc analyses indicated that the Untreated-Typical group performed significantly better than both groups of children with SSD, while the groups of children with SSD did not differ significantly. Confirmation of appropriate group assignment to SSD versus Typical groups was achieved on the basis of significant differences in speech production despite overall homogeneity in other measures.

The ANOVA also revealed significant differences between the three groups on the PA test,  $F(2, 27) = 8.357, p < .001$ . The average PA test score for normally developing 4-year-olds is 21 and the lower limit of average performance is approximately 15 (Rvachew et al., 2003). Tukey's post-hoc comparisons indicated that the Untreated-Typical group performed significantly better on the PA test than either of the SSD groups with a mean score of 18.8 and scores ranging from 10 to 24. The Treated-SSD group had a mean score of 12.8 with scores ranging from 8 to 19. The Untreated-SSD group had a mean score of 13.0 with a range of 8 to 18. The Treated-SSD group and the Untreated-SSD group did not differ significantly in PA. These findings indicate that these two groups of children with SSDs had significantly lower PA than normally developing children.

### Post-Treatment Analyses

The pre-treatment and post-treatment results for the Treated-SSD group are displayed in Figure 1. A paired samples t-test was used to determine if the Treated-SSD group's PA had changed significantly as a result of treatment. The increase in PA test score from 12.8 to 18.7 was statistically significant,  $t(9) = -3.93, p < .003$ .

Speech perception and speech production were also reassessed following participation in the treatment program. The mean scores on The Speech Assessment and Interactive Learning System increased significantly from 69.9% to 80.3%,  $t(9) = -3.16, p < .011$ . The mean scores on the articulation probe increased from 21.6 to 25.9. This change was not significant. These results indicate that the intervention program was successful in making a significant improvement in both skills targeted, PA and speech perception, compared to the pre-treatment levels.

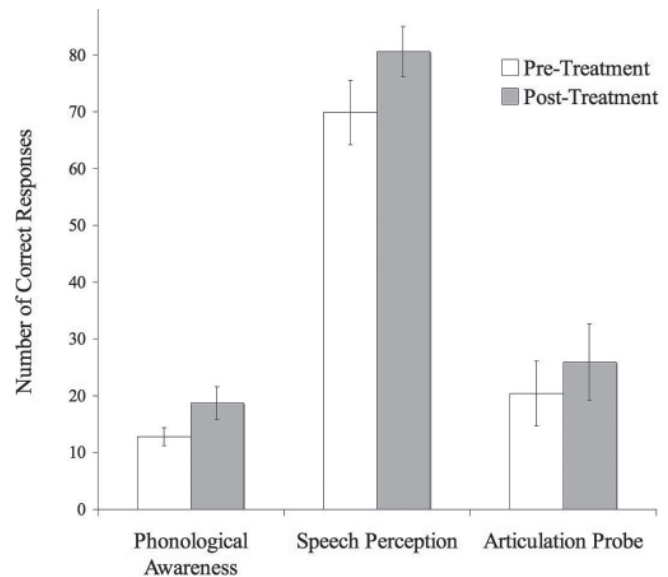


Figure 1. Mean pre-treatment and post-treatment scores for the treated-SSD group on measures of phonological awareness (PA raw score), speech perception (SAILS percent correct), and speech production skills (articulation probe raw score). Standard error bars are shown. The mean difference for phonological awareness is significant at the 0.01 level. For speech perception, the mean difference is significant at the 0.01 level. The mean difference in articulation is not significant.

Articulation skills, as measured by the articulation probe, did not change significantly.

### Post-Treatment Group Comparisons

The Untreated-SSD and Untreated-Typical comparison groups participated in only the initial assessments and not the post-treatment measures. Therefore, post-treatment scores from the Treated-SSD group were compared to initial assessment scores from both comparison groups. An ANOVA confirmed that there were significant differences between the groups on the PA test,  $F(2, 27) = 5.064, p < .014$ . A Tukey's post-hoc analysis indicated that the Treated-SSD group performed significantly better on the PA posttest than the Untreated-SSD group performed on the initial PA test. The difference between the post-treatment test scores of the Treated-SSD group and the initial scores of the Untreated-Typical group were not statistically significant. Figure 2 illustrates these results.

The ANOVA also indicated that there were significant differences between groups on the Speech Assessment and Interactive Learning System,  $F(2, 27) = 6.313, p < .006$ . A Tukey's post-hoc analysis indicated that the post-treatment test scores of the Treated-SSD and initial scores of the Untreated-Typical group had significantly higher speech perception scores than the Untreated-SSD group. As in



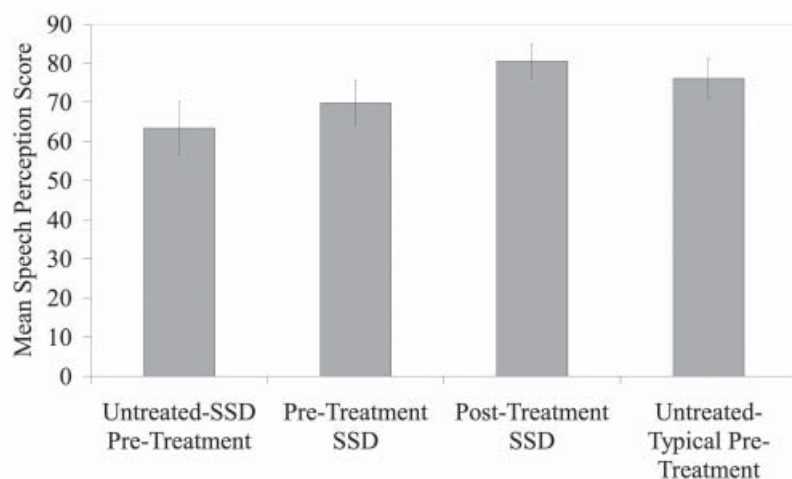


Figure 2. Mean raw scores on the phonological awareness test for the Untreated-SSD group, the Treated-SSD group Pre-Treatment and Post-Treatment, and the Untreated-Typical group. Standard error bars are shown.

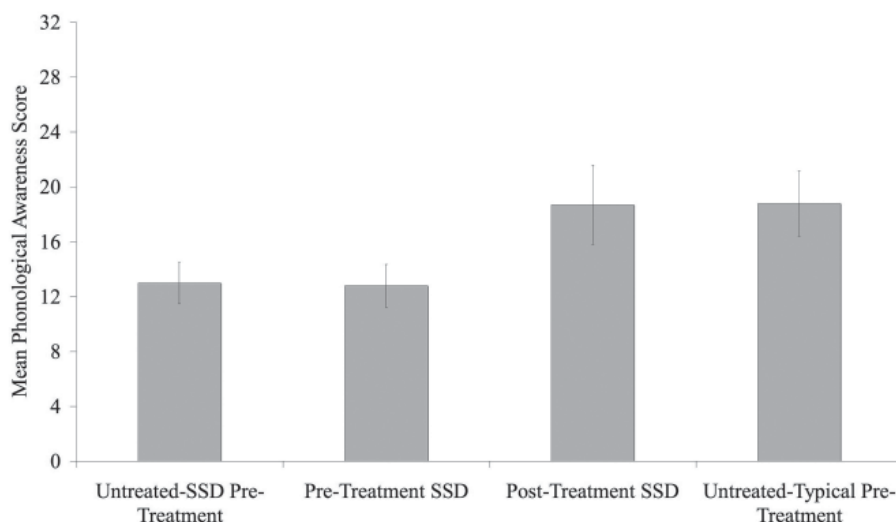


Figure 3. Mean raw scores on the Speech Assessment and Interactive Learning System for the Untreated-SSD group, the Treated-SSD group prior to treatment, the Treated-SSD after treatment, and the Untreated-Typical group. Standard error bars are shown.

the initial assessment, differences in speech perception scores between the Treated-SSD and Untreated-Typical groups were not significant. These results are displayed in Figure 3.

## Discussion

### The Success of the Program

In this study, 10 children with SSD participated in a PA intervention program. At study onset, both groups of children with SSD had significantly lower PA than normally

developing children. After participating in the PA intervention, the mean PA of the treated group increased significantly from the pre-treatment level of other children with SSD to the level of the group mean of normally developing children. Though not all intervention participants ended up with PA skills within the average range, skills for the group moved in the direction of normal functioning. These results demonstrate that preschoolers with SSD can benefit from PA intervention.

Other researchers have also shown that PA intervention programs are successful in increasing the PA of prereaders with SSD. The studies by Gillon (2000), Hesketh et al. (2000), Roth et al. (2002), and van Kleeck et al. (1998) targeted PA in prereaders with SSD. However, the average length of intervention in these investigations was 13 hours. The children in the present study were able to make significant gains in PA in substantially less time. Bus and Ijzendoorn (1999) found that the duration of treatment was not related to the effect size, thus encouraging researchers to continue working to determine how much treatment is enough to normalize PA, while conserving valuable time and resources. Thus, this study is important in demonstrating that improvements in PA are possible with less intervention time than has been previously demonstrated.

The present study is unique in its combination of characteristics including targeting preschool-aged children with SSD, teaching PA through rhyme and onset matching activities, and the incorporation of speech perception activities. Other researchers have successfully improved PA in the absence of a speech perception component, even for children with SSD (e.g., Gillon, 2000; Roth, et al. 2002). Due to the demonstrated connection between PA and speech perception, it was hypothesized that the inclusion of speech perception training would improve the ability of the children in this study to benefit from PA intervention. The design of the study did not permit the isolation of the impact of speech perception training on improvements in PA, but this is an important area for future investigation.

### Limitations of the Research Design

Despite the significant improvement in PA achieved through the PA intervention program, there are limitations to the study design, including a small number of participants and threats to internal and external validity. Given the small number of participants it is impossible to predict

the success of this intervention in the larger population of children with SSD.

Random assignment and the use of equivalent control groups are two components of an experimental study design which minimize threats to internal and external validity in order to ensure that the findings are the result of a true relationship between the independent and dependent variables. The quasi-experimental nature of this study design lacked both of these characteristics. Resulting threats to internal validity included maturation, testing effects, and selection bias; therefore, it is not certain that the PA intervention program alone is responsible for the increased PA scores. Threats to external validity included the Hawthorne effect, novelty effects, history, and teacher effects, bringing into question the effectiveness of the treatment program.

However, since this study was not a randomized clinical trial and occurred in a more clinically realistic fashion, some threats to external validity typically encountered when running randomized clinical trials were avoided. Randomized clinical trials run the risk of being ungeneralizable to the target population due to the irregular setting, exceptional type of treatment, or atypical participants. In this study, the clinical treatment style used is likely to be replicated by other professionals.

Additional support for the validity of these results come from other PA intervention programs which were implemented using quasi-experimental designs that lack random assignment of participants and have non-equivalent groups (e.g., Ehri et al., 2001; Lundberg, Frost, & Petersen, 1988). Ehri et al. (2001) demonstrated that poor study design did not necessarily lead to inflated effect size.

### Future Research Directions

In order to control for threats to internal and external validity resulting from the quasi-experimental design of the current study, future studies should utilize a randomized clinical trial including a PA intervention group with and without speech perception training, an untreated SSD group and an untreated typically developing group. After an initial assessment, children with SSD should be matched on age, SES, PA, and receptive vocabulary and randomly assigned to one of the three conditions for children with SSD. After the completion of the intervention program or passage of the equivalent amount of time, children from all four conditions should participate in the post-treatment assessment thereby isolating the effects of PA training, speech perception training, or some combination, on improved PA. In addition, it may be desirable to further examine the type of SSD when defining groups (i.e., SSD with phonetic versus phonological origins).

### Speech-Language Pathologist Involvement in Early Intervention

In order for early intervention to be successful, at-risk children must be identified and intervention implemented effectively and promptly. S-LPs have a crucial role in the

identification and remediation of children who are at risk for future reading difficulties. Given their expertise in speech, language, and prereading skills, S-LPs are an important resource in both the identification and remediation of children with delayed PA. Young children referred to S-LPs often undergo a thorough assessment of their speech and language abilities. This is an opportune time for the S-LP to conduct a PA screening as it would be a natural addition to assessment batteries. PA intervention should not necessarily occur in the absence of a screening or assessment since, even though children with SSD are more likely to have below average PA than children with normally developing speech skills, it is not necessarily the case (Rvachew et al., 2003).

Generalization of the results of this study to other clinical settings is likely given that the treatment program was carried out in a clinical setting and that the program was practical in nature. Treatment changes were shown with children with SSD when both PA and speech perception components were targeted directly.

### Conclusion

This intervention program was successful in improving the PA skills of children with SSD in less time than has previously shown in other studies, potentially decreasing their risk of future decoding difficulties. This study showed that PA training, which incorporated both PA and speech perception training was successful in improving PA of children with SSD, but was not designed to isolate the unique contributions of each component. Future study is needed to determine which components are essential to bringing about changes within the shortest period of time.

Participants in this intervention program are also enrolled in a longitudinal study, which will reassess all the pre-treatment measures, with the addition of decoding and reading measures, for 2 years following the treatment program. Therefore, the impact of the intervention on prospective PA, decoding, and reading skills will be measured. Additionally, a computer-based PA intervention program is currently in development utilizing many of the same design principles as this intervention program, including a focus on onset and rime matching and speech perception.

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## ■ Les Inventaires MacArthur du développement de la communication: validité et données normatives préliminaires

## ■ MacArthur Communicative Development Inventories: Validity and Preliminary Normative Data

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### Abrégé

Peu d'études décrivent le développement du langage en français. Ainsi, peu d'outils d'évaluation du langage ont été développés. C'est pourquoi les *MacArthur Communicative Development Inventories* (Fenson et al., 1993), questionnaires aux parents, ont été traduits et adaptés en français québécois (Frank, Poulin-Dubois, & Trudeau, 1997; Trudeau, Frank, & Poulin-Dubois, 1997). L'Inventaire MacArthur est disponible en deux versions : Mots et Gestes (pour les 8 à 16 mois) et Mots et Énoncés (pour les 16 à 30 mois). Cet article vise à vérifier la validité de l'outil MacArthur en démontrant qu'il est sensible au développement. Des analyses de cohérence interne sont également présentées afin de montrer si les différentes sections du questionnaire sont corrélées entre elles. Les résultats sont discutés en lien avec les résultats obtenus dans d'autres langues, notamment l'anglais. L'échantillon est composé de 777 enfants âgés de 8 à 30 mois. Les participants (48,3 % de filles et 51,7 % de garçons) sont issus de toutes les régions du Québec. Le nombre de mots compris et le nombre de mots produits augmentent avec l'âge et il existe une grande variabilité interindividuelle pour ces deux variables. Les résultats obtenus quant au nombre de mots produits sont, de façon globale, semblables à ceux obtenus par Fenson et al., (1994) avec la version américaine, quoique légèrement moins élevés. On note à 17 mois l'émergence des combinaisons de mots, soit au moment où les enfants atteignent en moyenne un lexique expressif de 50 mots. La longueur moyenne des trois plus longs énoncés augmente également avec l'âge. Ces résultats laissent croire que les Inventaires MacArthur sont sensibles au développement du lexique et de la syntaxe et qu'ils pourront constituer des outils précieux pour le milieu orthophonique en permettant une première évaluation du langage d'un enfant.

### Abstract

Few studies have described language development in French. Thus, few language evaluation tools have been developed. This is why the *MacArthur Communicative Development Inventories* (Fenson et al., 1993), based on questionnaires to parents, were translated and adapted to Quebec French (Frank, Poulin-Dubois, & Trudeau, 1997; Trudeau, Frank, & Poulin-Dubois, 1997). The French adaptation of the MacArthur Inventory is available in two versions: Mots et Gestes [words and gestures] (for children 8 to 16 months) and Mots et Énoncés [words and sentences] (for children 16 to 30 months). This article seeks to check the validity of the French-Canadian MacArthur tool by demonstrating that it is sensitive to development. The article also contains internal coherence analyses designed to determine whether the different sections of the questionnaire correlate with each other. The findings are discussed in relation to the findings obtained in other languages, especially English. The sample consisted of 777 children aged 8 to 30 months. The participants (48.3% girls and 51.7% boys) were from all Quebec regions. The number of words understood and the number of words produced increased with age, and there existed great inter-individual variability for these two variables. The findings obtained with respect to the number of words produced were similar overall to those obtained by Fenson et al., (1994) with the American



version, although slightly lower. Word combinations emerged at 17 months, i.e. when the children reached an average active vocabulary of 50 words. The average length of the three longest sentences also increased with age. These findings suggest that the French MacArthur Inventories are sensitive to lexical and syntactic development and may constitute valuable speech-language pathology tools by facilitating initial assessment of a child's language.

**Mots clés :** langage, jeune enfant, questionnaire aux parents, évaluation, français québécois

L'identification des jeunes enfants à risque de développer un retard ou un trouble de langage représente un défi de plus en plus important pour la pratique orthophonique. En effet, dans un contexte où les ressources humaines et matérielles sont limitées, il est primordial d'identifier ces enfants le plus tôt possible, afin d'assurer une bonne distribution des services et de donner à ces enfants les meilleures chances pour poursuivre leur développement. Le gouvernement du Québec a d'ailleurs exprimé une volonté politique afin d'intervenir précocement pour prévenir les difficultés d'adaptation et de développement chez les enfants (Ministère de la Santé et des Services sociaux, 2002). L'Ordre des orthophonistes et audiologistes du Québec (OOAQ) prend en considération cette politique et cherche à orienter la pratique orthophonique en ce sens (OOAQ, 2002).

Or, les orthophonistes qui travaillent en français au Québec ne possèdent que très peu de moyens pour faciliter l'évaluation des enfants à risque (Trudeau, Frank, & Poulin-Dubois, 1999). En effet, peu de recherches ont jusqu'ici décrit le développement du langage en français, encore moins en contexte québécois. Conséquemment, peu d'outils d'évaluation ont été développés, ce qui rend le contexte clinique différent de ce qu'on retrouve en milieu anglophone. C'est dans cette optique que les *MacArthur Communicative Development Inventories* (Fenson et al., 1993) ont été traduits et adaptés en franco-québécois (Frank, Poulin-Dubois, & Trudeau, 1997; Trudeau, Frank, & Poulin-Dubois, 1997).

Les Inventaires MacArthur sont des questionnaires qui s'adressent aux parents et qui visent à obtenir des informations sur le langage de leur enfant. Les questionnaires aux parents sont des outils qui peuvent être très utiles pour obtenir un portrait de la communication de l'enfant au quotidien; les parents sont en effet ceux qui sont les mieux placés pour nous informer à ce sujet. Aussi, à l'opposé des tests formels, les questionnaires aux parents donnent un portrait plus naturel du comportement communicatif de l'enfant, portrait qui n'est pas influencé par le cadre officiel et plutôt artificiel du cabinet de l'orthophoniste. Et, en recensant les comportements habituels de l'enfant, ils fournissent une image plus globale que celle qui peut être obtenue par un échantillon de langage spontané. Dale,

Bates, Reznick, & Moriset (1989) ont jeté les bases pour l'élaboration de questionnaires aux parents en définissant les principes suivants :

1. Les questionnaires aux parents doivent se limiter à l'évaluation des comportements actuels ou récents, et non pas des comportements antérieurs;
2. Ils doivent se concentrer sur des comportements en émergence;
3. Une tâche de reconnaissance doit être utilisée, plutôt qu'une tâche de rappel libre;
4. On doit chercher à obtenir des exemples, des anecdotes afin de compléter l'information;
5. On doit prendre en considération le rapport coût/bénéfice entre l'efficacité et la validité (i.e. que la qualité des informations recueillies est souvent proportionnelle à la longueur du questionnaire).

Il faut également demeurer vigilant dans l'utilisation de tels questionnaires : un questionnaire complété par un parent ne doit pas constituer la seule source d'information sur laquelle baser des conclusions sur le développement langagier d'un enfant. Il ne devrait pas non plus servir d'outil unique pour comparer diverses populations socio-économiquement différentes, par exemple (Feldman, Dollaghan, Campbell, Kurs-Lasky, Janosky, & Paradise, 2000). Néanmoins, plusieurs études ont démontré la validité des questionnaires aux parents (Camaioni, Castelli, Longobardi, & Voltera, 1991; Dale et al., 1989; Klee, Carson, Gavin, Kent, & Reece, 1998; Rescorla & Alley, 2001). La validité de l'Inventaire MacArthur en particulier a bien été démontrée, tant avec des enfants à développement typique qu'avec des populations particulières, comme par exemple les enfants avec syndrome de Down ou fissure palatine (Charman, Drew, Baird, & Baird, 2003; Dale, 1991; Fenson et al., 1993; Miller, Sedey, & Miolo, 1995; Ring & Fenson, 2000; Scherer & D'Antonio, 1995; Thal, O'Hanlon, Clemmons, & Franlin, 1999). Des adaptations des Inventaires MacArthur ont été réalisées dans plusieurs langues : espagnol, hébreu, italien, islandais, pour n'en nommer que quelques unes. Le site Internet des Inventaires MacArthur recense les différentes versions ([www.sci.sdsu.edu/cdi/](http://www.sci.sdsu.edu/cdi/)). Les études de validité ayant été réalisées dans certaines de ces langues ont produit des résultats semblables à l'anglais en ce qui a trait à l'utilisation d'un tel outil pour obtenir un portrait adéquat du langage d'un enfant (Hamilton, Plunkett, & Schaffer, 2000; Kauschke & Hofmeister, 2002; Maital & Dromi, 1997; Thal, Jackson-Maldonado, & Acosta, 2000; Thodardottir & Ellis-Weismer, 1996).

La validité de la version franco-québécoise de l'inventaire a été explorée en parallèle à l'étude de normalisation toujours en cours. Les résultats préliminaires de la validité de la version Mots et Énoncés indiquent une bonne fidélité test-retest pour les différentes sections du questionnaire. Les analyses de validité concordante et de validité prédictive, quoique très préliminaires, indiquent que la version québécoise des Inventaires MacArthur est un outil valide (Breault, 2004).

Le projet de normalisation de l'outil MacArthur

en français québécois s'inscrit donc dans une optique d'intervention précoce et de développement des connaissances. Il s'insère dans la sphère « Langage » du Réseau canadien de recherche sur le langage et l'alphabétisation (RCRLA) dont l'objectif est le suivant : Trouver des façons d'identifier les enfants exposés au risque d'un développement retardé ou désordonné des habiletés du langage, et d'intervenir efficacement dans ce domaine (RCRLA, s.d.). Les résultats présentés ici sont des données préliminaires, qui proviennent d'analyses effectuées avec ce qui correspond au deux tiers de l'échantillon à amasser.

Cet article vise à vérifier la validité de l'outil MacArthur en démontrant tout d'abord qu'il est sensible au développement. La validité de construit sera analysée par une approche développementale. Des analyses de cohérence interne sont également présentées afin de montrer si les différentes sections du questionnaire sont corrélées entre elles. Des données normatives sur l'outil MacArthur seront présentées et les résultats seront discutés en lien avec les résultats obtenus dans d'autres langues, notamment l'anglais.

## Méthodologie

### Participants

Notre échantillon se compose de 777 enfants âgés de 8 à 30 mois répondant aux critères d'admissibilité suivants :

- être âgé de 8 à 30 mois au moment où le questionnaire est complété;
- être francophone unilingue et être exposé au français au moins 80% du temps (i.e. ne pas être en train d'acquérir ou avoir acquis une autre langue que le français);
- ne pas présenter de problème de développement connu

Pour les fins de la normalisation, l'échantillon est divisé en tranches d'âge d'un mois. Les participants sont issus de toutes les régions du Québec, dans des proportions semblables aux caractéristiques populationnelles québécoises (Institut de la statistique du Québec, 2004). De cet échantillon, 48,3 % sont des filles et 51,7 % sont des garçons. Les mères de ces enfants ont, dans une proportion de 55,2 %, complété une formation universitaire; 28,1 % d'entre elles ont terminé un programme collégial et 16,7 %, un programme secondaire ou professionnel, ou n'ont pas terminé leur secondaire. La majorité des enfants (71,4 %) fréquentent un milieu de garde soit un centre de la petite enfance (CPE) en institution ou en milieu familial, soit une garderie privée. Les autres enfants (28,6 % de l'échantillon) demeurent à la maison avec un parent, un autre membre de la famille ou encore un gardien ou une gardienne. Finalement, plus de la moitié des enfants ayant participé à l'étude (57,1 %) ont au moins un frère ou une sœur tandis que 42,9 % sont enfants uniques. Le tableau 1 présente les différentes caractéristiques des participants.

### Matériel

La version franco-québécoise de l'Inventaire

MacArthur de développement de la communication est la mesure principale de cette étude. L'inventaire est disponible en deux versions : le questionnaire Mots et gestes (Trudeau et al., 1997), qui est utilisé avec les enfants de 8 à 16 mois, et le questionnaire Mots et énoncés (Frank et al., 1997), utilisé avec les enfants de 16 à 30 mois.<sup>1</sup>

Le questionnaire Mots et gestes, pour les enfants de 8 à 16 mois est divisé en deux grandes parties :

1. Premiers mots, qui décrit les premiers signes de compréhension, les phrases comprises, le début de l'expression verbale et le vocabulaire réceptif et expressif de l'enfant;
2. Actions et gestes, qui décrit les premiers gestes communicatifs, les jeux et routines, les actions avec les objets, le « faire semblant » d'être un parent, l'imitation d'autres actions des adultes et le jeu symbolique.

La présente étude porte sur la section du vocabulaire réceptif et expressif du questionnaire Mots et gestes. Celle-ci regroupe 408 mots répartis en 19 catégories : Effets sonores et sons d'animaux, Animaux, Véhicules, Jouets, Nourriture et boissons, Vêtements, Parties du corps, Meubles et pièces, Petits articles ménagers, Choses de l'extérieur et endroits où aller, Gens, Jeux et routines, Verbes d'action, Mots pour parler du temps, Mots descriptifs, Pronoms, Mots d'interrogation, Prépositions, adverbess et termes locatifs et finalement, Quantificateurs. Le parent est invité à cocher si son enfant « comprend » ou « comprend et dit » chacun des mots proposés.

Le questionnaire Mots et énoncés pour les enfants de 16 à 30 mois est également divisé en deux parties :

1. Mots qu'emploient les enfants, qui regroupe le vocabulaire expressif et la façon dont les enfants utilisent les mots;
2. Énoncés et grammaire qui décrit les formes grammaticales utilisées par l'enfant, ses trois plus longs énoncés (M3L), la complexité de ses phrases et son utilisation des formes substantives ou pronominales.

La présente étude porte sur trois sections du questionnaire Mots et énoncés. Premièrement, la section vocabulaire, qui comprend 664 mots, répartis en 21 catégories : Effets sonores et sons d'animaux, Animaux, Véhicules, Jouets, Nourriture et boissons, Vêtements, Parties du corps, Petits articles ménagers, Meubles et pièces, Choses de l'extérieur, Endroits où aller, Gens, Jeux et routines, Verbes, Mots descriptifs, Mots pour parler du temps, Pronoms, Mots d'interrogation, Prépositions et termes locatifs, Quantificateurs et articles et finalement, Conjonctions. Deuxièmement, les combinaisons de mots que font les enfants nous intéressent. Dans cette section, les parents sont invités à cocher si leur enfant combine des mots jamais, parfois ou souvent. Finalement nous regardons la section où les parents notent les trois plus longs énoncés produits par leur enfant.

Les parents participant à l'étude avec leur enfant complètent, en plus de la version de l'Inventaire MacArthur adaptée à l'âge de leur enfant, un questionnaire

**Tableau 1***Caractéristiques des participants*

Âge  (mois)	Sexe		Niveau de scolarité de la mère			Fréquentation d'un milieu de garde		Présence d'autres enfants dans la famille		Total
	Filles	Garçons	Secondaire, professionnel ou moins	Collégial	Universitaire	Non	Oui	Non	Oui	
8	15	26	6	15	20	26	15	13	28	41
9	15	15	3	9	18	18	12	20	10	30
10	22	16	8	13	17	18	20	17	21	38
11	13	11	1	8	15	10	14	12	12	24
12	16	27	8	12	23	15	28	21	22	43
13	11	20	6	9	16	13	18	14	17	31
14	12	11	5	7	11	8	15	8	15	23
15	15	26	5	11	25	13	28	25	16	41
16	18	14	7	6	19	7	25	15	17	32
17	13	13	0	11	15	5	21	13	13	26
18	18	10	7	9	12	7	21	16	12	28
19	16	17	11	7	15	7	26	17	16	33
20	11	23	8	6	20	6	28	12	22	34
21	21	17	5	11	22	11	27	17	21	38
22	24	16	6	8	26	10	30	17	23	40
23	19	21	9	7	24	12	28	18	22	40
24	20	14	7	12	15	7	27	13	21	34
25	20	22	7	14	21	6	36	13	29	42
26	20	19	5	10	24	6	33	9	30	39
27	24	19	5	11	27	9	34	14	29	43
28	15	21	6	11	19	2	34	18	18	36
29	8	15	0	4	19	5	18	4	19	23
30	9	9	5	7	6	1	17	7	11	18
Total	375	402	130	218	429	222	555	333	444	777
	48,3%	51,7%	16,7%	28,1%	55,2%	28,6%		42,9%	57,1%	100,0%

démographique. Celui-ci vise à obtenir un portrait global de l'enfant. Il aborde divers aspects comme la langue, les niveaux de scolarité et statuts d'emploi des parents, la fratrie, la fréquentation de milieux de garde, l'histoire périnatale et le développement global.

### Procédures

Le recrutement des parents participant à l'étude a été effectué de trois manières différentes : premièrement, par le biais d'affiches postées dans les CPE, les cliniques médicales, les CLSC et les organismes communautaires destinés à la famille de partout à travers le Québec. Une version électronique de cette affiche a également été placée sur le portail Petit Monde ([www.petitmonde.com](http://www.petitmonde.com)), un site d'information pour les parents.

Les parents intéressés communiquaient avec nous et l'admissibilité de leur enfant au projet était vérifiée par téléphone ou courrier électronique. Suite à ce contact initial, les documents nécessaires à leur participation ont été envoyés aux parents : un formulaire d'information et de consentement en deux copies, le questionnaire démographique ainsi que l'Inventaire MacArthur adapté à l'âge de leur enfant. Une enveloppe de retour pré-affranchie était incluse dans l'envoi.

Deuxièmement, certains parents ont été recrutés de façon plus directe. En effet, des membres du projet se sont déplacés dans quelques organismes communautaires de la ville de Montréal pour rencontrer des parents susceptibles de participer. Les documents nécessaires pour participer leur étaient distribués. Troisièmement, la collaboration des infirmiers et infirmières en C.L.S.C. ainsi que de certaines cliniques médicales à travers la province a été très appréciée : ceux-ci ont distribué les documents nécessaires aux parents après avoir vérifié leur admissibilité et leur intérêt à participer.

Pour le cas particulier des enfants de 16 mois, pour lesquels les deux versions de l'inventaire sont adaptées, l'une ou l'autre des versions de l'inventaire était envoyée en alternance aux parents. Ainsi, il y a deux groupes d'enfants de 16 mois : un groupe ayant reçu l'inventaire Mots et gestes et l'autre l'inventaire Mots et énoncés.

### Traitement des données

Les données recueillies par le biais du questionnaire démographique et des Inventaires MacArthur ont été compilées, pour chaque enfant, dans des bases de données créées à l'aide du logiciel Excel. Pour les tranches d'âge de 8 à 16 mois, le nombre total de mots compris et le nombre total de mots produits ont été calculés pour chaque enfant. Pour les tranches d'âge de 16 à 30 mois, trois calculs ont été effectués : le nombre total de mots produits pour chaque enfant, le nombre d'enfants qui combinent des mots parfois ou souvent et la longueur moyenne des trois plus longs énoncés (M3L) de chaque enfant.

La longueur moyenne des trois plus longs énoncés (M3L) a été déterminée par le biais du nombre de morphèmes contenus dans ces énoncés. La méthode utilisée

pour coder le nombre de morphèmes est celle développée par Thordardottir (2005).

Toutes les entrées de données concernant le vocabulaire (en compréhension et en production) et les premières combinaisons ont été soumises à une vérification par un deuxième juge afin d'éviter les erreurs de compilation et d'interprétation. Lors de désaccords, une décision était prise par consensus entre deux juges. Pour la M3L, le codage a été fait par deux juges ayant reçu une formation spécifique et travaillant ensemble. Les désaccords ont été résolus par consensus.

Des statistiques descriptives (moyenne, écart-type et percentiles) ont été utilisées. De plus, des corrélations de Pearson ont été employées afin d'explorer les liens possibles entre les différentes sections du questionnaire analysées dans la présente étude. Le logiciel Statistical Package for Social Sciences (SPSS for Windows 11.0.1, Moore, 2001) a été employé pour l'analyse des données.

### Résultats

Le nombre moyen de mots compris augmente de 24,8 mots (ÉT 25,5) pour les enfants de 8 mois à 207,2 mots pour les enfants de 16 mois (ÉT 99,8) (voir tableau 2). L'augmentation du nombre de mots compris à chaque mois varie de 9,3 mots (en moyenne) entre 10 et 11 mois, jusqu'à 44,6 mots (en moyenne) entre 15 et 16 mois.

Bien qu'il y ait une nette augmentation du nombre de mots compris, une importante variabilité à l'intérieur de chaque groupe d'âge est également évidente. La figure 1 présente le nombre de mots compris en fonction de l'âge pour les 10e, 25e, 50e, 75e et 90e percentiles de l'échantillon à chaque tranche d'âge. Pour les plus jeunes enfants (8 mois), les plus avancés (90e percentile) comprennent plus de 50 mots tandis que les moins avancés (10e percentile) en comprennent très peu. À 16 mois, l'écart entre le 10e percentile et le 90e percentile est de presque 300 mots (voir figure 1).

Le nombre moyen de mots produits augmente également. À 8 mois, 0,73 mots sont produits en moyenne (ÉT 1,3) et à 16 mois, ce sont 35,3 mots qui sont produits en moyenne (ÉT 27) (voir tableau 2). En moyenne, les enfants atteignent un vocabulaire expressif de 50 mots entre 16 et 17 mois. Le vocabulaire expressif continue d'augmenter par la suite, pour arriver à un nombre moyen de mots produits de plus de 500 à 30 mois. Le nombre de nouveaux mots produits à chaque mois varie à travers les groupes d'âge ; l'augmentation est très petite au début (1 ou 2 mots de plus en moyenne par mois, de 8 à 11 mois) mais beaucoup plus grande pour les groupes plus âgés, surtout entre 20 et 21 mois (80,8 mots de plus) et entre 28 et 29 mois (73 mots de plus).

La variabilité à l'intérieur de chaque tranche d'âge pour la production est semblable à celle notée en compréhension. La figure 2 présente le nombre de mots produits en fonction de l'âge pour les 10e, 25e, 50e, 75e et 90e percentiles de l'échantillon à chaque âge. On y voit l'augmentation du nombre de mots produits et la variabilité à l'intérieur de



**Tableau 2**

*Nombre de mots compris, nombre de mots produits et M3L en fonction de l'âge chez des enfants de 8 à 30 mois*

Âge (mois)	Nombre de mots compris		Nombre de mots produits		M3L	
	Moyenne	Écart-type	Moyenne	Écart-type	Moyenne	Écart-type
8	23,83	25,47	0,73	1,34	-	-
9	41,13	48,91	2,17	5,50	-	-
10	53,24	52,55	2,63	3,53	-	-
11	62,50	59,89	4,25	4,55	-	-
12	88,93	56,76	7,56	10,01	-	-
13	106,00	63,46	12,26	10,78	-	-
14	135,13	83,03	12,09	11,38	-	-
15	162,63	71,59	24,05	26,35	-	-
16	207,19	99,82	35,34	26,98	1,65	1,07
17	-	-	68,73	60,88	2,51	1,41
18	-	-	93,57	82,95	2,59	1,39
19	-	-	135,67	103,28	3,28	2,00
20	-	-	129,85	94,30	3,69	1,95
21	-	-	200,68	148,41	4,10	1,84
22	-	-	212,50	153,59	4,78	2,45
23	-	-	279,60	128,24	5,54	2,58
24	-	-	303,85	147,88	6,94	3,72
25	-	-	307,05	144,16	6,26	2,47
26	-	-	376,44	148,66	7,09	2,59
27	-	-	401,95	136,40	7,22	3,03
28	-	-	435,17	135,00	8,81	3,69
29	-	-	508,17	99,81	9,53	3,15
30	-	-	503,06	104,90	8,74	2,59

trois plus longs énoncés (M3L) rapportés par les parents augmente également de 16 à 30 mois. Nous observons une M3L de 1,7 (ÉT 1,07) à 16 mois et de 8,7 (ÉT 2,6) à 30 mois. Tout comme les résultats pour le vocabulaire réceptif et expressif, une certaine variabilité est évidente à l'intérieur de chaque tranche d'âge. La figure 4 illustre la M3L en fonction de l'âge pour les 10e, 25e, 50e, 75e et 90e percentiles. La variabilité interindividuelle, dont témoignent l'étendue des données et l'écart type, demeure relativement stable avec l'âge.

Des corrélations positives significatives sont observées entre l'âge et les différentes sections du questionnaire et entre ces sections elles-mêmes. Le nombre de mots compris, le nombre de mots produits et la M3L sont corrélés significativement ( $p < 0,0001$ ) avec l'âge. Ces corrélations vont de modérées à fortes ( $r = 0,642$  à  $0,822$ ). De plus, le nombre de mots compris est modérément corrélé ( $r = 0,632$ ,  $p < 0,0001$ ) avec le nombre de mots produits. Le nombre de mots produits est quant à lui fortement corrélé avec la M3L ( $r = 0,812$ ,  $p < 0,0001$ ) (voir tableau 4).

## Discussion

### Compréhension

chaque tranche d'âge, surtout entre 21 et 28 mois.

Le pourcentage d'enfants qui combinent les mots augmente aussi à chaque tranche d'âge, de 16 à 30 mois (voir le tableau 3). À 16 mois, moins du tiers des enfants font des combinaisons de mots (31%), et ce, parfois seulement : selon les réponses des parents au questionnaire, aucun enfant de notre échantillon ne combine souvent les mots à 16 mois. À 17 mois, 50 % des enfants combinent les mots parfois ou souvent (voir la figure 3). À 22 mois, plus de 90 % des enfants emploient les combinaisons de mots parfois ou souvent. À partir de 28 mois, ce sont tous les enfants de l'échantillon qui combinent souvent les mots.

Le nombre moyen de morphèmes contenus dans les

Le nombre de mots compris augmente avec l'âge (8 à 16 mois), ce qui dénote une variable sensible au développement. À 8 mois déjà, la plupart des enfants comprennent au moins quelques mots. À 16 mois, tous les enfants comprennent au moins 50 mots et certains en comprennent plus que 300. On remarque une grande variabilité interindividuelle qui semble s'accroître avec l'âge. Une partie de cette grande variabilité peut s'expliquer par le fait que certains parents peuvent avoir de la difficulté à juger le nombre de mots compris. En effet, il peut être ardu de distinguer la compréhension réelle d'un mot de la compréhension contextuelle, surtout dans le cadre d'activités quotidiennes. Ainsi, un parent peut par exemple juger que son enfant

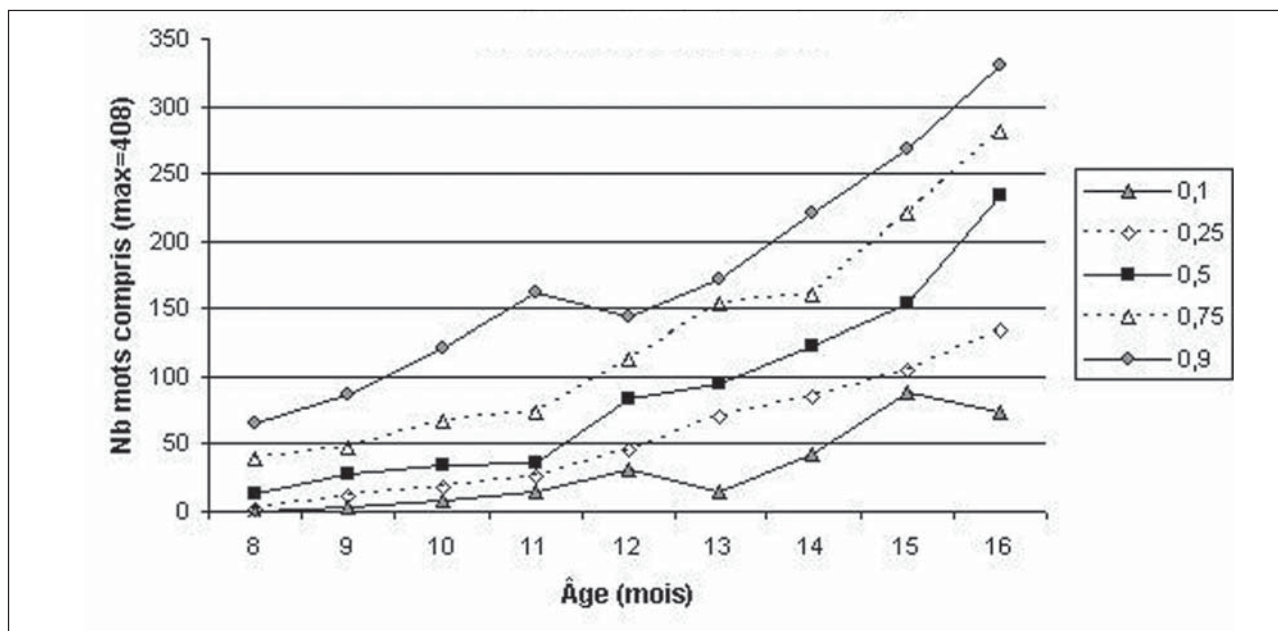


Figure 1. Nombre de mots compris en fonction de l'âge chez des enfants de 8 à 16 mois

Tableau 3

Pourcentage des enfants de 16 à 30 mois qui combinent les mots en fonction de l'âge

Âge (mois)	Souvent (%)	Parfois (%)	Combine (souvent + parfois) (%)
16	0,0	31,3	31,3
17	26,9	34,6	61,5
18	28,6	42,9	71,4
19	36,4	45,5	81,8
20	44,1	35,3	79,4
21	55,3	34,2	89,5
22	65,0	27,5	92,5
23	82,5	17,5	100,0
24	88,2	5,9	94,1
25	85,7	11,9	97,6
26	97,4	0,0	97,4
27	95,3	4,7	100,0
28	97,2	0,0	97,2
29	100,0	0,0	100,0
30	100,0	0,0	100,0

comprend lorsque celui-ci réagit aux paroles de son parent (contact visuel accru, sourire, geste, etc.). Une autre hypothèse voulant que les parents de classe socio-économique moins élevée aient tendance à surestimer la compréhension de mots des tout jeunes enfants a été proposée par Reznick (1990). Une partie de la variabilité s'explique probablement par la grande différence existant entre les rythmes de développement des enfants.

### Production

Le nombre de mots produits augmente avec l'âge, ce qui dénote une variable sensible au développement après l'âge de 16-18 mois approximativement. Avant cet âge, très peu de mots sont produits mais à 18 mois, la plupart des enfants produisent au moins quelques mots. Selon les réponses des parents au questionnaire, on peut s'attendre à un vocabulaire expressif d'au moins 200 mots à 27 mois.

On ne remarque pas dans nos données d'indice clair de l'explosion du vocabulaire (vocabulary burst) souvent mentionnée dans la littérature (par exemple, Reznick & Goldfield, 1992). Nous observons plutôt une évolution relativement constante du vocabulaire expressif. Cette observation peut être attribuable, entre autres, au fait qu'il s'agit d'une étude transversale et non pas longitudinale. La courbe obtenue est semblable à celle présentée par Fenson et al., (1994).

On remarque toutefois que, tel que rapporté par Fenson et al., (1994), la variabilité interindividuelle est très grande, particulièrement entre 21 et 28 mois. Ceci peut s'expliquer par une importante variation dans le rythme de développement d'un enfant à l'autre, surtout dans ces tranches d'âge. Cette grande variabilité pourrait donc

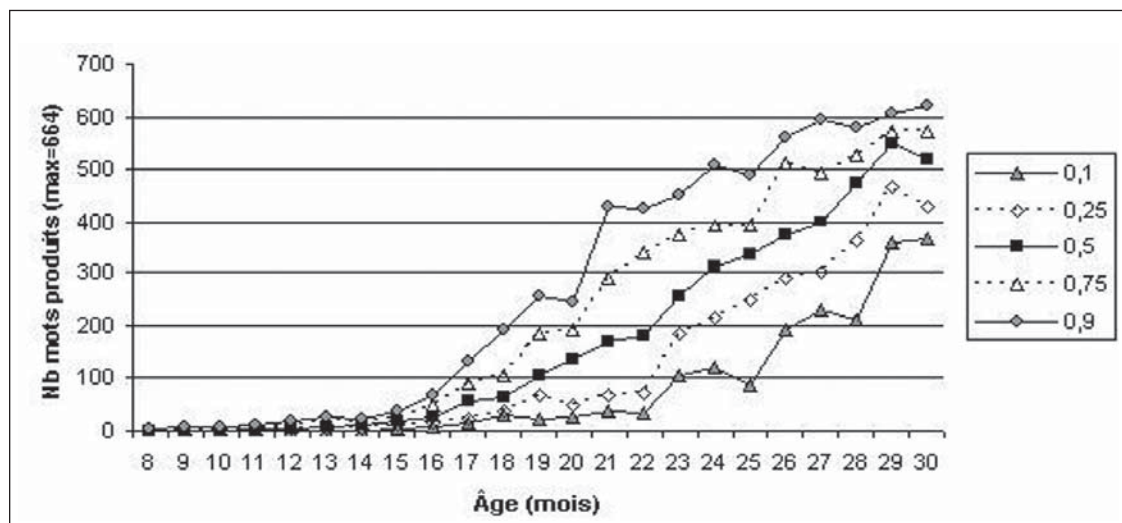


Figure 2. Nombre de mots produits en fonction de l'âge chez des enfants de 8 à 30 mois

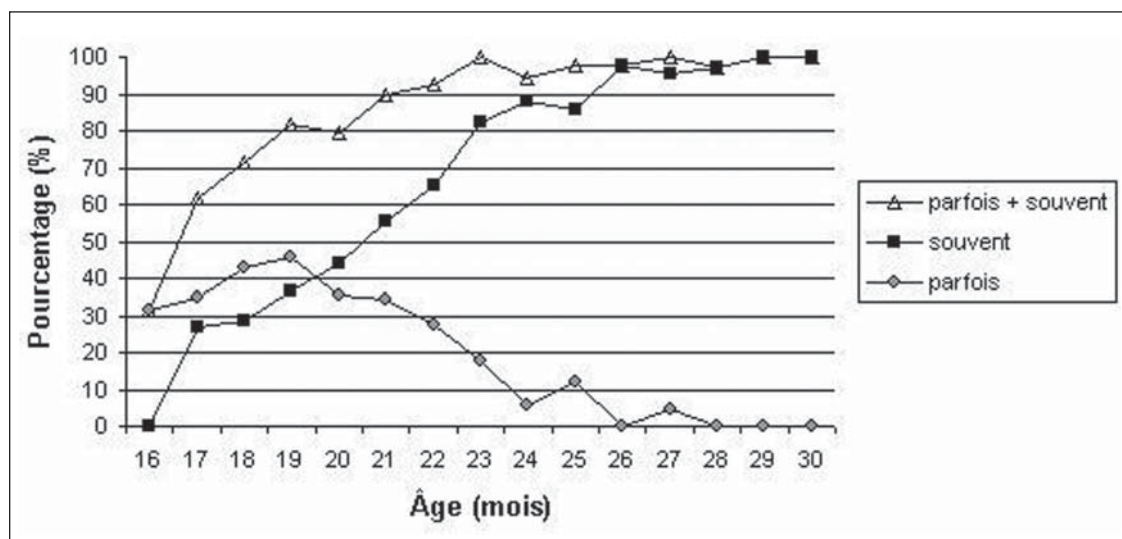


Figure 3. Pourcentage des enfants de 16 à 30 mois qui combinent les mots en fonction de l'âge

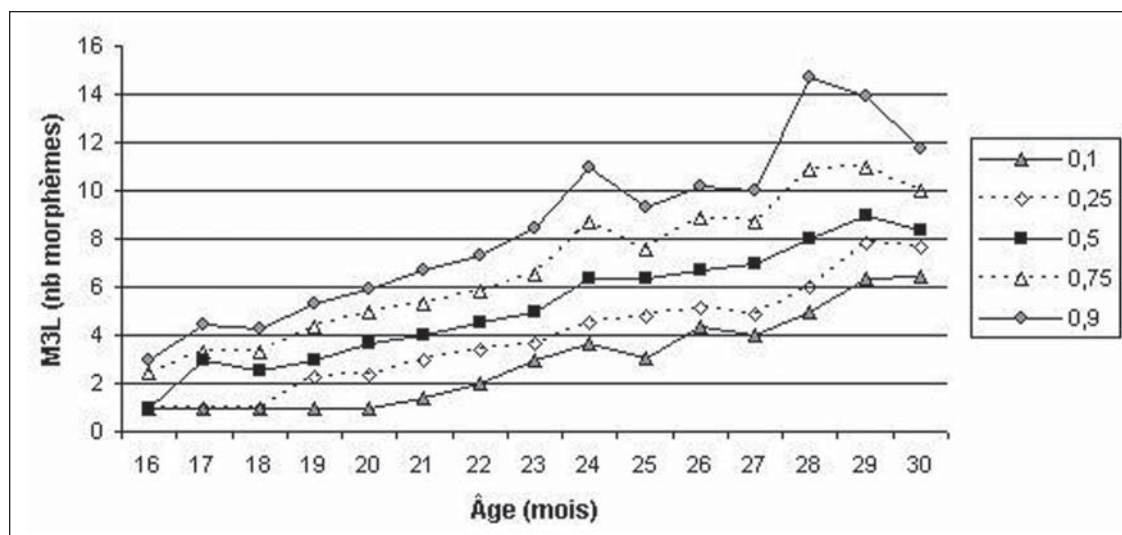


Figure 4. Longueur moyenne des trois plus longs énoncés (M3L) en fonction de l'âge chez des enfants de 16 à 30 mois

**Tableau 4**

*Corrélations de Pearson entre l'âge, le nombre de mots compris, le nombre de mots produits et la M3L*

		Nb mots compris	Nb mots produits	M3L
Âge	r	0,649	0,822	0,642
	p	< 0,0001	< 0,0001	< 0,0001
Nb mots compris	r	1,000	0,632	-
	p		< 0,0001	-
Nb mots produits	r		1,000	0,812
	p			< 0,0001

Toutes les corrélations sont significatives au niveau 0.01 (bilatéral).

témoigner du fait que les enfants connaissent leur explosion de vocabulaire à différents moments dans ces tranches d'âge. La variabilité interindividuelle semble décroître progressivement vers 29 et 30 mois, ce qui peut représenter un indice de plafonnement de l'inventaire, qui, bien que non atteint à 30 mois, pourrait l'être dans les quelques mois suivants.

Le nombre de mots produits à travers les groupes d'âge est semblable, de façon globale, au nombre de mots produits observé par Fenson et al. (1994), quoique légèrement moins élevé. Par exemple, la version américaine rapporte un score médian de 573 mots à 30 mois tandis que nous obtenons une médiane de 518 mots au même âge.

Le fait que le vocabulaire expressif que nous observons chez les enfants franco-québécois soit légèrement moins élevé que celui noté chez les enfants anglophones américains concorde avec les observations faites lors des études avec les versions islandaise, anglaise (Grande-Bretagne) et française (France) (Thordardottir & Ellis-Weismer, 1996; Hamilton et al., 2000; Kern, 2003). Cette différence ne semble pas être liée aux caractéristiques démographiques de l'échantillon québécois qui sont très semblables à celle de l'échantillon américain (Fenson et al. 1994). On peut supposer que le nombre inférieur de mots produits en français québécois peut être lié à la plus grande complexité morphosyntaxique du français qui aurait une influence sur le rythme d'acquisition du lexique (Thordardottir, 2005).

On note également que les enfants québécois produisent en moyenne davantage de mots que les enfants français - de 10 à 144 mots de plus selon l'âge (Kern, 2003). Kern a d'ailleurs souligné que ce type de différence, observée également entre le vocabulaire expressif des enfants

américains et celui des enfants britanniques, pouvait être attribuable à des particularités culturelles dans la manière d'évaluer les connaissances et habiletés des enfants.

On note finalement qu'un écart de cinq mois sépare l'âge médian auquel les enfants comprennent 50 mots (entre 11 et 12 mois) de celui auquel ils produisent 50 mots (entre 16 et 17 mois), ce qui concorde avec l'avance de la compréhension par rapport à la production souvent rapportée dans la littérature (par exemple, Bates et al., 1994).

### Combinaisons de mots

Le pourcentage d'enfants combinant souvent ou parfois les mots augmente avec l'âge. On note à 17 mois l'émergence des combinaisons de mots (50 % des enfants), soit au moment où les enfants atteignent en moyenne un lexique expressif de 50 mots. À 22 mois, on note que les combinaisons de mots semblent acquises (90 % des enfants), ce qui coïncide avec le moment où les enfants atteignent un vocabulaire expressif de 200 mots.

Fenson et al., (1994) rapportent un écart d'environ 4 mois entre le moment où 50% des enfants combinent « parfois » (18 mois) et où 50% des enfants combinent « souvent » les mots (22 mois). Ceci ne concorde pas avec nos résultats. Nous obtenons plutôt une différence minime entre ces deux critères : en effet, environ 50% des enfants vont combiner « parfois » entre 19 et 20 mois tandis que 50% des enfants sont rapportés comme combinant « souvent » les mots dès 21 mois. Il est possible que le concept de combinaison de mots ne soit pas évalué de la même manière par les parents des deux échantillons. En effet, Fenson et al., (1994) écrivent que la différence entre les concepts « parfois » et « souvent » peut être davantage interprété en fonction de la forme des phrases (phrase en émergence vs phrase plus près du modèle adulte) plutôt qu'en fonction de la fréquence d'agencement de deux mots ou plus. Il serait pertinent d'investiguer le parallèle entre le fait que les parents indiquent « parfois » ou « souvent » avec la M3L et la structure syntaxique des phrases données en exemple par les parents afin de pouvoir expliquer cette différence entre la version originale et la nôtre.

### Longueur d'énoncés

La longueur moyenne des trois plus longs énoncés (M3L) augmente avec l'âge, ce qui témoigne du fait que cette partie du questionnaire est sensible au développement<sup>2</sup>. La variabilité pour cette mesure demeure relativement stable avec l'âge. Les résultats de longueur d'énoncés ne sont pas ici comparés à ceux obtenus en anglais (Fenson et al., 1994) mais feront l'objet d'analyses futures plus poussées.

Il serait éventuellement intéressant d'étudier l'évolution de la longueur des énoncés en fonction de la taille du lexique expressif, ces deux variables étant fortement corrélées. Ainsi, on peut poser comme hypothèse que la M3L est davantage influencée par la taille du lexique que par l'âge puisque nous avons obtenus des corrélations plus fortes avec le nombre de mots produits qu'avec l'âge.



## Conclusion

Nous rapportons ici des analyses initiales des données obtenues avec la version franco-qubécoise de l'Inventaire MacArthur. Nos résultats laissent croire que cet outil est sensible au développement du lexique et de l'émergence de la syntaxe des jeunes enfants. L'étude de validation (déjà amorcée par Breault, 2004) nous permettra de vérifier si les résultats au questionnaire sont représentatifs de la performance réelle de l'enfant et s'ils ont une valeur prédictive de leur performance future. Des analyses seront également effectuées afin de mesurer l'impact de divers facteurs (sexe de l'enfant, scolarité de la mère, fréquentation d'un milieu de garde, etc.) sur le développement du lexique et l'émergence de la syntaxe.

Ainsi, l'Inventaire MacArthur constituera un outil précieux pour le milieu clinique en permettant une première évaluation du langage d'un enfant. Ils s'agit d'un apport non négligeable pour la pratique orthophonique de première ligne ainsi que pour l'intervention précoce, en CLSC par exemple. L'inventaire pourra également être utilisé pour suivre le développement langagier d'un enfant avec ou sans problème de langage à travers le temps. De plus, le fait de faire appel aux parents comme source d'information lors du processus d'évaluation du langage les implique dès le départ dans le processus de réadaptation avec leur enfant.

Du point de vue de la recherche, les études se servant de l'Inventaire MacArthur fourniront une très importante base de données qui pourra permettre des analyses diverses. Par exemple, des analyses futures pourront porter sur l'ordre d'acquisition des mots ou encore sur l'évolution de la complexité syntaxique en fonction de la taille du lexique.

Les adaptations de l'Inventaire MacArthur en différentes langues ouvrent la porte à différentes études de comparaisons inter-linguistiques ainsi qu'à la possibilité d'étudier le langage des enfants bilingues (Caselli, Casadio, & Bates, 1999; Maital, Dromi, Sagi, & Bornstein, 2000; Marchman & Martinez-Sussman, 2002; Thodardottir, Ellis-Weismer, & Evans, 2002). En effet, le fait d'avoir un outil comparable et équivalent dans plusieurs langues est un apport non négligeable pour les recherches et la pratique clinique future. Le bilinguisme étant une réalité de plus en plus importante au Québec, il va sans dire qu'un outil qui permet d'investiguer l'impact d'acquérir deux langues à la fois serait le bienvenu. Une mise en garde s'impose toutefois dans les cas d'évaluation d'enfants bilingues. L'*American Speech-Language and Hearing Association (ASHA)* mentionne qu'un enfant évoluant dans une situation de bilinguisme doit être évalué en gardant en tête que son développement langagier est distribué entre deux langues et que par conséquent, les normes établies auprès d'enfants monolingues ne sont pas applicables (ASHA, 1985). C'est pourquoi des normes spécifiques devront être établies auprès d'enfants bilingues afin de permettre une utilisation adéquate de l'outil MacArthur chez cette population. Il est toutefois possible d'utiliser cet outil à des fins descriptives, si le professionnel tient compte des performances relatives de l'enfant dans les deux langues.

L'adaptation du MacArthur en français québécois pourrait servir de base à une version de l'outil adaptée aux francophones hors Québec, afin de tenir compte des particularités régionales et culturelles. En effet, des outils d'évaluation adaptés sont essentiels pour ces populations qui évoluent dans des contextes linguistiques qui diffèrent de celui du Québec.

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## Notes en bas de page

<sup>1</sup>La démarche d'adaptation des questionnaires en français-québécois (e.g. sélection du vocabulaire, choix des mots spécifiques lorsque plusieurs synonymes existent, développement d'une section 'grammaire' pertinent au français, etc.) a été décrite en détail par Trudeau, Frank, et Poulin-Dubois (1999). Seule une description des questionnaires utilisés est donc offerte ici.

<sup>2</sup>Une analyse de régression par paliers serait sans doute appropriée afin d'étudier la relation entre l'âge et la longueur d'énoncé. Cette analyse est prévue, une fois l'échantillon complet recruté.

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## ■ Temporal Processing Skills of Children with and without Specific Language Impairment

## ■ Le traitement temporel chez les enfants avec et sans trouble spécifique du langage

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### Abstract

This paper compares the temporal processing skills of 6- to 9-year-old children meeting criteria for enrolment in specific language impairment (SLI) special classes to controls. Children were tested on two temporal-order judgment tasks (TOJ) and one interval-production task with 31 finger taps at a rate of 1 tap/s. Nonverbal IQ (NVIQ) was assessed using the Block Design subtest of the WISC-III. In a visual task (V-TOJ), children indicated which of two flashes, left or right, appeared first; and, in a bimodal task (B-TOJ), they indicated which signal, a sound or a light, appeared first. In the production task, groups were compared on mean production interval, the variability of produced intervals and the coefficient of variation. The results indicate a weaker capacity of children with SLI to determine the order of arrival of sensory signals in both TOJ tasks, and more variability (and higher coefficient of variation) of children from the same group in the production task. Furthermore, there were no group differences on NVIQ. Binary logistic regression revealed that performance on the V-TOJ task is sufficient to predict group membership with a 78% accuracy rate.

### Abrégé

Cet article compare les compétences pour le traitement temporel des enfants de 6 à 9 ans qui répondent aux critères d'admission dans des classes spéciales pour ceux qui ont un trouble spécifique du langage aux compétences des enfants d'un groupe contrôle. Les enfants ont subi deux épreuves (visuelle et bimodale) de jugement de l'ordre temporel et un test de production d'intervalles temporels à l'aide de frappes digitales à un taux de 1 frappe à la seconde. Le quotient intellectuel non-verbal a été mesuré à partir du sous-test Block Design du WISC-III. Dans le cadre de l'épreuve visuelle, les enfants devaient indiquer lequel de deux signaux visuels, celui de gauche ou celui de droite, est apparu en premier. Pour l'épreuve bimodale, ils devaient indiquer quel signal, le son ou la lumière, est apparu en premier. Pour la tâche de production, on a comparé l'intervalle moyen de production entre les groupes, la variabilité des intervalles produits et le coefficient de variation. Les résultats indiquent une capacité réduite chez les enfants atteints d'un trouble spécifique de langage à déterminer l'ordre d'arrivée des signaux sensoriels pour les deux tâches de jugement de l'ordre temporel et une plus grande variabilité (et un coefficient de variation supérieur) pour le test de production temporelle chez les enfants de ce même groupe. Qui plus est, nous n'avons relevé aucune différence entre les groupes pour le quotient intellectuel non-verbal. Une analyse de régression logistique binaire a montré que les résultats de l'épreuve visuelle étaient suffisants pour prédire l'appartenance à un groupe avec un taux de précision de 78 %.

**Key Words:** Specific language impairment, temporal processing, temporal order judgement, interval production, nonverbal IQ

Specific language impairment (SLI) is a neurological impairment involving problems with speech and language understanding that cannot be explained by a general cognitive deficit. It is estimated that 3% to 7% of children suffer from this impairment (Leonard, 1998; Tallal, Stark, & Mellits, 1985). These children might also suffer from other problems involving psychosocial adjustment (Cohen, 2001), literacy (Tallal, 2003), fine motor skills and temporal processing (Tallal et al., 1985). Little is known about the etiological factors of SLI. One hypothesis states that the cognitive abilities related to the processing of time, referred to as temporal processing skills, could operate as a causal factor in SLI (see Benasich & Tallal, 2002; Jensen & Neff, 1993; Tallal, 1993; Wright et al., 1997). Speech perception, arguably fundamental to language acquisition, requires that a child be able to segment the stream of speech into meaningful units. This could be a daunting task if we consider that phonemes, the basic acoustic units of speech, occur at the rate of one per few milliseconds in normal speech. Tallal and others (e.g., Benasich & Tallal, 2002; Jensen & Neff, 1993; Leonard, 1998) have hypothesized that the inability to process the rapid succession of acoustic sounds in speech could explain why some children fail to develop appropriate language skills for their general cognitive abilities. They claim that the hypothesized temporal processing deficit of children with SLI impairs the development of phonological awareness.

A series of studies conducted by Tallal and Piercy (1973, 1974, 1975) are at the basis of the hypothesis that SLI and temporal processing are closely linked. In these studies, when children have to identify in what order a pair of auditory stimuli are presented, those with SLI displayed poorer performances, especially when sounds were brief and the intervals between sounds were short. Other studies also supported the hypothesis of a temporal processing deficit in SLI. For instance, in a study using a discriminant analysis of over 160 variables known to be related to speech deficits (sensory, neurodevelopmental, demographic, motor, and speech-related) to classify children according to their SLI status, Tallal et al. (1985) reported that six of these variables were sufficient to accurately classify 98% of participants. All six variables involved temporal processing skills. More recently, a prospective longitudinal study conducted by Benasich and Tallal (2002) has shown that rapid auditory processing abilities measured during infancy accurately identified children at risk of developing a SLI and predicted subsequent language skills<sup>1</sup>.

In spite of the evidence reported previously, several researchers have questioned the relevance of temporal processing deficits as a fundamental cause of SLI (Bishop, Carlyon, Deeks, & Bishop, 1999; Mody, Studdert-Kennedy, & Brady, 1997; Studdert-Kennedy, 2002). One reason for questioning this hypothesis is the failure to replicate some of Tallal's previous findings (Bishop et al., 1999; Hanson & Montgomery, 2002; Mody et al., 1997). Moreover, even when temporal processing deficits in children with SLI are reported, it is often the case that not every child in their SLI group presented such a deficit. For instance, in

an authoritative study, Bishop and colleagues (1999) have shown that some children with SLI do not exhibit any difficulty to process temporal information, while some children with temporal processing deficits do not have language impairment. They concluded that a temporal processing deficit is neither a sufficient nor a necessary causal factor of SLI. Bishop and colleagues' conclusions are consistent with the hypothesis of Ramus (2003) who contends that in dyslexia, temporal processing problems could be a symptom that affects only a portion of the dyslexic population. In addition, even though a stable link between temporal processing and language skills is observable in the literature (Tallal, 2003), it is not possible to totally reject the hypothesis that the temporal processing deficit is only a secondary manifestation of a linguistic deficit in SLI (Studdert-Kennedy, 2002), or that the link between temporal processing and language skills is due to a third variable. For Ramus (2003), temporal processing problems fall into a more general sensorimotor syndrome. According to Ramus' hypothesis, the sensorimotor syndrome would explain why some dyslexics present a plethora of symptoms, from rapid temporal processing to poor fine motor skills. Some researchers argue that the nonverbal cognitive abilities (Bishop et al., 1999) or the general cognitive processing skills (e.g., Hanson & Montgomery, 2002) might partly explain the relationship between temporal processing and language skills.

Other criticisms can also be addressed to the temporal processing deficit hypothesis. Because the tasks employed to measure temporal processing skills are so different across studies, it is sometimes difficult to clearly identify what aspects of temporal processing are impaired in SLI. If there is a general temporal processing deficit, it should not be restricted to the auditory mode, and should be apparent in other sensory modalities. In their review of the literature concerning the link between dyslexia and temporal processing deficit, Farmer and Klein (1995) identified several studies employing temporal processing tasks with visual or tactile stimuli and reported that temporal processing is not impaired only when auditory signals are used. However, there are only a few studies reporting the performance of children with SLI on temporal processing tasks involving multiple modalities (Tallal et al., 1985). Further, temporal processing deficits in SLI are apparently not restricted to brief or rapidly presented stimuli. For example, some children with SLI show worse performances than children of control groups at producing rhythm during a tapping task involving no brief stimuli (Share, Jorm, Maclean, & Matthews, 1984; Wolff, Michel, Ovrut, & Drake, 1990), a task that is argued to involve some aspects of temporal processing. Indeed, this task requires the explicit measurement of time, a skill closely linked to the use of an internal clock (Ivry & Hazeltine, 1995; Wing & Kristofferson, 1973).

In brief, there are a significant number of studies suggesting that SLI children suffer from a temporal processing deficit. But there are substantial problems with the inferences we can draw from the existing body of data.



This work aims to address two problems in the previous research. In its strict form, the temporal processing hypothesis states that the deficit affects the processing of brief and rapidly presented auditory stimuli, but the extent of this temporal processing deficit of children with SLI is in need of clarification. The present study extends the investigation of the hypothesis to temporal tasks different from those usually reported. In particular, the purpose is to look at the visual temporal processing and bimodal temporal processing (auditory and visual) in children with SLI, and to investigate temporal processing in a context which does not involve only brief or rapidly presented stimuli. This study also seeks to control for the possibility that deficits on these tasks could be due to a more general cognitive deficit.

### The present study

The present study employed temporal processing tasks that are usually not used in the study of temporal processing by children with SLI. Two tasks involved a judgement about the order of presentation of stimuli - temporal order judgement (TOJ) - and another one was an interval production task in which the participants produced 1-s intervals by reproducing a rhythm on a keyboard. Although the TOJ tasks were highly similar to the classical temporal processing tasks (e.g., Auditory Repetition Task (ART), Tallal & Piercy, 1973), they were different on two aspects: the involvement of memory skills, and the modalities used for marking sensory events presented during the task.

Most studies relating SLI to temporal processing have used methods similar to the ART, in which judgements are made about the temporal order of consecutive signals, verbal or non-verbal (e.g., Bishop et al., 1999; Tallal & Piercy, 1974). These signals were presented in the auditory mode during a training phase in which the children had to learn the correct response key to every sequence presented (e.g., for two signals, a and b, the possible sequences would be: a-b, b-a, a-a, b-b). During the experimental phases, the level of difficulty increased as the ISI and stimulus duration were decreased. This procedure therefore required some memory skills, as the participants had to maintain the sequence they just heard in memory before they would produce their response. The memory demands of the task were even higher when sequences of more than two stimuli had to be identified, as it was the case in some studies (e.g., Bishop et al., 1999). In order to reduce the memory loading, stimulus sequences in the present study involved only two brief sensory signals. In order to test the hypothesis of a general temporal processing deficit in SLI, the TOJ tasks employed in this study involved the visual modality as well as mixed modalities. In the visual TOJ task (V-TOJ), participants were asked to judge the temporal order of arrival of two visual signals (one presented in each visual hemifield of the participant); in the bimodal TOJ task (B-TOJ), they were asked to determine the order of arrival of signals delivered via a bimodal sequence (a sound and a light).

In addition, children were asked to perform an interval production task. More specifically, this task required them to keep track of a series of brief sounds marking 1-s intervals, and to produce a series of 1-s intervals with finger taps. This task was designed to test the hypothesis that temporal processing deficits are not restricted to rapidly presented stimuli (Bishop et al., 1999; Lincoln, Dickstein, Courchesne, Elmasian, & Tallal, 1992). This task is not often used in the study of SLI, and does not seem to have been explored yet in the context of temporal processing deficits possibly correlated with deficiency in language and literacy, but it is a classical one in the study of time perception (e.g., Ivry & Hazeltine, 1995; Wing & Kristofferson, 1973).

Finally, researchers like Bishop et al. (1999) suggested that nonverbal cognitive abilities could partially explain the relationship between temporal processing and language skills. To provide a control for the possible effect of the nonverbal cognitive skills on the results, the Block Design subtest from the WISC-III (BD) was administered to the participants.

In brief, the main research question of this study is to determine if children with SLI perform more poorly or not than children with no language disability on temporal processing tasks, that is, on visual and bimodal (visual and auditory) time order judgments, and on the production of intervals, a task which involves no stimuli rapidly presented. Another issue in the present study is to provide a control for the possible effect of nonverbal cognitive abilities on the results.

## Method

### Participants

Forty-two children, in Grades 1 and 2, from four elementary schools in an urban Québec City school board participated in this study. Ages ranged from 6.4 to 9.4 years ( $M = 7.4$  years). Twenty-three children (13 males,  $M = 7.48$ , and 10 females,  $M = 7.51$ ) attending special classes for children with SLI were compared with 19 children (10 males,  $M = 7.34$ , and 9 females,  $M = 7.13$ ) from the same schools on the basis of sex and age (4 months). The SLI diagnosis was established by a speech pathologist on the basis of criteria set in 2000 by the Québec Ministry of Education<sup>2</sup>. Children with known intellectual deficiencies or auditory and visual pathologies were excluded from this study. One female participant from the SLI group had to be excluded from the study because of failure to cooperate and complete the tasks. The final sample included 22 children with SLI and 19 controls.

On average, children with SLI were 7.49 years old ( $SD = .73$ ) and controls were 7.24 years old ( $SD = .46$ ). Age did not differ as a function of group membership,  $F(1,39) = 1.72, p = .20$ . More importantly, groups did not differ on a measure of cognitive abilities, the nonverbal IQ score (NVIQ, see below),  $F(1,39) = 2.43, p = .13$ , with

a mean score of 97 ( $SD = 17$ ) for the children with SLI and 104 ( $SD = 10$ ) for controls.

### Apparatus and Stimuli for Temporal Processing Tasks

Two types of sensory signals, auditory and visual, were used in the present study. The 5-ms visual (V) signals consisted of small circular red-light-emitting diodes (LED: Radio-Shack #276-088) placed about 1m from the participant, each subtending a visual angle of about .57 degree. In the V-TOJ task, LEDs were located in the left (L) and right (R) visual hemifields at 48.5 cm from one another. For the B-TOJ task, the LED was placed in front and at about 1m from the participant. The auditory (A) signals were 1-kHz tones with an intensity recorded at about 70 dB SPL, and were delivered from the computer placed in front of the participant. They lasted 5 ms in the B-TOJ task and 15 ms in the production task.

All temporal processing tasks were administered with a Zenith micro-computer. Linked to the computer was a small box with three pushbuttons: the central button was used for producing intervals in the production task, and the left and right buttons were used by the experimenters to indicate the child's responses (1) in the V-TOJ left signal first and right signal first, respectively, and (2) in the B-TOJ task - auditory signal first and visual signal first, respectively.

### Nonverbal IQ Testing

Nonverbal cognitive abilities were assessed using the Block Design (BD) subtest of the French adaptation of the Wechsler Intelligence Scale for Children-III (WISC-III; Wechsler, 1991). The Block Design subtest is known to be a reliable and valid predictor of non-verbal intelligence (Sattler, 1992) and is often used as a reliable substitute for non-verbal IQ. Raw scores were converted to scaled scores following standardized procedure and then prorated following Sattler's (1992) procedure to compute a nonverbal IQ (NVIQ) score with a M of 100 and a  $SD$  of 15.

### Procedure

The experiment took place at the school attended by the child. Participants completed the three time processing tasks, followed by the BD subtest. During the TOJ tasks, the room was dimly lit, so the flashes from the diodes were clearly visible. Presentation of the TOJ tasks was counterbalanced: half of participants did the V-TOJ first, and the other half did the B-TOJ first. All participants did the production task between the two TOJ tasks. There was a 1- to 2-minute break between each task. Assessments were completed within one experimental session lasting about 40 minutes. Each child received candy and stickers.

In both TOJ tasks, the child had to indicate which of two sensory signals appeared first. In the V-TOJ, the child was asked to point to the visual source (left or right) and the experimenter recorded the response using the appropriate pushbutton; in the B-TOJ, the child was

asked to say if the sound or the light came first, and the experimenter recorded the response with the appropriate pushbutton. Each TOJ task comprised three blocks of trials. The practice block included 8 trials with ISIs of 400 ms or 450 ms between the A-V or V-A stimuli (2 randomized repetitions per condition), and ISIs of 250 ms or 300 ms between the L-R or R-L stimuli (2 randomized repetitions per condition). The two experimental blocks contained 24 randomized trials with four different ISIs for each L-R/R-L and A-V/ V-A sequences, each ISI appearing three times per block (2 sequences X 4 ISI durations X 3 repetitions). In the V-TOJ task, ISIs lasted 40, 120, 200 or 280 ms, whereas in the B-TOJ task, ISIs lasted 60, 180, 300 or 420 ms. The choice of interval parameters was based on pilot testing with children without SLI in order to reach an average accuracy rate of 75% per experimental block. The participants had a 10-s interval for responding and, after the response was recorded by the experimenter, there was a 2.5-s interval before the next trial or a 25-s break before the next block.

In the production task, participants were presented with 10 successive 15-ms sounds at a tempo of one sound every second (1 tap/s target production). At the end of the auditory sequence, the experimenter pressed on the middle pushbutton of the response box reproducing the same tempo with 8 finger taps, until a higher frequency sound was heard, which indicated the end of the task. The participants were then asked to do the same and complete the next sequence until they were told to stop. The child's finger tip was placed on top of the pushbutton before the sequence started. Participants had to produce 30 intervals of 1 s by pressing 31 times on the pushbutton. The session ended with the administration of the WISC-III BD subtest according to the standardized procedure.

### Results

This study asked if there is a difference between the performance of children with SLI and a control group in a visual time order judgment task, in a bimodal (visual and auditory) time order judgment task and in an interval production task which involved no stimuli rapidly presented. Possible effects of nonverbal cognitive abilities on the results were controlled.

### Group comparisons on TOJ tasks

For each TOJ task, there were seven scores of interest: the overall proportion of correct responses, the proportion of correct responses for each type of sequence condition (A-V and V-A, or L-R and R-L) and the proportion of correct responses for each of the 4 ISIs. A level of significance of .05 was used for all statistical analyses. A matched samples t-test revealed no effect of sequence conditions in both TOJ tasks (A-V vs. V-A:  $t(40) = .41$ ,  $p = .68$ ; L-R vs. R-L:  $t(40) = 1.44$ ,  $p = 0.16$ ). Sequence condition distinctions were dropped from all subsequent analyses.

Figures 1 and 2 depict the proportion of correct responses for the B-TOJ task and the V-TOJ task, respectively, by group for each ISI. Results generally show much lower proportions of correct responses by children with SLI than by controls. An analysis of variance, according to a 2 (groups)  $\times$  4 (ISI) factorial design, with repeated measures on the ISI factor, was conducted for each TOJ task.

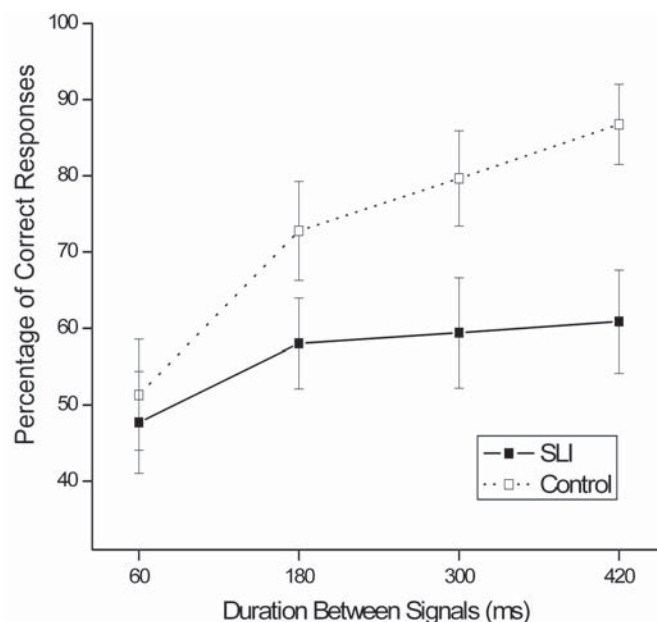


Figure 1. Mean proportion of correct responses as a function of the inter-stimuli intervals in the bimodal temporal order judgment task, for children with specific language impairment (SLI) and controls. Bars represent standard error.

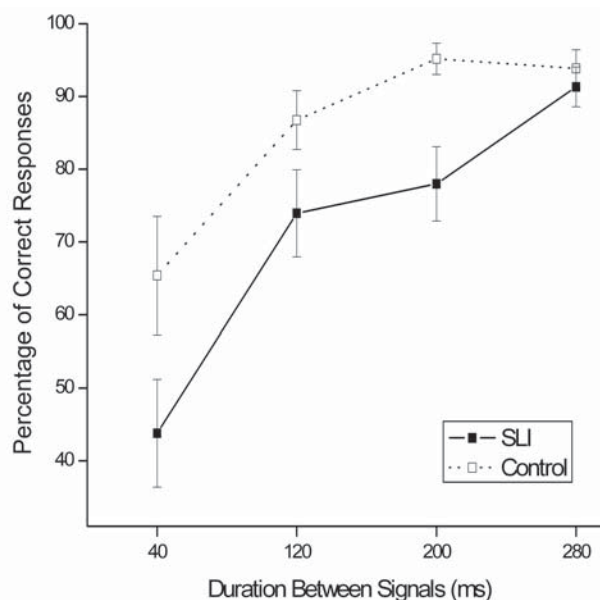


Figure 2. Mean proportion of correct responses as a function of the inter-stimuli intervals in the visual temporal order judgment task, for children with specific language impairment (SLI) and controls. Bars represent standard error.

For the V-TOJ task, the analysis revealed a significant main effect of ISI,  $F(3,37) = 30.79$ ,  $p < .001$ , with an effect size ( $\eta^2$ ) of .714, which means that about 71% of the variance observed on the scores can be accounted for by the experimental manipulation of the ISIs. Note that shorter ISIs are associated with lower proportions of correct responses. Analyses also revealed a main effect of group membership,  $F(1, 39) = 14.26$ ,  $p < .001$ ,  $\eta^2 = .268$ , children with SLI having overall lower proportions of correct responses than controls; and a significant ISI by group effect,  $F(3, 37) = 6.32$ ,  $p < .001$ ,  $\eta^2 = .339$ . ISI comparisons by repeated contrasts revealed that there were significant group differences in the 40 ms,  $F(1, 39) = 9.51$ ,  $p = .004$ ,  $\eta^2 = .196$ , 120 ms,  $F(1, 39) = 4.27$ ,  $p = .046$ ,  $\eta^2 = .099$ , and 200 ms,  $F(1, 39) = 13.86$ ,  $p < .001$ ,  $\eta^2 = .262$ , conditions, but not in the 280 ms ISI condition,  $F(1, 39) = .60$ ,  $p = .44$ , where both groups showed accuracy above 90%. At 200 ms, however, the proportion of correct responses by children with SLI dropped significantly,  $F(1, 39) = 22.16$ ,  $p < .001$ ,  $\eta^2 = .513$ , while children from the control group maintained a level of accuracy similar to that at 280 ms,  $F(1, 39) = .46$ ,  $p = .51$ . Group performances dropped significantly for controls from 200 ms to 120 ms,  $F(1, 39) = 11.72$ ,  $p = .003$ ,  $\eta^2 = .394$ , and from 120 ms to 40 ms,  $F(1, 39) = 12.07$ ,  $p = .003$ ,  $\eta^2 = .401$ . For children with SLI, performances at 200 ms and 120 ms were not significantly different,  $F(1, 39) = .97$ ,  $p = .34$ , but performance worsened from 120 ms to 40 ms ISI,  $F(1, 39) = 23.84$ ,  $p < .001$ ,  $\eta^2 = .532$ .

For the B-TOJ task, the statistical analysis revealed essentially the same results: a significant main effect of group membership,  $F(3, 37) = 14.07$ ,  $p < .001$ ,  $\eta^2 = .27$ , children with SLI having overall lower proportions of correct responses than controls; and a significant main effect of ISI,  $F(3, 37) = 8.96$ ,  $p < .001$ ,  $\eta^2 = .427$ . However, the interaction was not significant. There were no group differences on the shortest ISI, 60 ms,  $F(1, 39) = .36$ ,  $p = .55$ , but significant group differences were found at 180 ms,  $F(1, 39) = 8.0$ ,  $p = 0.007$ ,  $\eta^2 = .174$ , 300 ms,  $F(1, 39) = 9.14$ ,  $p = .004$ ,  $\eta^2 = .194$ , and 420 ms,  $F(1, 39) = 15.54$ ,  $p < .001$ ,  $\eta^2 = .29$ . At 60 ms, both groups showed an average correct response level close to 50%, which is equivalent to what would be expected by mere chance. When the ISI increased to 180 ms, both groups showed a significant increase in correct responses, but controls continued to perform significantly better than children with SLI. However, there was no significant improvement in performance with ISIs longer than 180 ms in either group.

### Group comparisons on the interval production task

Three dependent variables were derived from the production task: the mean production interval (MPI), the variability of the produced intervals (SDPI), and a coefficient of variation ( $CV = SDPI/MPI$ ). Table 1 displays Mean and SD for each of the three variables. Multivariate analysis of variance indicated an overall group effect, with



**Table 1**

*Mean (in ms) and standard deviation (SD) of the mean produced interval (MPI), variability of the produced intervals (SDPI), and coefficient of variation (CV) in the production task for children with SLI and controls.*

	With SLI		Controls		<i>F</i>	<i>df</i>
	Mean	<i>SD</i>	Mean	<i>SD</i>		
Interval production						
Overall					4.05*	3, 37
MPI	845.70	219.40	936.10	147.25	2.05	1, 39
SDPI	210.12	150.37	107.70	52.84	6.48*	1, 39
CV	0.2269	0.1248	0.1172	0.0603	10.36*	1, 39

Note: \*  $p < .05$

children with SLI performing more poorly. Overall, intervals produced by children of each group were shorter than the 1-s target, and the groups did not significantly differ on MPI. However, the SDPI was very high ( $M = 210.1$ , range from 69.5 to 625.5 ms) for children with SLI, almost twice as high as that of controls, which indicates that children with SLI were much more irregular in their tapping activity than controls. As a result, the CV was much higher for children with SLI which indicates that, even when the MPI difference is taken into account, they still had more difficulty than children from the control group in producing a regular tempo with finger taps.

### Correlations between tasks

Performances on TOJ tasks were significantly correlated for the total sample ( $r = .50$ ,  $p < .001$ ) and for the SLI group ( $r = .42$ ,  $p < .05$ ), but not for the control group ( $r = .24$ ,  $p = .33$ ). For the total sample, the correlation between the IP task (CV) and the B-TOJ task was significant ( $r = .32$ ,  $p < .05$ ), but the correlation between the IP task and V-TOJ was not ( $r = .20$ ,  $p = .22$ ). The correlations between each of the TOJ tasks and the IP task, for the

SLI and for the control groups, were poor and none were significant. As for nonverbal IQ, the scores for the total sample were significantly correlated with TOJ performances ( $r = .32$  and  $.37$ ,  $p < .05$ ), but not with the CV of the IP task ( $r = .08$ ,  $p = .64$ ).

### Predicting group membership

One critical question regarding the temporal processing skills of children with SLI is whether performance on temporal tasks correctly identifies children with and without SLI. To assess to what extent the three temporal tasks in this study uniquely predicted group membership in this sample, a step-by-step binary logistic regression analysis was conducted, entering as predictors age, sex, NVIQ, overall performances on the V-TOJ and B-TOJ tasks, and the SDPI and CV from the production task. Table 2 presents the results of the logistic regression, with the three variables retained, 1) proportion of correct responses on the V-TOJ task, 2) CV and 3) age, indicating that a model using those three variables accurately classified 85.4 % of children in this sample. Performance on the temporal tasks alone accurately classified 78% of the children (78.9% for the controls vs. 77.3% for the SLI children), indicating that the temporal tasks are sensitive enough to detect deficits that specifically characterise children with SLI.

**Table 2**

*Variables retained to predict group membership in a step-by-step binary logistic regression with age, sex, nonverbal IQ, proportion of correct responses in the visual (V-TOJ) and bimodal (B-TOJ) temporal order judgment tasks, mean produced interval (MPI), variability of the produced intervals (SDPI), and coefficient of variation (CV) in the production task entered in the model.*

Steps	Variables in equation	Wald	Model				
			$\chi^2$	$\chi^2$ change	% correctly classified		
					Control	SLI	Overall
Step 1	V-TOJ	9.22**	16.11**		84.2	68.2	75.6
Step 2	V-TOJ	6.77**	24.26**	8.15*	78.9	77.3	78.0
	CV	5.01*					
Step 3	V-TOJ	6.76**	28.38**	4.13*	84.2	86.4	85.4
	CV	4.47*					
	Age	3.68*					

Note: \*  $p < .05$  and \*\*  $p < .01$



## Discussion

The results of the present study strongly suggest that, as a group, children with SLI have much poorer skills than controls to judge the order of sensory signals. This difference applied to both temporal order judgment tasks in this study. Most interestingly, performance on the V-TOJ task was the best overall predictor of group membership in a binary logistic regression. In sum, these results suggest that the deficit for processing temporal information in children with SLI is not specific to the auditory modality. Our results would rather support the hypothesis that there is a central processing mechanism for temporal information, not specific to a given sensory mode. Moreover, they suggest that children with SLI would be less efficient than children without SLI in using this mechanism. Likewise, in their review, Tallal, Merzenich, Miller and Jenkins (1998) suggested that children with SLI: "have a pervasive, pansensory/motor deficit, which impedes their ability to perceive or produce rapidly successive information within a tightly delineated time window of tens of ms" (p. 211).

In the visual temporal order judgment task, there was a clear decline in performance for children with SLI as they reached inter-stimuli intervals of 200 ms whereas the decline was only apparent in children without SLI when intervals decreased to 120 ms. At the 40 ms interval, children with normal language were still able to perform at a better rate than would be expected by chance whereas children with SLI seemed completely unable to process the order of signals. Thus, children with SLI need much more time between visual signals than control children to judge their order of arrival.

The bimodal task in this study was not as powerful as the visual task in distinguishing group membership. Nevertheless, the children with SLI exhibited more difficulty in distinguishing the order of arrival of a sound and a flash. Indeed, even when there was as much as 420 ms between the signals, the mean performance remained very poor (about 60% of correct responses). Heath and Hogben (2004) have suggested that a differential need for practice in clinical groups might explain poorer performance in TOJ tasks by children with dyslexia. Our tasks contained a relatively low amount of trials so this could have meant that we have measured children with SLI at a different place in their learning curves than the children with normal language had reached within the same number of trials. However, the poor performance in B-TOJ cannot be attributed to a low number of trials alone because there was no such problem in the V-TOJ task where a similar number of trials were used. It may be that the children with SLI encounter particular difficulties when they have to judge the temporal order of bi-modal sequences. Therefore, these results point toward a new direction of investigation. Having said this, it should be noted that, in the case of both V-TOJ and B-TOJ, it cannot be excluded that the method adopted is particularly difficult for SLI individuals and using a different method might have led to different results.

Children with SLI also exhibited a marked deficit for another aspect of temporal processing: When asked to replicate regular interval durations by producing a series of finger taps at the rate of 1 tap/s the variability of their produced intervals was much higher than that of children without language impairment. In fact, the CV for children with SLI was twice as high as the CV of controls. Typically, in such production tasks, the observed variability is argued to be issued from two sources. One is the motor process involved in the tapping activity and the other is associated with an inner time-keeping process (Grondin, 1992, 2001; Grondin, Metthé, & Koren, 1994; Ivry & Hazeltine, 1995; Wing & Kristofferson, 1973). Group differences may be due to both processes, motor and temporal. Some children with SLI are known to present significant fine motor skills deficits (Tallal et al., 1985). Although simple taps every second are probably not very demanding on the fine motor coordination of 6- to 9-year-old children, keeping track of time might be. Therefore, one interpretation of the results that cannot be discarded is that the timekeeping process of children with SLI may be impaired. The ability of SLI children to make judgements about the duration of time intervals is certainly another temporal issue deserving further investigation.

The very large variability observed in children with SLI is somewhat surprising if we consider that the processing in this task involved intervals lasting 1 s. This range of duration is much higher than the one usually referred to in the general temporal processing literature, which has emphasised deficits in rapid auditory sequences and/or events. In the present task, it might not be the rapidity of successive events that causes difficulty, but the fact that the sequence is long. It would therefore be the ability to keep track of a long series of events that would be critical and would distinguish children with and without SLI. This interpretation could be consistent with Hanson and Montgomery (2002) who proposed that the language disabilities and temporal processing deficit in SLI could be explained by a general processing deficit or an incapacity for sustaining attention.

The question of the specificity of temporal processes in language acquisition is one that future research needs to address more thoroughly. For instance, in this study, there were no group differences on the nonverbal IQ measure and group differences on the temporal tasks were not explained by nonverbal cognitive abilities as estimated by the BD task. However, the fact that nonverbal IQ was correlated with both TOJ tasks suggests that, although there is a non-temporal specific cognitive component to the performance on TOJ tasks, the covariance between nonverbal IQ and TOJ is not what predicts group membership. In addition, it is not the covariance between V-TOJ and B-TOJ that predicts group membership. Rather, it is the residual variance of both the visual TOJ task and the coefficient of variability that predicts group membership. This could be tentatively interpreted as evidence of the specificity of the temporal pathway to SLI. However, our study does not exclude the possibility that the deficits

observed in the SLI group are part of a more general problem affecting only a small part of the experimental group (Hanson & Montgomery, 2002; Ramus, 2003; Roach, Edwards, & Hogben, 2004). According to Roach et al. (2004), more attention needs to be allocated to the variability of the results, which is often more pronounced in the SLI or dyslexic group. Indeed, in the present study, the variability in the experimental group exceeds the variability observed in the control group. However, the deficit on the temporal tasks seems specific enough to the children with SLI to classify them in the correct group at a better than chance level. Having said this, it would be useful, in future studies, to use experimental designs with specific consideration for other cognitive processes like selective attention and working memory, to test further the hypothesis that the temporal processing deficit is part of a more generalized processing problem.

### Conclusion

Our study suggests that children in SLI classes exhibit more difficulty than children with normal language in processing the order of arrival of sensory signals. This difficulty is observed when both signals are visual stimuli, or bimodal sequences involving an auditory and a visual signal. Furthermore, children with language impairment showed more difficulty in performing a simple task involving the production of a series of intervals. Overall, our results do not suggest that temporal processing deficits may be a causal factor in SLI, but they do provide tentative new evidence that this language deficit is associated with different forms of temporal processing problems, and that these temporal deficits remain observable even when nonverbal intelligence is taken into account.

### Footnotes

<sup>1</sup>Note that a computerized intervention called Fast ForWord was designed to improve the rapid auditory temporal processing skills of children with language learning disabilities (LLD, which is a general term often used in the literature to regroup children with dyslexia and children with SLI). The interventions led to positive results on language comprehension, both in English and in French (Habib et al., 2002; Merzenich et al., 1996; Tallal et al., 1996). However, because the program contains both verbal and nonverbal stimuli, it was not possible to identify specifically which of the training of temporal processing or of linguistic skills was responsible for the improvement. Moreover, several studies where Fast ForWord was compared with different language intervention programs did not support the underlying premise of Fast ForWord, i.e., that acoustically modified speech will improve processing deficits in children's language (Cohen et al., 2005; Pokorni, Worthington & Jamison, 2004; Rouse & Krueger, 2004). In brief, some results obtained with Fast ForWord suggest that children with SLI have a deficit for processing rapid auditory sequences of events, but these results remain debatable.

<sup>2</sup>The Québec Ministry of Education defines SLI as a severe and persistent deficit of language development which restricts social interactions, socialization and academic learning. This deficit must persist above the age of five and the child must experience strongly marked difficulties in language evolution, verbal expression, cognitive-verbal functions, and moderate to severe difficulties in verbal comprehension. This deficit must prevent the child from performing school work usually proposed to children of the same age.

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# CASLPA 2007 Abstracts

## Moncton, New Brunswick

### April 25 - 28, 2007

#### Preconference Workshops

##### **Strategies for Solving Behaviour Problems in Children of Ages 2 to 12 Years**

*Paul McDonnell, PhD, University of New Brunswick, and Clinical Child Psychologist in private practice, Fredericton, NB*

Behaviour problems are common. Therapists report that child behaviour problems prevent or significantly delay treatment. In school, the costs are high and long lasting. Behavioural techniques are effective within a relatively short period. In this workshop we will explore typical behaviour problems in children, look at solutions using traditional models and look at some new directions.

##### **Dysphagia Assessment and Management: Techniques for All Clinicians**

*Julie Stierwalt, PhD, Florida State University, Tallahassee, FL*

This seminar will focus on advances in the assessment and treatment of individuals with dysphagia. While instrumental techniques abound in dysphagia management, this workshop will focus on techniques (instrumental and non-instrumental) to be utilized by any clinician. Rationale for adopting their use and current evidence will also be shared.

##### **Understanding Ototoxicity: Ototoxicity Monitoring and New Otoprotective Agents for Ototoxic and Noise-Induced Hearing Loss**

*Kathleen Campbell, PhD, Southern Illinois University School of Medicine, Springfield, IL*

This presentation will review relevant terminology in pharmacology, mechanisms of ototoxicity, monitoring options, and ototoxins in current clinical use. Ototoxic agents will be discussed with regards to therapeutic purposes, side effects, additional risk factors, and patient considerations. Research on new pharmacologic otoprotective agents for noise and ototoxic-induced hearing loss will also be presented.

#### Speech-Language Pathology and Audiology Workshops

##### **Emerging from the "Locked In" Syndrome**

*Shawn Jennings, MD, Saint John, NB*

Dr. Shawn Jennings will describe his experience in being "locked in" after a brainstem stroke. He had been a family doctor for 20 years before his stroke at the age of 46. He will describe his journey to acceptance and the struggle to find happiness in his new life. He will share with us what speech-language therapy and being unable to communicate meant to him.

#### Audiology Workshops

##### **Best Practices for Diagnosis and Monitoring of the Impact of Ototoxicity on Hearing and Vestibular Function**

*Jayne Handelsman, PhD, University of Michigan Health System, Ann Arbor, MI*

Ototoxicity is a negative consequence of the use of certain medications for the treatment of serious illness including infection and cancer. As audiologists, our goal is to monitor the impact of potentially toxic agents on hearing and vestibular system function. This presentation will discuss optimal audiological management of ototoxicity.

##### **Hair Cell Regeneration: What is the Potential for Therapeutic Intervention?**

*Brenda Ryals, PhD, James Madison University, Harrisonburg, VA*

This presentation is designed for non-biologists who want to learn more about the cellular and molecular mechanisms involved in hair cell regeneration. Recent advances in the use of stem cells and gene therapy in the mammalian cochlea will be reviewed, as well as functional changes in hearing following hair cell regeneration.

##### **Hereditary Hearing Loss and Modern Genetics: The Audiologist's Perspective**

*Linda Hood, PhD, Vanderbilt University, Nashville, TN*

Advances in molecular genetics have led to the discovery of numerous genes related to hearing loss. Auditory characteristics of genetic forms of hearing loss will be discussed. The role of audiologists will be explored in relation to describing auditory characteristics and obtaining pedigree information from patients and their families.



### **Understanding and Managing Patients with Auditory Neuropathy/Dys-synchrony**

*Linda Hood, PhD, Vanderbilt University, Nashville, TN*

Patients with auditory neuropathy/dys-synchrony (AN/AD) vary in auditory and other characteristics, with difficulty understanding speech, particularly in noise. Management includes consideration of communication options including visual information for language learning in children without cochlear implants. Patient variation and considerations for evaluation and management in infants, children and adults will be discussed.

### **Where will Audiology be in 25 Years?**

*Moderator: Louise Getty, PhD, Université de Montréal, Montreal, QC*

*Panelists: Kathleen Campbell, PhD, Southern Illinois University School of Medicine, Springfield, IL*

*Jayne Handelsman, PhD, University of Michigan Health System, Ann Arbor, MI*

*Linda Hood, PhD, Vanderbilt University, Nashville, TN*

*Brenda Ryals, PhD, James Madison University, Harrisonburg, VA*

Where is audiology today and where will it be in 25 years? Will we ever be able to stop hearing loss before it occurs? On the last day of the conference, all of the audiology presenters will participate in a panel. Each will present their vision of audiology in 25 years from now based on information from their respective fields of expertise.

### **Infant Hearing Screening: The New Brunswick Experience**

*André Lafargue, MSc, Dr. Everett Chalmers Regional Hospital, Fredericton, NB*

*John Serkiz, MSc, New Brunswick Department of Health, Fredericton, NB*

A universal newborn and infant hearing screening program was implemented in New Brunswick 5 years ago and despite normal growing pains, has been a resounding success. This presentation will review the start-up of the program, changes since its inception and data from the first 5 years. Recommendations and directions for the future will also be highlighted.

## **Speech-Language Pathology Workshops**

### **Cranial Nerves: Implications for Speech and Swallowing**

*Julie Stierwalt, PhD, Florida State University, Tallahassee, FL*

This seminar will review the importance of cranial nerve assessment. Demonstration and an opportunity to practice conducting a cranial nerve screen will be provided. In addition, direct implications of impairment on those cranial nerves vital for speech and swallowing will be discussed.

### **S-LP Intervention with Bilingual and Multilingual Children (presented in English)**

*Elin Thordardottir, PhD, McGill University, Montreal, QC*

Children from bilingual and multilingual backgrounds are a growing population in Canada. Whereas bilingual exposure was traditionally discouraged for children with developmental disabilities, bilingualism is currently viewed far more positively. Nevertheless, language assessment and intervention for bilingual children remains a remarkably difficult area for S-LPs. This workshop will present recent research addressing clinical work with bilingual children.

### **Multi-Modal Communication and Adaptive Play for Young Children and Children Functioning at Young Levels**

*Linda Burkhart, MS, Consultant and Technology Integration Specialist, Eldersburg, MD*

Play is the young child's most powerful mode for learning. Through assistive technology, we can put children back in control of play and learning. Discover ways of using multi-modal communication so we can provide children with both receptive and expressive tools to develop language and communication skills. This session will include a "Make & Take" component.

### **Medication Effects on Speech and Swallowing**

*Irene Campbell-Taylor, PhD, Clinical Neuroscientist, Sydney, NS*

This presentation will describe the ways in which commonly used medications can adversely affect the ability to speak and swallow, as well as how swallowing dysfunction affects the delivery and availability of many drugs. The effects on nutrition and hydration will be highlighted, as well as suggestions for correcting the problem.

### **The Irritable Larynx Syndrome**

*Murray Morrison, MD, University of British Columbia, Vancouver, BC*

*Linda Rammage, PhD, University of British Columbia, Vancouver, BC*

The irritable larynx syndrome (ILS) is a clinical picture in which a person develops laryngeal spasm, triggered by a sensory stimulus. The laryngospasm might produce airway obstruction, chronic paroxysmal cough, pharyngeal-laryngeal globus and/or dysphonia. Relevant theory, the multifactorial factors contributing to ILS, and assessment and management strategies will be presented.

### **Strategic Teaching for Struggling Learners**

*Barbara J. Ehren, EdD, University of Kansas, Sunrise, FL*

S-LPs working with the school-age population must address literacy and curriculum needs if they are to provide relevant therapeutic intervention. For many S-LPs this means an expanded view of their traditional role with oral language intervention. S-LPs will understand the unique contributions they can make to literacy achievement.

### **Evaluating and Treating Prelinguistic Communication Disorders**

*Shirley Leew, PhD, Calgary Health Region, Calgary, AB*

Prelinguistic communication has an important relationship with later social communication and language development. Early prelinguistic intervention is a developing domain for S-LPs. Interventions for children at-risk and those with confirmed delays can ameliorate subsequent delays. This workshop will focus on evaluating current evidence and developing skills to identify, assess and plan successful interventions.

### **Intervention with Bilingual & Multilingual Children**

*Elin Thordardottir, PhD, McGill University, Montreal, QC*

Children from bilingual and multilingual backgrounds are a growing population in Canada. Whereas bilingual exposure was traditionally discouraged for children with developmental disabilities, bilingualism is currently viewed far more positively. Nevertheless, language assessment and intervention for bilingual children remains a remarkably difficult area for S-LPs. This workshop will present recent research addressing clinical work with bilingual children.

### **Experiences in Aphasia Group Therapy**

*Linda Carey, MA, InteRACT Program Director, Halifax, NS*

Group therapy for aphasia can be a dynamic form of service delivery. This presentation will review the "evolution" of one long-standing therapy group and will highlight considerations for starting a group, session format, skills necessary to run an interactive (and enjoyable!) group, treatment material resources, and methods for recording outcomes.

### **Literacy in Low-income Homes: Implications for S-LPs**

*Rhonda Rubin, PhD, Extra Mural Services, Sackville, NB*

Research suggests that parental language input and emergent literacy experiences of children from low-income homes differs from that of children from more privileged backgrounds. By understanding these differences and working with families, speech-language pathologists can play a critical role in helping a child experience success in both school and society.

### **Panel on Early Language Services Across Canada: Where Are We Now?**

*Panelists to be announced*

The importance of early language skills in mastering both communication and pre-literacy skills has prompted the growth of early language services (ELS) in many regions of the country. Panelists will discuss their unique ELS programs, share experiences and consider the future of ELS initiatives.

### **Cognitive-Communication Disorders after Right Hemisphere Stroke**

*Leora Cherney, PhD, Northwestern University, Chicago, IL*

This short course will present a general framework for managing cognitive-communication disorders in adults with right hemisphere dysfunction. It will provide more specific updated information about two areas that are typically impaired in these patients: (1) attention and neglect, and (2) social skills and pragmatics. Practical tasks for assessing and treating these areas will be discussed.

### **Language and Literacy: Making the Classroom Connection**

*Lynne Healy, MSc, Acadia University, Hammonds Plains, NS*

This interactive workshop will provide participants with a framework for developing oral language skills in the classroom context, making specific links between oral language and literacy development. Suggestions for collaborating more effectively with teachers will also be discussed.

### **A Model for Autism Intervention Training (AIT) for the Province of New Brunswick**

*Paul McDonnell, PhD, University of New Brunswick, and clinical child psychologist in private practice, Fredericton, NB*

In 2003, New Brunswick began funding intensive intervention programs for preschool children. In the last three years we have provided a unique training package to over 300 practitioners. In this presentation, we will look at the impact of this interdisciplinary program on the province, on families and children, and on professionals and their professions.

## **Speech-Language Pathology and Audiology Contributed Papers**

### **Evaluating Sound Field Amplification Technology in New Brunswick Schools**

*Rhonda Rubin, MSc, S-LP(C), CCC-SLP, MEd, PhD, SE Regional Health Authority, Sackville, NB*

*Catherine Aquino-Russell, BScN, MN, PhD, University of New Brunswick, Moncton, NB*

*Joan Flagg-Williams, BA, Med, PhD, Atlantic Baptist University, Moncton, NB*

This presentation will describe a research project which evaluated the use of free field sound amplification in early elementary classrooms. This study included over 1,100 students in 60 classrooms across the province. Quantitative and qualitative data were collected and analyzed including: communication flow, reading achievement, and teachers' and students' perceptions.

### **Inter-professional Learning in Rehabilitation in the Context of HIV**

*Janet Wu, MHSc, Reg CASLPO, St. Michael's Hospital, Toronto, ON*

*Gillian Bone, MSc CPD, Canadian Working Group on HIV and Rehabilitation, Toronto, ON*

*Debra Cameron, PhD, Med, BSc (OT), University of Toronto, Toronto, ON*

*Kelly O'Brien, BSc, BScPT, PhD (cand), University of Toronto, Toronto, ON*

*Elisse Zack, MA, MMgt, Canadian Working Group on HIV and Rehabilitation, Toronto, ON*

This session will describe an innovative national capacity-building project for rehabilitation professionals regarding rehabilitation in the context of HIV, increase the knowledge of speech-language pathologists and audiologists on the unmet rehabilitation needs of people living with HIV, and describe an inter-professional education model for rehabilitation professionals.

## Audiology Contributed Papers

### What are We Really Testing with Speech in Noise Tests?

*Josée Lagacé, PhD candidate, Université de Montréal, Montréal, QC*

*Benoît Jutras, PhD, Université de Montréal, Montréal, QC*

*Jean-Pierre Gagné, PhD, Université de Montréal, Montréal, QC*

*Amineh Abdollah, PhD candidate, Université de Montréal, Montréal, QC*

Hearing-related factors as well as non-hearing-related factors can influence performances on speech in noise tests. Moreover, most of the available speech in noise tests are known to present marginal sensitivity. Explored ways to get specific information about speech in noise difficulties amongst children with auditory processing disorders will be discussed.

## Speech-Language Pathology Contributed Papers

### Development and Pilot Testing of the FOCUS: Focus on the Outcomes of Communication Under Six

*Nancy Thomas-Stonell, BSc, DSP, S-LP(C), CCC-Slp, Bloorview Research Institute, Toronto, ON*

*Bernadette Robertson, LCST, Bloorview Research Institute, Toronto, ON*

*Bruce Oddson, PhD, Laurentian University, Sudbury, ON*

*Peter Rosenbaum, MD, CanChild Centre for Childhood Disability Research, Hamilton, ON*

This paper describes the development and pilot testing of a new communication outcome measure for preschool children. Based on the WHO ICF framework, it links speech and language treatment to the child's ability to 'participate' in their world. Items are derived from parent and clinicians observations of changes after therapy.

### Gathering Research Evidence Using Systematic Techniques in Pediatric Speech-Language Pathology

*Cyne Johnston, Doctoral candidate, University of Ottawa, Ottawa, ON*

*BJ Collins, MSc, KidsAbility, Waterloo, ON*

*Kathleen Bloom, PhD, The University of Waterloo, Waterloo, ON*

This project created a Catalogue of Speech Language Pathology Reviews. Eleven sources were systematically searched for pediatric review articles published between 2000 and 2006, and 65 met criteria. Reviews examined pediatric speech and language assessments and interventions, and described speech and language development. The catalogue will be disseminated to speech-language pathologists.

### SLI, the ICF and You: How New Conceptualizations of Disability May Change the Way You Work with Children with Language Impairment

*Lynn Dempsey, PhD, Brock University, St. Catharines, ON*

*Wenonah Campbell, MSc, University of Western Ontario, London, ON*

*Elizabeth Skarakis-Doyle, PhD, University of Western Ontario, London, ON*

In this session we explore how new conceptualizations of disability may impact clinical practice with children with SLI. We provide an overview of the International Classification of Functioning Disability and Health and discuss clinical practices it supports, including: functional assessment, universal design for learning, and the interactive teaming approach to treatment.

### An Intensive Intervention Approach for Children Who are Selective Eaters

*Kimberly MacKeigan, MSc, S-LP, Stan Cassidy Centre for Rehabilitation, Fredericton, NB*

*Barbara Dugas, BSc, RD, Stan Cassidy Centre for Rehabilitation, Fredericton, NB*

*Elizabeth McDonnell, BSc, OT (C), Private Practice, Fredericton, NB*

Food selectivity is common among children with developmental disabilities. Research has demonstrated the efficacy of a behaviour management approach to solving feeding problems. Based on the research and clinical experience, the Paediatric Feeding Team at the Stan Cassidy Centre for Rehabilitation has developed an intensive intervention protocol for increasing food acceptance.

### Perspectives on Parent Participation in School Speech-Language Pathology Services

*Kelly Roberts, MSc, S-LP (C), MAEd, Cape Breton – Victoria Regional School Board, Sydney, NS*

This research study examined the perceptions of parents and speech-language pathologists on aspects of parent involvement in school speech-language pathology services in Nova Scotia. Results of the study validated the need for improved communication and collaboration with parents and served as an impetus for piloting a new service delivery model.

### Radiation Safety for S-LPs Performing Videofluoroscopy

*Linda Walsh, MHSc, S-LP(C), Moncton Hospital, Moncton, NB*

As dysphagia caseloads for S-LPs have increased over the years, so has the amount of time S-LPs spend in radiology suites. S-LPs have, however, received little or no training in radiation safety. This presentation will explain the radiation risks associated with videofluoroscopy and will recommend radiation safety guidelines for S-LPs.

### Validation and normalization of MacArthur Communicative Development Inventories

*Natacha Trudeau, Assistant Professor, Université de Montréal, Montréal, QC*

*Caroline Bouchard, Assistant Professor, UQAM*

*Marie-Claude Boudreault, speech-language pathologist, Université de Montréal, Montréal, QC*

*Ann Sutton, Associate Professor, Université de Montréal, Montréal, QC*

This paper will look at the validation and normalization of a questionnaire to parents (MCDI). Data will be presented on the psychometric value of the MCDIs and norms in relation to the Quebec Francophone population. These data will allow the tool to be used in practice with young children.

### **Phonological development among Francophone children aged 18 to 54 months**

*Ann Sutton, PhD, Université de Montréal, Montréal, QC*

*Natacha Trudeau, Assistant Professor, Université de Montréal, Montréal, QC*

*Annick Poupart*

*Valérie Grenon, MPA*

*Elin Thordardottir, PhD, McGill University, Montréal, QC*

*Nicole Lessart, PhD*

Phoneme and liaison production was evaluated among 80 francophone children (18-54 months). Correct production increased with age, with a majority of phonemes being correct by four years of age, although errors did remain. Liaison production varied greatly depending on the word used.

### **A Preschool Language/Literacy Project that Supports Children, Families and Preschool Teachers**

*Patricia Smith, MSc, School District # 23, Westbank, BC*

The research, process, and results of a preschool language/literacy camp with the implications for early language/literacy practice on long term student achievement has resulted in a mentorship program for preschool teachers incorporating language/literacy-based, age-appropriate experiences with a family-focused component into their preschool programs.

### **Early Response to Language Intervention (ERLI) Program**

*Ken Albanese, Halton Peel Preschool Speech and Language Program, Mississauga, ON*

*Jan Pepper, MCISc, Peel Preschool Speech and Language Program, Mississauga, ON*

*Marilou Jack, Peel Preschool Speech and Language Program, Mississauga, ON*

*Madhu Jain, Peel Preschool Speech and Language Program, Mississauga, ON*

*Kristi Morgan, MCISc, Peel Preschool Speech and Language Program, Mississauga, ON*

*Charisse Pantin, Peel Preschool Speech and Language Program, Mississauga, ON*

The Early Response to Language Intervention (ERLI) Program, part of the Halton Peel Preschool Speech and Language Program, provides early identification and treatment of communication disorders in children 30 months of age or younger at the time of referral in order to provide intervention as early as possible and to reduce overall wait times for services.

### **Considerations for AAC in Children with Cortical Visual Impairment**

*Cindy Millar, MSc, APSEA, Halifax, NS*

*Patsy Newman, MA, MSc, APSEA, Halifax, NS*

Cortical Visual Impairment (CVI) is the leading cause of visual impairment in children. This condition is frequently associated with multiple disabilities. The presentation will briefly examine the unique characteristics of the three phases of CVI. Considerations and practical adaptations of AAC strategies, to enable effectiveness and build stable visual behaviour at each phase, will be examined.

### **Augmentative Alternative Communication: Transitioning Best Practices**

*Stacey Harpell, BS, MC, CCC-SLP, City Hospital, Saskatoon, SK*

This presentation discusses how to decrease transition issues for children who are AAC users. The presentation will centre on two specific transition times, the transition from one physical setting to another, and secondly the transition from one grade level to the next.

### **Beyond Consultation – Using Telehealth to Provide Intervention**

*Sandy Nickel, Capital Health, Sherwood Park, AB*

*Karyn Forst, Capital Health, Sherwood Park, AB*

*Cindy Dekort, Aspen Regional Health, Raday, AB*

This presentation will focus on the use of telehealth in providing ongoing clinical speech-language services to rural and remote areas of Alberta. Experiences, successes, and lessons learned will be shared with participants.

### **Videoconferencing for Distant Clients – It Works for AAC**

*Loralee MacLean, MHSc, Toronto Rehabilitation Institute, Toronto, ON*

*Monique Fourcaudot, MA, Toronto Rehabilitation Institute, Toronto, ON*

This session will focus on sharing the clinic's experiences using videoconferencing to provide Augmentative and Alternative Communication (AAC) assessment and intervention to long distance adult clients with acquired conditions. The challenges and potential factors that lead to successful AAC interventions will be discussed.

### **Using Videoconference Technology to Enhance Reflective Practice Skills**

*Lynn Ellwood, University of Toronto, Toronto, ON*

*Jacqueline Hummelbrunner, Northern Ontario School of Medicine, Thunder Bay, ON*

The University of Toronto partnered with Northern Ontario School of Medicine to evaluate the potential for using videoconference technology to promote reflective practice skills in speech-language pathology students on placement in remote settings. Results illustrate the benefits and challenges of this approach as compared to current practice using face-to-face groups.

### **Evidence-based Clinical Education in Speech-Language Pathology**

*J. Alexa Okrainec, Brandon University, Winnipeg, MB*

Scientific criteria are being applied to medical education through the Best Evidence Medical Education (BEME) initiative. Lessons learned about how to train doctors could and should be applied to the clinical education of speech-language pathologists. The purpose of this session is to address the need for evidence-based clinical education, to review the BEME initiative, and to provide recommendations for enhancing the clinical education of speech-language pathologists.



## Poster Sessions

### **SPEECH-LANGUAGE PATHOLOGY AND AUDIOLOGY**

#### **Implementation Strategies for an Inter-professional Rehabilitation University Clinic in Primary Health Care**

*Lynn Metthé, MScS, Reg CASLPO, University of Ottawa, Ottawa, ON*

*Claire-Jehanne, PhD, University of Ottawa, Ottawa, ON*

*Jacinthe Savard, University of Ottawa, Ottawa, ON*

*Paulette Guitard, PhD, University of Ottawa, Ottawa, ON*

*Marie-Josée Thelland, University of Ottawa, Ottawa, ON*

Steps involved in the development and implementation of an inter-professional rehabilitation university clinic in primary health care will be presented. Results of a gap analysis identifying the limitations of the current service delivery will be reviewed. Challenges encountered during implementation and our partner's level of satisfaction will be discussed.

#### **Knowledge Transfer: How Do Physicians Learn Best**

*Robin Gaines, MA, PhD, CCC-SLP, S-LP (C), CASLPO, Children's Hospital of Eastern Ontario, Ottawa, ON*

*Cheryl Missiuna, PhD, McMaster University, Hamilton, ON*

*Mary Egan, PhD, University of Ottawa, Ottawa, ON*

*Jennifer McLean, MD, Children's Hospital of Eastern Ontario, Ottawa, ON*

*Denise De Laat, Med, CHEO Research Institute, Ottawa, ON*

A recent study in the Ottawa region used innovative knowledge translation techniques to educate 147 primary care physicians about Developmental Coordination Disorder. Project activities, physician preferences for learning, as well as the successes and barriers to knowledge transfer will be described. Implications for inter-professional education and collaboration will also be discussed.

### **SPEECH-LANGUAGE PATHOLOGY**

#### **Adult and Child Storytelling: What Changes Past Age 9?**

*Miranda Brown, MSc-SLP, University of Alberta, Edmonton, AB*

*Phyllis Schneider, PhD, University of Alberta, Edmonton, AB*

Previous research using the Edmonton Narrative Norms Instrument indicated little change in information included by typically developing children aged 7-9. The present study compared story information included by adults versus 9-year-olds. In complex stories, adults included more story information overall, and more Setting, Initiating Event, and Internal Response units.

### **CHILD LANGUAGE**

#### **Helping Preschoolers Communicate: An Interactive Parent Training Group**

*Lisa Schumacher, MSc(A), S-LP(C), Mackay Rehabilitation Centre, Montreal, QC*

*Sonia Bérubé, Mackay Rehabilitation Centre, Montreal, QC*

*Lucie Andonian, Mackay Rehabilitation Centre, Montreal, QC*

Parents and preschoolers presenting speech-language difficulties participated in Helping Preschoolers Communicate: Interactive Parent Training Program at Mackay Rehabilitation Centre. An S-LP and psychoeducator explained strategies for actively supporting children's communication and social skills in a parent-centred class. Parents applied the strategies to their children with the coaching of the instructors.

#### **Effect of word type in relation to specific forms of phonological sensitivity**

*Joline Poirier, Université de Moncton, Moncton, NB*

*Pierre Cormier, Université de Moncton, Moncton, NB*

*Alain Desrochers, University of Ottawa, Ottawa, ON*

This study considered the role of the nature of stimuli and responses (real vs. invented words) in phonemic and syllabic sensitivity tasks performed by 192 Francophone students. The analyses revealed significant stimulus and response effects particular to syllabic and phonemic elision.

#### **Weighted Vests Affect Joint Attention Episodes for Children with ASD**

*Shirley Leew, PhD, CCC-SLP, S-LP(C), Calgary Health Region, Calgary, AB*

*Nicole Stein, BScOT, Calgary Health Region, Calgary, AB*

*Ben Gibbard, MD, MCS, MScFRCPC, Alberta Children's Hospital, Calgary Health Region, Calgary, AB*

*Margaret Clarke, MD, FRCPC, University of Calgary and Calgary Health Region, Calgary, AB*

Treatment for toddlers with ASD and sensory difficulties includes wearing weighted vests. We examine the effects of this intervention on joint attention (JA) episodes. Early interventions targeting joint attention may generate better communication and language outcomes. Multiple baseline methods allowed systematic examination of changes in JA because of this intervention.

**Sound Skills: Research-based Instruction***Susan Bassili, MHSc, Peel District School Board, Mississauga, ON*

Sound skills refer to students' ability to consciously think about and demonstrate their knowledge of the structure of spoken language. Pre/post testing of these skills was completed in Kindergarten. The data demonstrates that with direct instruction, sound awareness skills can be taught and is correlated with their reading and writing marks.

**How is Parent Training So Empowering?***Carolyn Cronk, Associate Professor, Université de Montréal, Montreal, QC*

S-LPs have given considerable attention to what parents learn to do within parent training programs. This presentation will take an in-depth look at just what the S-LP does or can do to facilitate the parent's journey towards feeling truly able to foster his or her atypical child's development.

**ADULT LANGUAGE****Investigating Sentence Shaper: A Processing Prosthesis***Erin Albright, MSc, University of British Columbia, Vancouver, BC**Barbara Purves, PhD, University of British Columbia, Vancouver, BC*

This study explored possible uses of Sentence Shaper (Linebarger, McCall, & Berndt, 2004), a language remediation software program for nonfluent aphasia. The objectives were, first, to replicate Linebarger et al.'s (2004) study and, second, to explore ways in which Sentence Shaper could be used to augment communication in everyday life.

**Category Specific Impairments and Multiple Semantic Systems: A Case Discussion***Gopee Krishnan, MSc, Manipal Academy of Higher Education, Manipal, Karnataka, India**Shivani Tiwari, MSc, Manipal Academy of Higher Education, Manipal, Karnataka, India**Raj Shekar, PhD, Manipal Academy of Higher Education, Manipal, Karnataka, India*

This presentation discusses the differential impairment of verbs in an anomia patient Ms. VSB. The difference in performance between verb and noun naming has been discussed in light of recent advances category-specific impairments following the brain damage and the explanatory hypothesis of multiple semantic systems is addressed.

**ADULT SERVICES****Breaking Bread Together: Building Volunteer Mealtime Assistance Programs***Elizabeth Hanna, MHSc, Reg CASLPO, Bridgepoint Health, Toronto, ON**Bob Tychynski, MHSc, S-LP(C), Reg CASLPO, Bridgepoint Health, Toronto, ON**Elissa Cuccan, University of Toronto, Toronto, ON**Eudice Rotfarb, Baycrest, Toronto, ON*

Volunteer mealtime assistance programs are often proposed as a way to increase residents' quality of life and improve nutritional intake. A comparison between two very different but healthy programs will help participants better understand the challenges in their development, and provide tools to meet these challenges.

**CLINICAL EDUCATION/INSERVICE****Learning about Disabilities: A Professional Development Program***Laureen McIntyre, PhD, S-LP(C), CCDC-SLP, University of Saskatchewan, Saskatoon, SK*

Eight professional development modules concerning disabilities and disability-related topics were developed in partnership with Saskatoon Association for Community Living. The development and ongoing adaptation of the modules, and implications for speech-language pathologists with regard to the needs for inservicing and the potential impact on service delivery will be discussed.

**AUDIOLOGY****Hearing Screening and Classroom Acoustical Considerations: Results of a Provincial Initiative***Rhonda Rubin, MSc, S-LP(C), CCC-SLP, MEd, PhD, Extra-Mural Services, Sackville, NB**Tim Lushington, Nova Scotia Hearing and Speech Centre, Amherst, NS*

In 2006, an audiologist and speech-language pathologist screened children's hearing in kindergarten to grade 3 from three school districts in New Brunswick. Ambient noise levels were measured in selected classrooms by an audiologist. Results of this initiative will be shared, along with recommendations for improving the listening environment for students.

**Aggregated Autocorrelogram for the Perception of the Missing Fundamental***Takahide Matsuoka, Utsunomiya University, Utsunomiya, Japan**Masahiro Ogawa, Utsunomiya University, Utsunomiya, Japan*

We found by model experiments that aggregated autocorrelogram plays an important role in the perception of the missing fundamental. It was suggested that the auditory centre had the function making autocorrelogram. The function making aggregated autocorrelogram was not obvious. We have made Integrate-and-Fire unit producing the information of aggregated autocorrelogram.

# Congrès de l'ACOA 2007

## Moncton (Nouveau-Brunswick) du 25 au 28 avril, 2007

### Ateliers antérieurs au congrès

#### **Stratégies pour résoudre les troubles de comportement chez les enfants de 2 à 12 ans**

*Paul McDonnell, PhD, Université du Nouveau-Brunswick, pédopsychologue exerçant en clinique privée, Fredericton (Nouveau-Brunswick)*

Les troubles de comportement sont répandus. Les thérapeutes déclarent que ces troubles empêchent ou retardent considérablement les traitements. Les écoles le paient cher, longtemps. Les techniques comportementales sont efficaces sur une période relativement courte. Dans cet atelier, nous analyserons les troubles de comportement typiques chez les enfants, considérerons des solutions en suivant des modèles conventionnels et examinerons quelques nouvelles orientations.

#### **Évaluation et traitement de la dysphagie : techniques pour tous les cliniciens**

*Julie Stierwalt, PhD, Florida State University, Tallahassee (Floride)*

Cette séance se concentrera sur l'évaluation de l'état et le traitement des personnes atteintes de dysphagie. Bien que les techniques utilisant des appareils abondent dans le traitement de la dysphagie, cet atelier se concentrera sur les techniques (avec et sans appareils) que tout clinicien doit utiliser. La séance permettra également de communiquer les raisons de leur adoption ainsi que les observations actuelles.

#### **Comprendre l'ototoxicité : suivi de l'ototoxicité et nouveaux agents de protection contre l'ototoxicité et la perte auditive occasionnée par le bruit.**

*Kathleen Campbell, PhD, École de médecine de l'Université Southern Illinois, Springfield (Illinois)*

Cet exposé examinera la terminologie pertinente en pharmacologie, les mécanismes de l'ototoxicité, les choix en matière de suivi ainsi que l'utilisation actuelle des ototoxines en clinique. Nous discuterons des agents ototoxiques relativement aux objectifs de la thérapie, aux effets secondaires, aux facteurs de risque supplémentaires et aux éléments à prendre en considération pour le patient. Les résultats de la recherche sur les nouveaux agents de protection contre l'ototoxicité en pharmacologie visant la perte d'audition occasionnée par le bruit et aux ototoxines feront également l'objet d'un exposé.

### Ateliers en orthophonie et audiologie

#### **Sortir du syndrome de déafférentation motrice**

*Shawn Jennings, MD, Saint John (Nouveau-Brunswick)*

Dr Shawn Jennings relatera son expérience de « déafférentation » après un infarctus du tronc cérébral. Il a été médecin de famille pendant 20 ans avant son infarctus, survenu à 46 ans. Il décrira son parcours vers l'acceptation et ses efforts pour trouver le bonheur dans sa nouvelle vie. Il partagera avec nous ce que l'orthophonie et l'incapacité de communiquer ont représenté pour lui.

### Ateliers en audiologie

#### **Pratiques exemplaires pour le diagnostic et la surveillance des effets de l'ototoxicité sur l'ouïe et la fonction vestibulaire**

*Jayne Handelsman, PhD, Centre hospitalier de l'University of Michigan, Ann Arbor (Michigan)*

L'ototoxicité est une conséquence néfaste de l'administration de certains médicaments pour le traitement de maladies graves, y compris les infections et les cancers. À titre d'audiologistes, notre objectif est de surveiller les effets d'agents qui peuvent être toxiques sur l'ouïe et la fonction vestibulaire. Cet exposé permettra de discuter du traitement optimal de l'ototoxicité par l'audiologiste. Régénération des cellules ciliées : quel est le potentiel dans le cadre d'une intervention thérapeutique?

### **Régénération des cellules ciliées : quel est le potentiel dans le cadre d'une intervention thérapeutique?**

*Brenda Ryals, PhD, James Madison University, Harrisonburg (Virginie)*

Cet exposé s'adresse aux professionnels autres que les biologistes qui désirent en apprendre davantage sur les mécanismes cellulaires et moléculaires intervenant dans la régénération des cellules ciliées. Nous passerons en revue les progrès récents de l'utilisation des cellules souches et de la thérapie génique dans la cochlée chez le mammifère, de même que les changements fonctionnels de l'ouïe consécutifs à la régénération des cellules ciliées.

### **Perte auditive héréditaire et génétique moderne : le point de vue de l'audiologiste**

*Linda Hood, PhD, Vanderbilt University, Nashville (Tennessee)*

Les progrès de la génétique moléculaire ont mené à la découverte de nombreux gènes liés à la perte auditive. L'atelier traitera des caractéristiques des formes de perte auditive associées au patrimoine génétique. Il permettra d'analyser le rôle des audiologistes dans la description des caractéristiques auditives et l'obtention de renseignements généalogiques des patients et des membres de leur famille.

### **Comprendre et prendre en charge les patients souffrant de neuropathie auditive et de dyssynchronie**

*Linda Hood, PhD, Vanderbilt University, Nashville (Tennessee)*

Les patients souffrant de neuropathie auditive et de dyssynchronie ne présentent pas tous les mêmes caractéristiques auditives, certains ayant de la difficulté à comprendre les paroles, particulièrement en présence de bruit. Le traitement inclut la prise en compte d'options pour communiquer, y compris de l'information visuelle permettant l'acquisition du langage chez les enfants sans implants cochléaires. Nous traiterons des différences et des éléments à prendre en considération d'un patient à l'autre en vue de l'évaluation et de la prise en charge des tout-petits, des enfants et des adultes.

### **Où l'audiologie en sera-t-elle dans 25 ans?**

*Modératrice : Louise Getty, PhD, Université de Montréal, Montréal (Québec)*

*Expertes : Kathleen Campbell, PhD, École de médecine de la Southern Illinois University, Springfield (Illinois)*

*Jayne Handelsman, PhD, Centre hospitalier de l'University of Michigan, Ann Arbor (Michigan)*

*Linda Hood, PhD, Vanderbilt University, Nashville (Tennessee)*

*Brenda Ryals, PhD, James Madison University, Harrisonburg, (Virginie)*

Où en est l'audiologie aujourd'hui et où en sera-t-elle dans 25 ans? Arriverons-nous jamais à empêcher la perte auditive? Le dernier jour de la conférence, tous les conférenciers en audiologie prendront part à un groupe d'experts. Chacun présentera sa vision de l'audiologie dans 25 ans en s'inspirant des données de son domaine de spécialisation respectif.

### **Dépistage des troubles de l'audition chez les tout-petits: l'expérience du Nouveau-Brunswick**

*André Lafargue, M.Sc., Hôpital régional Dr-Everett-Chalmers, Fredericton (Nouveau-Brunswick);*

*John Serkiz, M.Sc., ministère de la Santé du Nouveau-Brunswick, Fredericton (Nouveau-Brunswick)*

Il y a cinq ans, nous avons mis sur pied un programme universel de dépistage des troubles de l'audition chez les nouveau-nés et les tout-petits au Nouveau-Brunswick. Malgré les difficultés de croissance normales, ce programme a obtenu un succès retentissant. Cet exposé permettra d'examiner le démarrage du programme, les changements apportés depuis sa création et les résultats des cinq premières années. L'atelier permettra aussi de faire des recommandations et de montrer des orientations pour l'avenir.

## **Ateliers en orthophonie**

### **Nerfs crâniens : répercussions sur la parole et la déglutition**

*Julie Stierwalt, PhD, Florida State University, Tallahassee (Floride)*

Cette séance permettra d'examiner l'importance du diagnostic neurologique crânien. Elle offrira une démonstration et une occasion de travailler le dépistage des troubles neurologiques crâniens. De surcroît, nous parlerons des conséquences directes d'une dégradation pour les nerfs crâniens, indispensables à la parole et à la déglutition.

### **Interventions en orthophonie auprès d'enfants bilingues et multilingues**

*Elin Thordardottir, PhD, Université McGill, Montréal (Québec)*

Le nombre d'enfants de milieux bilingues et multilingues est en croissance au Canada. Bien qu'il était auparavant déconseillé d'exposer au bilinguisme des enfants ayant des troubles du développement, le courant de pensée à ce sujet semble maintenant beaucoup plus favorable. Néanmoins, l'évaluation linguistique et l'intervention auprès de ces enfants demeure un domaine remarquablement difficile pour les orthophonistes. Cet atelier présentera les dernières recherches traitant du travail clinique auprès d'enfants bilingues.

### **Divers modes de communication et jeu d'adaptation à l'intention des jeunes enfants et des enfants au développement tardif**

*Linda Burkhart, M.Sc., consultante et spécialiste de l'intégration des technologies, Eldersburg (Maryland)*

Le jeu est le mode d'apprentissage privilégié des jeunes enfants. Grâce à la technologie d'aide, nous pouvons redonner aux enfants les commandes du jeu et de l'apprentissage. Découvrez des façons d'utiliser divers modes de communication afin que nous puissions offrir aux enfants des outils favorisant la réception et l'expression qui leur permettront d'acquérir des habiletés pour le langage et la communication. Cette séance comprend un volet « Faire et faire faire ».



### **Effets des médicaments sur la parole et la déglutition**

*Irene Campbell-Taylor, PhD, neuroscientifique clinicienne, Sydney (Nouvelle-Écosse)*

Cet exposé présentera les façons dont les médicaments fréquemment administrés peuvent nuire à la capacité de parler et d'avaler, de même que la façon dont un dysfonctionnement de la déglutition limite les médicaments qui peuvent être prescrits. Je soulignerai les effets sur la nutrition et l'hydratation et ferai des suggestions pour résoudre le problème.

### **Le syndrome du larynx irritable**

*Murray Morrison, MD, University of British Columbia, Vancouver (Colombie-britannique), Linda Rammage, PhD, University of British Columbia, Vancouver (Colombie-britannique)*

Le syndrome du larynx irritable (SLI) est un trouble où une personne se présente avec un spasme au niveau du larynx, provoqué par un stimulus sensoriel. Ce laryngospasme peut apporter un blocage au niveau des voies aériennes, une toux paroxystique chronique, un globus pharyngo-laryngé et/ou une dysphonie. La théorie pertinente, les facteurs multifactoriels contribuant à SLI ainsi que l'évaluation et le traitement de celui-ci seront présentés.

### **Enseignement stratégique à l'intention des apprenants en difficulté**

*Barbara J. Ehren, EdD, Kansas University, Sunrise (Floride)*

Les orthophonistes qui travaillent avec des enfants d'âge scolaire doivent tenir compte de leurs besoins de lire, d'écrire et d'apprendre s'ils veulent offrir des interventions thérapeutiques pertinentes. Pour nombre d'orthophonistes, cela signifie élargir leur façon de voir leur rôle conventionnel en ce qui concerne les interventions portant sur le langage parlé. Les orthophonistes seront amenés à comprendre la contribution unique qu'ils peuvent apporter à l'apprentissage de la lecture et de l'écriture.

### **Évaluation et traitement des troubles de la communication prélinguistique**

*Shirley Leew, PhD, Régie régionale de la santé de Calgary, Calgary (Alberta)*

La communication prélinguistique entretient une relation importante avec la communication sociale et l'acquisition du langage qui viendront plus tard. L'intervention précoce avant l'acquisition du langage est un domaine en développement pour les orthophonistes. Cette intervention chez les enfants à risque et ceux dont le retard est confirmé peut abréger un retard ultérieur. Cet atelier se concentrera sur l'évaluation des observations actuelles et le perfectionnement des compétences permettant de repérer les troubles, de poser un diagnostic et de prévoir des interventions fructueuses.

### **Interventions en orthophonie et apprentissage avec les enfants bilingues et multilingues**

*Elin Thordardottir, PhD, Université McGill, Montréal, QC*

Le nombre d'enfants grandissant dans un milieu bilingue ou multilingue ne cesse de grandir au Canada. Toute intervention en matière d'évaluation ou de traitement des enfants bilingues demeure très problématique pour les orthophonistes et les intervenants en milieu scolaire. Cet atelier présentera un sommaire de la recherche actuelle et les conséquences qu'ont les interventions chez des enfants bilingues.

### **Expériences tirées de la thérapie d'un groupe de personnes aphasiques**

*Linda Carey, MA, directrice du programme InterACT, Halifax (Nouvelle-Écosse)*

La thérapie de groupe dans le cas de l'aphasie est parfois une forme dynamique de prestation d'un service. Cet exposé permettra d'examiner « l'évolution » d'un groupe de thérapie formé il y a longtemps, reprendra les principaux points à examiner avant de lancer un groupe et mettra l'accent sur la présentation des séances, les compétences requises pour diriger des séances de groupe interactives (et agréables!), les ressources matérielles ainsi que les méthodes de consignation des résultats.

### **L'alphabétisation dans les familles à faible revenu : conséquences pour les orthophonistes**

*Rhonda Rubin, PhD, Services extra-muros, Sackville (Nouveau-Brunswick)*

Les résultats de la recherche laissent entendre que le niveau de langue des parents et les nouvelles expériences de lecture et d'écriture des enfants de familles à faible revenu diffèrent de ceux des enfants de milieux favorisés. En comprenant ces différences et en travaillant avec les familles, les orthophonistes peuvent jouer un rôle crucial pour aider un enfant à réussir autant à l'école qu'en société.

### **Groupe d'experts sur les services d'apprentissage linguistique en bas âge au Canada : où en sommes-nous en ce moment?**

*Nom des experts à communiquer*

L'importance des aptitudes linguistiques chez les jeunes enfants dans la maîtrise des aptitudes à communiquer avant de savoir lire et écrire a provoqué la croissance des services d'apprentissage linguistique en bas âge (ELS) dans bien des régions du pays. Les experts discuteront de leurs propres programmes d'ELS, partageront leurs expériences et réfléchiront à l'avenir des initiatives d'ELS.

### **Troubles de la communication associés à un retard cognitif après un accident vasculaire à l'hémisphère droit du cerveau**

*Leora Cherney, PhD, Northwestern University, Chicago (Illinois)*

Ce cours abrégé présentera un cadre général de traitement des troubles de la communication associés à un retard cognitif chez les adultes souffrant d'un dysfonctionnement de l'hémisphère droit. Il permettra de transmettre de nouvelles données plus précises sur deux domaines de compétences généralement diminués chez ces patients : (1) l'attention et l'intérêt; (2) les compétences sociales et les activités pragmatiques. Nous discuterons de travaux pratiques portant sur l'évaluation et le traitement de ces problèmes.

**Langage et capacité de lire et écrire : établir un lien avec la salle de classe**

*Lynne Healy, MHsc., Acadia University, Hammonds Plains, Wolfville (Nouvelle-Écosse)*

Cet atelier interactif offrira aux participants un cadre de développement de l'habileté du langage parlé en classe; il établira des liens précis entre le langage parlé et l'acquisition des capacités de lecture et d'écriture. Des suggestions pour collaborer de manière plus efficace avec les enseignants feront également l'objet d'une discussion.

**Un modèle de formation en intervention auprès des autistes (AIT) pour le Nouveau-Brunswick**

*Paul McDonnell, PhD, Université du Nouveau-Brunswick, pédopsychologue exerçant en clinique privée, Fredericton (Nouveau-Brunswick)*

En 2003, le Nouveau-Brunswick a commencé à financer des programmes d'intervention intensifs destinés aux enfants d'âge préscolaire. Au cours des trois dernières années, nous avons fourni une trousse de formation unique à plus de 300 praticiens. Dans cet exposé, nous examinerons l'incidence de ce programme interdisciplinaire sur la province, sur les familles et les enfants ainsi que sur les professionnels et l'exercice de leur profession.

**Les présentations proposées en orthophonie et en audiologie****Évaluer une technologie d'amplification sonore dans les écoles du Nouveau-Brunswick**

*Rhonda Rubin, M.Sc., O(C), CCC-SLP, M.Ed., PhD, Programme extra-mural, Sackville (N.-B.)*

*Catherine Aquino-Russell, B.Sc.N., M.N., PhD, Université du Nouveau-Brunswick, Moncton (N.-B.)*

*Joan Flagg-Williams, B.A., M.Ed, PhD, Université baptiste de l'Atlantique, Moncton (N.-B.)*

Cette communication décrira un projet de recherche sur l'amplification sonore dans les salles de classe des premiers niveaux de l'élémentaire. Cette étude a porté sur 1 100 élèves dans 60 classes de la province. Des données quantitatives et qualitatives ont été recueillies et analysées, y compris sur le flux de la communication, les résultats en lecture ainsi que les perceptions des enseignants et des élèves.

**Apprentissage interprofessionnel en réinsertion sociale dans le contexte du VIH**

*Janet Wu, M.H.Sc., OAO Reg, Hôpital St. Michael's, Toronto (Ont.)*

*Gillian Bone, M.Sc. CPD, Groupe de travail canadien sur le VIH et la réinsertion sociale, Toronto (Ont.)*

*Debra Cameron, Ph.D., Med, B.Sc. (OT), University of Toronto, Toronto (Ont.)*

*Kelly O'Brien, B.Sc., B.Sc.PT, candidate au doctorat, University of Toronto, Toronto (Ont.)*

*Elisse Zack, M.A., M.Mgt., Groupe de travail canadien sur le VIH et la réinsertion sociale, Toronto (Ont.)*

Cette communication :décrira une initiative nationale novatrice de renforcement des capacités pour les professionnels de la réinsertion sociale qui travaillent dans le contexte du VIH, renseignera les orthophonistes et les audiologistes sur les besoins en réinsertion sociale des personnes atteintes du VIH et décrira un modèle de formation interprofessionnelle pour les professionnels de la réinsertion sociale.

**Les présentations proposées en audiologie****Que mesurent vraiment les tests de la parole dans le bruit?**

*Josée Lagacé, Candidate au doctorat, Université de Montréal, Montréal (Qué.)*

*Benoit Jutras, PhD, Université de Montréal, Montréal (Qué.)*

*Jean-Pierre Gagné, PhD, Université de Montréal, Montréal (Qué.)*

*Amineh Abdollah, Candidate au doctorat, Université de Montréal, Montréal (Qué.)*

Des facteurs liés à l'ouïe de même que des facteurs non liés à l'ouïe peuvent influencer le rendement lors des tests de la parole dans le bruit. De plus, la plupart des tests de ce genre présentent une sensibilité marginale. Cette communication s'attardera à des façons d'obtenir de l'information précise sur les difficultés de la parole dans le bruit chez les enfants ayant des troubles de traitement des informations auditives.

**Les présentations proposées en orthophonie****Élaboration et mise à l'essai : mesure du résultat de la communication à la petite enfance (COME-C)**

*Nancy Thomas-Stonell, B.Sc., DSP, O(C), CCC-SLP, Bloorview Research Institute, Toronto (Ont.)*

*Bernadette Robertson, LCST, Bloorview Research Institute, Toronto (Ont.)*

*Bruce Oddson, PhD, Université Laurentienne, Sudbury (Ont.)*

*Peter Rosenbaum, M.D., CanChild Centre for Childhood Disability Research, Hamilton (Ont.)*

Cette communication décrit l'élaboration et la mise à l'essai d'une nouvelle mesure du résultat de la communication pour les enfants d'âge préscolaire. Fondé sur la classification ICF de l'OMS, cette mesure lie le traitement de la parole et du langage à la capacité de l'enfant à « participer » à son monde. Les éléments sont issus des changements observés par les parents et les cliniciens après la thérapie.

### **Réunir des résultats de recherche à partir de techniques systématiques en orthophonie pédiatrique**

*Cyne Johnston, Candidate au doctorat, Université d'Ottawa, Ottawa (Ont.)*

*BJ Collins, M.Sc., KidsAbility, Waterloo (Ont.)*

*Kathleen Bloom, PhD, University of Waterloo, Waterloo (Ont.)*

Cette initiative a mené à la création d'un catalogue de comptes rendus en orthophonie. Onze sources ont été épluchées pour trouver des comptes rendus en pédiatrie publiés entre 2000 et 2006, ce qui a permis d'en relever 65. Les comptes rendus portaient sur l'évaluation de la parole et du langage en pédiatrie ainsi que des interventions. Ils décrivaient aussi l'acquisition de la parole et du langage. Ce catalogue sera diffusé aux orthophonistes.

### **Trouble spécifique du langage, CIF et vous : comment les nouvelles conceptualisations de l'incapacité peuvent changer la façon dont vous travaillez avec des enfants atteints d'un trouble du langage?**

*Lynn Dempsey, PhD, Brock University, St. Catharines (Ont.)*

*Wenonah Campbell, M.Sc., University of Western Ontario, London, (Ont.)*

*Elizabeth Skarakis-Doyle, PhD, University of Western Ontario, London (Ont.)*

Lors de ce petit séminaire, nous explorerons comment les nouvelles conceptualisations de l'incapacité peuvent influencer sur l'exercice clinique auprès des enfants atteints d'un trouble spécifique du langage. Nous offrirons un survol de la Classification internationale du fonctionnement, du handicap et de la santé (CIF) et nous discuterons des pratiques cliniques qu'elle soutient, y compris l'évaluation fonctionnelle, la conception universelle de l'apprentissage et l'approche interactive du travail en équipe pour le traitement.

### **Une intervention intensive auprès des enfants ayant un appétit sélectif**

*Kimberly MacKeigan, M.Sc., O, Stan Cassidy Centre for Rehabilitation, Fredericton (N.-B.)*

*Barbara Dugas, B.Sc., inf. aut., Stan Cassidy Centre for Rehabilitation, Fredericton (N.-B.)*

*Elizabeth McDonnell, B.Sc., OT (C), exercice privé, Fredericton (N.-B.)*

La sélectivité des aliments est courante chez les enfants ayant des troubles du développement. La recherche a fait valoir l'efficacité des méthodes de gestion du comportement pour résoudre les problèmes alimentaires. À partir de la recherche et de l'expérience médicale, l'équipe d'alimentation en pédiatrie au Stan Cassidy Centre for Rehabilitation a élaboré un protocole d'intervention intensif pour améliorer la réceptivité vis-à-vis des aliments.

### **Points de vue sur la participation des parents aux services d'orthophonie en milieu scolaire**

*Kelly Roberts, M.Sc., O(C), M.A.Ed, conseil scolaire régional Cap Breton-Victoria, Sydney (N.-É.)*

Cette recherche a examiné les perceptions des parents et des orthophonistes concernant la participation des parents aux services d'orthophonie en milieu scolaire en Nouvelle-Écosse. Les résultats de cette étude ont fait ressortir le besoin d'améliorer la communication et la collaboration avec les parents et ont donné lieu à la mise à l'essai un nouveau modèle de prestation de services.

### **Sécurité en radiologie pour les orthophonistes qui font de la vidéofluoroscopie**

*Linda Walsh, M.H.Sc., O(C), Hôpital de Moncton, Moncton (N.-B.)*

Au fil de ans, les orthophonistes ont dû prendre en charge un nombre croissant de patients aphasiques, ce qui fait qu'ils doivent passer toujours plus de temps dans les salles de radiologie. Or, les orthophonistes reçoivent une formation limitée voire inexistante sur la sécurité en radiologie. Cette affiche présentera les risques liés aux rayonnements émis lors de la vidéofluoroscopie et recommandera des lignes directrices sur la sécurité pour les orthophonistes.

### **Validation et normalisation des Inventaires MacArthur du développement de la communication**

*Natacha Trudeau, Professeur adjoint, Université de Montréal, Montréal, QC*

*Caroline Bouchard, Professeur adjoint, UQAM*

*Marie-Claude Boudreault, Orthophoniste, Université de Montréal, Montréal, QC*

*Ann Sutton, Professeur agrégé, Université de Montréal, Montréal, QC*

Cette présentation porte sur la validation et la normalisation d'un questionnaire aux parents (IMDC). Des données sur la valeur psychométrique des IMDC et des normes pour la population francophone du Québec seront présentées. L'existence de ces données permettra une utilisation de l'outil dans la pratique auprès des jeunes enfants.

### **Développement phonologique chez les enfants francophones âgés de 18 à 54 mois**

*Ann Sutton, PhD, Université de Montréal, Montréal, QC*

*Natacha Trudeau, Professeur adjoint, Université de Montréal, Montréal, QC*

*Annick Poupart*

*Valérie Grenon, MPA*

*Elin Thordardottir, PhD, McGill University, Montréal, QC*

*Nicole Lessart, PhD*

La production des phonèmes et de la liaison a été évaluée chez 80 enfants francophones (18-54 mois). Les bonnes productions augmentent avec l'âge. Les phonèmes sont majoritairement bien produits à 4 ans, mais des erreurs sont présentes. La production de la liaison varie beaucoup selon le mot utilisé.

## **Un programme d'apprentissage du langage, de la lecture et de l'écriture pour les enfants d'âge préscolaire soutient les enfants, les familles et les éducatrices**

*Patricia Smith, M.Sc., arrondissement scolaire no 23, Westbank (C.-B.)*

La recherche, la démarche et les résultats d'un camp pour enfants d'âge préscolaire sur le langage et l'apprentissage de la lecture et de l'écriture de même que les incidences à long terme sur les pratiques d'apprentissage de la lecture et de l'écriture ont mené à la création d'un programme de mentorat pour les éducatrices auprès des enfants d'âge préscolaire. Ce programme comprend des expériences adaptées en fonction de l'âge des enfants concernant la langue et l'apprentissage de la lecture et de l'écriture. Il comporte aussi un volet axé sur la famille.

## **Programme d'intervention linguistique précoce**

*Ken Albanese, Programme de rééducation de la parole et du langage pour les enfants d'âge préscolaire de Halton Peel, Mississauga (Ont.)*

*Jan Pepper, MCISC, Programme de rééducation de la parole et du langage pour les enfants d'âge préscolaire de Peel, Mississauga (Ont.)*

*Marilou Jack, Programme de rééducation de la parole et du langage pour les enfants d'âge préscolaire de Peel, Mississauga (Ont.)*

*Madhu Jain, Programme de rééducation de la parole et du langage pour les enfants d'âge préscolaire de Peel, Mississauga (Ont.)*

*Kristi Morgan, MCISC, Programme de rééducation de la parole et du langage pour les enfants d'âge préscolaire de Peel, Mississauga (Ont.)*

*Charisse Pantin, Programme de rééducation de la parole et du langage pour les enfants d'âge préscolaire de Peel, Mississauga (Ont.)*

Le Programme d'intervention linguistique précoce, rattaché au Programme de rééducation de la parole et du langage pour les enfants d'âge préscolaire de Halton Peel, offre des services de dépistage et de traitement des troubles de la parole chez les enfants de 30 mois et moins au moment de l'aiguillage. Ce programme vise à assurer une intervention aussi tôt que possible et à réduire les périodes d'attente avant d'obtenir des services.

## **Éléments à prendre en considération pour la communication suppléante et alternative chez les enfants dont l'aire corticale visuelle est déficiente**

*Cindy Millar, M.Sc., APSEA, Halifax (N.-É.)*

*Patsy Newman, M.A., M.Sc., APSEA, Halifax (N.-É.)*

La déficience de l'aire corticale visuelle est la principale cause des troubles de la vue chez les enfants. Cette condition est souvent associée à des incapacités multiples. Cette présentation examinera brièvement les caractéristiques uniques des trois étapes de l'atteinte corticale visuelle. Elle s'attardera aussi aux éléments à prendre en considération et aux adaptations pratiques des stratégies de communication suppléante et alternative afin d'en assurer l'efficacité et d'acquiescer un comportement visuel stable à chaque étape.

## **Communication alternative et suppléante : les meilleures pratiques pour assurer la transition**

*Stacey Harpell, B.S., M.C., CCC-SLP, City Hospital, Saskatoon (Sask.)*

Cette communication aborde la façon d'atténuer les difficultés de transition pour les enfants qui utilisent la communication alternative et suppléante. Elle mettra l'accent sur deux périodes de transition particulières, soit celle d'un lieu à un autre, et celle d'un niveau scolaire à un autre.

## **Au-delà de la consultation – la télésanté comme moyen d'intervention**

*Sandy Nickel, Capital Health, Sherwood Park (Alb.)*

*Karyn Forst, Capital Health, Sherwood Park (Alb.)*

*Cindy Dekort, Aspen Regional Health, Raday (Alb.)*

Cette communication mettra l'accent sur l'utilisation de la télésanté pour offrir des services cliniques d'orthophonie à des régions rurales et éloignées de l'Alberta. Elle permettra de partager avec les participants les expériences, les réussites et les leçons tirées.

## **La vidéoconférence pour les clients à distance – ça fonctionne pour la communication suppléante et alternative**

*Loralee MacLean, M.H.Sc., Toronto Rehabilitation Institute, Toronto (Ont.)*

*Monique Fourcaudot, M.A., Toronto Rehabilitation Institute, Toronto (Ont.)*

Cette séance mettra l'accent sur le partage des expériences cliniques grâce à la vidéoconférence pour effectuer des évaluations de la communication suppléante et alternative et pour faire des interventions à distance auprès d'adultes souffrant d'un trouble acquis. Cette séance abordera aussi les défis et les facteurs potentiels qui ont mené à des interventions réussies en communication suppléante et alternative.

## **La vidéoconférence pour améliorer les habiletés de pratique réflexive**

*Lynn Ellwood, University of Toronto, Toronto (Ont.)*

*Jacqueline Hummelbrunner, Northern Ontario School of Medicine, Thunder Bay Ont.)*

L'University of Toronto a conclu un partenariat avec la Northern Ontario School of Medicine pour évaluer le potentiel d'utiliser la vidéoconférence afin de promouvoir des habiletés de pratique réflexive chez les étudiants en orthophonie lors des stages en milieu éloigné. Les résultats montrent les avantages et les défis d'une telle démarche comparativement aux rencontres face à face en groupe.



### **Formation clinique des orthophonistes fondée sur des résultats scientifiques**

*J. Alexa Okrainec, Brandon University, Winnipeg (Man.)*

Des critères scientifiques sont intégrés à la formation en médecine par le biais de l'initiative Best Evidence Medical Education (BEME). Les leçons tirées sur la façon de former les médecins doivent servir à la formation clinique des orthophonistes. Cette communication aborde la nécessité de fonder la formation clinique sur des résultats scientifiques, de passer en revue l'initiative BEME et de formuler des recommandations pour améliorer la formation clinique des orthophonistes.

## **COMMUNICATIONS AFFICHÉES**

### **ORTHOPHONIE ET AUDIOLOGIE**

#### **Stratégies de mise en œuvre d'un centre universitaire interprofessionnel de réadaptation en soins primaires**

*Lynn Metthé, M.Sc.S., OAOO Reg, Université d'Ottawa, Ottawa (Ont.)*

*Claire-Jehanne, PhD, Université d'Ottawa, Ottawa (Ont.)*

*Jacinthe Savard, Université d'Ottawa, Ottawa (Ont.)*

*Paulette Guitard, PhD, Université d'Ottawa, Ottawa (Ont.)*

*Marie-Josée Thelland, Université d'Ottawa, Ottawa (Ont.)*

Cette affiche présentera les étapes d'élaboration et de mise en œuvre d'un centre universitaire interprofessionnel de réadaptation en soins de santé primaires. Les résultats d'une analyse de l'écart portant sur les limites de la prestation actuelle de services seront examinés, tout comme les défis entourant la mise en œuvre et le niveau de satisfaction de notre partenaire.

#### **Transfert des connaissances : quelle est la meilleure méthode d'apprentissage des médecins**

*Robin Gaines, M.A., PhD, CCC-SLP, O(C), OAOO, Centre hospitalier pour enfants de l'est de l'Ontario, Ottawa (Ont.)*

*Cheryl Missiuna, PhD, McMaster University, Hamilton (Ont.)*

*Mary Egan, PhD, Université d'Ottawa, Ottawa (Ont.)*

*Jennifer McLean, M.D., Centre hospitalier pour enfants de l'est de l'Ontario, Ottawa (Ont.)*

*Denise De Laat, Med, Institut de recherche du Centre hospitalier pour enfants de l'est de l'Ontario, Ottawa (Ont.)*

Une étude récente menée dans la région d'Ottawa a utilisé des techniques novatrices de transfert des connaissances pour former 147 médecins de premier recours concernant le trouble de l'acquisition de la coordination. Cette affiche décrira les activités, les préférences d'apprentissage des médecins ainsi que les réussites et les obstacles au transfert des connaissances. Elle abordera aussi les incidences de la formation et de la collaboration interprofessionnelles.

### **ORTHOPHONIE**

#### **Raconter une histoire durant l'enfance et à l'âge adulte : quoi de neuf après 9 ans?**

*Miranda Brown, M.Sc.-SLP, University of Alberta, Edmonton (Alb.)*

*Phyllis Schneider, PhD, University of Alberta, Edmonton (Alb.)*

Des recherches précédentes fondées sur l'Edmonton Narrative Norms Instrument (instrument des normes de narration d'Edmonton) ont montré peu de changement dans l'information fournie par des enfants de 7 à 9 ans qui se développent normalement. La présente étude compare l'information fournie par des adultes à celle fournie par des enfants de 9 ans lors d'une histoire. Dans le cas d'histoires complexes, les adultes incluent beaucoup plus d'information en général, ainsi que plus d'unités de mise en contexte, d'événements déclencheurs et de réaction interne.

### **LANGAGE DE L'ENFANT**

#### **Aider les enfants d'âge préscolaire à communiquer : un groupe de formation interactive pour les parents**

*Lisa Schumacher, M.Sc.(A), O(C), Centre de réadaptation Mackay, Montréal (Qué.)*

*Sonia Bérubé, Centre de réadaptation Mackay, Montréal (Qué.)*

*Lucie Andonian, Centre de réadaptation Mackay, Montréal (Qué.)*

Des parents et des enfants d'âge préscolaire présentant des difficultés d'orthophonie ont participé à l'initiative Aider les enfants d'âge préscolaire à communiquer : un programme de formation interactive pour les parents au Centre de réadaptation Mackay. Un orthophoniste et un psychoéducateur ont expliqué les stratégies pour soutenir activement les capacités de communiquer et les aptitudes sociales des enfants dans le cadre d'un cours axé sur les parents. Les parents ont mis en pratique les stratégies auprès de leur enfant en bénéficiant de l'encadrement d'instructeurs.

### **Effet du type de mots selon les formes spécifiques de sensibilité phonologique**

*Joline Poirier, Université de Moncton, Moncton, NB*  
*Pierre Cormier, Université de Moncton, Moncton, NB*  
*Alain Desrochers, Université d'Ottawa*

Cette étude examine le rôle de la nature des stimuli et des réponses (mots réels vs. mots inventés) dans des tâches de sensibilité phonémique et syllabique chez 192 élèves francophones. Les analyses révèlent des effets significatifs en termes de stimulus et réponse particuliers à l'élision syllabique et à l'élision phonémique.

### **Les vestes lestées ont un effet sur les épisodes d'attention partagée chez les enfants atteints de troubles du spectre autistique**

*Shirley Leew, Ph.D., CCC-SLP, O(C), région sanitaire de Calgary, Calgary (Alb.)*  
*Nicole Stein, B.Sc.OT, région sanitaire de Calgary, Calgary (Alb.)*  
*Ben Gibbard, M.D., MCS, M.Sc., FRCPC, Alberta Children's Hospital, Calgary Health Region, Calgary (Alb.)*  
*Margaret Clarke, M.D., FRCPC, University of Calgary et région sanitaire de Calgary, Calgary (Alb.)*

Le traitement des tout-petits atteints de troubles du spectre autistique et ayant des troubles sensoriels nécessite qu'ils portent des vestes lestées. Nous examinons les effets de cette intervention sur les épisodes d'attention partagée. Les interventions précoces ciblant l'attention conjointe peuvent améliorer la communication et le langage. Les multiples méthodes de base permettent un examen systématique des changements de l'attention conjointe à la suite d'une telle intervention.

### **Les habiletés sonores : l'enseignement fondé sur la recherche**

*Susan Bassili, M.H.Sc., conseil scolaire du district de Peel, Mississauga (Ont.)*

Les habiletés auditives font référence à la capacité d'un élève à délibérément réfléchir aux connaissances qu'il possède concernant la structure de la langue parlée et à en faire preuve. Ces habiletés ont été évaluées avant et après une intervention à la maternelle. Les résultats montrent qu'il est possible d'enseigner les habiletés sonores et que celles-ci ont un lien avec les notes en lecture et en écriture.

### **Comment rendre la formation des parents habilitante?**

*Carolyn Cronk, professeur agrégé, Université de Montréal, Montréal (Qué.)*

Les orthophonistes ont accordé une attention considérable à ce que les parents apprennent à faire lors des programmes de formation à leur intention. Cette affiche s'attardera à ce que les orthophonistes peuvent faire pour faciliter le cheminement des parents qui souhaitent se sentir véritablement en mesure de stimuler le développement de leur enfant atypique.

## **LANGAGE DE L'ADULTE**

### **Exploration de Sentence Shaper : une prothèse pour le traitement**

*Erin Albright, M.Sc., University of British Columbia, Vancouver (C.-B.)*  
*Barbara Purves, Ph.D., University of British Columbia, Vancouver (C.-B.)*

Cette étude explore les utilisations possibles du logiciel Sentence Shaper (Linebarger, McCall et Berndt, 2004) pour faciliter le langage chez les personnes atteintes d'aphasie nonfluente. Elle avait pour objectif d'abord de reproduire l'étude de Linebarger et coll. (2004), puis d'explorer des façons dont ce logiciel peut servir à suppléer à la communication dans le quotidien.

### **Détériorations spécifiques à une catégorie et systèmes sémantiques multiples : discussion de cas**

*Gopee Krishnan, M.Sc., Manipal Academy of Higher Education, Manipal, Karnataka, Inde*  
*Shivani Tiwari, M.Sc., Manipal Academy of Higher Education, Manipal, Karnataka, Inde*  
*Raj Shekar, Ph.D., Manipal Academy of Higher Education, Manipal, Karnataka, Inde*

Cette affiche aborde la détérioration différentielle des verbes chez une patiente anomique nommée Mme VSB. L'écart de performance entre le verbe et le nom nominatif y est abordé à la lumière des récentes percées dans les détériorations spécifiques à une catégorie à la suite d'une lésion cérébrale. L'affiche présente aussi des hypothèses exploratoires de systèmes sémantiques multiples.

## **SERVICES POUR ADULTES**

### **Casser la croûte ensemble : instaurer des programmes bénévoles d'aide durant les repas**

*Elizabeth Hanna, M.H.Sc., OAO Reg, Bridgepoint Health, Toronto (Ont.)*  
*Bobi Tychynski, M.H.Sc., O(C), OAO Reg, Bridgepoint Health, Toronto (Ont.)*  
*Elissa Cucan, University of Toronto, Toronto (Ont.)*  
*Eudice Rotfarb, Baycrest, Toronto (Ont.)*

Les programmes bénévoles d'aide durant les repas sont souvent proposés comme moyen d'améliorer la qualité de vie des résidents et leur apport nutritionnel. Une comparaison entre deux bons programmes très différents permettra aux participants de mieux comprendre les défis liés à l'élaboration de telles initiatives et offrira des outils pour relever les défis.

## EXERCICE CLINIQUE/FORMATION EN EXERCICE

### **En apprendre sur les incapacités : programme de perfectionnement professionnel**

*Laureen McIntyre, PhD, O(C), CCC-SLP, University of Saskatchewan, Saskatoon (Sask.)*

Huit modules de perfectionnement professionnel sur les incapacités et les sujets connexes ont été élaborés en partenariat avec l'Association pour l'intégration communautaire de Saskatoon. L'affiche traitera du perfectionnement et de l'adaptation continue des modules ainsi que des incidences pour les orthophonistes en ce qui concerne les besoins de service sur place et les incidences éventuelles sur la prestation de services.

## AUDIOLOGIE

### **Dépistage de la surdité et acoustique en salle de classe : résultats d'une initiative provinciale**

*Rhonda Rubin, M.Sc., O(C), CCC-SLP, M.Ed., PhD, Programme extra-mural, Sackville (N.-B.)*

*Tim Lushington, Nova Scotia Hearing and Speech Centre, Amherst (N.-É.)*

En 2006, un audiologiste et un orthophoniste faisait du dépistage de la surdité chez les enfants de la maternelle à la troisième année dans trois arrondissements scolaires du Nouveau-Brunswick. Un audiologiste mesurait le niveau du bruit ambiant dans certaines salles de classe. Les résultats de cette initiative seront présentés de même que des recommandations pour améliorer l'environnement d'écoute pour les élèves.

### **Autocorrelogrammes globaux pour la perception de la fondamentale manquante**

*Takahide Matsuoka, Université Utsunomiya, Utsunomiya, Japon*

*Masahiro Ogawa, Université Utsunomiya, Utsunomiya, Japon*

Des essais sur maquette ont permis de constater que les autocorrelogrammes globaux jouent un rôle important dans la perception de la fondamentale manquante. Il a été avancé que le centre auditif a la fonction de fabrication des autocorrelogrammes. Cette fonction n'était pas évidente. Nous avons créé un modèle « Integrate-and-Fire » qui produit l'information des autocorrelogrammes globaux.

## 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 recently has established multiple categories of manuscript submission that will permit the broadest opportunity for dissemination of information related to human communication and its disorders. New 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.

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**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.

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## Submission of Manuscripts

Contributors should 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: [phyllis.schneider@ualberta.ca](mailto:phyllis.schneider@ualberta.ca). Sending manuscripts by e-mail is the preferred method of submission. However, manuscripts may still be submitted by sending five (5) hard copies to:

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**Editor, CJSLPA**  
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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 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

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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.



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All copies should be typed, double-spaced, with a standard typeface (12 point, noncompressed font) on high quality 8 ½ X 11 paper. All margins should be at least one (1) inch. 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, each author's affiliation, and a complete mailing address for the contact author. An electronic mail address also is recommended.

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**Acknowledgments:** Acknowledgments should be typewritten (double-spaced) on a separate sheet of paper. 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 (4th 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 C JSLPA 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 when publication occurs.

### ***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 récemment 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 nouvelles 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

On demande aux collaborateurs de faire parvenir par voie électronique un fichier électronique incluant leurs manuscrits, y compris tous les tableaux, figures ou illustrations et références, en format MS Word ou WordPerfect à : phyllis.schneider@ualberta.ca. L'envoi des manuscrits par voie électronique est la méthode préférée pour la soumission, pourtant les manuscrits peuvent toujours être soumis en envoyant 5 copies imprimées à :

**Phyllis Schneider, Ph.D.**  
**Rédactrice en chef, Revue canadienne d'orthophonie et d'audiologie**  
**Dept. of Speech Pathology and Audiology**  
**University of Alberta**  
**2-70 Corbett Hall**  
**Edmonton (Alberta) T6G 2G4**

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<sup>th</sup> Edition. 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, et l'adresse complète de l'auteur-contact. Une adresse de courriel est également recommandée.

**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.

**Illustrations :** Toutes les illustrations faisant partie du

manuscrit doivent être incluses avec chaque exemplaire du manuscrit. Quoiqu'un seul exemplaire du matériel d'illustration original (photographies, radiographies, etc.) soit requis, chaque manuscrit doit contenir des copies claires de toutes les illustrations pour le processus de révision. Dans le cas de photographies, on préfère les photos sur papier glacé "5 X 7". Les impressions au laser de haute qualité sont acceptables. 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<sup>e</sup> 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.

## ***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 de ses 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.



# APPEL POUR COMMUNICATIONS

**Congrès de l'ACOA 2008  
Kananaskis (Alberta)  
du 17 au 19 avril, 2008**

**Date limite de réception des propositions:  
le 15 septembre 2007**

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

Le congrès annuel 2008 de l'Association canadienne des orthophonistes et audiologistes (ACOA) se tiendra à Kananaskis (Alberta). L'ACOA vous invite donc à soumettre vos propositions de communication pour son programme du congrès annuel 2008.

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 17 au 19 avril, 2008.

## 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 2.4m par 1.2m. 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 vidéocassette:** Les vidéocassettes peuvent présenter des sujets cliniques, des études de cas, des agences, programmes, procédures de thérapie ou autres. Les vidéocassettes doivent être de type VHS (1/2 pouce).

- ☐ Évaluation et mise en oeuvre de nouvelles technologies/méthodes
- ☐ Mesure de performance ou de rendement (outcome) et efficacité
- ☐ Ce qui fonctionne en pratique/ conseils à suivre en milieu clinique
- ☐ Les services aux clientèles difficiles
- ☐ Formation de médiateurs/facilitateurs
- ☐ Éthique en milieu clinique
- ☐ Effets du multiculturalisme
- ☐ Modèles de prestation de services
- ☐ Situations de transition (p. ex.: préscolaire-scolaire, soins intensifs-communauté)
- ☐ La planification et la réalisation de recherche en milieu clinique.
- ☐ 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](http://www.caslpa.ca/francais/events/conference.asp). Vous pouvez soumettre votre demande en ligne ou en communiquant avec [toni@caslpa.ca](mailto:toni@caslpa.ca) pour obtenir un formulaire et informations par envoi postal ou électronique ou par télécopieur.





# CALL FOR PAPERS

CASLPA Conference 2008  
Kananaskis, Alberta  
April 17 - 19, 2008

**Deadline for receipt of all program submissions:  
September 15, 2007**

**Online abstract submissions at:  
[www.caslpa.ca/english/events/conference.asp](http://www.caslpa.ca/english/events/conference.asp)**

The Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA) 2008 conference will be held in Kananaskis, Alberta. 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 17 - 19, 2008.

## 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.

**Videotape Presentations:** Videotapes may be presented on clinical topics, case studies, agencies, therapy procedures or other topics. Videotapes must be on 1/2-inch VHS video cassette.

- ☐ Evaluating and implementing new technologies/methods
- ☐ Measuring outcome and efficacy
- ☐ Best practice/clinical guidelines
- ☐ Hard-to-serve populations
- ☐ Mediator/facilitator training
- ☐ Ethics in clinical practice
- ☐ Multicultural considerations
- ☐ Service delivery models
- ☐ Transition issues
- ☐ Designing and implementing clinical research
- ☐ 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](http://www.caslpa.ca/english/events/conference.asp) You can submit on-line or contact [toni@caslpa.ca](mailto:toni@caslpa.ca) to have a hard copy e-mailed, faxed or mailed to you.



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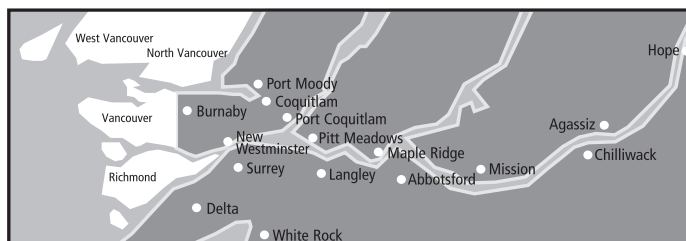


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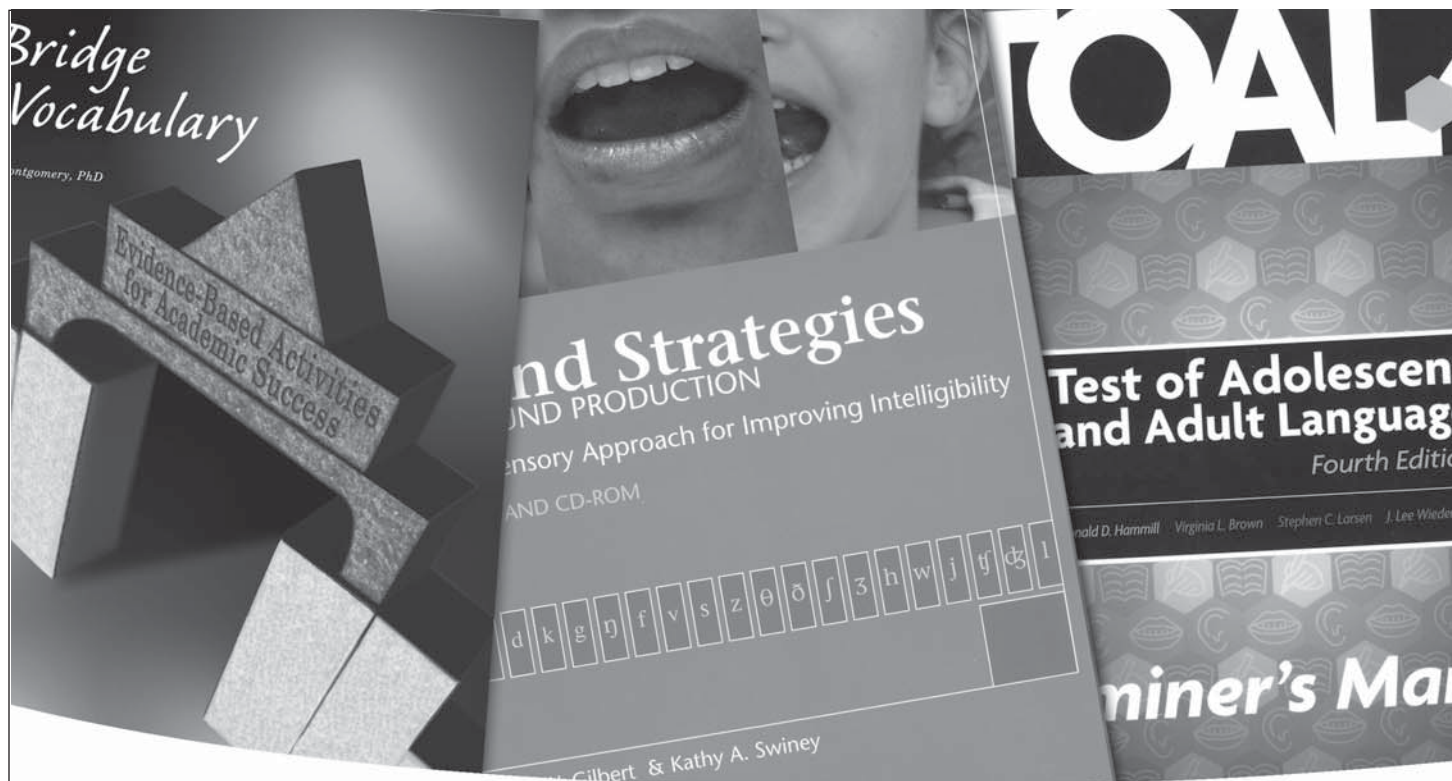
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