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# CJSLPA | RCOA

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Elizabeth Fitzpatrick

## Monitoring Oral Colonization as a Risk for Pneumonia in Complex Continuing Care: Lessons Learned From a Pilot Study

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## Book Review:

### School-Based Audiology, 2011

Dave Gordey

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

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

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

## Mission

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



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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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### Mission

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

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# From the Editor

## SUMMER ISSUE



The summer issue of CJSPLA presents readers with four papers addressing a wide range of topics. In the first article, Yoon and Steele highlight the importance of oral health as a topic of concern for speech-language pathologists. They report the results of a pilot study on oral health conducted with 10 residents of continuing care facilities and share what they learned related to the complexity of oral colonization in this population.

Suleman and colleagues examined the effectiveness of an interprofessional education experience between student speech-language pathologists and student teachers. Their study revealed that student speech-language pathologists used significantly more profession-specific terminology than student teachers when explaining profession-specific concepts to parents; however, an interprofessional education experience led to a decrease in the use of jargon words by the speech-language pathology students. The authors conclude that there are important benefits from interprofessional preparation programs.

Our last two articles are related to pediatric communication assessment tools. In their article: *Développement de la version québécoise francophone du Children's Communication Checklist – 2 (CCC-2) : Normalisation et équivalence métrique*, Vézina, Sylvestre and Fossard make a contribution to the development of tools for French-speaking children. The article describes the normalization of the Quebec French adaptation of the CCC-2 by this Laval University research team using a sample of 80 young French Quebecers with a language disorder. The authors conclude from the study that the tool can be used with the Quebec French population.

In the final paper, Oddson and colleagues contribute a research note to report an evaluation of the reliability of the FOCUS© (Focus on the Outcomes of Communication Under Six), a tool that measures functional change in real-world communication in young children through interviews with parents. Based on their work, the authors propose that the FOCUS© is a reliable measure for clinical and research purposes.

The articles assembled for this issue reflect some of the fine and diverse research underway in Canada. Several researchers have recently shared considerable new research at our CASLPA annual conference in Victoria, B.C. I invite the authors to disseminate some of this new information to the broader professional community through your journal, CJSPLA. Remember that in an online open-access journal, your work becomes easily accessible to an international readership. I also hope that we can count on you to assist with peer reviews of the many manuscripts we receive and I express my warmest thanks to all those who have accepted our invitations to review for CJSPLA since I began my term in 2012. If you have not already done so and are able to review future manuscripts, please register as a journal reviewer at [www.cjslpa.coverpage.ca](http://www.cjslpa.coverpage.ca) and let us know your areas of interest. Please do not hesitate to contact us for support with any technical issues.

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# Mot de la Rédactrice en Chef

NUMÉRO D'ÉTÉ



Le numéro d'été de la RCOA présente à ses lectrices et à ses lecteurs quatre communications traitant d'une large gamme de sujets. Dans le premier article, Yoon et Steel font ressortir l'importance de la santé buccale comme sujet de préoccupation pour les orthophonistes. Les auteurs font rapport d'une étude pilote sur la santé buccale menée avec 10 résidents d'institutions de soins continus et partagent ce qu'ils ont appris en rapport avec la complexité de la colonisation buccale dans cette population.

Suleman et des collègues ont examiné l'efficacité d'une expérience d'enseignement interprofessionnel entre des étudiants orthophonistes et des étudiants enseignants. Leur étude révèle que les étudiants orthophonistes utilisaient significativement plus de terminologie spécifique à la profession que les étudiants enseignants quand ils expliquaient aux parents des concepts propres à leur profession; toutefois, une expérience d'enseignement interprofessionnel a conduit à une diminution de l'usage de mots de jargon par les étudiants orthophonistes. Les auteurs concluent que les programmes de préparation interprofessionnels comportent d'importants bénéfices.

Nos deux derniers articles ont rapport à des outils d'évaluation de la communication des enfants. Dans leur article Développement de la version québécoise francophone du *Children's Communication Checklist – 2 (CCC-2) : Normalisation et équivalence métrique*, Vézina, Sylvestre et Fossard apportent une contribution au développement d'outils destinés aux enfants francophones. L'article décrit la normalisation de l'adaptation en français québécois du CCC-2 par cette équipe de recherche de l'Université Laval en utilisant un échantillon de 80 jeunes Québécois de langue française atteints d'un trouble du langage. De cette étude les auteurs concluent que l'outil peut être utilisé avec la population francophone du Québec.

Dans la dernière communication, Oddson et ses collègues nous présentent une note de recherche où ils font rapport d'une évaluation de la fiabilité du *FOCUS® (Focus on the Outcomes of Communication Under Six)*, un outil qui mesure le changement fonctionnel dans la communication en monde réel chez les jeunes enfants à l'aide d'entrevues tenues avec les parents. En se basant sur leur travail, les auteurs proposent que le *FOCUS®* est une mesure fiable à des fins cliniques et de recherche.

Les articles réunis dans ce numéro sont le reflet de la qualité et de la diversité de quelques-unes des recherches présentement en cours au Canada. Plusieurs chercheurs viennent de nous faire part de nombre considérable de nouvelles recherches dans le cadre de notre congrès annuel de l'ACOA, à Victoria (BC). J'invite les auteurs à diffuser une partie de cette nouvelle information à la communauté professionnelle plus large par le biais de notre revue, la RCOA. N'oubliez pas que, comme revue à accès libre en ligne, vos travaux deviennent facilement accessibles à des lecteurs du monde entier. J'espère aussi que nous pouvons compter sur vous pour nous aider à l'évaluation par des pairs des nombreux manuscrits que nous recevons et j'exprime mes remerciements les plus chaleureux à tous ceux et celles qui ont accepté nos invitations à faire de l'évaluation pour la RCOA depuis que je suis entrée en fonction, en 2012. Si vous ne l'avez pas déjà fait et si vous êtes capable de réviser des manuscrits futurs, veuillez vous enregistrer à [www.cjslpa.coverpage.ca](http://www.cjslpa.coverpage.ca) et indiquer vos domaines d'intérêt. N'hésitez pas à communiquer avec nous en cas de problèmes techniques.

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# Monitoring Oral Colonization as a Risk for Pneumonia in Complex Continuing Care: Lessons Learned from a Pilot Study

## Le Suivi de la Colonisation Buccale Comme Risque de Pneumonie Dans les Soins Continus Complexes : Les Leçons Apprises d'une Étude Pilote

### KEY WORDS

ORAL HYGIENE

COLONIZATION

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RESPIRATORY PATHOGENS

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### Abstract

Oral health has become a topic of increasing concern for speech-language pathologists given recent evidence implicating oral colonization with pathogenic bacteria as a precursor condition contributing to aspiration pneumonia risk. In this study, we conducted an observational study of oral colonization over the 3-month interval between successive dental hygiene appointments for 10 residents of complex continuing care facilities. Oral swabs were taken at 5 time-points per participant and sent to a lab for microbiological analysis, with semi-quantification of bacterial species. The analyses failed to show the predicted pattern of incrementally greater counts of pathogenic bacteria as time post dental hygiene service increased. Additionally, measures of oral dryness using a Modified Schirmer Test failed to show any particular relationship to swab results. We discuss our own learnings regarding the complexity of oral colonization arising from this pilot study.

### Abrégé

Avec le temps, la santé buccale est devenue un sujet de préoccupation pour les orthophonistes étant donné les preuves récentes mettant en cause la colonisation buccale par des bactéries pathogéniques comme état précurseur contribuant au risque de pneumonie par aspiration. Dans la présente recherche, nous avons mené une étude observationnelle de la colonisation buccale sur l'intervalle de trois mois séparant des rendez-vous successifs d'hygiène buccale pour dix résidents d'institutions de soins continus complexes. Des échantillons de salive ont été prélevés à cinq moments différents pour chaque participant et envoyés à un laboratoire pour analyse microbiologique, avec semi-quantification des espèces bactériennes. Les analyses n'ont pas montré la progression attendue de bactéries pathogènes en fonction du temps écoulé après le service d'hygiène dentaire. De plus, des mesures de sécheresse buccale à l'aide d'un test *Schirmer* modifié n'ont pas montré de relation particulière avec les résultats des échantillons de salive. Nous discutons ce que nous avons appris concernant la complexité de la colonisation buccale découlant de cette étude pilote.

A growing body of literature supports the link between oral microflora and the importance of oral hygiene in limiting the risk of pneumonia development. Dramatic improvements in general dental health in the Western world during the latter half of the 20th century mean that people are increasingly reaching old age with intact dentition (Gooch, Eke & Malvitz, 2004). Although this trend is indicative of improvements in the delivery of dental services, it brings with it an imperative to promote proper oral care delivery to older adults and the disabled in order to limit the oral-health related risk of systemic diseases such as pneumonia. Individuals who are dependent on others for oral care, such as populations residing in long-term care (LTC) facilities, are recognized to be at a significant disadvantage with respect to the provision of adequate oral care (Chalmers, Levy, Buckwalter, Ettinger & Kambhu, 1996; Fiske & Lloyd, 1992; Frenkel, Harvey & Newcombe, 2000; Grap, Munro, Ashtiani & Bryant, 2003; Holmes, 1996; ; MacEntee, Thorne, & Kazanjian, 1999; Paterson, 2000; Preston, Punekar & Gosney, 2000; Wardh, Hallberg, Berggren, Andersson & Sorensen, 2000). Many individuals in LTC settings also have dysphagia (swallowing impairment) that places them at risk for aspiration (the inhalation of oropharyngeal secretions and other material into the larynx and down to the lower respiratory tract), with the subsequent risk of developing aspiration pneumonia (Marik, 2001; Pikus et al., 2003).

Pneumonia is the leading cause of acute care hospitalization and the primary cause of death in many diseases found amongst LTC residents (Muder, 1998). The reported incidence of pneumonia in LTC settings is approximately 1.2 per 1,000 patient days (Loeb, McGeer, McArthur, Walter & Simor, 1999; Muder, 1998; Nicolle, 2001). More specifically, aspiration pneumonia constitutes 15.5% of all Medicare pneumonia admissions in the United States (Baine, Yu & Summe, 2001). Bacterial pneumonia (as opposed to viral pneumonia) is directly precipitated by aspiration (Marik, 2001). Aspiration is a common feature of dysphagia, particularly in the elderly population (Feinberg, Knebl, Tully & Segall, 1990; Marik & Kaplan, 2003; Pikus et al., 2003). A recent study suggests that individuals with Parkinson's Disease or dementia, who are confirmed to aspirate thin liquids, have between a 7 and 15% risk for developing pneumonia over a 3 month interval, even with the use of techniques to limit their aspiration, such as thickened liquids or the use of a chin-down posture when drinking thin liquids (Robbins, 2008). However, seminal work by Langmore and colleagues (1998) has suggested that dysphagia, by itself, is not an adequate risk factor to lead to pneumonia pathogenesis in older adults. Rather,

factors related to oral health and dependency for oral care emerged as strong predictors of pneumonia, together with factors related to frailty, mobility and medical complexity (Langmore et al., 1998). In particular, excessive colonization of the mouth and oral secretions with bacteria that are known to be respiratory pathogens emerges from the literature as a primary factor in the pathogenesis of pneumonia (Langmore, Skarupski, Park & Fries, 2002; Terpenning et al., 1993; Millns, Gosney, Jack, Martin & Wright, 2003).

The recognition that oral hygiene is a factor that impacts a patient's risk for developing aspiration pneumonia has attracted the attention of speech-language pathologists (S-LPs), who are the primary clinicians involved in managing dysphagia. In a recent qualitative study using focus groups to explore perspectives on oral care amongst different health-care professionals, Canadian S-LPs expressed concern that oral hygiene is easily neglected amongst nursing care responsibilities, and reported taking on advocacy roles and even some hands-on provision of oral care, motivated by the desire to limit the risk of pneumonia (Yoon & Steele, 2012). Evidence of such advocacy is seen in the fact that S-LPs were involved in development of best practice guidelines for nursing oral care practice, published by the Registered Nursing Association of Ontario (RNAO, 2008). These guidelines define oral hygiene as "the practice of keeping the mouth clean and healthy by brushing and flossing to prevent tooth decay and gum disease" (p.16) and further conclude that Level IV evidence supports the recommendation that "nurses provide, supervise, remind or cue oral care for clients at least twice daily, on a *routine* basis" (p. 32). In another example, a water protocol intervention study for patients with dysphagia at a Canadian rehabilitation hospital involved explicit consideration of and planning for oral care needs, including needs for assistance and suctioning (Carlaw, Finlayson, Beggs, Visser, Marcoux, Coney & Steele, 2012). Expected oral care for the rehabilitation hospital where that study was performed is described as being done "first thing in the morning, prior to oral intake, and at bedtime" with procedural instructions detailed as "swab mouth or rinse-and-spit... prior to any water intake".

Poor oral hygiene is reported to lead to the elevated presence of respiratory pathogens in oropharyngeal secretions (Limeback, 1988; Loesche & Lopatin, 1998; Marsh, 1999; Mojon & Bourbeau, 2003; Mojon, Budtz-Jorgensen, Michel & Limeback, 1997; Mombelli, 1998; Scannapieco, 1999). When these pathogens are aspirated, they can overburden host defense mechanisms and lead to infection (Marik, 2001). For this reason, the promotion of high quality oral care should be a priority strategy



for limiting the occurrence of bacterial pneumonia, particularly for individuals with an increased risk of aspiration secondary to dysphagia. Several recent Japanese studies have reported that the provision of frequent professional dental services is effective in reducing the incidence of pneumonia and colonization of oral secretions with respiratory pathogens in individuals in LTC settings (Abe, Ishihara & Okuda, 2001; Adachi, Ishihara, Abe, Okuda & Ishikawa, 2002; Yoneyama et al., 2002). However, the extent and frequency of oral care in these studies involved full dental cleanings by a dental hygienist or dentist as frequently as once per week. This level of oral care intervention is much higher than the levels currently recommended in the RNAO oral care best practice guidelines, which apply to Ontario LTC facilities (RNAO, 2008). Indeed, it is difficult to imagine how the level of oral care described in these Japanese studies could ever be provided in the context of current levels of funding for public dental care in Canada. Prior literature does not demonstrate whether the delivery of *routine* dental hygiene services and oral care impact oral colonization with pathogenic bacteria in residents in LTC settings.

The primary purpose of this pilot study was to conduct a prospective longitudinal investigation in order to describe and better understand patterns of oral microbial colonization over time, and specifically to document the presence and quantitative load of respiratory pathogens, aerobic gram negative bacteria and *Candida albicans* in oral swabs collected from residents in Canadian LTC institutions. The two Ontario facilities where the study was conducted were complex continuing care (CCC) hospitals, where *routine* oral care involved quarterly visits to the dental hygienist for detailed cleaning, paired either with self-care or nursing care between dental hygiene appointments. Individual patients would receive daily oral care guided by an individualized oral care plan developed in consultation with the dental hygienist at an assessment within 3 weeks of admission. By policy, the expected frequency of nursing oral care provision was at least twice daily, with the basic procedure defined as brushing teeth or cleaning dentures as outlined in a nursing textbook (Perry and Potter, 1997). Suction toothbrushes were made available as an option for patients with serious oral infections, serious dysphagia, or reduced level of consciousness.

To our knowledge, a longitudinal study of oral colonization related to *routine* oral care has not previously been conducted in the LTC population, and it remains unknown whether existing oral care regimens are sufficient for managing and limiting oral colonization with bacteria known to be associated with

the pathogenesis of pneumonia. We were primarily interested in documenting the time course of oral colonization in the context of *routine* oral care, and decided to do this through the monitoring of bacterial levels in a series of oral swabs taken over the course of a 3 month interval spanning two successive dental hygiene visits for each participant. Our specific hypotheses were that oral colonization with the pathogens of interest:

- (1) would be at their peak just prior to the delivery of professional dental hygiene services;
- (2) would decline to a minimum at the first measurement following professional dental hygiene care; and
- (3) would subsequently increase across measurements taken at successive intervals following the delivery of professional dental hygiene care.

## Methods

**Participants.** A convenience sample of 11 participants was recruited from two CCC facilities in the Greater Metropolitan Toronto Area, Canada. After the initial recruitment and consent, one participant withdrew from the study because she was no longer interested in participating, leaving a total of 10 participants, who were each followed for a three-month period. The units on which these individuals resided served patients with primary diagnoses of stroke and acquired brain injury. There was no exclusion of participants on the basis of age, gender, or ethnicity. Individuals with significant cognitive impairment (defined as a Cognitive Performance Score > 3 from the Minimum Data Set) were excluded due to concerns about their ability to provide informed consent, the expectation that they would need to be repeatedly re-oriented and re-consented for each encounter involved in the study, as well as the risk that they might inadvertently bite and/or swallow the materials that were to be used during data collection. Table 1 summarizes demographic and etiological information about the participants. We did not specifically recruit or exclude individuals with documented diagnoses of confirmed dysphagia or aspiration because this was a pilot study. Although dysphagia is known to occur broadly in the LTC population, the majority of participants in this study were eating an oral diet of normal consistency (Table 1). Three participants may be presumed to have had some degree of dysphagia: participant 1 was receiving a diet including chopped foods and thickened liquids; participant 10 was receiving enteral feeding and no oral intake; and participant 9 was on a normal consistency

oral diet but had a prior history of enteral feeding. None of these individuals underwent assessment to determine the nature of new swallowing concerns during the course of the study.

### Data Collection

**Medical history/Chart reviews.** Retrospective chart reviews were conducted for each participant in order to record health status factors that might influence the results and interpretation of the oral colonization data.

These factors are summarized in Table 1. Major medical diagnosis and comorbidities were documented as well as current route of feeding and diet consistency. The level of dependency for oral care was recorded, based on the dental hygienists' evaluation of the patient. The participants' state of dentition was captured because the oral cavities of patients with natural teeth and/or dentures, both of which accumulate dental plaque, are more likely to be colonized with respiratory pathogens than those patients who are completely edentulous

Table 1. Demographic and case history information about participants in the study.

Participant	Sex	Age	Time post admission (years)	Etiology	Comorbidities	Diet	Functional Status	Dental Status
1	M	39	15	Acquired Brain Injury	Hypertension, Diabetes	Oral: chopped food plus thickened liquids	Dependent for feeding and oral care	Dentate
2	F	54	3	Cerebral Palsy	Cervical spondylosis, COPD	Oral: normal diet	Independent with some assistance	Dentate
3	M	55	1	Quadriplegia following motor vehicle accident	Prior drug and alcohol use	Oral: normal diet	Completely dependent	Dentate
4	M	38	9	Intracranial hemorrhage following ruptured arterio-venous malformation	Hydrocephalus	Oral: normal diet	Independent with some assistance	Dentate
5	F	79	12	Multiple Sclerosis	Hypertension, COPD	Oral: normal diet	Independent with some assistance	Dentate with front lower bridge
6	F	78	4	CVA - right internal capsule	Hypertension, Diabetes, COPD	Oral: normal diet	Independent with some assistance	Complete upper dentures, partial lower dentures
7	M	78	1	CVA - right	Hypertension, prior alcoholism	Oral: normal diet	Independent	Dentate
8	M	49	1	CVA - right	Hypertension, Diabetes, COPD	Oral: normal diet	Independent with some assistance	Complete upper dentures, partial lower dentures
9	M	42	3	CVA - brainstem	Prior drug use, Hepatitis C	Prior enteral feeding; now oral, normal diet	Completely dependent	Molar teeth missing
10	M	62	1	CVA - right, post coronary artery bypass graft	Hypertension, Diabetes, COPD	Enteral feeding, nothing by mouth	Completely dependent	Most teeth missing

(Scannapieco, 1999). Furthermore, older adults who retain their natural teeth are at an elevated risk of aspiration pneumonia due to the combination of poor oral hygiene and the periodontal disease that contributes to greater shedding of respiratory pathogens into the saliva (Loesche & Lopatin, 1998).

Two factors were collected through a chart review at the end of the study, to capture events that occurred during the period of observation. First, we documented the use of antibiotic medications, since the long-term use of broad-spectrum antibiotics is reported to lower the colonization resistance of dental plaque, facilitating the overgrowth of non-resident microorganisms (Marsh, 1999). Second, any changes in medical status over the course of the study were captured, with particular attention to respiratory infections.

**Oral swabs.** Oral swabs were collected from participants at five time-points: a baseline analysis taken prior to their quarterly dental-hygiene appointment, and four follow-up analyses taken at 1, 5, 9 and 12 weeks following baseline. Specimens were collected just prior to lunch in order to reflect the typical lunchtime risk of aspirating pathogenic bacteria that might have accumulated over the course of the morning (i.e. in the time since the provision of routine morning oral care). Participants were evaluated under their normal eating conditions (i.e. with or without dentures), and no special procedures were used to cleanse the mouth immediately before specimen collection.

Pathogenic bacteria are known to be readily detectable on the tongue (Van der Velden, Van Winklehoff, Abbas & De Graaff, 1986), which is prone to the accumulation of microorganisms due to its papillary structure and large surface area (Dahan, Timmerman, Van Winklehoff & Van der Velden, 2004). For the current investigation, oral specimens were collected from the dorsal surface of the tongue by sweeping the midline groove in a posterior to anterior direction three times with a sterile oral swab. We chose the tongue swabbing method over swabbing the gingiva or tooth surfaces, because it is likely to gather equivalent data from both dentate and edentate participants. This method was also considered safer than collecting an expectorated oral rinse because it avoids the risk of a rinse spilling into the airway in patients with dysphagia.

Upon removal of the swab from the participant's mouth, it was immediately placed in a sterile specimen container (Amies-Gel with Charcoal Double Swab Kits) and transported to a microbiology lab to undergo standard microbiological analyses (Izenberg, 2003). Transport time to the microbiology lab ranged from 1-2 hours. At the lab, the specimens were plated onto

sheep blood agar, chocolate agar, and MacConkey agar and incubated at 35 °C for 48 hours. Respiratory pathogens (such as *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*), gram-negative bacilli and *Candida albicans* were identified to the species level using standard techniques. The microbiology report produced a semiquantification (0 = absent, 1 = scant, 2 = light, 3 = moderate, 4 = heavy) of all isolated organisms based on the smear plate method. Tables 2a, 2b and 2c illustrate the results of the colonization analysis by participant and species, across the 5 swabs that were collected. The number of different bacterial species detected served as a crude index of complexity. Total burden was calculated as the number of bacterial species present, multiplied by their semiquantified levels, and is summarized in Table 3.

**Salivary flow.** As the volume of saliva decreases, the fissures of the tongue may deepen (Limeback, 1988), the oral pH usually decreases (Shay, 2000; Shay & Ship, 1989), and the natural antimicrobial and buffering capacity of saliva reduces. This allows for the proliferation of bacteria (Loesche & Lopatin, 1998) and fungi (Narhi, Ainamo & Meurman, 1993). In order to control for the possible influence of oral dryness on oral colonization, we collected whole saliva measurements immediately following each oral swab using a modified Schirmer test (MST) (Chen, Wai, Lee, Lake & Woo, 2005). This MST used filter paper test strips (Eagle Vision, Memphis, Tenn.), calibrated in 1mm intervals and impregnated with blue dye at the omm wick end, which were placed sublingually on the floor of the participant's mouth. When exposed to moisture, the dye travels up the length of the strip; the distance of blue dye travelled was read at a designated interval of one minute.

**Data Analyses.** Statistical analyses for the study were conducted using SPSS 19.0 software. Chi-square tests were performed to identify differences in the semi-quantified colonization load at each time-point (baseline, 1, 5, 9 and 12 weeks post). Semi-quantified load classes were then collapsed into binary measures (present, absent). Two by two contingency tables for the association between organism presence and respiratory concerns were computed, with Fisher's exact tests used to explore this relationship. A mixed-model repeated measures analysis of variance was performed on the MST data with a repeated factor of time-point to identify differences in the oral dryness measures across swabs.

Table 2a. Semiquantified colonization loads, by species and participant, for successive oral swabs (part 1).

Semiquantified Load	Swab#	<u>Neisseria</u>		<u>Viridans Streptococcus</u>		<u>Haemophilus parainfluenzae</u>		<u>Corynebacterium</u>	
		Frequency	Participants	Frequency	Participants	Frequency	Participants	Frequency	Participants
Light	Baseline	2	p8, p10			3	p6, p7, p8		
	Week 1								
	Week 5					1	p7		
	Week 9								
	Week 12			1	p6			1	p6
Moderate	Baseline					1	p1		
	Week 1					3	p2, p8, p9		
	Week 5	2	p2, p7			3	p1, p3, p8	1	p4
	Week 9	3	p2, p3, p8	3	p2, p3, p8	4	p1, p2, p3, p6		
	Week 12					3	p1, p4, p7		
Heavy	Baseline	3	p4, p5, p6	3	p4, p5, p6	2	p5, p9	1	p4
	Week 1	5	p2, p5, p7, p8, p9	7	p2, p3, p5, p6, p7, p8, p9	6	p1, p3, p4, p5, p6, p7	2	p2, p3
	Week 5	2	p8, p9	3	p4, p8, p9	2	p5, p9		
	Week 9	4	p4, p5, p7, p9	5	p4, p5, p6, p7, p9	2	p4, p5	1	p7
	Week 12	2	p3, p7	1	p3	1	p10	1	p3
Very Heavy	Baseline	5	p1, p2, p3, p7, p9	6	p1, p2, p3, p7, p8, p9			2	p2, p3
	Week 1	3	p3, p4, p10	1	p1			1	p1
	Week 5	4	p1, p3, p5, p10	4	p1, p3, p5, p6			2	p6, p10
	Week 9	2	p1, p10	2	p1, p10			1	p1
	Week 12	7	p1, p2, p4, p5, p8, p9, p10	7	p1, p2, p4, p5, p7, p8, p9	3	p5, p8, p9	3	p1, p5, p9

Table 2b. Semiquantified colonization loads, by species and participant, for successive oral swabs (part 2).

Semiquantified Load	Swab#	<u>Non-Hemolytic Streptococcus</u>		<u>Coagulase Neg. Staphylococcus</u>		<u>Group B Streptococcus</u>		<u>Streptococcus Species</u>	
		Frequency	Participants	Frequency	Participants	Frequency	Participants	Frequency	Participants
Light	Baseline								
	Week 1								
	Week 5								
	Week 9								
	Week 12							1	
Moderate	Baseline								
	Week 1								
	Week 5			2	p2, p9				
	Week 9								
Heavy	Baseline	1	p4	1	p8	1	p10		
	Week 1	5	p1, p2, p3, p7, p8					1	p5
	Week 5	2	p7, p8						
	Week 9			1	p6				
	Week 12			1	p3				
Very Heavy	Baseline	3	p1, p2, p3						
	Week 1			2	p1, p4	1	p10		
	Week 5			1	p6	1	p10	1	p6
	Week 9					1	p10		
	Week 12	1	p5	3	p2, p8, p9	1	p10	1	p8

Table 2c. Semiquantified colonization loads, by species and participant, for successive oral swabs (part 3).

Semiquantified Load	Swab#	Non-Hemolytic Streptococcus		Coagulase Neg. Staphylococcus		Group B Streptococcus		Streptococcus Species	
		Frequency	Participants	Frequency	Participants	Frequency	Participants	Frequency	Participants
Light	Baseline								
	Week 1								
	Week 5								
	Week 9								
	Week 12							1	
Moderate	Baseline								
	Week 1								
	Week 5			2	p2, p9				
	Week 9								
	Week 12								
Heavy	Baseline	1	p4	1	p8	1	p10		
	Week 1	5	p1, p2, p3, p7, p8					1	p5
	Week 5	2	p7, p8						
	Week 9			1	p6				
	Week 12			1	p3				
Very Heavy	Baseline	3	p1, p2, p3						
	Week 1			2	p1, p4	1	p10		
	Week 5			1	p6	1	p10	1	p6
	Week 9					1	p10		
	Week 12	1	p5	3	p2, p8, p9	1	p10	1	p8

Table 3. Total colonization burden (the number of identified species, each multiplied by their semi-quantified load), by participant, across successive oral swabs.

Participant	Baseline	Week 1	Week 5	Week 9	Week 12
1	14	18	10	14	14
2	16	11	4	6	12
3	16	14	10	6	12
4	12	15	5	9	14
5	12	13	11	9	20
6 <sup>§</sup>	10	10	18	8	3
7	9	15	6	9	9
8 <sup>§§</sup>	9	14	11	4	20
9	14	14	11	6	20
10 <sup>§§§</sup>	5	9	12	16	15

<sup>§</sup>Participant 6 developed pneumonia during the course of the study.

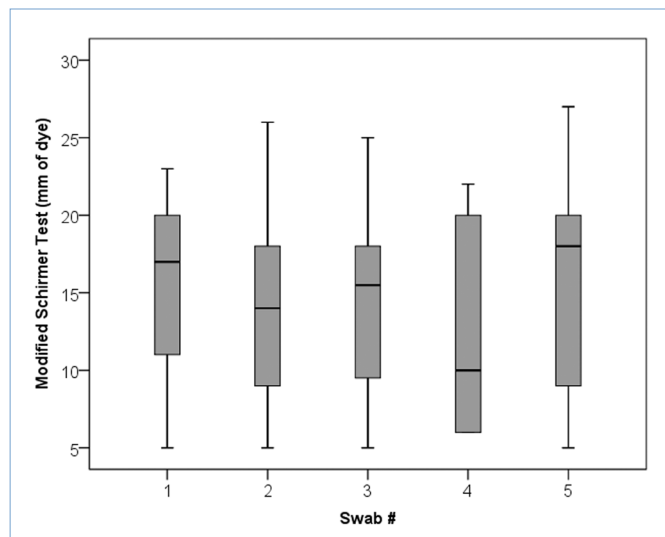
<sup>§§</sup>Participant 8 developed a cough and congestion and was prescribed antibiotics during the course of the study.

<sup>§§§</sup>Participant 10, who was the only participant on enteral feeding, is the only participant in whom the predicted trend of increasing colonization burden across successive swabs was observed.

## Results

As summarized in Tables 2a, the most prevalent microorganisms in this study were found to be *Neisseria* species (not *meningitidis* or *gonorrhoeae*), *Viridans*

Figure 1. Means and standard deviation error bars for Modified Schirmer test measures across swabs.



*Streptococci*, and *Haemophilus parainfluenzae*, which consistently showed heavy colonization across all time-points. These strains are typically classified as commensal (or typical, non-pathogenic) flora in the mouth. Oral colonization with respiratory pathogens was rare in this sample. Colonization with respiratory pathogens did not decrease in response to dental hygiene interventions nor increase with the passage of time as initially hypothesized. In fact, there were no obvious trends in colonization patterns; none of the microorganisms identified in our samples appeared to be disturbed by the dental hygiene interventions.

In our sample, we encountered only two cases of respiratory concern. Participant 6 was medically diagnosed with pneumonia via x-ray and participant 8 was suspected of pneumonia due to cough and congestion and treated as such with antibiotics. In the rare cases where respiratory pathogens of interest were found (i.e., *Staphylococcus aureus* and AGNB) there was no significant association with episodes of respiratory concern amongst our participants. The only exception to this observation was with yeast of types other than *Candida albicans* ( $p < 0.01$ , Fisher's exact test). Participant 6 (who was diagnosed with pneumonia) was the only individual in our sample who showed colonization with yeast. Given that yeasts are not classified as respiratory pathogens, the clinical significance of this finding is unclear.

Our sample included only one participant on enteral feeding (participant 10). This participant was the only one noted to have a white coating on his tongue and "heavy tenacious calculus" documented in his chart. This participant's oral swabs were unique in showing colonization with Group B *Streptococcus* and *Proteus* species. Notably, as shown in Table 3, this participant was also the only one to exhibit an overall pattern of bacterial load that corresponded to the hypothesized pattern (i.e., lowest load post dental hygiene intervention, then gradually increasing with time).

With respect to measures of oral dryness, the mean MST measure across all swabs was 14.6 mm (SD = 6.8), which is comparable to measures seen in normal healthy individuals (Chen et al., 2005). In all cases except one, the MST measures failed to show oral dryness (i.e., MST measures < 5 mm at 1 minute). MST measures did not fluctuate in any meaningful way across time (see Figure 1). Oral dryness as a factor that may encourage proliferation of pathogens did not appear to be at play in our study.

## Discussion

In the current study we observed no particular pattern with respect to the decrease and gradual proliferation of the bacterial pathogens of interest over time in individuals receiving routine oral care and quarterly dental hygiene interventions. We could naively interpret these data to show that routine oral care was not influencing colonization patterns at all, or that it was effectively limiting pathogen colonization in these patients, and conclude that our data do not argue strongly for a need for better oral care in CCC hospitals. However, the variability of the observed oral ecology gives us grounds to think otherwise. In order to position the current results in a proper context, it would be necessary to fully understand the development/colonization process of dental plaque, the homeostatic mechanisms involved in maintaining oral ecology, and the bacterial/cellular interactions that occur and how these may place patients at risk for pneumonia. While such issues go beyond the scope of this paper, it is apparent to us that a sample size of 10 is inadequate for displaying the oral hygiene-bacterial interactions that are relevant to the pathogenesis of pneumonia. In fact, the biggest lesson we learned in pursuing this study was just how complex the relationship between oral microbial colonization and oral care appears to be. We found that we were left with more questions than answers.

The majority of the bacterial strains identified in the samples collected were determined to be commensal, non-pathogenic microflora of the upper respiratory tract. The most predominant genera of the nasopharynx are *Neisseria*, *Streptococci*, and *Haemophilus*, which



were the most prevalent microorganisms collected in our samples. These bacteria have also been shown to be the early colonizers in dental plaque development (Liljemark, Fenner & Bloomquist, 1986; Nyvad & Kilian, 1987), and therefore they are thought to play a key role in creating conditions that enable more fastidious organisms to further colonize, leading to the bacterial and structural complexity of dental plaque (Marsh, 2005). *Viridans streptococci* are also reported to be the most numerous bacteria, comprising approximately 40% of cultivable microflora in the oral cavity (Marsh, 2000, p.33). This was the most common strain of bacteria identified in our sample across all swabs (Figure 1).

Anecdotally, the dental hygienists working in the CCC facilities where our study was conducted reported that they considered oral health status to be relatively poor among residents in general. This corroborates the literature showing poor oral health in LTC populations, even following interventions designed to improve the situation (Frenkel, Harvey & Newcombe, 2001). It should, of course, be acknowledged that CCC facilities, in which dental hygiene services are available, probably provide better access to dental care than other types of LTC facilities such as nursing homes. However, our data suggest that the state of poor oral health in the CCC residents who participated in our study was not sufficiently poor to allow for evident colonization with respiratory pathogens. This raises questions about the types of physiological changes that might need to occur in order for an individual in LTC to become susceptible to colonization with respiratory pathogens. Do these changes involve disruption of the early colonizers seen in our data and how do such changes interact with such issues as medical frailty, cognitive status and dependence for activities of daily living? Given that we did not find respiratory pathogens in our small sample, does that mean that these particular individuals were not at risk of developing pneumonia, and would have remained at low risk over a longer timeframe of observation?

Speech-language pathologists, who perform assessments of oral motor and sensory function in adults during in their evaluations of swallowing (CASLPA, 2008), are increasingly interested in patients' oral health as a risk factor for developing pneumonia secondary to aspiration associated with dysphagia. They frequently report that oral health status affects their clinical recommendations for this patient population (Yoon & Steele, 2012) and it has become extremely common for S-LPs to request greater vigilance in oral care for their patients. It is interesting to reflect on the fact that prior literature drawing a connection between oral health and pneumonia risk does not, in fact, suggest that dysphagia is a necessary facilitating

factor in this association (Langmore et al., 1998). Thus, the risk of pneumonia for individuals with oral colonization with respiratory pathogens may exist independent of dysphagia, or, it may be the case that future research will demonstrate a heightened risk in those with dysphagia. The current data, collected from individuals residing in LTC suggest that clinical observations of poor oral health status do not add up to reflect colonization that constitutes a clear risk for developing respiratory infection. Furthermore, the three participants for whom dysphagia might have been expected to be a contributing factor were not the ones who developed respiratory concerns during the course of the study. Thus, we conclude that clinicians should be wary of overusing recommendations for vigilant oral care as a mechanism for limiting pneumonia risk, since this appears to reflect an oversimplified understanding of the risk factors involved.

### Limitations

There are several limitations in this study that should be taken into consideration for future studies:

1. There was no tracking of the oral care provided by the nursing staff. The type of nursing oral care provided, products used, and the actual time of care delivery relative to the swab collection may have influenced the results of the oral swabs that were collected.
2. The hospitals in which data were collected for this study both have in-house dental services, which provided quarterly dental hygiene appointments to residents. This level of dental service provision is not common to most LTC facilities and, therefore, the definition of *routine* oral care for this study may not be generalizable to other facilities where residents are more likely served by outpatient services.
3. Our sample size was primarily constrained due to budget. The high costs associated with the microbiological testing of oral swabs (i.e., \$75.00/swab) render this method of monitoring oral colonization questionably feasible for screening for respiratory pathogens in larger samples or over longer time frames. Even if we had found significant results, we question the merits of swabbing for oral bacteria as a method for tracking pneumonia risk. Clear demonstration of a much stronger relationship would be necessary before recommending more widespread use of this approach. Further, impeccable methods are required to avoid contamination of swabs, and to ensure that species present in oral secretions remain viable in the swab samples up until the point of analysis in a lab.

4. In the current study, we did not stratify our sample for level of dependence in oral care, or for the presence/absence of dysphagia. Both of these factors can impact the risk of developing aspiration-related pneumonia and should therefore be monitored as factors in future, larger studies. In addition, we did not recruit a sufficient number of participants who experienced oral dryness to be able to discern the influence of salivary flow on colonization levels.
5. In an ideal world, we would have continued to add participants to our sample, and would have monitored our participants until we had observed an incidence of pneumonia similar to that reported in the literature. The occurrence of only two candidate episodes in our sample suggests that our study was underpowered to reveal any meaningful relationship between the variables studied and the emergence of aspiration-related respiratory concerns.
6. The oral colonization of the one participant who was on enteral feeding was different from that observed in the rest of the sample. Greater vigilance is required for more vulnerable and complex patients and, therefore, we should have better defined our exclusion criteria, or deliberately sampled a greater number of individuals on enteral feeding.
7. Oral ecology is a variable and complex phenomenon, which fluctuates over time, as shown by the data in this study (Tables 2a, 2b and 2c). The timing of our swab collections was not sufficiently frequent to monitor for rapid changes that might occur. Dental plaque starts to form immediately after being removed, when the early colonizers interact with the pellicle and begin to adhere to the enamel to begin the process; therefore, by the time we collected the first swab following a dental hygiene intervention, it is quite likely that bacteria had already reestablished themselves and the oral environment had already re-stabilized.

### Conclusion

Our data did not show any changes in patterns of oral microbial colonization related to dental hygiene interventions over the time-course of our study. No clear relationships were found between oral microbial colonization and symptoms of upper respiratory infection in our pilot sample of LTC residents. We did not find any significant association between measures of oral dryness and the different classes of medications used by our participants, and we did not find that oral

dryness measures affected oral bacterial colonization. From this study, we learned that the relationship between microflora and oral care does not unfold in a predictable linear pattern over time. Although our study demonstrated no clear relationships between oral care, oral colonization and respiratory concerns, we would caution that a pilot study does not provide sufficient grounds to challenge previous literature suggesting that oral care may be an effective defensive strategy for managing the risk of developing pneumonia. Our study suggests that speech-language pathologists should be aware that neither dysphagia nor oral colonization are simple or straight-forward mitigating factors for pneumonia pathogenesis. In conclusion, we recommend that speech-language pathologists should collaborate with their colleagues in dental hygiene and nursing to promote good oral health for LTC patients. We caution against the overuse of *routine* recommendations for more vigilant oral care by S-LPs, and recommend that where oral care concerns are identified by an S-LP, interprofessional collaboration to develop patient-centered plans of care should be the preferred approach. Given evidence that efforts to improve oral care provision in LTC facilities face challenges and show poor uptake (Frenkel et al., 2001; Holmes, 1996; MacEntee et al., 1999; Preston et al., 2000; Wardh et al., 2000; Yoon & Steele, 2012), our data suggest that such interprofessional problem solving would be appropriate in situations where there is clear evidence of multiple converging risk factors for pneumonia, including dysphagia, poor oral health and concerns about compromised immune status in a patient.

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## Do Students Talk the Talk?

A Study of the use of Professional Vocabularies  
Among Student Speech-Language Pathologists  
and Teachers Through an Interprofessional  
Education ExperienceLes Étudiants Font-ils de Beaux Discours ?  
Une Étude sur L'utilisation du VocabulaireProfessionnel Chez les Étudiants en Orthophonie  
et les Étudiants en Enseignement par le Biais  
d'une Expérience InterprofessionnelleSalima Suleman  
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## Abstract

A barrier to collaboration is the use of profession-specific terminology that is inaccessible to members outside of one's own profession. Results presented in this paper are part of a study that examined the efficacy of an interprofessional education (IPE) experience between student speech-language pathologists (SLPs) and student teachers. This paper focuses on analyses pertaining to profession-specific terminology. Results showed that student SLPs used significantly more profession-specific terminology than student teachers when explaining profession-specific concepts to parents. It was also found that an IPE experience significantly decreased the number of jargon words used by student SLPs. Finally, when student SLPs and teachers worked together, they used minimal amounts of profession-specific terminology. This study provides evidence for professional preparation programs to allocate time and resources to increase student awareness of profession-specific terminology. Professional speech-language pathologists are encouraged to increase awareness of jargon terms and identify and reduce their use of this terminology in their professional practice.

## Abrégé

La terminologie spécifique à une profession, qui est inaccessible à quiconque n'est pas membre de la profession, constitue un obstacle à la collaboration. Les résultats présentés font partie d'une étude ayant examiné l'efficacité de l'expérience d'éducation interprofessionnelle (EIP) entre des étudiants en orthophonie et des étudiants en enseignement. Le présent article se concentre sur des analyses portant sur la terminologie professionnelle. Les résultats ont montré que les étudiants en orthophonie utilisaient significativement plus de termes spécifiques à la profession que les étudiants en enseignement lorsqu'ils expliquaient aux parents des concepts propres à la profession. On a trouvé qu'une expérience d'éducation interprofessionnelle (EIP) diminuait de façon significative le nombre de mots de jargon utilisés par les étudiants en orthophonie. Enfin, quand les étudiants en orthophonie et les étudiants en enseignement travaillaient ensemble, ils utilisaient moins de termes spécifiques à la profession. Cette étude montre que les programmes de formation professionnelle devraient allouer du temps et des ressources à la sensibilisation des étudiants concernant la terminologie spécifique à la profession. Les orthophonistes sont encouragés à prendre conscience de l'utilisation qu'ils font des termes spécialisés et à réduire l'usage de cette terminologie dans leur pratique professionnelle.



## Introduction

Communicative competence is a set of skills that is fundamental to effective collaboration (Woods, 2007). As students immerse themselves in a professional field, their lexicon is developed through a socialization process that results in a vocabulary that is specialized and potentially inaccessible to those outside of the discipline (Hall & Weaver, 2001; Irvine, Kerridge, McPhee & Freeman, 2002). It has been suggested that the use of profession-specific jargon can interfere with sharing information among professionals from differing fields (Bucknavage, 2007; Wright, Stackhouse & Wood, 2008). In a study that asked early-childhood educators about collaboration with speech-language pathologists (S-LPs), different professional vocabularies and the time consuming nature of asking for clarification from S-LPs were identified as barriers to interprofessional communication and collaboration (Hall, 2005). For example, a teacher surveyed stated “they [S-LPs] sent some sheets, I didn’t really understand them... and it was obviously something that was really familiar to themselves and (we didn’t know) what it was used for...I wasn’t really sure what to do with it...” (Hall, 2005, p. 17). While there is a paucity of evidence regarding the use of profession-specific terminology by S-LPs when collaborating with teachers, the field of school-based psychology has conducted some research to show that the use of profession-specific terminology in psychology reports negatively impacts teacher preference, ability to recall information, and perceived comprehension of reports (Bucknavage, 2007; Wiese, Bush, Newman, Benes, & Witt, 1986). Effective collaborators need skills to negotiate the barrier of profession-specific terminology.

Interprofessional education (IPE) has been defined as “those occasions when members [or students] of two or more professions learn with, from and about one another to improve collaboration and the quality of care” (Hammick, Freeth, Koppel, Reeves & Barr, 2007, p. 736). Interprofessional education programs can foster the development of communication skills related to the clear expression and clarification profession-specific ideas and terminology (Woods, 2007). The University of Alberta Health Sciences Council, in collaboration with professional agencies, other universities and Canadian Interprofessional Health Collaboration (CIHC) developed an Interprofessional Learning Pathway Competency Framework that consists of four collaborative competencies; collaboration, reflection, communication, and understanding professional roles aimed to improve efficiency and effectiveness of successful collaboration (HSERC, 2011, p.1). The communication competency refers to “communication skills that enhance interprofessional collaboration” (HSERC, 2011, p. 3). When detailed, this competency involves skills associated with profession-specific terminology including the ability

to address profession-specific language as a barrier to effective communication, the ability to match level and mode of communication to the communication partner (i.e., other professional, client, family, etc), and the ability to ensure that professional knowledge is translated and conveyed appropriately to the client (HSERC, 2011). IPE has the potential to help students learn to identify their profession-specific terminology and define it in a way that is understandable to individuals outside their profession.

The American Speech-Hearing Association estimated that over 50% of S-LPs work in the school system (ASHA, 2012) and speech, language, and communication disorders are cited as the most common childhood disability (Hall, 2005). Listening, speaking, reading and writing are interrelated and support in all language processes is especially important for children with communication disorders or those at risk of school failure (ASHA, 2010; Catts & Kamhi, 2005 ). Both teachers and S-LPs have responsibilities in the area of language and literacy development, and therefore a distinct area of role overlap emerges for these two professions (Ukrainetz & Fresquez, 2003).

In spring 2011, the University Of Alberta Department of Speech Pathology and Audiology and the Department of Elementary Education established a two-session IPE experience for student S-LPs and student teachers. The experience was developed to address four constructs of collaboration: knowledge and understanding of professional roles; communication skills, specifically the ability to identify and reduce the use of profession-specific terminology; personal reflection; and knowledge and application of models of specialized service delivery. These four constructs were specific to this IPE experience and were derived from the competencies outlined in the University of Alberta Health Science Council Interprofessional Learning Pathway Competency Framework (HSERC, 2011). The analysis and results presented in this paper only pertain to the communication construct of this IPE experience. The IPE experience included completion of two online reflective surveys, attendance and participation in a ninety-minute interactive seminar, where interprofessional pairs of students completed six activities based on a foundational metaphor that described schools as existing on a mainland and S-LPs existing on an island approximately a kilometer off the coast, and completion of a collaborative case study that required student S-LPs and teachers to work in small groups to develop an intervention plan for a hypothetical classroom (Figure 1).

Specific to the communication construct, the IPE provided student teachers and student S-LPs with authentic opportunities to become aware of and reduce their use of profession-specific terminology, as well as develop skills in explaining profession-specific terminology to individuals



external to their profession. For example, in the interactive seminar, participants engaged in a discussion around shared vocabulary (i.e., words used in both fields that may appear related but are distinct in their usage, for example *phonology*, a term used by S-LPs and *phonics*, a term used by teachers).

## Methodology

### Participants

All students enrolled in designated speech-language pathology and education courses were required to participate in the IPE experience as part of their course work. Student teachers were registered in the Faculty of Education course entitled 'Language Arts in Elementary Schools'. This course was designed to prepare student teachers to implement a Language Arts curriculum in an elementary school setting. The student S-LPs were registered in the Department of Speech Pathology and Audiology course entitled 'Language and Literacy', which focuses on the relationship between oral language and literacy skills such as reading and writing. The courses selected focussed on language and literacy and therefore there was some shared content, which allowed the IPE to have foundation in the content of the courses. Ninety-five percent of students who took part in the IPE experience agreed to participate in research related to the efficacy of the IPE experience. This study used information from 55 student S-LPs and 52 student teachers. The IPE experience took place midway through the student S-LPs second semester in a two-year professional master's degree program, prior to formal clinical experience. For student teachers, the timing of the IPE experience varied and depended on when the students opted to take the course in their three-plus-one-year bachelor's degree program. Over 95% of the student teachers had completed a five-week introductory practicum placement in a classroom. For the collaborative case study, students were randomly assigned to small groups of four to six students, with a comparable number of student S-LPs and student teachers per group.

### Materials

Data related to the use of profession-specific terminology were gathered from reflective surveys. Identical surveys were completed independently and online before the interactive seminar and after the collaborative case study (i.e., before and after the jointly attended sessions). As part of the surveys, participants were asked to:

- explain to a parent the role and process of assessment in your profession; and
- explain to a parent the connection between spoken language (i.e., speech and language) and reading/writing.

These items were used as one way to assess participants' ability to reduce jargon.

For the case study, every interdisciplinary group received a thorough description that included a diagram of the classroom layout, a description of the school (i.e., school population, demographics, shared spaces), and holistic descriptions of seven students with behavioral and/or speech or language concerns in an inclusive grade two classroom. For example, one student description stated:

*Doug has a moderate stutter, and while he seems to have a close circle of friends, Doug reported to his mom last week that he was being picked on by some kids on the playground. Doug rarely speaks up in class, but has no trouble completing written academic work.*

One response item on the collaborative case study was used for analysis of use of profession-specific terminology. On this item, small interprofessional groups of students were asked to explain their jointly developed intervention plan for one of the hypothetical students to the hypothetical child's parents.

### Analysis Methodology

Researchers developed a list of objective criteria to identify profession-specific terminology. The criteria included researchers' agreement, appearance in glossary or index of general introductory textbooks to the field, and usage that deviates from conventional definitions found in a dictionary. The analysis process involved counting the number of profession-specific words in the explanation provided by each participant. Simultaneously, the researchers created a list of words used by students that met the criteria of being profession-specific terminology and sorted this list according to whether the word was used by student S-LPs, student teachers, or both student S-LPs and teachers.

## Results

### Compilation of Jargon Terms

Analysis of responses from all items from the reflective surveys yielded a total of 56 different jargon terms used by students. Student S-LPs used 44 of the jargon words, 7 were used only by student teachers and only 5 words were used by students from both disciplines. Speech-language pathology jargon words included *articulation*, *graphemes*, *intelligible*, *orthography*, *sound-letter correspondence* and *standardized test*. Education jargon terms included *differentiated instruction*, *formative* and *summative*, and *program of studies*. Jargon terms used by students of both disciplines included *decode*, *developmental functioning/appropriate*, *formal* and *informal* and *receptive* and *expressive*. Examples of student responses can be found in Table 1. Table 2 contains the full list of profession-specific terms organized by profession.

## ANOVA analysis

The preliminary ANOVA analysis conducted yielded a significant between-groups difference ( $F(1, 105) = 23.979$ ,  $p < 0.001$ , partial eta squared = 0.186). The ANOVA analysis also showed a significant difference within-groups before and after the IPE experience ( $F(1, 105) = 6.137$ ,  $p = 0.015$ ). Mean and standard deviations for both groups before and after the IPE experience can be found in Table 3. A post-hoc pairwise comparison using a Bonferroni correction showed a significant difference within the speech-language pathology group before and after the IPE experience ( $t(54) = 2.801$ ,  $p = 0.007$ ). The post-hoc pairwise comparison showed that there was no significant difference within the education group before and after the IPE experience ( $t(51) = 0.131$ ,  $p = 0.896$ ). These results showed that student S-LPs used significantly more jargon than student teachers before the IPE experience. After the IPE experience, student S-LPs showed a significant decrease in their use of jargon words. However, student S-LPs continued to use significantly more jargon than student teachers after the IPE. Student teachers used relatively less jargon before the experience and did not show any change in their use of jargon after the IPE experience.

## Collaborative Case study

The collaborative case study asked each interprofessional group of students to explain their intervention plan for one of the hypothetical children in the description to his parents. The number of jargon words used in that explanation was counted for each group response. Results displayed in Table 4, showed that the majority of groups (87%) used zero to one jargon word in their explanation of an intervention plan to parents. Analysis of group responses on the collaborative case study yielded six different jargon terms: *articulation*, *digit fidget*, *intelligibility*, *phonological awareness*, *segmenting & blending*, and *sound-letter correspondence*. One group used all six of the identified jargon terms. It can be noted that five of the six words used on the collaborative case studies were identified as being used only by student S-LPs on the reflective surveys.

## Discussion

The statistical analysis of the frequency with which participants used jargon showed that student S-LPs used significantly more profession-specific terminology than student teachers before and after the interprofessional education experience. However, analysis also showed that student S-LPs used significantly less jargon after the IPE experience. Both disciplines were able to explain the concepts; the difference was the student teachers were able to do so with minimal use of profession-specific terminology. For example, a student teacher who used profession-specific terminology in their explanation of assessment, stated (profession-specific terms are in bold):

*The role of assessment is to determine the students standing in the classroom on a given activity.*

- *Allows the teacher to reflect on teaching (how to improve it)*
- *Shows what needs to be improved in the students*
- *The process of assessment is clearly defined by the teacher to the students*
- *Sometimes **formal/informal***
- *Must reflect on the **program of studies***

In comparison, a student S-LP who used profession-specific terminology in their explanation of assessment, stated (profession-specific terms are in bold):

*To see if the child has a disability and if so, in what **domains of language**. Use **standardized test** to see if there is a problem then do more **informal probes** and language samples to see exactly where the problem is (**semantics, syntax, pragmatics**.)*

When examined, not only does the response from the student S-LP use quantitatively more jargon terms; the terms actually refer to abstract concepts that may be unknown or unclear to individuals outside of their profession (e.g., syntax). The student teacher's response provides an explanation that is primarily free from jargon, while the student S-LP uses jargon more frequently and regularly in their explanation. The student teacher used 64 words in her explanation, and only two profession-specific terms. This student teacher used jargon at the very end of their explanation, and at no other point in her explanation. In contrast, the student S-LP used 44 words in her explanation with six profession-specific terms that were employed regularly throughout the response. These qualitative differences between this pair of examples, demonstrates some of the details that were not formally analyzed in this study but provide valuable information that informs the following discussion.

Of the 56 jargon words identified by researchers, student teachers used only 7 terms. Not only were speech-language pathology participants using more profession-specific terminology, they were also using a broader range of terms that were considered jargon. Even with the emphasis being placed on 'parent-friendly' language in post-secondary preparation programs, the student S-LPs in this study seemed to fluently use jargon in their explanations, even though this was inappropriate in the given context.

In contrast, when students were assigned to interprofessional groups and given an opportunity to explain a concept to parents, almost 90% of groups used less than two jargon term in their explanation. This demonstrated that when students worked together in

interprofessional groupings, they were either actively working to use less jargon in their explanation or they were using less profession-specific terminology as a consideration of working with members of another profession. The single group that used six profession-specific terms used five words that were classified as being used by student S-LPs on the reflective surveys. This suggested that in that group, the student S-LPs may have been responsible for the use of the jargon terminology. Statistical analysis showed a significant decrease in the use of profession-specific terminology used by student S-LPs after the IPE experience concluded.

This study showed that student S-LPs used profession-specific terminology in inappropriate contexts perhaps due to being unaware that the terms are not generally understood by the general population or other professions. The IPE experience was shown to reduce the amount of profession-specific terminology used by student S-LPs, which may ultimately work to improve collaboration between members of these professions. The IPE provided an opportunity for students to receive immediate feedback regarding their communication style. The authentic nature of the IPE allowed students to explore their developing professional vocabularies and increase their awareness of their use of this vocabulary.

### Implications

This preliminary study demonstrated that this IPE reduced the number of profession-specific words used by student S-LPs. In doing so, the IPE assisted in the preparation of these students for the collaborative workplace. Ideally, all university programs in Canada would include some form of IPE that connects student S-LPs with student teachers, a very probable collaborative pairing upon graduation.

Unfortunately, the establishment of an interprofessional education experience is time-consuming and complicated to coordinate, so IPE is not always feasible. Finding a mutually agreeable time proved to be one of the greatest challenges to setting up this IPE. The authors suggest establishing departmental investment in the establishment of IPE and culminating relationships between faculty members in order to promote the accommodation of IPE into course work and time. At the University of Alberta, student S-LPs have a fixed course schedule and attend all courses as a single cohort, whereas student teachers have individual and varied course schedules. This IPE took place during scheduled class time for education students, which was either during flexible speech-language pathology course time or after S-LP courses had concluded for the day.

The results from this study provide evidence for university programs to include more education related to effective communication for professional preparedness. This education can be included in coursework as well as

in the clinical practicum setting. Throughout the formal education of students, professors and instructors can provide additional opportunities for students to practice using jargon-free language by promoting parent or client-friendly communication. Clinical educators for students S-LPs can use these findings to enhance the education they provide students. Clinical educators for students could mentor student S-LPs by providing examples of jargon-free reports and explanations to demonstrate a collaborative-friendly communication style. Also, these results should heighten awareness of personal use of profession-specific terminology in new and established practitioners. This study provides rationale for practitioners to connect with team members from other professions and discuss clarity of communication (written and spoken) and profession-specific terminology. It would be valuable for interprofessional teams to work together to develop a shared vocabulary and clarify their intent when using terms that could be confusing (e.g., phonology and phonics). Team leaders can foster a collaborative-ready team by promoting and providing time for formal team discussions of communicative barriers, and fostering an open environment where team members feel comfortable requesting clarification and providing feedback to other team members if their communication is unclear or laden with jargon terms.

### Limitations & Future Research

This preliminary study provided a broad overview of the efficacy of one specific IPE experience. This study brought together student teachers and S-LPs and developed an IPE curriculum specific to these professions. This specific IPE experience focussed on the area of language and literacy, a unique area of overlap between S-LPs and teachers. Other IPE experiences should be developed to focus on other areas of overlap, such as curricular modifications, and then tested for efficacy. If the IPE were to include other professions that work in schools (e.g., occupational therapists, physical therapists, nurses, psychologists, educational assistants, speech-language pathology assistants, etc), this language-literacy IPE curriculum would not be relevant and would require revision. Interdisciplinary teams typically involve more than two professions, so in the interest of workforce preparedness, an authentic IPE experience would include more professions. In order to determine the impact of IPE on the use of profession-specific terminology across more disciplines, a future study should include a variety of other professions.

This study only looked at quantitative changes in the use of profession-specific terminology before and after the IPE. A future study should employ different measures in order to provide more qualitative information about the explanations used by members of different professions.

These measures could include complexity measures related to sentence structure and overall vocabulary choice or ratio of profession-specific terms to total number of words in an explanation. A closer examination of this phenomenon would provide more information for individuals, programs, and teams trying to address this problem.

It may also be beneficial to determine the effects of clinical experience on frequency of jargon use. In this study all the student S-LPs in this study had not yet engaged in clinical experience. A future study should look into the efficacy of this IPE with professional teachers and S-LPs working in the schools to determine if the IPE would benefit professionals as well as pre-professional students. Finally, in order to determine the prevalence of profession-specific terminology used by professionals, a future study should look at the use of profession-specific terminology used in S-LPs' written and spoken communication in the schools.

### Conclusions

A profession-specific vocabulary is a product of professional socialization and results in the use of professional vocabularies even when engaging in discourse with other professionals and parents. This study found those student S-LPs were using a jargon-rich professional vocabulary in authentic situations. The introduction of IPE reduced the quantity of profession-specific terms used by student S-LPs. Interprofessional education can assist in preparing student S-LPs for a collaborative workplace by increasing their awareness and reducing their use of profession-specific terminology.

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Table 1. Examples of SLP and education participant responses explaining the connection between oral and written language, organized by use of profession-specific terminology

Participant Discipline	Responses free from profession-specific terms	Responses with profession-specific terms
S-LP	<p>“There is a strong but complex connection between the spoken language and reading/writing. Reading and writing are language based, and children begin to learn to read and write based on the language they have gained through speaking. Reading/writing can also increase vocabulary in the spoken language. Also they are all forms of communication”</p> <p>(S-LP participant, 118 pre-IPE reflective survey)</p>	<p>“Spoken language is the generation of <b>grammatical structures</b> and vocabulary. This does not require explicit knowledge of <b>phonemes</b> or the alphabet. However, reading and writing requires <b>phonemic awareness</b> and requires the child to make <b>letter-sound correspondences</b>. Reading helps to increase vocabulary and introduce new <b>grammatical forms</b> to the child. Writing is the creative generation of these <b>grammatical structures</b> and vocabulary”</p> <p>(S-LP participant, 116 pre-IPE reflective survey)</p>
Education	<p>“Spoken language generally develops sooner than reading and writing skills. After developing spoken language ability, the child begins to connect their knowledge of word sounds with the idea that they can be represented in writing. Over time, children make specific connections to oral sounds and written letters and words to learn to read and write.”</p> <p>(Education participant, 211 pre-IPE reflective survey)</p>	<p>“Spoken language refers to the way children communicate to peers, adults, etc. using their mouth or other methods to create sounds. It is a way to express themselves (as is writing). With reading (<b>receptive language</b>) and writing it is also a mental process but it requires movement of their hands and eyes and <b>fine motor skills</b> (for writing). Some children have trouble seeing the connection between spoken and written language.”</p> <p>(Education participant, 321 post-IPE reflective survey)</p>

Notes: S-LP = speech-language pathology



Table 2. Profession-specific terms used organized by discipline

Terms used by S-LP participants	Terms used by Education participants	Terms used by participants from both disciplines
<ul style="list-style-type: none"> <li>• Articulation</li> <li>• Chronological + (age)</li> <li>• Criterion Referenced</li> <li>• Domains + (language)</li> <li>• Fine Motor</li> <li>• Fluency</li> <li>• Forms + (Grammatical)</li> <li>• Graphemes</li> <li>• Intelligible</li> <li>• Modalities + (language)</li> <li>• Morphology</li> <li>• Narrative Sample</li> <li>• Normal Curve</li> <li>• Normal Distribution</li> <li>• Normal Range</li> <li>• Norms</li> <li>• Operating + (—)</li> <li>• Oral Language</li> <li>• Orthography</li> <li>• Output + (Motor)</li> <li>• Phonemes</li> <li>• Phonemic</li> <li>• Phonological Awareness</li> <li>• Phonology</li> <li>• Pragmatics</li> <li>• Pre-Literacy</li> <li>• Pre-Post Treatment Measure</li> <li>• Probes</li> <li>• Profile + (language)</li> <li>• Representations + (—)</li> <li>• Resonance</li> <li>• Segmenting + (sounds)</li> <li>• Semantics</li> <li>• Sight Words</li> <li>• Significant Difference</li> <li>• Sound-Letter Association</li> <li>• Sound-Letter Correspondence</li> <li>• Sound Segments</li> <li>• Standard Deviation</li> <li>• Standard Scores</li> <li>• Standardized Test</li> <li>• Typical + (range, etc)</li> <li>• Within normal limits</li> </ul>	<ul style="list-style-type: none"> <li>• Differentiated Instruction</li> <li>• Formative</li> <li>• Metacognitively</li> <li>• Portfolios</li> <li>• Program of Studies</li> <li>• Registers</li> <li>• Summative</li> </ul>	<ul style="list-style-type: none"> <li>• Decode</li> <li>• Developmentally + (appropriate/ functioning)</li> <li>• Formal &amp; Informal</li> <li>• Phonetic</li> <li>• Receptive &amp; Expressive</li> </ul>

Notes: S-LP = speech-language pathology



Table 3. Summary of mean and standard deviation of profession-specific terms used by participants from each discipline before and after the IPE experience

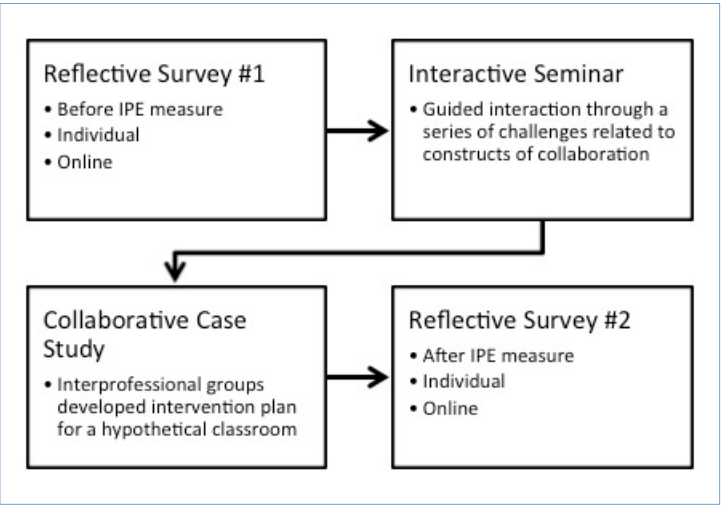
Participant Discipline	Mean before IPE	SD before IPE	Mean after IPE	SD after IPE
S-LP	1.96	1.91	1.22	1.71
Ed	0.48	0.92	0.46	0.78

Notes: Ed = education. IPE = Interprofessional education. SD = standard deviation S-LP = speech-language pathology.

Table 4. Summary of percentages of groups of participants that used numbers of profession-specific terminology in explanation of an intervention plan to parents (collaborative case study)

	Number of profession-specific terms						
	0	1	2	3	4	5	6
Percentage of groups	58%	29%	8%	0%	0%	0%	4%

Figure 1. Summary of University of Alberta Interprofessional Education Experience





# CCC Développement de la Version Québécoise Francophone du *Children's Communication Checklist – 2 (CCC-2)* : Normalisation et Équivalence Métrique.

## CCC Development of a Quebec French Version of the *Children's Communication Checklist – 2 (CCC-2)*: Normalisation and Metric Equivalence.

### MOTS-CLÉS

TROUBLE DU LANGAGE (TL)

TROUBLE DU SPECTRE  
AUTISTIQUE (TPA)TROUBLE ENVAHISSANT DU  
DÉVELOPPEMENT (TED)

PRAGMATIQUE

CHILDREN COMMUNICATION  
CHECKLIST (CCC)

NORMALISATION

ÉQUIVALENCE MÉTRIQUE

Marie Vézina  
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### Abrégé

Dans une démarche de diagnostic différentiel entre les troubles du langage et les troubles du spectre autistique, en orthophonie ou en pédopsychiatrie, l'évaluation de la pragmatique du langage est de première importance. En effet, les habiletés pragmatiques peuvent fournir des indices discriminants, permettant de bien cerner l'étiologie des difficultés et d'orienter l'enfant vers les ressources appropriées. Or, il existe très peu d'outils d'évaluation de la pragmatique et aucun n'est normé en franco-québécois. Pour combler cette lacune, une équipe de recherche de l'Université Laval a entrepris la validation en franco-québécois du *Children's Communication Checklist-2 (CCC-2, Bishop, 2006)*, un outil réputé d'évaluation de la pragmatique dont les qualités métrologiques ont été démontrées. Lors des étapes préliminaires de la validation, une traduction-adaptation de l'instrument a été réalisée, puis diverses analyses ont permis de démontrer l'équivalence conceptuelle du construit mesuré entre les cultures américaine (culture source) et franco-québécoise (culture cible) (Vézina, Samson-Morasse, Gauthier-Desgagné, Sylvestre & Fossard, 2011). La présente étude consiste en la normalisation de l'adaptation franco-québécoise du CCC-2 auprès d'un échantillon de 80 jeunes franco-québécois présentant un trouble de langage. Ainsi, cette étude reproduit la méthodologie de validation utilisée par l'auteur du CCC lors de la création de la version initiale de l'instrument en 1998. Les données normatives obtenues ont été soumises à différentes analyses quantitatives afin d'évaluer l'équivalence métrique de l'adaptation franco-québécoise du CCC-2 par rapport à la version américaine de l'outil. Les résultats confirment que le CCC-2 *version franco-québécoise* conserve à un degré satisfaisant les qualités métrologiques de l'instrument source. Ces données confirment donc la validité interne du CCC-2 *version franco-québécoise*, en plus de permettre l'utilisation des normes auprès de la population franco-québécoise.

### Abstract

The assessment of language pragmatics is of prime importance for differential diagnosis between language disorders and pervasive developmental disorders, both in speech therapy and child psychiatry. Indeed language pragmatics can provide discriminating insights that help properly identify the etiology of problems, and thus guide the child to appropriate resources. There are however few tools for assessing pragmatics and none are standardized in Quebec French language. To fill this gap a research team from Laval University undertook the validation in standard Quebec French language of the *Children's Communication Checklist-2 (CCC-2, Bishop, 2006)*, a well-recognized evaluation tool of pragmatics with well-established metrological qualities. In the early stages of validation, the tool was translated, adapted, and then various analyses demonstrated the conceptual equivalence of the construct being measured between the American (source culture) and Quebec French culture (target culture) (Vézina, Samson-Morasse, Gauthier-Desgagné, Sylvester & Fossard, 2011). This study is the normalization of the Quebec French adaptation of the CCC-2 with a sample of 80 young French Quebecers with a language disorder. We applied the validation methodology used by the author of the CCC at the time of its creation in 1998. The normative data that was collected was subjected to various quantitative analyses to evaluate the metric equivalence of the Quebec French adaptation of the CCC-2 with the American version of the tool. The results confirm that the adaptation of the CCC-2 satisfactorily retains the metrological qualities of the source instrument. Furthermore, this study allows the use of standards in the Quebec French population.

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## Introduction

Une évaluation orthophonique doit non seulement permettre d'identifier la présence d'un retard ou d'un trouble du langage (TL), mais doit aussi permettre de déceler les indices pouvant être indicateurs d'autres troubles de développement non spécifiques au langage. Les difficultés langagières peuvent effectivement être les premiers symptômes d'autres pathologies, notamment les troubles du spectre autistique (TSA). Les orthophonistes sont donc souvent sollicités pour le dépistage des TSA ou pour contribuer au diagnostic différentiel entre les TSA et les TL. L'évaluation orthophonique doit permettre de différencier les profils de difficultés langagières pouvant s'apparenter à un TSA, de manière à orienter l'enfant vers les ressources appropriées en pédopsychiatrie. Une évaluation multidisciplinaire complète en pédopsychiatrie est cependant nécessaire pour conclure à la présence d'un TSA.

Afin de bien cerner l'étiologie des difficultés langagières et orienter l'enfant vers les ressources appropriées, l'évaluation de la composante pragmatique du langage en orthophonie est de première importance. La « pragmatique » réfère à l'utilisation du langage dans un contexte de communication réelle (Owens, 2009). Elle englobe les habiletés conversationnelles en face à face et implique l'expression d'intentions de communication par le recours à des formes langagières adaptées à l'interlocuteur et au contexte (Owens, 2009). Les déficits pragmatiques font généralement partie du tableau clinique des TL comme de celui des TSA, mais s'expriment différemment selon le type de trouble. Chez les enfants présentant un TL, les déficits pragmatiques sont souvent consécutifs aux autres atteintes langagières. Par exemple, un enfant ayant un vocabulaire limité et éprouvant de grandes difficultés à formuler des phrases aura de la difficulté à converser avec ses pairs (déficits pragmatiques consécutifs). En revanche, les déficits pragmatiques sont souvent prépondérants par rapport aux autres atteintes langagières chez les jeunes présentant un TSA. Ces jeunes peuvent éprouver de grandes difficultés à participer aux interactions sociales avec leurs pairs et être inadéquats socialement (atteinte pragmatique prédominante), en dépit de bonnes habiletés au plan du vocabulaire, de la structure de phrases et de la prononciation (autres sphères du langage bien développées). Ce profil clinique est souvent observé dans le syndrome d'Asperger, l'autisme de haut niveau ou le TSA non spécifié (DSM-IV-TR, APA, 2000).

Compte tenu de l'importance de la pragmatique pour le diagnostic différentiel entre les TL et les TSA et pour l'orientation de l'intervention, il importe d'utiliser des mesures d'évaluation valides et fiables de cette composante du langage. Cette condition est essentielle à une approche clinique correspondant à une démarche scientifique rigoureuse. Or, très peu d'instruments permettent

l'évaluation de la pragmatique. Cela représente une lacune majeure pour les milieux cliniques québécois, en orthophonie comme en pédopsychiatrie.

Pour combler cette lacune, une équipe de recherche de l'Université Laval (Gauthier-Desgagné, Samson-Morasse, Vézina, 2008; Vézina, Samson-Morasse, Gauthier-Desgagné, Sylvestre & Fossard, 2011) a entrepris la validation en franco-québécois du *Children's Communication Checklist-2* (CCC-2, Bishop, 2006). Cet outil permet, d'une part, d'identifier les jeunes présentant des déficits pragmatiques prédominants et, d'autre part, de dépister ceux présentant des difficultés langagières significatives par rapport à la population générale (Bishop, 2006). Le CCC-2 est actuellement le seul outil validé d'évaluation de la pragmatique à présenter des qualités métrologiques satisfaisantes (Adams, 2002; Bishop, 2006). Ses propriétés métrologiques ont été vérifiées aux États-Unis et en Grande-Bretagne auprès de jeunes présentant un développement typique et auprès de diverses populations cliniques, notamment des enfants présentant un TL ou un TSA (Bishop, 2006; Norbury, Nash, Baird & Bishop, 2004).

Le CCC-2 est un questionnaire auto-administré soit par les parents, soit par l'enseignant de l'enfant. Il comporte 70 items décrivant des comportements de communication répartis dans dix sous-échelles. Les sous-échelles A à D font référence aux aspects structurels du langage, soit aux habiletés de forme et de contenu: (A) phonologie et fluence, (B) morphosyntaxe, (C) sémantique, (D) cohérence. Les sous-échelles E à H évaluent quant à elles la pragmatique du langage: (E) initiation de la conversation, (F) langage stéréotypé, (G) utilisation du contexte, (H) communication non verbale. Enfin, les sous-échelles I et J font référence à certaines caractéristiques inhérentes aux TSA: (I) relations sociales, (J) intérêts. Pour chaque item, le répondant doit se prononcer sur la fréquence d'occurrence du comportement décrit en utilisant une échelle en 4 points qui permet de préciser l'absence du comportement (cotation = 0), son caractère occasionnel (cotation =1), fréquent (cotation =2) ou constant (cotation =3) (Bishop, 2006). Les cotations des différents items d'une même sous-échelle sont d'abord additionnées pour obtenir un score brut. Pour chaque sous-échelle, les scores bruts ainsi obtenus sont ensuite pondérés, de manière à ce que les différents paramètres du langage puissent être comparés entre eux. Deux scores composites sont ensuite calculés à partir des scores pondérés. Le « score composite de communication générale » (score CCG) est dérivé à partir de la somme des scores pondérés aux échelles A à H. Le score CCG peut être utilisé dans une perspective de dépistage pour identifier, dans la population générale, les jeunes présentant des difficultés communicationnelles significatives. Le second score dérivé, soit l'« index différentiel d'interaction sociale » (score IDIS), correspond à la différence entre la somme des sous-échelles E, H, I, J

et celle des sous-échelles A, B, C, D. Il constitue un indice pouvant contribuer au diagnostic différentiel entre les TL et les TSA. Ce score permet d'identifier les jeunes pour lesquels une évaluation plus approfondie des TSA est jugée pertinente (Bishop, 2006). Enfin, une analyse qualitative du patron global de résultats, prenant en compte les scores aux différentes sous-échelles et les scores composites, permet de compléter l'évaluation.

Lors des étapes préliminaires du processus de validation, une traduction-adaptation en franco-québécois du CCC-2 a été réalisée. Une méthodologie rigoureuse, conforme aux lignes directrices de la Commission internationale pour l'adaptation des tests (Gesinger, 2003)<sup>1</sup>, a été suivie lors du processus de traduction-adaptation (Gauthier-Desgagné et al., 2008; Vézina et al., 2011). Des analyses ont par la suite été réalisées pour évaluer l'équivalence du construit mesuré entre les cultures américaine (population source) et franco-québécoise (population cible). Ainsi, l'équivalence linguistico-culturelle et l'équivalence conceptuelle du CCC-2 *version franco-québécoise* ont été démontrées lors des étapes antérieures du processus de validation (Gauthier-Desgagné et al., 2008; Vézina et al., 2011). Ces analyses soulignent la validité interne du CCC-2 *version franco-québécoise*, montrant que les conclusions tirées à partir de cet outil ne sont pas biaisées par des éléments linguistiques ou culturels.

Ces étapes étant complétées, la phase subséquente de validation consiste à recueillir des **normes préliminaires**, permettant de mesurer **l'équivalence métrique** de la *version franco-québécoise* de l'outil par rapport à la version source. La normalisation d'un instrument nécessite de l'administrer à un échantillon de référence de manière à recueillir des données normatives supposées représenter les caractéristiques de la population à l'étude (Rupp, Templin & Henson, 2010 ; Czichos, Saito & Smith, 2011). Ces données normatives sont indispensables pour toute utilisation clinique de l'instrument. En effet, les résultats obtenus auprès de l'échantillon de normalisation servent de références auxquelles les résultats obtenus par un enfant donné peuvent être comparés. Les normes permettent de situer l'enfant relativement à une moyenne en fournissant, soit des rangs centiles, soit des scores pondérés, soit des scores standards (Rupp, Templin & Henson, 2010; Czichos, Saito & Smith, 2011). Ces scores sont à la base des interprétations et des inférences cliniques permettant de poser un diagnostic.

Qui plus est, la collecte de normes préliminaires fournit des données quantitatives permettant de soumettre l'instrument à diverses analyses statistiques. Ces données sont importantes pour évaluer l'équivalence métrique dans le cadre du processus de validation d'un instrument pour une nouvelle population et culture cibles. La mesure de l'équivalence métrique permet d'évaluer dans quelle mesure

le test présente les mêmes propriétés métrologiques (ex. : distributions, écarts, validité, fidélité) et conduit aux mêmes conclusions (ex. : pathologie ou non) peu importe la langue ou la culture de la population cible (Nichols et al., 2002, dans Geisinger, 2003). L'équivalence métrique doit être confirmée pour permettre l'utilisation quantitative des résultats obtenus à la nouvelle version du test.

Dans le cadre de la présente étude, l'étape de normalisation du CCC-2 *version franco-québécoise* consiste à reproduire les procédures de validation employées par Bishop lors de la création de l'instrument en 1998. Bishop avait initialement validé l'instrument en établissant des normes auprès des parents et des enseignants de 80 jeunes britanniques ayant un TL âgés entre 7 et 9 ans 11 mois. Le but était alors, non seulement d'établir des normes, mais aussi de vérifier si l'outil permettait de détecter les jeunes présentant des déficits pragmatiques prédominants parmi un ensemble de jeunes ayant un TL (Bishop, 1998). De façon analogue, 80 jeunes franco-québécois du même âge et présentant un TL ont été choisis comme population à l'étude pour établir des normes préliminaires. Les données recueillies auprès de l'échantillon franco-québécois permettront l'obtention de mesures de tendance centrale, de manière à pouvoir convertir les scores bruts obtenus aux différentes sous-échelles du questionnaire en scores pondérés. Ces normes permettront aussi de dériver des scores composites à partir de l'ensemble des résultats pour un même enfant, soit les scores CCG et IDIS. Ultimement, ces données permettront d'établir des tables de conversion normatives des scores bruts en scores pondérés ou standards, et serviront de normes préliminaires.

De plus, les normes franco-québécoises permettront d'établir l'équivalence métrique de l'outil par rapport à sa version source. En effet, ces données normatives seront soumises à diverses analyses statistiques dans le but de vérifier si l'administration du CCC-2 *version franco-québécoise* auprès d'une population franco-québécoise engendre des résultats similaires à ceux obtenus avec les autres versions de l'outil. Le CCC-2 *version franco-québécoise* sera donc comparé à ses prédécesseurs, soit le CCC-2 américain (instrument source, Bishop, 2006) et le CCC-2 britannique (version antérieure similaire à l'édition américaine, Bishop, 2003). Les mesures de fidélité (accord inter-juges et cohérence interne) permettront de comparer les différentes versions de l'outil. Le CCC-2 *version franco-québécoise* pourra être considéré valide dans la mesure où les indices de fidélité obtenus seront semblables à ceux de la version source. Il est à noter que cette étape de validation n'a pas pour objectif de discuter des qualités métrologiques de l'instrument source, celles-ci ayant déjà été investiguées avant la commercialisation de l'outil (se référer à Bishop, 2006, et à Gauthier-Desgagné et al., 2008, pour plus de détails). Il s'agit plutôt de déterminer si l'outil dans sa

forme adaptée à la population cible conserve les qualités métrologiques de la version source. Des procédures valides de traduction-adaptation ayant été utilisées, il est attendu que le *CCC-2 version franco-québécoise* engendre auprès de l'échantillon franco-québécois des résultats similaires à ceux obtenus auprès des échantillons américain et britannique.

### Objectifs de l'étude

La présente étude est la deuxième phase du processus de validation du *CCC-2 version franco-québécoise*. Il s'agit de la normalisation et de l'établissement de l'équivalence métrique de l'instrument de mesure. Cette étude poursuit deux objectifs de recherche principaux :

- (1) Établir des normes préliminaires auprès des jeunes franco-québécois âgés de 7 à 9 ans 11 mois présentant un TL.
- (2) Établir l'équivalence métrique du *CCC-2 version franco-québécoise*, afin de vérifier si l'outil conserve les qualités métrologiques des versions antérieures, américaine et britannique.

#### Objectif 1 : Normalisation

### Méthodologie

#### Recrutement

La population visée par l'étude de validation du *CCC-2 version franco-québécoise* correspond aux jeunes âgés entre 7 et 9 ans 11 mois présentant un TL sans TSA confirmé ni déficience intellectuelle ou autre trouble associé. Ces critères sont conformes à ceux utilisés par Bishop lors de la validation de l'instrument en 1998.

Pour chaque enfant recruté, le questionnaire *CCC-2 version franco-québécoise* a été complété par un parent du jeune ainsi que par son enseignant. Pour être admissibles au projet, les répondants devaient avoir côtoyé le jeune sur une base régulière au cours des trois mois précédant leur participation au projet. Le recrutement des 85 jeunes participants a été réalisé grâce à la contribution de 29 orthophonistes en milieu scolaire des régions administratives de Québec Capitale-Nationale, Saguenay-lac-St-Jean, Abitibi-Témiscamingue et Estrie entre les mois d'avril et juin 2007 inclusivement. Les orthophonistes de ces régions ont été identifiées à l'aide du bottin de l'Ordre des Orthophonistes et Audiologistes du Québec (2007). Un premier contact téléphonique a été effectué auprès de 56 orthophonistes afin de leur faire part des critères d'inclusion des participants de l'étude. Les orthophonistes désireuses de participer au projet étaient alors en mesure d'identifier les jeunes répondant à ces critères dans leurs établissements respectifs. Vingt-neuf (29) orthophonistes ont accepté de participer au projet. Le consentement des directions d'écoles à la participation des orthophonistes au projet a ensuite été obtenu.

Sur l'invitation de l'orthophoniste, 85 parents ont consenti par écrit à ce que leurs coordonnées soient communiquées à l'équipe de recherche. Un membre de l'équipe de recherche a ensuite téléphoné à ces 85 parents pour les inviter à participer à l'étude. Tous les parents contactés ont accepté de participer au projet. Les parents recevaient par la poste le questionnaire *CCC-2 version franco-québécoise* ainsi qu'un formulaire de consentement expliquant en détails la nature du projet et la teneur de leur participation. Ces derniers devaient retourner à l'équipe de recherche les deux documents complétés dans une enveloppe pré-affranchie et pré-adressée fournie à cette fin. Les parents participant au projet ont également donné leur autorisation pour que l'enseignant de leur enfant soit contacté par un membre de l'équipe de recherche. Les coordonnées des enseignants étaient alors recueillies auprès des parents. Les enseignants des enfants ciblés ont également été contactés par téléphone par l'équipe de recherche. Le questionnaire *CCC-2 version franco-québécoise* ainsi qu'un formulaire de consentement ont ensuite été envoyés par la poste aux 80 enseignants intéressés à participer au projet. Le retour des documents s'effectuait de la même façon qu'auprès des parents.

### Participants

Les données ont été amassées auprès des parents et des enseignants de 85 jeunes franco-québécois présentant un TL sans TSA confirmé. Par la suite, cinq enfants ont été exclus en raison de leur âge, portant l'échantillon final à 80 jeunes. La répartition de l'échantillon selon la provenance géographique, le milieu scolaire (classe spécialisée ou régulière) et le sexe est représentée dans le tableau 1.

Dans la grande majorité des cas (78/80), le *CCC-2 version franco-québécoise* a été complété à la fois par un parent et par l'enseignant du jeune. Certains cas présentent cependant des particularités. Dans deux cas (2/80), les éducatrices spécialisées des jeunes ont complété le questionnaire à la place de l'enseignante. Dans sept autres cas (7/80), ce sont les orthophonistes responsables des jeunes qui ont complété le questionnaire à la place de l'enseignante. Ces autres professionnels du milieu scolaire ont été sollicités lorsqu'une même enseignante avait trop d'élèves participant à l'étude dans sa classe ou encore lorsque l'enseignante jugeait qu'un autre professionnel était plus apte qu'elle à répondre au questionnaire. Pour l'ensemble de ces neuf cas, les répondants côtoyaient régulièrement les jeunes depuis plus de trois mois et répondaient aux critères d'admissibilité à l'étude.

Les données au sujet de sept jeunes de l'échantillon sont incomplètes, c'est-à-dire que le *CCC-2 version franco-québécoise* n'a été complété que par un seul répondant. Pour un participant, le parent est le seul répondant, alors que pour les six autres, le questionnaire n'a été complété que par



Tableau 1. Répartition géographique et classement scolaire (N=80)

Caractéristiques de l'échantillon		Nombre de participants	Pourcentage (%)
Région	Abitibi-Témiscamingue	12	15
	Estrie	3	3,75
	Québec-Capitale-Nationale	42	52,5
	Saguenay-Lac-St-Jean	23	28,75
Milieu scolaire	Classe régulière	67	83,75
	Classe spécialisée pour enfants avec difficultés langagières	13	16,25
Genre	Garçon	67	83,75
	Fille	13	16,25
		N = 80	Total = 100 %

le professionnel scolaire. Ces données ont été exclues des analyses de corrélation inter-juges.

### Analyses statistiques: données normatives

Diverses analyses statistiques ont été réalisées afin d'obtenir des normes à partir des données brutes. Les procédures statistiques retenues sont celles s'apparentant le plus aux travaux de recherche portant sur les versions américaine et britannique du CCC et du CCC-2. Les calculs des normes ont été majoritairement réalisés avec le logiciel Microsoft Excel 2008.

Pour chaque enfant, les scores bruts aux différentes sous-échelles ont été calculés en additionnant les cotations de tous les items constituant la sous-échelle (cotation de 0 à 3 par item, selon la fréquence d'occurrence du comportement décrit). Ces scores bruts ont ensuite été pondérés. Ainsi, peu importe la distribution des scores bruts aux différentes sous-échelles, les scores sont pondérés de sorte qu'ils ont une étendue de 1 à 19 (moyenne=10; é.t.=3). Ces balises correspondent à celles utilisées dans la *version américaine du CCC-2* pour le calcul des scores pondérés. Afin de réaliser cette conversion, il a d'abord fallu calculer les rangs en pourcentage correspondant aux scores bruts obtenus à chaque sous-échelle pour chaque participant. Le rang en pourcentage représente la position du score brut considéré relativement à l'ensemble de la distribution

franco-québécoise des scores bruts pour une même sous-échelle. Les rangs en pourcentage ont ensuite été convertis en scores Z à l'aide d'une table de conversion informatisée basée sur la loi normale. Le score Z représente la distance entre un résultat et la moyenne, mesuré en unités d'écart-type. Enfin, les scores Z ont servi au calcul des scores pondérés suivant une transformation linéaire à l'aide de la formule mathématique suivante :

$$\text{Score pondéré}_{xy} = 3 * (\text{Score } Z_{xy}) + 10$$

Moyenne = 10; Écart-type = 3  
x représente le participant échantillonné  
y représente la sous-échelle prise en compte dans le calcul

Les scores pondérés pour les différentes sous-échelles ont été utilisés pour calculer le score composite de communication générale (CCG) pour chaque jeune, autant pour la cotation des parents que pour celle des enseignants. Le score CCG brut a été calculé conformément à la méthode proposée dans le manuel d'utilisation du *CCC-2 version américaine* et équivaut à la somme des scores pondérés correspondant aux sous-échelles A à H :

$$\text{CCG brut} = \sum \text{Scores pondérés}_{A \text{ à } H}$$

Une table de conversion normative des scores CCG bruts en scores standards a ensuite été réalisée de manière à en faciliter l'interprétation et à être conforme à la *version américaine du CCC-2*. Ainsi, les scores CCG bruts ont été convertis en scores standards ayant tous une

## Résultats

moyenne de 100 et un écart-type de 15. Afin de réaliser cette conversion, il a d'abord fallu calculer le rang en pourcentage correspondant au CCG brut pour chaque enfant, et ce, pour les cotations des parents et des enseignants séparément. Les rangs en pourcentage ont ensuite été convertis en scores Z grâce à une table de conversion informatisée basée sur la loi normale. Enfin, les scores Z ont servi au calcul des scores CCG standards correspondant à l'aide de la formule mathématique suivante :

$$\text{CCG standard}_x = 15 * (\text{Score } Z_x) + 100$$

Moyenne = 100; Écart-type = 15

x représente le participant échantillonné

Enfin, le score IDIS pour chaque participant a été dérivé à partir des scores pondérés aux différentes sous-échelles, conformément à la méthode proposée dans le manuel d'utilisation du CCC-2 *version américaine*. L'IDIS équivaut à la différence entre la somme des échelles E, H, I, J et la somme des échelles A, B, C, D :

$$\text{IDIS} = (\sum \text{Scores pondérés}_{E,H,I,J}) - (\sum \text{Scores pondérés}_{A,B,C,D})$$

Les procédures statistiques ont permis d'établir des tables de conversion des scores bruts en scores pondérés pour chaque sous-échelle. Les analyses pour les sous-échelles ont été faites séparément pour les répondants « parents » et « enseignants ». Des tables de conversion distinctes ont été élaborées pour ces deux groupes de répondants. Des exemples tirés de ces tables sont présentés aux tableaux 2 et 3. De même, une table de conversion des scores CCG bruts en CCG standards a été élaborée séparément pour les répondants parents et enseignants (voir exemples aux tableaux 4 et 5). Ces tables de conversion constituent les normes préliminaires obtenues dans le cadre de cette étude.

## Discussion

L'administration du CCC-2 *version franco-québécoise* auprès de l'échantillon de la présente étude a permis d'établir des normes préliminaires. La table de conversion en scores pondérés de chacune des sous-échelles permet de situer la performance d'un jeune par rapport à la

Tableau 2. Extrait<sup>2</sup> de la table de conversion des scores bruts aux scores pondérés pour les répondants « parents »  
- Scores aux sous-échelles.

Sous-échelle A Phonologie et fluence		Sous-échelle B Morphosyntaxe		Sous-échelle C Sémantique		Sous-échelle D Cohérence		Sous-échelle E Initiation	
Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés
0	3,6	0	2,7	4	2,4	2	2,5	1	3,6
1	4,2	1	3,3	5	3,3	3	3,3	2	4,2
...	...	...	...	...	...	...	...	...	...
19	16,6	21	16,3	17	17,5	19	16,6	19	16,6

Sous-échelle F Langage stéréotypé		Sous-échelle G Utilisation du contexte		Sous-échelle H Comm. non verbale		Sous-échelle I Relations sociales		Sous-échelle J Intérêts	
Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés
0	3,3	1	2,6	0	3,31	0	4,0	1	3,4
1	4,2	2	3,3	1	4,2	1	4,8	2	4,2
...	...	...	...	...	...	...	...	...	...
14	16,6	18	16,6	12	15,7	19	20,4	17	16,0

<sup>2</sup> Les données normatives présentées dans les tableaux 2 à 5 sont non exhaustives, mais pourraient éventuellement être fournies en entier aux utilisateurs potentiels du CCC-2 *version franco-québécoise*, moyennant l'accord de l'éditeur de l'outil.

Tableau 3. Extrait de la table de conversion des scores bruts aux scores pondérés pour les répondants « enseignants »  
- Scores aux sous-échelles

Sous-échelle A Phonologie et fluence		Sous-échelle B Morphosyntaxe		Sous-échelle C Sémantique		Sous-échelle D Cohérence		Sous-échelle E Initiation	
Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés
0	4,8	0	5,2	0	0,0	0	0,4	0	2,4
2	5,7	1	5,7	3	3,2	4	3,2	1	3,2
...	...	...	...	...	...	...	...	...	...
21	16,7	21	15,8	20	16,0	19	15,8	20	20,1

Sous-échelle F Langage stéréotypé		Sous-échelle G Utilisation du contexte		Sous-échelle H Comm. non verbale		Sous-échelle I Relations sociales		Sous-échelle J Intérêts	
Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés	Scores bruts	Scores pondérés
0	3,7	0	2,6	0	2,5	0	4,4	0	2,3
1	4,7	1	3,2	1	3,2	1	5,1	1	3,2
...	...	...	...	...	...	...	...	...	...
14	17,7	20	17,4	17	17,4	15	15,3	17	17,6

Tableau 4. Extrait de la table de conversion des scores bruts aux scores pondérés pour les répondants « parents » - Scores CCG

Scores CCG bruts	Scores CCG standards
40,2	63
44,5	67
...	...
76,4	99
77	100
...	...
108,1	133
115,5	140

Tableau 5. Extrait de la table de conversion des scores bruts aux scores pondérés pour les répondants « enseignants » - Scores CCG

Scores CCG bruts	Scores CCG standards
33,4	66
33,9	66
...	...
77,2	99
77,4	100
...	...
105,7	133
110,5	138

moyenne du groupe à ces mêmes sous-échelles. Ainsi, le résultat obtenu par un jeune peut être comparé à celui des autres jeunes de l'échantillon pour chacun des différents paramètres évalués. Les scores pondérés fournissent donc un indice de sévérité de l'atteinte de divers paramètres langagiers par rapport à l'ensemble des jeunes du même âge présentant un TL. Les scores peuvent être interprétés en fonction d'une moyenne normative de 10 avec un écart-type de 3.

De façon analogue, la table de conversion des scores CCG bruts en scores standards permet de situer la performance globale d'un jeune par rapport à la moyenne du groupe. Le score CCG est le score composite représentant globalement les habiletés langagières de forme, de contenu et d'utilisation (sous-échelles A à H), mais ne prend pas en compte les caractéristiques TSA (sous-échelles I et J). Dans le cadre de la présente étude, ce score est utilisé comme indice de sévérité du TL. Ces scores peuvent être interprétés en fonction d'une moyenne normative de 100 avec un écart-type de 15.

Les données normatives obtenues permettent aussi de calculer le score IDIS d'un participant, à partir des scores pondérés aux différentes sous-échelles. Tel qu'indiqué précédemment, le score IDIS constitue un indice supplémentaire pouvant contribuer au diagnostic différentiel entre les TL et les TSA. Ce score n'est cependant normé pour aucune version de l'outil. De plus, ce score n'est pas suffisamment sensible pour être utilisé à des fins diagnostiques (Bishop, 2006). Aucun seuil de rupture ou d'interprétation permettant de statuer quand à la probabilité d'un TSA n'est donc proposé. Les valeurs extrêmes peuvent néanmoins être révélatrices. Ainsi, un IDIS inférieur à -10 serait indicateur d'un TSA (Bishop, 2006).

Enfin, une analyse descriptive du patron global des résultats, basée sur la comparaison des scores pondérés aux différentes sous-échelles, permet de compléter l'évaluation. L'obtention de scores pondérés a effectivement pour but de rendre les résultats aux différentes sous-échelles comparables entre eux. Quelle que soit la distribution des scores bruts aux différentes sous-échelles, les résultats sont considérés selon une même échelle quantitative d'interprétation. Les scores pondérés d'un même enfant aux différentes sous-échelles peuvent donc être comparés entre eux. Cette comparaison permet rapidement de se faire une idée du profil de difficultés communicatives de l'enfant. Ainsi, il est facile de vérifier si un enfant présente des déficits pragmatiques prédominants par rapport aux résultats dans les autres sphères du langage. Un tel profil clinique devrait correspondre à des scores pondérés relativement élevés aux sous-échelles A à D (aspects structurels du langage: phonologie et fluence, morphosyntaxe, sémantique, cohérence), mais déficitaires aux sous-échelles E à H (pragmatique: initiation de la

conversation, langage stéréotypé, utilisation du contexte, communication non verbale). Le cas échéant, ce patron de résultats pourrait s'apparenter à un TSA et une évaluation approfondie en orthophonie et en pédopsychiatrie serait alors jugée pertinente.

## Objectif 2 : Équivalence métrique

### Méthodologie

Différents indices de fidélité ont été calculés afin d'évaluer les qualités métrologiques du *CCC-2 version franco-québécoise* et de vérifier son équivalence métrique par rapport à la version source de l'outil. Ces indices de fidélité ont été comparés à ceux obtenus avec les versions antérieures de l'outil, soit le *CCC-2 américain* (instrument source, Bishop, 2006) et le *CCC-2 britannique* (version antérieure similaire à l'édition américaine, Bishop, 2003). Par contre, la version originale de l'outil, soit le *CCC* (Bishop 1998), n'a pas été utilisée aux fins de comparaison étant donné qu'elle présente des différences importantes par rapport au *CCC-2*. Tous les calculs ont été réalisés avec le logiciel Statistical Analysis Software Version 9.1.3 (SAS 9.1.3, Windows, 2008). D'abord, le degré d'accord inter-juges entre les parents et les enseignants a été calculé pour le score CCG ainsi que pour l'IDIS. L'accord inter-juges a été évalué au moyen de coefficients de Pearson afin d'être conforme aux procédures statistiques réalisées lors de la validation de la version américaine de l'outil. Par souci d'exactitude et de précision statistique, l'accord inter-juges a également été évalué au moyen de corrélations intra-classe, ces mesures étant moins sensibles au nombre de données que le coefficient de Pearson. Les coefficients calculés ont été comparés à ceux de la version britannique du *CCC-2* car le *CCC-2 version américaine* ne fournit aucun indice de fidélité inter-juges.

La cohérence interne de chaque sous-échelle a également été évaluée par le calcul de coefficients alpha de Cronbach. Cette mesure vise à évaluer l'homogénéité des items d'une même sous-échelle. Ces coefficients alpha ont été comparés statistiquement à ceux obtenus pour les versions britannique et américaine du *CCC-2* au moyen de tests-t de Student.

### Résultats

Pour le *CCC-2 version franco-québécoise*, les résultats révèlent une corrélation inter-juges significative pour le score CCG ( $r(72)=0,28, p=0,016$ ) ainsi que pour le score IDIS ( $r(72)=0,40, p<0,001$ ). Les mêmes résultats ont été obtenus à partir de la corrélation intra-classe. Pour fins de comparaison, la fidélité inter-juges pour la version britannique de l'outil avait été évaluée à 0,40 ( $p=0,003$ ) pour le score CCG et à 0,79 ( $p<0,001$ ) pour le score composite de déviance socio-interactive (score équivalent à l'IDIS dans la version américaine) (Norbury et al., 2004).

Le Tableau 4 permet de présenter les coefficients de cohérence interne obtenus aux différentes sous-échelles pour les trois versions de l'outil. Au plan quantitatif, les différences d'homogénéité entre les coefficients du Québec et ceux de la Grande-Bretagne ne sont pas significatives ( $t=0,75$ ,  $p=0,47$ ) alors qu'elles le sont avec celles des États-Unis ( $t=3,24$ ,  $p=0,01$ ).

Le Tableau 7 rend compte des coefficients de cohérence interne pour les trois versions du CCC-2, ordonnés par ordre décroissant. Cette seconde analyse permet de vérifier si les sous-échelles les plus et les moins homogènes sont globalement les mêmes pour la *version franco-québécoise* et pour les versions antérieures du CCC-2.

Tableau 6. Cohérence interne des différentes versions du CCC-2

	Grande-Bretagne (2003) n=527 à 537	États-Unis (2006) n=950	Québec (2008) n=153
Sous-échelle	Coefficient Alpha de Cronbach	Coefficient Alpha de Cronbach	Coefficient Alpha de Cronbach
A. Phonologie et fluence	0,80	0,85	0,89
B. Morphosyntaxe	0,73	0,80	0,85
C. Sémantique	0,68	0,75	0,54
D. Cohérence	0,78	0,83	0,76
E. Initiation	0,80	0,81	0,69
F. Langage stéréotypé	0,66	0,75	0,62
G. Utilisation du contexte	0,74	0,81	0,73
H. Communication non verbale	0,69	0,77	0,66
I. Relations sociales	0,69	0,77	0,70
J. Intérêts	0,66	0,69	0,60

Tableau 7. Sous-échelles des différentes versions du CCC-2 par ordre décroissant de cohérence interne

Version britannique (2003) n=527 à 537	États-Unis (2006) n=950	Québec (2008) n=153
A (.80)	A (.85)	A (.89)
E (.80)	D (.83)	B (.85)
D (.78)	E (.81)	D (.76)
G (.74)	G (.81)	G (.73)
B (.73)	B (.80)	I (.70)
H (.69)	H (.77)	E (.69)
I (.69)	I (.77)	H (.66)
C (.68)	C (.75)	F (.62)
F (.66)	F (.75)	J (.60)
J (.66)	J (.69)	C (.54)



## Discussion

### Accord inter-juges

En ce qui concerne la fidélité inter-juges le coefficient obtenu pour l'échantillon franco-québécois traduit un faible degré d'accord pour le score CCG ( $r(72)=0,28$ ,  $p=0,016$ ). Les résultats concordent davantage avec la version britannique de l'outil où une corrélation modérée de 0,40 ( $p=0,003$ ) est montrée (Norbury et al., 2004). Pour le score IDIS, le coefficient de fidélité inter-juges obtenu dans l'échantillon franco-québécois traduit une relation modérée ( $r(72)=0,40$ ,  $p<0,001$ ). Pour la version britannique de l'outil, le coefficient qui avait été obtenu ( $r=0,79$ ,  $p<0,001$ ) traduit plutôt un degré d'accord élevé entre les parents et les professionnels pour ce même score. Les cotations des répondants « parents » et « enseignants » sont donc relativement peu concordantes pour les deux versions de l'outil.

Les résultats montrent que les enseignants et les parents peuvent avoir une perception très différente des habiletés communicatives d'un même enfant. Selon certains auteurs, un degré d'accord modéré correspond à ce qui est généralement attendu entre les parents et les professionnels scolaires dans les cas de problématiques psychiatriques (Bishop & Baird, 2001 ; Bishop, 2006). Les discordances observées peuvent alors être expliquées en grande partie par la différence des contextes à partir desquels le jeune est évalué. En effet, le parent évalue les habiletés pragmatiques de son enfant en se référant aux comportements de ce dernier à la maison, en relation avec sa fratrie ou avec d'autres adultes, dans un contexte où l'enfant est généralement à l'aise pour communiquer. L'enseignant, de son côté, évalue plutôt le jeune en se référant à la façon dont il se comporte en grand groupe, selon la manière dont il s'intègre aux autres enfants et communique avec eux. L'enseignant voit notamment comment le jeune réussit à prendre son tour de parole en compétition avec d'autres, comment il se comporte dans un contexte d'encadrement et de consignes, etc. De plus, dans le contexte scolaire québécois actuel, l'enseignant étant seul pour diriger une classe de plus de vingt élèves, il ne peut forcément pas être autant à l'écoute des actes de communication subtils ou non verbaux du jeune que peut l'être le parent à la maison. Quoiqu'il en soit, les résultats montrent à quel point il est important de considérer les différents contextes de vie de l'enfant, lors du processus d'évaluation en orthophonie ou en pédopsychiatrie. Les faibles corrélations inter-juges constituent néanmoins une limite au plan des qualités métrologiques de l'instrument. Cette lacune s'explique certainement par la différence des contextes scolaires et familiaux, mais peut-être aussi par un manque de précision de l'outil. Le jugement clinique des professionnels est donc essentiel, en complément aux résultats de l'outil, pour juger des habiletés langagières d'un enfant.

Les résultats de corrélation inter-juges obtenus diffèrent entre les versions britannique et franco-québécoise. Cette différence doit cependant être relativisée. En effet, il ne s'agit pas de calculs réalisés sur la version source (édition américaine) ayant servi à l'adaptation franco-québécoise, mais bien sur une version antérieure qui a également subi des modifications lors de l'adaptation américaine. De plus, les échantillons auprès desquels les données ont été recueillies diffèrent. En effet, la corrélation inter-juges de la version britannique a été calculée auprès d'un échantillon de jeunes présentant diverses pathologies, combinant les TL, l'autisme de haut niveau, le syndrome d'Asperger et le trouble pragmatique (Norbury et al., 2004). Pour la *version franco-québécoise*, l'accord inter-juges a plutôt été calculé auprès d'un échantillon de jeunes présentant uniquement un TL sans TSA confirmé. Le score IDIS référant spécifiquement aux symptômes des TSA, il est normal que ces caractéristiques soient plus saillantes auprès d'un échantillon constitué de TSA (échantillon britannique) et que l'accord inter-juges s'en trouve amélioré.

Les résultats obtenus pour l'accord inter-juges ne vont pas dans le sens d'une conservation des qualités métrologiques pour la *version franco-québécoise* du CCC-2. Cependant, le manque de données concernant la version source et la différence entre les échantillons franco-québécois et britannique viennent interférer avec la validité de la corrélation inter-juges, en tant qu'indice pour juger de l'équivalence des versions source et cible. Les autres mesures statistiques pourront permettre de relativiser ces résultats.

### Cohérence interne

La mesure de cohérence interne est d'un grand intérêt en regard du second objectif de recherche, étant donné que des coefficients alpha ont été calculés pour le CCC-2 *version américaine* (version source) ainsi que pour la version britannique. Ces données peuvent donc servir de comparaison additionnelle pour juger du degré de validité de l'adaptation franco-québécoise.

Les données du tableau 6 montrent que les scores d'homogénéité sont très semblables entre les trois versions du CCC-2, incluant la *version franco-québécoise*. Les versions britannique et américaine avaient toutes deux obtenu des coefficients de cohérence interne satisfaisants. Les calculs réalisés avec le CCC-2 *version franco-québécoise* indiquent que cette version conserve cette qualité métrologique. En effet, les coefficients alpha s'étendant de 0,54 à 0,89 équivalent à une relation allant de modérée à forte. Les coefficients obtenus pour la version américaine sont généralement les plus élevés, ce qui peut être expliqué en partie par la taille de l'échantillon ( $n=950$ ). Au plan quantitatif, les différences d'homogénéité entre les coefficients du Québec et ceux de la Grande-Bretagne ne sont pas significatives ( $t=0,75$ ,  $p=0,47$ ) alors qu'elles le

sont avec ceux des États-Unis ( $t=3,24$ ,  $p=0,01$ ). Ce résultat s'explique vraisemblablement aussi par la taille des échantillons ( $n=950$  pour l'échantillon américain;  $n=153$  pour l'échantillon franco-québécois). En effet, plus la taille de l'échantillon est élevée, meilleurs sont la puissance statistique et le niveau de signification, ce qui résulte normalement en des coefficients plus élevés. Les résultats de la *version franco-québécoise* sont plus près de ceux de la Grande-Bretagne, la taille des échantillons étant plus similaire. Ainsi, les calculs de coefficient alpha montrent que l'outil franco-québécois donne lieu à des résultats analogues au plan de la cohérence interne à ceux des versions précédentes ayant servi de base à cette adaptation.

Qui plus est, en analysant les données du tableau 7, on constate que la distribution par ordre décroissant des sous-échelles selon leur coefficient alpha est semblable pour les trois versions de l'instrument. Les résultats de cette analyse constituent un appui de plus à la validité de la *version franco-québécoise* de l'outil. Pour les trois versions du CCC-2, les sous-échelles A et D affichent les meilleurs coefficients de cohérence interne, tandis que les sous-échelles C, F et J sont celles qui comportent les items les moins homogènes. La sous-échelle A (phonologie et fluence) obtient le meilleur indice d'homogénéité pour les trois versions du CCC-2. Les sous-échelles C (sémantique), F (langage stéréotypé) et J (intérêt) obtiennent quant à elles les coefficients les plus faibles pour les trois versions de l'outil. De façon plus précise, la sous-échelle C (sémantique) de la *version franco-québécoise* du CCC-2 est celle qui obtient le coefficient le plus faible et le plus discordant avec les versions antérieures. Ce résultat, cependant, doit être nuancé car tant pour la version britannique qu'américaine, cette sous-échelle obtient un coefficient alpha parmi les plus bas.

Néanmoins, bien que les grandes tendances soient similaires, le tableau 7 montre que la *version franco-québécoise* se différencie des deux autres au plan de la cohérence interne. En effet, entre la version britannique et la version américaine, seules deux sous-échelles occupant des rangs consécutifs ont changé de rang. Dans la version québécoise, on note non seulement plus de permutations, mais des permutations de plusieurs rangs. Ces différences pourraient s'expliquer par la traduction-adaptation de l'outil dans une autre langue. Certains items ont effectivement dû être modifiés lors du processus de traduction-adaptation en franco-québécois. Par exemple, l'un des items du CCC-2 américain et britannique porte sur un processus phonologique typique en anglais, appliqué sur un phonème que ne possède pas le franco-québécois (« th »). Lors de la traduction-adaptation de l'outil, cet item a été remplacé par un processus phonologique typique en français qui s'actualise dans les mêmes âges (antériorisation des palatales). D'autres items ont aussi dû être modifiés, tout en s'assurant de respecter le construit mesuré (Vézina

et al, 2011). Les versions britannique et américaine sont forcément plus similaires entre elles, puisqu'elles ne sont pas confrontées à cette différence linguistique. Il est donc normal qu'elles soient plus semblables au plan de la cohérence interne.

En somme, les coefficients d'homogénéité de la *version franco-québécoise* sont relativement élevés et très semblables à ceux des versions antérieures. Ils ne se différencient pas significativement des coefficients de la version britannique et se répartissent selon un ordre similaire aux versions antérieures du CCC-2. Ces constats amènent à considérer que la cohérence interne est un bon indicateur de l'équivalence des versions cible et source au plan de cette qualité métrologique. Cette équivalence renforce la validité interne du CCC-2 *version franco-québécoise*.

### Limites de l'étude

La présente étude a permis d'établir des normes préliminaires pour le CCC-2 *version franco-québécoise* auprès de jeunes présentant un TL, pour les répondants « parents » et « enseignants » séparément. Certaines limites de l'étude peuvent cependant affecter la validité des normes établies. En effet, certains questionnaires ont été complétés par l'éducatrice spécialisée ou par l'orthophoniste plutôt que par l'enseignante. Comparativement aux enseignants, ces professionnels côtoient surtout les enfants en individuel plutôt qu'en situation de groupe. Il est donc possible que les comportements communicatifs observés chez l'enfant, particulièrement en ce qui a trait à la pragmatique, diffèrent de ce qui aurait été rapporté par l'enseignante. De plus, les orthophonistes sont généralement plus au fait des caractéristiques inhérentes au TL de l'enfant, ayant des connaissances et une spécialité dans ce domaine. Ces professionnels sont donc susceptibles de rapporter des comportements communicatifs plus subtils ou précis. La cotation des éducatrices spécialisées et des orthophonistes pourrait donc s'apparenter davantage à celle des parents qu'à celle des enseignants. Il est néanmoins pertinent d'étendre l'utilisation du questionnaire à davantage de répondants, ce qui peut augmenter la validité externe de l'outil et son utilité clinique, pour autant que les normes soient réellement représentatives.

Par ailleurs, les normes ont été établies uniquement pour des jeunes âgés de 7 à 9 ans 11 mois ayant un TL confirmé. La validité externe de l'outil se limite donc à cette population. Les normes établies ne pourront pas être utilisées chez les enfants d'âge préscolaire, pour contribuer au diagnostic différentiel entre les TL et les TSA. Or, c'est précisément au cours de la petite enfance que le processus d'évaluation diagnostique a le plus souvent lieu. Les normes établies ne permettent pas non plus d'utiliser le score CCG à des fins de dépistage des troubles du langage, puisque l'instrument n'a

pas été validé auprès de la population générale. Néanmoins, il était pertinent d'établir des normes préliminaires auprès d'enfants d'âge scolaire, pour lesquels la conclusion orthophonique de TL est clairement établie. Ces normes pourront servir de comparaison pour identifier des jeunes présentant un développement langagier atypique, différent de ce qui est généralement observé dans les cas des TL. Par exemple, ces normes pourraient permettre d'identifier des jeunes présentant un *trouble pragmatique*. Des travaux sont d'ailleurs en cours afin de vérifier la présence de troubles pragmatiques au sein de l'échantillon de normalisation de cette étude.

Au plan statistique, les procédures employées pour pondérer les scores aux sous-échelles et pour standardiser les scores CCG ont permis de normaliser ces distributions de scores. Cette normalisation est essentielle pour pouvoir utiliser l'instrument tel que prévu dans l'édition américaine. Cette normalisation permet d'ailleurs de ramener les scores aux différentes sous-échelles sur une même échelle quantitative, de manière à pouvoir comparer les différents paramètres du langage entre eux. Or, les distributions de scores bruts obtenues par les participants (tant pour les scores bruts aux sous-échelles que pour les scores CCG bruts), ne suivent pas exactement une loi normale, bien que la tendance générale est de s'en approcher. Il est probable qu'un échantillon plus vaste aurait permis de normaliser davantage les distributions des scores bruts. Les scores ont donc été pondérés ou standardisés en fonction d'une distribution théorique (la loi normale) qui n'est pas complètement fidèle aux distributions des scores bruts. Cela permet de compenser l'effet de la taille de l'échantillon, mais affecte légèrement la validité des normes établies.

Enfin, les résultats révèlent un accord inter-juges décevant entre les répondants « parents » et « enseignants ». Cette lacune s'explique en bonne partie par la différence entre les contextes scolaires et familiaux, mais peut également être affectée par un manque de précision de l'outil. Le peu d'accord inter-juges constitue donc une faiblesse métrologique, d'où l'importance d'une évaluation clinique par des professionnels en complément à l'utilisation de l'outil. Il faut donc user de prudence lors de l'élaboration d'une conclusion clinique à partir des scores obtenus.

### Pistes de recherches futures

La présente étude a permis d'établir des normes préliminaires très pertinentes dans un contexte de recherche. L'analyse des patrons de résultats des participants pourrait permettre d'identifier les jeunes présentant un TL caractérisé par des déficits pragmatiques prédominants. Ces derniers pourraient alors faire l'objet d'une investigation clinique par des orthophonistes afin de vérifier si leur profil communicatif correspond

réellement au patron de résultats quantitatifs obtenu à l'aide du questionnaire CCC-2. Si cela est jugé pertinent, ces jeunes pourraient alors être évalués en pédopsychiatrie pour un TSA. Des études futures pourraient permettre de valider les patrons de résultats obtenus à l'aide du CCC-2 *version franco-québécoise*, en les comparant aux résultats d'évaluations cliniques. Cela permettrait d'évaluer la validité interne et l'utilité clinique du questionnaire. De plus, d'autres études pourraient éventuellement permettre d'établir des normes pour d'autres populations, notamment pour les enfants d'âge préscolaire et pour ceux présentant un développement langagier typique. L'établissement de nouvelles normes aurait pour effet d'étendre la validité externe et l'utilité clinique du questionnaire.

### Conclusion

La présente étude a permis d'établir des normes préliminaires pour le CCC-2 *version franco-québécoise* auprès d'un échantillon de jeunes présentant un TL. Les données obtenues pourront éventuellement servir à de fins de recherche et être utilisées dans les milieux cliniques québécois. Des analyses quantitatives ont été réalisées à partir des données amassées afin d'évaluer les qualités métrologiques de l'adaptation québécoise du CCC-2, particulièrement en ce qui a trait à l'équivalence métrique par rapport à la version source de l'outil. Les résultats confirment que le CCC-2 *version franco-québécoise* se compare de façon satisfaisante à l'instrument source. Ainsi, le CCC-2 *version franco-québécoise* génère des résultats similaires aux versions antérieures, conformément à l'hypothèse de départ. Ce constat confirme que la *version franco-québécoise* du CCC-2 constitue une adaptation valide du CCC-2. Son utilité clinique, c'est-à-dire sa capacité à discriminer les TL et les TSA ou sa contribution réelle au diagnostic différentiel, pourra faire l'objet d'études ultérieures.

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## Notes marginales

<sup>1</sup>La Commission internationale pour l'adaptation des tests a été créée en 1999 par différents chercheurs du domaine, dans le but d'identifier et d'uniformiser les procédures valides d'adaptation des tests en contexte de mondialisation croissante. Ce colloque a permis l'établissement des « lignes directrices de la Commission internationale des tests ». Se référer à Geisinger (2003) pour une revue de ces lignes directrices.

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## KEY WORDS

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## RESEARCH NOTE:



Inter-rater Reliability of Clinicians' Ratings of  
Preschool Children Using the FOCUS®:  
Focus on the Outcomes of Communication  
Under Six

## NOTE DE RECHERCHE :



La Fiabilité Inter-évaluateurs des Évaluations  
d'enfants d'âge Préscolaire par des Cliniciens  
Utilisant la Méthode FOCUS® (*Focus on the  
Outcomes of Communication Under Six*)

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## Abstract

The present study was conducted to evaluate the reliability of the FOCUS® (*Focus on the Outcomes of Communication Under Six*). The FOCUS® is intended to measure the functional change in real-world communication associated with speech-language therapy. Clinicians administer this test by interviewing parents before and after treatment. The inter-rater reliability of detected change was high when evaluating preschool children ( $n = 13$ ). Results indicate that this measure is reliable for both practical and research purposes. The necessity of establishing reliability is discussed, as are limitations of the FOCUS®.

## Abstré

La présente étude a été menée pour évaluer la fiabilité de la méthode FOCUS® (*Focus on the Outcomes of Communication Under Six*). FOCUS® veut mesurer le changement fonctionnel dans la communication associée aux thérapies en orthophonie. Les cliniciens administrent ce test en interviewant les parents avant et après traitement. La fiabilité inter-évaluateurs du changement détecté était élevée lors de l'évaluation d'enfants d'âge préscolaire ( $n = 13$ ). Les résultats indiquent que cette mesure est fiable à la fois en clinique et en recherche. La nécessité d'établir la fiabilité est discutée, ainsi que les limites associées à FOCUS®.

Children need proficiency in communication at school, home, work and play (Byles, 2005; McCormack, 2009) and communication is central to the normal acquisition of many cognitive and academic skills, including literacy (Catts, Bridges, Little, & Tomblin, 2008; Catts, Fey, Tomblin, & Zhang, 2002; Justice, Bowles & Skibbe, 2006; Warr-Leeper, 1993; Warr-Leeper, Wright, & Mack, 1994). Preschool and school-age children with communication disorders are more likely to demonstrate social and behavioural problems that can negatively impact peer acceptance and popularity in school (McCabe, 2005; Warr-Leeper et al., 1994). Deficits in communication have an overall negative impact on children's abilities to participate in every day life situations such as learning in school, taking turns, playing, and most critically, establishing and maintaining friendships with others (Warr-Leeper et al., 1994; Washington, 2007).

Communication disorders are defined as persistent difficulties in the use or understanding of spoken and/or written language (Paul, 2001). These disorders frequently become apparent in early childhood (McLeod & Harrison, 2009), with approximately 6% of the preschool population identified as having a significant communication disorder (Law, Boyle, Harris, Harkness & Nye, 2000). They can be life-long and may result in poor life outcomes, including failure to complete high school, difficulties obtaining and maintaining gainful employment and an increased incidence of psychiatric disorders and arrests (Warr-Leeper, 2001; Johnson, Beitchman, Brownlie, 2010). However, there is some evidence supporting the positive outcomes of intervention for children with communication disorders (Law, Garrett, & Nye, 2003; Washington, Warr-Leeper, & Thomas-Stonell, 2011). Thus, measuring the outcomes of intervention is important in order to establish the effectiveness of speech and language therapy for this population of children (Thomas-Stonell, Oddson, Robertson, & Rosenbaum, 2009; 2010).

Outcome measurement is the backbone of evidence-based practices (Beitchman, Nair, Clegg, & Patel, 1986; Majnemer & Mazer, 2004) and is needed to determine the impact of speech and language therapy. Information about outcomes is critical for informing speech-language pathologists (S-LPs) about which children, with which kinds of problems, will benefit most from specific types or schedules of intervention (Beitchman et al., 1986; Thomas-Stonell et al., 2009). In particular, given the impact of communication impairments on children's lives, it is important to develop tools to measure the real-world outcomes of speech-language therapy. Although it is a common practice to use standardized tests to evaluate change, this is not a correct use because most standardized tests are neither reliable nor sensitive when used this way (Kerr, Guildford & Bird, 2003; Rosenbaum, et al., 1990). For example, when a change in child's age leads to a change of

normative group, scores (at least centiles) can go down even in the midst of therapeutic progress.

A critical component in establishing intervention outcomes is the use of reliable and valid outcome measures (Thomas-Stonell et al., 2009; 2010; Yorkston, Klasner, & Swanson, 2001). Outcome measures are simply 'tools', and as such must have demonstrated utility, reliability, validity, and in the case of change-detecting measures, clinical responsiveness (Law et al., 2000). Most of the measurement tools available to S-LPs do not adequately measure the full range of progress observed in successful interventions (Thomas-Stonell et al., 2009).

Outcome measures need to have established validity and responsiveness before being adopted into widespread use (Hall, 1997; Turk, 1997; Unsworth et al., 2004; van der Putten, Hobart, Freeman, & Thompson 1999). Tests that do not properly reflect the progress a child has made are likely to lead to inappropriate clinical decisions. On a broader scale, a test that is unsound could easily lead researchers to make poor comparisons between treatment models or programs, and hence, poor clinical and programatic decisions. Measures that are not valid or adequately responsive may be worse than no measurement at all.

Previous work in the measurement of therapy outcomes in speech-language pathology has not produced measurement tools with proven validity and responsiveness for two reasons (Thomas-Stonell et al., 2009; 2010; Washington, 2007). The first is a paucity of outcome measurement research in the field (Washington, 2007). The second is that the primary interest of most clinicians has been to measure progress specific to the treatment plan (Thomas-Stonell et al., 2009), usually at the 'impairment' level. This has driven the creation of a large number of measures, each targeting a limited range of the communication repertoire (e.g., voice disorders), each based on a particular assessment and treatment approach, and none corresponding to the diversity of the challenges in the preschool population. There are two more broadly-based exceptions – the American Speech and Hearing Association National Outcome Measure System (ASHA NOMS) and the Australian Therapy Outcome Measure System (AusTOMs). The ASHA NOMS does not have proven reliability and responsiveness (Thomas-Stonell et al., 2009). The AusTOMs has been shown to be reliable (Perry et al., 2004) and valid (Unsworth et al., 2004; van der Putten et al., 1999). However, it provides only a single rating of participation, thus offering little information about which real world skills have changed. Its simplicity may limit its capacity to evaluate change specifically and responsively.

Achieving good communication outcomes for children is important; therefore measuring the outcomes of intervention appropriately is both relevant and necessary.

The FOCUS© is a new and innovative broad-based outcome measure developed to provide a reliable, valid, and effective measure of progress in speech-language therapy for young children. Unlike most speech and language outcome measures, it evaluates changes in both 'Capacity' – what the child is capable of doing in an ideal environment such as a structured, therapeutic sessions – and 'Performance' – what the child does in various environments such as home, nursery school, and daycare. It is intended to identify real world changes in communication (e.g., intelligibility, sentence grammar, vocabulary, socialization) associated with speech therapy (Thomas-Stonell et al., 2009; 2010). The FOCUS© can be completed either by a parent as a checklist of 50 items, or by a clinician after a 15-minute interview with a parent. The vocabulary was developed out of responses from 210 parents of children enrolled in speech-language therapy in a previous study (Thomas-Stonell et al., 2009; 2010). Since the FOCUS© is based on the comments of the parents themselves, the questions have strong face validity and good correspondence to the vocabulary parents are accustomed to using in describing therapy progress. In previous work it was established that the FOCUS© items have high internal consistency (Thomas-Stonell et al., 2009; 2010). When used with parents, the test-retest reliability was found to be very high (Thomas-Stonell et al., 2010).

The present study investigated the inter-rater reliability of clinicians using the FOCUS© to rate change following speech-language interventions with a very broad range of children. Establishing high reliability is a necessary precondition for the appropriate use of any measurement tool; the majority of measures available in speech evaluation do not have proven reliability when looking at their ability to detect change.

## Method

### Participants

Ethics approval was granted at Holland Bloorview Kids Rehabilitation Hospital, Laurentian University, and each participating centre. Families and clinicians (speech-language pathologists) were recruited from three sites in the province of Ontario, Canada. Families were invited to participate in the study as they were referred to their respective programs. Every family approached agreed to participate in the study (100% recruitment rate). Informed consent was obtained from each participating family.

A total of 13 preschoolers with speech-language impairments and four S-LPs participated. Preschool participants ranged in age from 3 years, 1 month to 6 years, 4 months ( $M = 57$  months). Sixty-two percent ( $n=8$ ) were male. Many of the children (62%) had also been identified as having a specific medical diagnoses, including cerebral palsy ( $n=5$ ) and hypotonia ( $n=3$ ). Participating S-LPs

rated each preschooler's communication level using the Communication Function Classification System (CFCS) (Hidecker et al., 2011). The CFCS classifies communication performance into one of five levels (5 = lowest function, 1 = best function). The CFCS focuses on Activity and Participation levels as described in the World Health Organization's International Classification of Functioning (Hidecker et al., 2011). A parent, caregiver, and/or a professional who is familiar with the individual selects the person's communication level. Five preschoolers (38%) were classified as "effective sender and receiver with familiar partners" (Level 3 communicator). There was no attrition in this sample.

### Procedure

Inter-rater reliability for change scores was evaluated by asking pairs of S-LPs ( $n = 4$ ; including one of the authors) to use the FOCUS© to assess each preschooler ( $n = 13$ ) at two different time points (Time 1 and Time 2). Assessments were based on interaction with the child and interview of a parent(s). Each assessment (Time 1 and Time 2) was completed during the evaluation of speech and language skills. Participating S-LPs independently completed each assessment using the FOCUS©. To establish change scores, it was necessary to administer the FOCUS© before and after intervention. Thus, the FOCUS© was administered during an assessment session and then again within a 2½-month period (mean 89 days, ranging from 34 to 112), which followed speech-language intervention.

### Data Analysis

Using IBM SPSS Statistics (Version 20) the scores for each case were screened for outliers. Two cases were identified as outliers at more than 3 standard deviations from trimmed mean of the differences between each judges' scores. These cases were removed. Inter-rater reliability was assessed using the absolute agreement intra-class correlation coefficient (ICC) calculation.

### Results

Based on eleven cases, the inter-rater reliability of FOCUS© change scores was acceptable,  $ICC = .70$  (CI .24-.91). Change scores ranged from -18 to +116,  $M = 57$ ,  $SD = 36$ .

### Discussion

The FOCUS© is a new and innovative broad-based outcome measure of preschoolers' communication. Unlike most speech and language outcome measures, it has been designed to evaluate changes in both 'Capacity' – what the child is capable of doing in an ideal environment such as a structured, therapeutic sessions – and 'Performance' – what the child does in various environments.

Reliability is a critical attribute of an outcome measure. Measures with poor reliability cannot be used to measure the outcome of therapy. First, to the extent that reliability is poor, sound individual conclusions cannot be made. Second, even as a research tool, poor reliability will lead to distortions and inconsistent assessments of a concept's relationship to other measured variables (Cochran, 1968; Fuller 1987; Gleser, Carroll, & Gallo, 1987). Few measures in the domain of speech language pathology have established reliability.

The present results indicate that the test-retest and inter-rater reliabilities of the FOCUS® are acceptably high. It is important to note that ICC scores are very sensitive to differences in populations. Our sample was highly heterogeneous and reflected the caseloads of several different programs. This may elevate estimates of ICC values relative to ICCs obtained with more homogenous samples. However, the reported values excluded scores for two clients. In both of the cases the disagreement between clinicians was larger (161 and 86) than any treatment effect we have found in any of the validation studies to date. On examination it was found that one of the clinicians had made the ratings of both cases with insufficient discussion with the parents. The clinician relied primarily on direct observation of the child with only limited input from the parent for FOCUS® items that would have benefitted from parental description and elaboration. Since some FOCUS® items (e.g., plays well with others) might not be directly observable by the clinician at the time of the assessment, it is highly recommended that the completion of these items only be completed after a discussion with parent(s). For the above-mentioned examination, such a discussion was not sufficiently completed, resulting in a discrepancy in FOCUS® ratings between the clinician who completed a more lengthy parent discussion and the one who did not. The manual that comes with the FOCUS® will reflect this experience and be clear about the administration guidelines.

It should also be noted that we report values derived from clinicians. Clinicians score the FOCUS® using a combination of clinical observations and parent report. They should not be considered any more reliable than responses recorded directly by parents. Parent test-retest reliability has already been established as being very high (Thomas Stonell et al., 2010), although we have not been able to evaluate test-retest reliability for two parents separately.

Establishing the inter-rater reliability of the FOCUS® lays the groundwork for its eventual use in clinical settings. Reliability is one necessary attribute for useful measurement. Clinical use requires validity to be established using well-judged criteria. Effectively, an unreliable test cannot be used for individual judgments even if its validity is established – because one could never be sure if a specific measured rating was meaningful or not.

The present work represents a separate and independent step for the larger validation and refinement of this measure.

**Limitations.** Although we have a diversity of speech and language therapy needs represented, these results are from a small sample. Because of the nature of the recruitment process, we do not know if biases have been introduced by the selection of particular children and parents, or therapist assessors. Although each centre was asked to recruit consecutive families, there is no way to assess the impact of selection that may have occurred. The FOCUS® is intended to be applicable for a very broad range of children with a variety of speech and language therapy needs. The present sample includes children with varied severities of communication problems. This diversity means that we may detect higher reliability than would be found in any given treatment program. Similarly, although a wide range of ages was included, we cannot comment on the reliability for any specific age. Finally, we have not yet assessed the use of this instrument by related professionals, such as teachers or communication disorder assistants.

## Conclusion

Reliability is a critical precondition for useful and effective outcome measurement. The test-retest reliability of the FOCUS® is high, and the inter-rater reliability is acceptable. These results suggest that the FOCUS® will be reliable for its many proposed uses across a broad range of communication disorders, diagnoses, severities, and ages. The difficulty found in two cases out of thirteen suggest that some standards for training in the use of the FOCUS® and for a minimal amount of time in contact with the client and parents must be established.

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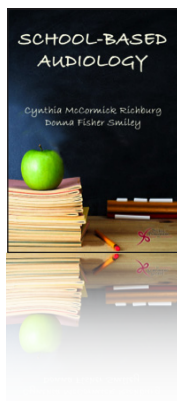
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# Book Review Évaluation de Livre



**Title:** School-Based Audiology, 2011

**Publisher:** Plural Publishing Inc.

**Authors:** Cynthia McCormick Richburg and Donna Fisher Smiley

**Cost:** \$60.00

**ISBN:** 9781597563857

**Reviewer:** Dave Gordey, M.Sc. Aud(C)

## School-Based Audiology

In Richburg and Smiley's new book, *School-Based Audiology*, the authors explore concepts and topics important in the practice of educational audiology. The foreword, written by Cheryl DeConde Johnson, provides a rationale for the authors' written work and highlights the importance of teaching educational audiology. She believes that understanding educational audiology is necessary to support students with hearing loss in the classroom.

The table of contents lists fourteen chapters that are comprehensive and include topics that address hearing technology, classroom structure and management, and special interest sections such as auditory processing assessment. Richburg and Smiley do a nice job of presenting this information clearly and concisely, and get support from guest authors who are experts in the field of audiology. Richburg and Smiley are careful and courteous in their writing, being mindful that the textbook's audience is audiology students. The book also could be beneficial to other students in hearing-related professions (i.e. teachers of the deaf, speech-language pathologists, and auditory-verbal therapists). The authors refrain from using complex terminology and theories, and instead focus on the fundamental concepts and practical applications of educational audiology. At the beginning of each chapter learning objectives are listed, setting a context for the information that is to be presented. Between each chapter, practicing educational audiologists contribute their experiences from working in the field. These vignettes present the diverse locations in which they work, and explain the successes and challenges they encounter. This is an important piece of the textbook as it provides the

student-reader an appreciation of the day-to-day work of an educational audiologist.

Chapters one through four focus on understanding basic terminology, concepts, and foundations of educational audiology. These are the most persuasive chapters of the book. They review key topics such as classroom acoustics, student success in the classroom and the role of the educational audiologist. These are important because they highlight the importance of the rights of students with hearing loss. While some of the content reflects on past and present educational laws in the United States, it could inspire readers in other countries to investigate and consider their own local legislation and their impact on students. Finally, Richburg and Smiley outline the importance of understanding the roles, the responsibilities, scope of practice, and service delivery of an educational audiologist. They alert the reader to the variability of professional practice within city, state, province, and country.

The next section of the book discusses programs and practices in the schools. Chapters five through seven examine hearing screenings, hearing technology, and hearing conservation programs. The authors are applauded for addressing the importance of hearing technology and providing guidance and protocols on its use and management. While the authors acknowledge verification and validation as important pieces to fitting hearing technology, they could elaborate more on the importance of verification equipment, and its use by the educational audiologist. I like that Richburg and Smiley took ownership of hearing conservation in the classroom. Historically, this important topic has received little attention, likely because its responsibility floated between health and safety professionals, school nurses and audiologists. The authors clearly explain why hearing conservation is critical to all students well-being and belongs with educational audiologists. Readers are also briefly introduced to the importance of social and emotional development of students with hearing loss. While they recognize the importance of social and emotional development and its relationship to the student's overall wellness in the classroom, I believe the authors should consider writing more on this topic. A chapter dedicated to explaining theories, benefits and development of self-advocacy and self-determination is very important to professionals working with students with hearing loss. As the authors state, it is a critical component to student success in the classroom.

Chapters ten through thirteen discuss special topics, important and relevant to the school-based hearing professional. This includes an excellent introduction to cochlear implant technology and their management guidelines. Richburg and Smiley call attention to the importance of professional collaboration in the schools and the benefits of working with other professionals involved with the student with hearing loss. Guest author Dr. Frank Musiek provides a nice contribution to the textbook, offering an introduction to auditory processing disorders. Assessment and treatment guidelines provide the reader with practical strategies to use in the management of auditory processing disorders.

In the final chapter, Richburg and Smiley discuss potential opportunities and challenges for the future and their impact on hearing education professionals. They celebrate the success of universal newborn hearing screenings, advancements in hearing technology and improved services to students with hearing loss, while acknowledging the complex problems that still exist in educational audiology today. They conclude by asking us to consider a new framework for educational audiologists, as professionals who have expertise and have special interest in the hearing of all students.

*School-Based Audiology* is a very good introduction to the field of educational audiology. The authors accomplish their goal of providing an excellent overview on topics and concepts specific to students with hearing loss. The textbook provides a nice combination of theoretical and practical information, and guides expectations of professional life as an educational audiologist. *School-Based Audiology* is a recommended textbook for those individuals interested in pursuing a career in education and working with students with hearing loss.

## Information for Contributors

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

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

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

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

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

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Contributors should use the electronic CJSLPA manuscript submission system at [www.cjslpa.coverpage.ca](http://www.cjslpa.coverpage.ca) to submit articles. If you are unable to use the electronic system, please send a file containing the manuscript, including all tables, figures or illustrations, and references in Word via e-mail to the editor at [elizabeth.fitzpatrick@uottawa.ca](mailto:elizabeth.fitzpatrick@uottawa.ca).

Along with copies of the manuscript, a cover letter indicating that the manuscript is being submitted for publication consideration should be included. The cover letter must explicitly state that the manuscript is original work, that it has not been published previously, and that it is not currently under review elsewhere. Manuscripts are received and peer-reviewed contingent upon this understanding.

The author(s) must also provide appropriate confirmation that work conducted with humans or animals has received ethical review and approval. Failure to provide information on ethical approval will delay the review process. Finally, the cover letter should also indicate the category of submission (i.e., tutorial, clinical report, etc.). If the editorial staff determines that the

manuscript should be considered within another category, the contact author will be notified.

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

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

## Organization of the Manuscript

All copies should be typed, double-spaced, with a standard typeface (12 point, non-compressed font) on 8 ½ x 11 paper size. All margins should be at least one (1) inch. An electronic copy of the manuscript should be submitted directly to the editor. Author identification for the review process is optional; if blind-review is desired, the documents should be prepared accordingly (cover page and acknowledgments blinded). Responsibility for removing all potential identifying information rests solely with the author(s). All submissions should conform to the publication guidelines of the most current edition of the Publication Manual of the American Psychological Association (APA). The APA manual is available from most university and 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.

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

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

## Renseignements à l'intention des collaborateurs

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

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

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

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

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

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

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

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

## Présentation de manuscrits

Pour soumettre un article, les auteurs doivent utiliser le système de soumission électronique de l'ACOA à l'adresse [www.cjslpa.coverpage.ca](http://www.cjslpa.coverpage.ca). Si vous ne pouvez pas utiliser le système électronique, veuillez envoyer par courriel un fichier Word contenant le manuscrit, y compris tous les tableaux, les figures ou illustrations et la bibliographie. Adressez le courriel au rédacteur en chef à l'adresse [elizabeth.fitzpatrick@uottawa.ca](mailto:elizabeth.fitzpatrick@uottawa.ca).

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 le publication Manual of the American Psychological Association (APA), 6e Édition. Un accusé de réception de chaque manuscrit sera envoyé à l'auteur-contact avant la distribution des exemplaires en vue de la révision. La RCOA cherche à effectuer cette révision et à informer les auteurs des résultats de cette révision dans les 90 jours de la réception. Lorsqu'on juge que le manuscrit convient à la RCOA, on donnera 30 jours aux auteurs pour effectuer les changements nécessaires avant l'examen secondaire.

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



## Organisation du manuscrit

Tous les textes doivent être écrits 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. Un fichier électronique du manuscrit doit être présenté 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 un fichier électronique 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 les plus récentes de l'APA. Ce manuel est disponible dans la plupart des bibliothèques universitaires et commerciaux. En général, les sections qui suivent doivent être présentées dans l'ordre chronologique précisé.

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

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

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

**Tableaux :** Tous les tableaux compris dans un même manuscrit doivent être écrits 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 annexer avec chaque exemplaire du manuscrit. Chaque manuscrit doit être accompagné d'un fichier

électronique pour chaque image et graphique en format JPEG, TIFF, AI, PSD, GIF, EPS ou PDF, compression minimale 300 ppp. Pour les autres types d'illustrations informatisées, il est recommandé de consulter le personnel de production de la RCOA avant la préparation et la présentation du manuscrit et des figures et illustrations s'y rattachant.

**Légendes des illustrations :** Les légendes accompagnant chaque figure et illustration doivent être écrits à double interligne sur une page 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 écrits à double interligne sur une page 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 le plus récent 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 écrits 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.



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