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La communication à coeur

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TABLE OF CONTENTS

TABLE DES MATIÈRES

ARTICLE 1 157
Touch Screen Assessment of High-Risk Infants' Word Knowledge
RACHEL HAHN ARKENBERG, SHARON CHRIST, AMANDA SEIDL

ARTICLE 2 167
Using a Five-Step Logic Model Development Process to Design an Intervention for Adolescents With Developmental Language Disorder
CATHERINE JULIEN, MARIE-EVE LAMONTAGNE, FRANCINE JULIEN-GAUTHIER, MARIE-CATHERINE ST-PIERRE, CHANTAL DESMARAIS

ARTICLE 3 179
YouTube Videos on Voice Disorders: What can a Layperson Learn?
DHANSHREE R. GUNJAWATE, ROHIT RAVI, MONICA L. BELLON-HARN, ABIGAIL J. DUEPPEN, VINAYA MANCHAIAH

ARTICLE 4 189
Syllabic Structures Inventory for Francophone Children: A Tool for Intervention Planning in Childhood Apraxia of Speech
NATHALIE AUBRY, ISABELLE BISSONNETTE, SOPHIE RAYMOND, MARC PERRON, LOUISE DUCHESNE

ARTICLE 5 209
Investigating Label Use by English Canadian Speech-Language Pathologists
ALYSSA KUIACK, LISA M. D. ARCHIBALD

ARTICLE 1 157
Évaluation par écran tactile du vocabulaire d'enfants présentant un risque élevé d'avoir un trouble de la parole et du langage
RACHEL HAHN ARKENBERG, SHARON CHRIST, AMANDA SEIDL

ARTICLE 2 167
Développement en cinq étapes d'un modèle logique pour concevoir une intervention destinée aux adolescents ayant un trouble développemental du langage
CATHERINE JULIEN, MARIE-EVE LAMONTAGNE, FRANCINE JULIEN-GAUTHIER, MARIE-CATHERINE ST-PIERRE, CHANTAL DESMARAIS

ARTICLE 3 179
Les vidéos portant sur les troubles de la voix disponibles sur YouTube : ce que le grand public peut en retirer
DHANSHREE R. GUNJAWATE, ROHIT RAVI, MONICA L. BELLON-HARN, ABIGAIL J. DUEPPEN, VINAYA MANCHAIAH

ARTICLE 4 189
Inventaire des structures syllabiques chez l'enfant francophone : un outil pour planifier l'intervention en dyspraxie verbale
NATHALIE AUBRY, ISABELLE BISSONNETTE, SOPHIE RAYMOND, MARC PERRON, LOUISE DUCHESNE

ARTICLE 5 209
Enquête sur la terminologie employée par les orthophonistes canadiens anglophones
ALYSSA KUIACK, LISA M. D. ARCHIBALD



Touch Screen Assessment of High-Risk Infants' Word Knowledge



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Rachel Hahn Arkenberg

Sharon Christ

Amanda Seidl

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Rachel Hahn Arkenberg,
Sharon Christ, and Amanda
Seidl

Purdue University, West
Lafayette, IN, USA

Abstract

Early identification of speech and language disorders is a priority for the field of speech-language pathology. The Computerized Comprehension Task is a promising tool for early assessment of language, because it preferentially taps strong word-referent associations (Friend & Keplinger, 2003), but its concurrent and predictive validity have not been examined in infants at high risk for speech and language disorders. We present preliminary findings related to using this tool with high-risk infants. We recruited 11 high-risk infants (having two or more risk factors) and 11 matched peers (14–24 months) to complete tests of speech and language at two time points, 6 months apart. Performance on the Computerized Comprehension Task was significantly correlated with standardized language measures for all infants. A mixed-effects model with corrections for small sample size and missing data revealed that the Computerized Comprehension Task and a more standard comprehension assessment were statistically significantly associated with expressive language outcomes 6 months post-baseline. This study provides preliminary data that the Computerized Comprehension Task could be a useful tool for early assessment of high-risk children and warrants further investigation in this population.

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Abrégé

L'identification précoce des troubles de la parole et du langage est une priorité en orthophonie. La *Computerized Comprehension Task* [tâche de compréhension informatisée] est un outil prometteur pour l'évaluation du langage en bas-âge, car elle cible les associations mot-référent qui sont fortes (Friend et Keplinger, 2003). Cependant, les validités concordante et prédictive de cet outil n'ont pas encore été examinées chez les enfants présentant un risque élevé d'avoir un trouble de la parole et du langage. Cet article présente les résultats préliminaires suivant l'utilisation de cet outil auprès d'enfants présentant un tel risque. Nous avons recruté 11 enfants âgés de 14 à 24 mois présentant un risque élevé d'avoir un trouble de la parole et du langage (présence d'au moins deux facteurs de risque) et 11 enfants à faible risque qui ont été appariés sur l'âge et sur le niveau d'éducation de la mère. La parole et le langage de ces enfants ont été évalués à deux reprises (les deux évaluations étaient espacées par une période de six mois). Les performances de tous les enfants à la *Computerized Comprehension Task* étaient fortement corrélées à celles des mesures standardisées du langage. Les résultats d'un modèle mixte (corrige pour la petite taille de l'échantillon et les données manquantes) révèlent une association significative entre les scores obtenus à la *Computerized Comprehension Task* et à une évaluation standardisée de la compréhension lors de l'évaluation initiale et le score obtenu à une mesure de langage expressif six mois plus tard. Les données préliminaires de cette étude suggèrent que la *Computerized Comprehension Task* pourrait être un outil utile pour l'évaluation de jeunes enfants présentant un risque élevé d'avoir un trouble de la parole et du langage et que des études plus approfondies auprès de cette population seraient justifiées.

Assessment of the communication of children under 2 years is a priority for the field of speech-language pathology, because early assessment and intervention can have a significant impact on academic and personal growth (Aram & Hall, 1989; Curtis et al., 2019; Lewis et al., 2011; McCormack et al., 2010; McKean et al., 2017; Wallace et al., 2015). Early assessment and intervention are particularly important in children who are at high risk for speech and language disorders. One of the most well-documented sources of risk is genetic, that is, having a sibling who has a communication disorder such as developmental language disorder (DLD; also called specific language impairment) or speech sound disorder. While both DLD (prevalence of 9.92%; Norbury et al., 2016) and speech sound disorder (prevalence of 16% at 3 years; Pennington & Bishop, 2009) are not highly prevalent in the general population, the odds are 1.7 times higher for siblings of children diagnosed with these disorders (Rudolph, 2017). Odds for speech and language disorders are also increased for children born preterm. Specifically, children born extremely preterm (less than 28 weeks) are 10 times as likely to have DLD and 4.4 times as likely to have speech sound disorder (Wolke et al., 2008).

However, risk for speech and language disorders is multifactorial, and one risk factor may not be sufficient to classify a child as “high risk” (Ebbels et al., 2019; Rudolph, 2017). Often a combination of risk factors, such as genetic risk, preterm birth, and low socioeconomic status, together contribute to overall risk (Hoff, 2003; Lewis et al., 2006, 2011; Rudolph, 2017). While many studies have examined risk factors for a variety of speech and language disorders, they have varied widely in sample size, ages, factors studied, and analyses, which limits comparison (Harrison & McLeod, 2010; Wallace et al., 2015). However, in a recent meta-analysis (i.e., Rudolph, 2017), studies of risk factors were systematically reviewed for quality and outcome variables before the meta-analysis was completed. The top five weighted risk factors (defined by highest odds ratio) are examined in our study: maternal education, family history, birth order, biological sex, and prematurity. Clearly, not every high-risk child develops a speech or language disorder, but, given the high-risk status of these children and the impact of these disorders on life outcomes, it is a priority to assess speech and language early and effectively in this population.

However, early assessment has some key maturation-related and methodological challenges. For example, speech production assessment, such as assessment of the phonetic inventory, is complicated by the wide age range for the onset of speech and clear confounds with motor development. Language comprehension, on the other hand, may be a more reliable measure of early language, and may enable standardized assessment at a younger age, since perception

precedes production and lacks confounds associated with the protracted development of motor skills (Bornstein & Haynes, 1998; Davis & MacNeilage, 1990). Current methods of assessing comprehension in clinical settings are often indirect assessments, which assess the whole continuum of weak to strong associations between words and referents. For example, on the popular indirect parent report measure, the MacArthur-Bates Communicative Development Inventories (Bruckner et al., 2007; Fenson et al., 1993), a parent may correctly report that their child knows the word *dog*, even if their child has a relatively weak word-referent association such as only using the word *dog* to refer to their neighbour’s pet.

On the other hand, direct comprehension assessment methods require both lexical retrieval and hypothesis testing, which means that they investigate strong, decontextualized associations (Yu & Smith, 2012). These decontextualized, stable associations appear to better predict downstream language in samples of primarily typically developing children (Friend et al., 2018; Schmitt, 2014). However, the concurrent and predictive value of direct assessment of comprehension is relatively unknown in children who are known to be at high risk for speech and language disorders.

Since it is vitally important to assess these high-risk children early, it is a priority to evaluate if direct assessment methods are predictive in this population. However, many direct comprehension assessment methods, such as the Mullen Scales of Early Learning (MSEL) or eye-tracking assessments, require a high degree of training, significant time investment, and/or expensive equipment and laboratory access, which limits their feasibility in clinical settings. Therefore, not only must we determine if direct assessments are predictive in this high-risk population, but it is also important to determine if clinically feasible direct assessments are predictive, because they have potential to lead to earlier identification.

One direct assessment that is relatively quick and simple to administer, while maintaining strong validity in developing children, is the Computerized Comprehension Task (CCT; Friend & Keplinger, 2003). The CCT is a forced-choice measure of vocabulary comprehension, reflecting decontextualized word-referent associations. The CCT is validated for typically developing, English-speaking infants with high test-retest reliability ($r = .76, p < .05$), convergent validity ($r = .64, p < .05$), and improved performance over time ($r = .61, p < .05$; Friend & Keplinger, 2008; Friend et al., 2012, 2019). It correlates concurrently with parent report and predictively with a language sample, and the CCT (given at 22 months) predicts language at age 3 (Friend et al., 2019). It also identifies language deficits 2 years earlier

than other methods, with similar sensitivity and specificity to Language Factor score (Friend et al., 2019). However, the CCT has not yet been studied in high-risk infants. Since this assessment method holds great promise for early identification of language deficits, it is imperative that we determine if it maintains concurrent and predictive validity in a high-risk population.

Therefore, we asked (a) Is decontextualized vocabulary, measured by the CCT, correlated with standardized and non-standardized measures of speech and language concurrently and predictively? and (b) Is performance on the CCT associated with 6-month expressive language outcomes in high-risk infants? We hypothesized that (a) decontextualized vocabulary measured by the CCT will have concurrent and predictive validity, demonstrated by correlation with other measures of speech and language given at the same time point and over time and (b) performance on the CCT will have predictive validity, demonstrated by association with 6-month expressive language outcomes in high-risk infants.

Method

Participants

Eleven low-risk and 11 high-risk infants age 14–24 months participated in this longitudinal study (19/22 completed both Sessions 1 and 2). Though this is a small sample, power analysis revealed that with only $n = 4$, differences could be detected in these groups with .80 power. Participants were monolingual infants recruited from our lab's database, which is compiled from birth records of local children, referrals from community speech-language pathologists, parents of siblings in other speech/language studies, and by searching a university-wide database of research participants. Infants could be defined as high risk in two ways. First, if they had a family history (i.e., a sibling with a reported speech/language problem), which is a well-established risk factor in the literature, and at least one other risk factor: second or later birth order, male biological sex, and/or preterm birth (< 37 weeks). Second, they were considered high risk if they had all three of the remaining risks: second or later birth order, male biological sex, and preterm birth (< 37 weeks). Each of these four risks have odds ratios of greater than 1.49 in well-controlled meta-analysis (Rudolph, 2017).

Socioeconomic status is another well-documented risk factor for language onset, but we were unsuccessful in recruiting a representative sample of this population. So instead of using it to categorize risk, we controlled for this by matching for maternal education, a proxy for socioeconomic status. The high- and low-risk groups were matched for both maternal education and age.

Procedure

During all visits, parents and infants were seen by a trained and supervised master's level speech-language pathology student researcher in a private clinic room with minimal distractions. All procedures were approved by Purdue University's Institutional Review Board (1610018380, 12/15/16). At the first visit, parents were introduced to the study and provided consent and case history information, and screenings were completed to determine eligibility. To be eligible for the study, infants needed to pass a hearing screening using otoacoustic emissions (Otoport OAE, Otodynamics) and demonstrate fine motor skills within normal limits (measured with the Fine Motor subtest of the MSEL). If the infants passed these two screenings, initial testing was completed.

Testing started with a production task to assess consonants present in the child's phonetic inventory. Each target word was elicited with three different toy exemplars and responses were audio-recorded (Shure PGXD1 Bodypack Transmitter and Shure PGXD4 Wireless Receiver). Words for this production task were selected to reflect a variety of consonants across word positions and word structures (see **Table 1**), based on production norms from WordBank (Frank et al., 2017). To elicit words, toys were taken out of a bag and described by saying, "This is a _____," and child repetitions of consonants in target words were transcribed phonetically live. All words were again transcribed for analysis using recordings, and consonants were considered present in the child's inventory if they appeared at least once.

Participants also completed two more scales from the MSEL related to language development (i.e., receptive language and expressive language; Mullen, 1995). The MSEL is a valid and reliable standardized test measuring cognitive ability and motor development. Each section takes approximately 10–20 minutes to complete. The MSEL was chosen because, like the CCT, it is a test that depends on infants' responses, as compared to popular measures solely based on parent report.

The final component of the session was the CCT. The CCT is a forced-choice direct assessment of language comprehension. It is delivered via touchscreen, but the touchscreen program must be administered by a live researcher/clinician, and the assessment takes about 5–10 minutes to administer. The experimenter gives verbal prompts embedded with the target word in child-directed speech, using the same prompt for each word class, such as "Where is the _____?", for nouns (for a detailed breakdown on word classifications, difficulty, and randomization, see Friend & Keplinger, 2003). Visual stimuli for the CCT

Table 1**Target Phonemes and Word Frames, Each Targeted With Three Unique Toy Exemplars**

Object	Ball	Dog	Cat	Sock	Keys	Banana	Fish	Apple	Duck
Phonemes assessed	/b/ /l/	/d/ /g/	/k/ /t/	/s/ /k/	/k/ /z/	/b/ /n/	/f/ /ʃ/	/p/ /l/	/d/ /k/

include 41 pairs of high-quality digital images on a solid blue screen. Images are prototypical referents for nouns, verbs, and adjectives, controlled for salience to childhood. When the child touches the correct item, the program plays a reinforcer. This digital reinforcer includes an auditory stimulus of the lexical item produced in child-directed speech and a reinforcing sound such as a recording of the word *ball* with a bouncing sound. The sound is presented only when the infant touches the correct target as a motivator for engagement with the task. Infant sensitive screen areas encompass less than 50% of the screen area, so random touches have a low probability of being counted as correct.

To introduce this touchscreen task, five training trials were completed. During training trials, the examiner gave the child specific directions, modeled screen touches, and used a hand-over-hand technique to introduce the touch screen if the child did not touch when prompted. All 22 children completed all trials of the CCT, according to standardized administration procedures including standardized prompts as described in Friend and Keplinger (2003). Scores were both recorded manually by the examiner and automatically within the program, with 100% agreement.

Six months later, 9 high-risk and 10 low-risk participants returned and again completed the CCT and the two language subscales of the MSEL (attrition of 3).

Analysis

All tests were scored according to their prescribed methods. The phonetic inventory was scored by number of consonants present, the CCT was scored by number correct, and the subtests of the MSEL were scored according to the test's specifications. However, raw scores from the MSEL were utilized for analysis and comparison, since the phonetic inventory and CCT do not have standard scores, and age was matched in our sample. We used descriptive statistics, *t* tests, and mixed-effect modeling to test hypotheses in this study. Data were screened for missing information and outliers prior to analysis, with no outliers found.

To address our first question aimed at examining concurrent validity, correlations were calculated for scores

on the CCT, language subtests of the MSEL, and our measure of phonetic inventory. To address our second question related to association with later outcomes, mixed-effects models were used. Mixed-effects modeling requires fewer assumptions than Analysis of Variance, can account for missing data, and is equipped for clustering of repeated assessments within child through use of clustered sandwich estimator and random intercepts. Also, it is able to handle continuous independent variables without the need to dichotomize or parcellate. A mixed-effect model with restricted maximum likelihood estimation and a Kenward-Roger correction was estimated. Restricted maximum likelihood estimation with correction decreases bias associated with small sample size, prevents inflation of Type 1 error rates, and accounts for missing data (Chawla et al., 2014; McNeish, 2017).

Results

All 22 infants who were screened were eligible to participate in the study. Ages ranged from 14.64 to 23.55 months in the high-risk group and 14.00 to 23.85 months in the low-risk group (see **Table 2**). The high-risk group had seven boys, and the low-risk group had five boys. Two-sample *t* tests were used to examine baseline group differences at the initial visit. They revealed no statistically significant differences between risk groups in age, $t(20) = 0.07, p = .94$; mother's education (a proxy for socioeconomic status), $t(20) = 0.32, p = .76$; number of ear infections, $t(20) = 0.72, p = .47$; or fine motor skills measured by the MSEL Fine Motor subtest, $t(20) = 0.64, p = .53$.

Performance was scored on phonetic inventory (number present: $M = 8.50, SD = 2.89, Range = 5-16$), CCT (number correct: $M = 16.72, SD = 6.85$), and raw MSEL scores (MSEL Receptive: $M = 17.41, SD = 3.92$; MSEL Expressive: $M = 17.23, SD = 1.99$). As seen in **Figure 1**, both receptive measures had larger ranges than expressive (MSEL Expressive Range = 14–21; MSEL Receptive Range = 13–27; CCT Range = 5–26). The high-risk group had a lower mean score on the CCT and a higher standard deviation ($M = 20.70, SD = 10.28$) than the low-risk group ($M = 23.10, SD = 7.86$), but these differences did not reach statistical significance, $t(20) = 1.19, p = .25$. This is not unexpected, since not all "at risk" children will go on to develop speech or language disorders.

Table 2
Participant Characteristics for all Infants, Grouped by Risk Category

Age (months)	Mother's education (years)	Reason for risk	Number of risk factors
14.64	15	Sibling/parent with SSD, male, birth order	3
15.00	16	Sibling with SSD, male, birth order	3
15.03	16	Sibling with DLD/parents with SSD, male, birth order	3
15.66	12	Sibling with DLD/SSD, birth order	2
15.69	18	Sibling with SSD, male, birth order	3
16.12	16	Sibling with SSD, preterm, birth order	3
17.57	16	Sibling with DLD/SSD, male, birth order	3
18.39	16	Sibling with SSD, birth order	2
19.97	16	Preterm, male, birth order	3
23.50	19	Sibling/family with DLD/SSD, male, birth order	3
23.55	16	Sibling with DLD, birth order	2
14.00	18		0
14.74	12	Male	1
14.84	16		0
15.39	20	Male	1
15.69	18		0
17.11	16	Birth order	1
18.75	18	Male, Birth order	2
19.14	16		0
19.47	16	Male	1
23.32	13		0
23.85	16	Male, Birth order	2

Note. SSD = speech sound disorder; DLD = developmental language disorder.

To examine concurrent validity across tasks, correlations were calculated between measures for each time point (**Table 3**), which revealed large, significant correlations between each pair. Correlations were also computed for measures between Time 1 and Time 2 to investigate predictive validity. These also revealed large, significant correlations between each pair (**Table 4**).

To further investigate prediction of 6-month language outcomes, a mixed-effects regression model with Kenward-Roger corrections was estimated for prediction

of performance on the expressive language subtest of the MSEL. Since there were multiple measures within subjects, a random intercept was included to capture inter-participant variability. We used backward step-wise selection to sequentially remove non-significant predictors: CCT score, age, risk, score on receptive subtest of the MSEL, and interaction between risk and CCT. There was no interaction, and CCT and score on the receptive subtest of the MSEL were the only significant predictors. All possible models from significant predictors were contrasted using Akaike

Figure 1

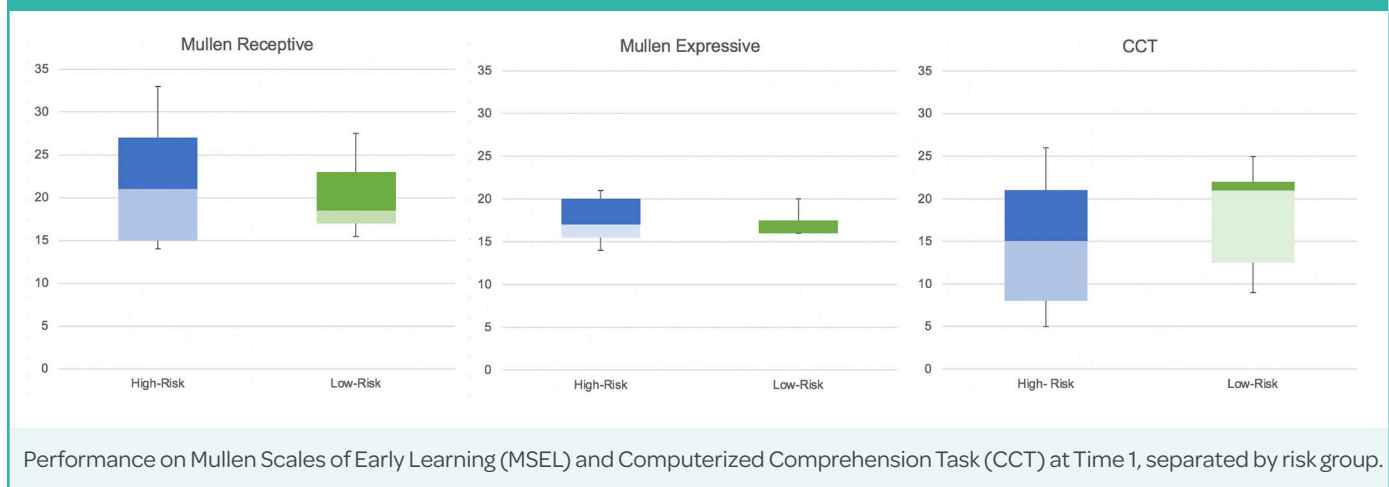


Table 3

Concurrent Validity of Speech and Language Measures at Time 1 and at Time 2

	Time 1 (<i>n</i> = 22)		Time 2 (<i>n</i> = 19)	
	Mullen Receptive	Mullen Expressive	Mullen Receptive	Mullen Expressive
Mullen Receptive	-			
Mullen Expressive	.755***	-	.606**	-
CCT	.771***	.752***	.674**	.650**

Note. CCT = Computerized Comprehension Task.
 ** $p < .01$ (2-tailed). *** $p < .001$ (2-tailed).

Table 4

Predictive Validity of Speech and Language Measures at Time 1 and at Time 2 (*n* = 19)

	T1 Mullen Receptive	T1 Mullen Expressive	T1 CCT
T2 Mullen Receptive	.532*	.570*	.466*
T2 Mullen Expressive	.776***	.807***	.778***
T2 CCT	.598**	.628**	.610**

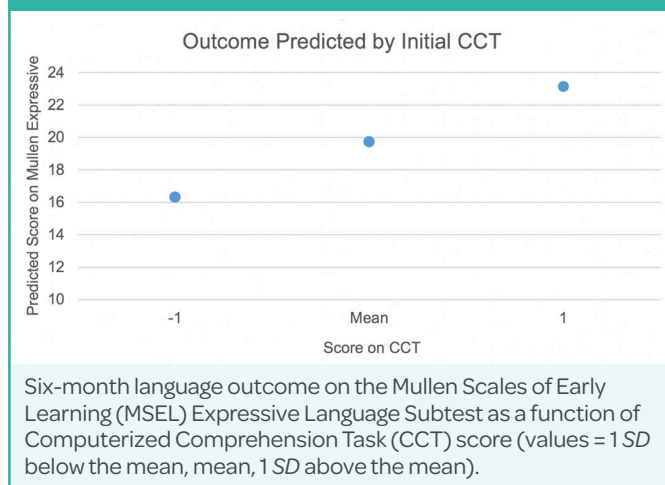
Note. T1 = Time 1; T2 = Time 2; CCT = Computerized Comprehension Task.
 * $p < .05$ (2-tailed). ** $p < .01$ (2-tailed). *** $p < .001$ (2-tailed).

Information Criterion (Posada & Buckley, 2004) to identify the most parsimonious model with the best fit. The lowest Akaike Information Criterion value (i.e., 212.59) was obtained for CCT and MSEL receptive scores; however, all three models were within one point of this value, so they cannot fully be distinguished in terms of fit.

Selecting the model with the lowest Akaike Information Criterion, the final model, $F(2, 36.83) = 29.32, p < .001$, included CCT, $B = 0.21, t = 2.26, p < .03$, and Mullen Receptive

score, $B = 0.34, t = 2.17, p < .04$. Proportion of the variance explained at the level of the person was 1.6×10^{18} and proportion of variance explained at the level of time was 1.4998. As seen in Figure 2, infants who score higher on the CCT, regardless of risk, score higher on expressive language 6 months later. Also, there is about a 7-point difference between model estimated expressive language scores for infants one standard deviation below the mean on the CCT and one standard deviation above the mean on the CCT 6 months prior.

Figure 2



Discussion

In this study, we sought to preliminarily investigate the concurrent and predictive validity of a clinically feasible direct assessment of comprehension in high-risk infants and their low-risk peers. Receptive language has been established as an effective means to assess early language abilities and is associated with later language outcomes, likely because it captures variability at an earlier time than tests of expressive language (Bornstein & Haynes, 1998; Feldman et al., 2000; Friend et al., 2012, 2019; Kuhl, 2009; Marchman & Fernald, 2008; Tsao et al., 2004). More specifically, direct assessment is reported to tap into infants' strong word-referent associations, which has more predictive power than indirect assessment (Friend et al., 2019).

Indirect assessments, like parental report measures, are hypothesized to reflect the full range of strong to weak word-referent associations, whereas decontextualized direct assessment preferentially gives insight to strong associations. Additionally, there is some bias associated with parent report (Feldman et al., 2000; Oliver et al., 2002). Our study provides preliminary evidence that direct assessment of comprehension is valid in high-risk infants. Correlations and mixed models revealed good concurrent and predictive validity of the CCT in this population (Post, 2016).

Our results revealed that CCT scores in our two groups (high-, low-risk) were not statistically significantly different, but that the CCT was a feasible task for both groups. Importantly, overall scores on the CCT were highly correlated with a standardized, well-established productive test of receptive language ($r = .77, p < .001$) and with a

typical, non-standardized phonetic inventory ($r = .75, p < .001$) for both low-risk and high-risk infants. Additionally, a mixed-effects model revealed that the CCT—not risk group or the interaction between risk and CCT—was significantly associated with expressive language, measured 6 months later.

Not only was the CCT highly associated with more established tests both concurrently and predictively, the CCT has an advantage over these measures since it is significantly faster, less expensive, and requires fewer manipulatives than the MSEL or eye-tracking assessment. Since this preliminary study had a small sample size, did not include blinding, had a wide range of ages, and had a limited longitudinal follow-up, its results (in isolation) should be interpreted with caution. However, when taken in the context of previous studies on the CCT completed by unrelated laboratories, it adds support to the validity of the CCT for direct measurement of receptive language in infants (Friend et al., 2019), and it provides initial data that supports further study of the CCT in high-risk infants.

Conclusion

This preliminary study revealed that the CCT has good concurrent and predictive validity in a sample of high-risk infants and matched low-risk peers. Future studies are warranted, and large-scale longitudinal data exploring both language and academic outcomes in low-risk and high-risk infants is needed to support this preliminary sample and to provide standardized scores for clinical utility.

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¹A model was also run where random effects were added for inter-item variability on the CCT, but this revealed no meaningful differences, so it is not reported here.

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Authors' Note

Correspondence concerning this article should be addressed to Rachel Hahn Arkenberg, Department of SLHS, Purdue University, West Lafayette, IN, United States, 47907. Email: hahn@purdue.edu.

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Using a Five-Step Logic Model Development Process to Design an Intervention for Adolescents With Developmental Language Disorder



Développement en cinq étapes d'un modèle logique pour concevoir une intervention destinée aux adolescents ayant un trouble développemental du langage

KEYWORDS

ADOLESCENTS

DEVELOPMENTAL
LANGUAGE DISORDER

INTERVENTION

LOGIC MODEL

COMMUNICATION SKILLS

Catherine Julien^{1,2}, Marie-Eve Lamontagne^{1,2}, Francine Julien-Gauthier², Marie-Catherine St-Pierre^{1,2}, and Chantal Desmarais^{1,2}

¹Centre interdisciplinaire de recherche en réadaptation et intégration sociale, Québec, QC, CANADA

²Université Laval, Québec, QC, CANADA

Catherine Julien
Marie-Eve Lamontagne
Francine Julien-Gauthier
Marie-Catherine St-Pierre
Chantal Desmarais

Abstract

A logic model is a graphical representation synthetically illustrating the links among resources, activities, results, and expected outcomes of a program. In recent years, the logic model has become a key tool in guiding the development and implementation of new interventions in several health science disciplines. In this study, the logic model was the first step in designing a new intervention program to improve the communication and social skills of adolescents with a developmental language disorder. This article presents the development of a five-stage logic model through a collaborative research process. It offers recommendations to stakeholders wishing to integrate the logic model in intervention development. We developed the logic model for the intervention with three participant groups: (a) adolescents with developmental language disorder ($n = 2$) and their parents ($n = 2$), (b) professionals in practice settings ($n = 9$), and (c) members of the research team ($n = 6$). Findings related to the facilitative processes and the challenges identified come from the analysis of scientific and clinical documents, notes taken during intervention workshops, research team meetings, discussions with the regional resource involved in schools, and three meetings with professionals working with adolescents with developmental language disorder. This article contributes to the existing body of knowledge on the method of logic model development by describing the processes that are specific to the development of a speech-language pathology intervention.

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Abrégé

Un modèle logique est une représentation graphique illustrant de façon synthétique les liens entre les ressources, les activités, les résultats et les impacts attendus d'un programme. Au cours des dernières années, le modèle logique est devenu un outil clé pour guider l'élaboration et l'implantation de nouvelles interventions dans plusieurs disciplines des sciences de la santé. Dans la présente étude, le modèle logique constituait la première étape de conception d'un nouveau programme d'intervention visant à améliorer les habiletés de communication et sociales d'adolescents ayant un trouble développemental du langage. Cet article présente les cinq étapes, effectuées dans un processus de recherche collaborative, ayant mené à l'élaboration d'un modèle logique. Il propose également des recommandations aux intervenants qui souhaiteraient intégrer un modèle logique pour le développement de leurs interventions. Trois groupes de participants ont participé au développement du modèle logique de l'intervention : (a) des adolescents ayant un trouble développemental du langage ($n = 2$) et leurs parents ($n = 2$), (b) des professionnels des milieux de pratique ($n = 9$) et (c) les membres de l'équipe de recherche ($n = 6$). Les constats relatifs aux processus facilitateurs et aux défis identifiés proviennent de l'analyse de documents de nature scientifique et clinique, de notes prises lors d'ateliers d'intervention, de réunions d'équipes de recherche, de discussions avec la ressource régionale impliquée dans les milieux scolaires et de trois rencontres menées auprès de professionnels travaillant avec des adolescents ayant un trouble développemental du langage. Cet article contribue au corpus de connaissances disponibles sur la méthode d'élaboration du modèle logique en décrivant les processus qui sont spécifiques à l'élaboration d'une intervention en orthophonie.

Logic Model in Speech-Language Pathology

When designing an intervention, a logic model (LM) can be used to formalize the underlying scientific and clinical foundations of the intervention. This methodological tool provides a framework for conceptualizing and planning the processes that support the implementation and evaluation of the intervention (Hayes et al., 2011). According to the Kellogg Foundation (2004),

a logic model is a systematic and visual way to present and share your understanding of the relationships among the resources you have to operate your program, the activities you plan, and the changes or results you hope to achieve. (p. 1)

It is a tool that integrates theoretical background and a shared vision among stakeholders about the problem to be solved, the targeted objectives, the activities to be put in place, and the expected outcomes. There are many LM designs, but the conceptualization and planning of LM processes are based on similar key components: resources needed, activities, outputs, outcomes (short-term), and impact (long-term; Kellogg Foundation, 2004).

LMs also follow an “if, then” logic. For example, *if* the identified resources are available, *then* activities can be facilitated. *If* the activities take place, *then* stakeholders can expect different outputs. *If* those outputs materialize, *then* the stakeholders can expect specific outcomes for the participants, and so on. Program modelling using an LM can therefore inform the scientific and clinical community about what a program is intended to do and how it intends to do it.

The development of an LM follows a systematic and iterative approach, meaning that stages involving back and forth exchanges with all stakeholders must be planned (Hayes et al., 2011). Guo et al. (2011) suggested a four-step development process of an LM. The first step is to (a) define the problem that the intervention program wishes to address; subsequent steps invite stakeholders to (b) identify the need for the intervention, (c) establish the main goal, and (d) outline the specific objectives and desired outcomes of the intervention. In other words, an LM follows a sequence of predetermined steps to which stakeholders are invited to contribute, ranging from the objectives of the program to the activities that make it up.

Throughout the development process, different levels of participation can be expected depending on the expertise and characteristics of the stakeholders involved (Schenkels & Jacobs, 2018). Because stakeholders are engaged at each stage, the use of an LM broadens the consultation processes beyond program managers or researchers (Peyton & Scicchitano, 2017). As such, the Strategy for Patient-Oriented Research of the Canadian Institutes of Health Research

(2011) strongly encourages researchers to collaborate with partners who are closely involved with the intervention (i.e., patients, caregivers, and families) to ensure that the intervention intended for them is in line with their needs. Therefore, the development of an LM is fully aligned with this strategy.

Currently, LMs are mainly reported to support intervention development and implementation in public health and acute health care settings (e.g., cancerology, obesity; Ball et al., 2017). Their use in rehabilitation, more precisely in the speech-language field, remains rare. An overview of the existing literature reveals that two studies in the speech-language research field used the LM elaboration guidelines that the Kellogg Foundation (2004; see also Guo et al., 2011; Wium et al., 2010) proposed.

Guo et al.’s study (2011) focused on the effect of an evidence-based ongoing training program targeting speech-language pathologists and audiologists that included an LM. At the end of the workshops, five of the program’s eight objectives were met. The authors concluded that this evidence-based ongoing training program, developed using an LM, was successful. Among the advantages of the LM, the authors emphasized the value of its flexible nature and the openness to various points of view that its elaboration imposes (Guo et al., 2011). The LM is developed within a perspective of co-construction, thus it is expected to evolve over time depending on the stakeholders’ (participants, clinicians, managers, etc.) responsiveness to the intervention.

Wium et al. (2010) used an LM as part of their study aimed at determining the value of a support program for speech-language pathologists working with educators to facilitate literacy and numeracy. The LM components (i.e., input, process, outputs, and outcomes) helped structure the qualitative data—collected from focus groups, a research diary, testimonials, and other research documents—through transcribing and coding the data according to the LM framework. Similar to Guo et al. (2011), Wium et al. used the LM as an instrument, from a methodological perspective only. As a result, the processes underlying the use of an LM in the field of speech-language pathology have remained poorly documented.

Researchers have identified several advantages to using the LM as a tool for developing an intervention. Developing the LM of an intervention creates multiple opportunities for all stakeholders involved to share opinions on the problem to be solved and the objectives and expected outcomes, as well as to decide on activities (Ball et al., 2017; Guo et al., 2011). Collaboration among stakeholders, which is at the heart of LM development, ensures that the LM is co-constructed (Kellogg Foundation, 2004). Finally, the LM’s

visual representation provides a quick overview of the key elements and details the different components of the program (Hayes et al., 2011; Kellogg Foundation, 2004). Although rare, the use of the LM as a tool for developing speech therapy interventions seems promising in terms of facilitating collaboration among stakeholders and supporting the elaboration of a shared representation of the intervention.

Using an LM to Provide a Shared Vision of an Intervention for Adolescents With Developmental Language Disorder

A systematic review indicated that few studies have examined the effectiveness of language intervention targeting adolescents with developmental language disorder (DLD; Cirrin & Gillam, 2008). Moreover, research rarely focuses on holistic communication and social skills of adolescents with DLD (Myers et al., 2011). Current single-case study interventions targeting adolescents mainly focus on a specific language skill (e.g., morphological awareness) or address a specific population (e.g., autism spectrum disorder or speech sound disorder; Reed, 2016; Turnbull & Justice, 2017). Research shows that adolescents with DLD are less skilled than their peers in holistic communication skills such as detecting others' communicative intents, responding appropriately to the topic of conversation, and engaging in decision making (Durkin & Conti-Ramsden, 2010). In turn, these difficulties mean that others are less likely to approach adolescents with DLD, thereby further limiting their social interactions. They also face challenges regarding socio-professional integration, as well as forming and maintaining social relationships (Conti-Ramsden & Botting, 2004; Durkin & Conti-Ramsden, 2007, 2010; Johnson et al., 2010; Mathrick et al., 2017; Smith, 2004; St Clair et al., 2011). This is worrisome because these characteristics contribute to the transition to adulthood and to overall quality of life.

The reported outcomes support the need to be proactive and to develop intervention programs aimed at enhancing the communication and social skills of adolescents with DLD (Starling et al., 2012). One research team recently published positive results of an intervention based on mock-interviews targeting communication and social skills for youth with DLD aged 17–19 (i.e., Mathrick et al., 2017). This supports the relevance of empowering adolescents with DLD in terms of holistic communication and social skills.

The fact that interventions intended for adolescents with DLD are rarely documented argues in favour of a structured intervention proposal adapted to them. Furthermore, the knowledge available about the use of the LM to plan and evaluate the impact of an intervention underscores

its relevance in this context. In this study, we present an application of the LM in the speech-language pathology field. This application began with the adaptation of a pilot intervention initially designed for a rehabilitation centre that was subsequently adapted for the secondary school setting. The intervention aims to enhance communication and social skills of adolescents with DLD.

The objective of this article is to describe the co-construction of the LM of an intervention for young adolescents with DLD following a five-stage development process involving different stakeholders. Inspired by the four-step model designed by Guo et al. (2011) and in accordance with the Patient-Oriented Research Strategy (Canadian Institutes of Health Research, 2011), the team wanted to take the consultation process a step further. Consequently, in this study, the fifth step in the LM creation is to engage all stakeholders in the development of activities. This article also aims to provide recommendations for speech-language pathologists wishing to use the LM in their practice.

Method

This study is part of a larger project entitled, "Improving the communication and social skills of adolescents with a developmental language disorder: Documenting implementation and measuring the effects of a new intervention in schools" (Desmarais et al., 2018–2022). The elaboration of the LM is the first phase of this project funded by the Social Sciences and Humanities Research Council of Canada. The project has received approval from the ethics review board of the Centre intégré universitaire en santé et services sociaux de la Capitale-Nationale, which is affiliated with Université Laval (2019–1551). Throughout its implementation, the intervention will be subject to continuous review to ensure a relevant evidence- and experience-based LM for implementation in other secondary schools at the end of the project. This continuous improvement process will be carried out through regular consultations with all stakeholders, communities of practice, and school staff.

Participants

Stakeholders at various levels must be engaged in the process of developing the current LM to ensure compliance with the co-construction criterion (Kellogg Foundation, 2004). More precisely, three categories of participants were involved in the five stages of the current LM ($N^{total} = 21$): (a) two adolescents with DLD and their parent; (b) professionals from practice settings (i.e., four speech-language pathologists, three teachers, two members of school boards, one occupational therapist, one guidance

counsellor); and (c) six research team members. The first two participant groups—adolescents with DLD and their parents, and professionals from practice settings—corresponding to a convenience sample, were recruited on a voluntary basis from the larger study sample through the partnerships established by the principal investigator for the main study. These participants had a consultative role and did not participate in the fall 2019 intervention because they were older (15 years old) than the targeted population (12–14 years old). They were invited to share their opinions about the components, but final decision making was left to the members of the research team (Jacobs, 2010; Pretty et al., 1995).

Procedures

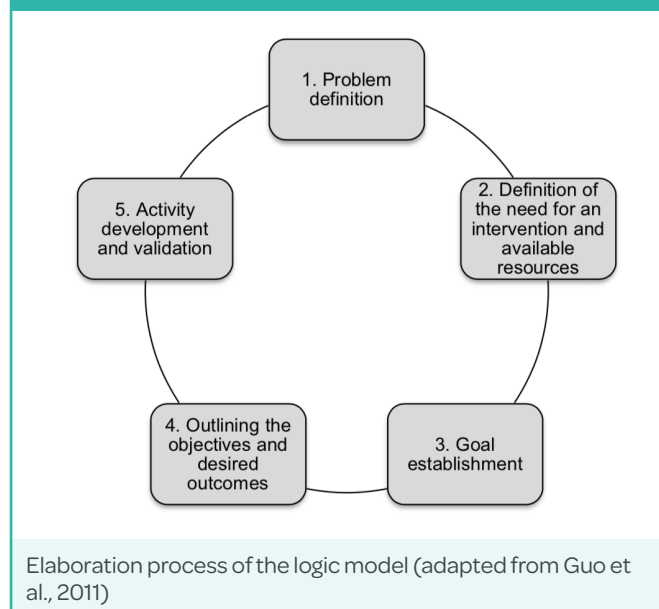
In this study, the five-stage development of the LM (illustrated in **Figure 1**), following a sequential and iterative process, is inspired from Guo et al. (2011).

Multiple sources of information form the body of data used for the development of the LM (see **Table 1**). First, document analysis includes the intervention program offered in a rehabilitation centre in the city of Québec. In addition, a literature overview was conducted in CINAHL and What Works to search for recent publications on interventions designed for adolescents with DLD. Second, field notes from research team meetings, observations of two workshops carried out at the rehabilitation centre for adolescents with DLD, discussions with the regional resources involved in school settings, meetings with school boards, and one meeting with adolescents and professionals (advisory committee) supplement the data collection. All field notes were taken by a postdoctoral fellow—a trained speech-language pathologist—and validated with the principal investigator. The meetings took place between January and August 2019. These meetings, held at the beginning of the intervention development process, promote collaborative work and communication because the people consulted were those who would be implementing the intervention. Field notes provided a personalized representation of the reality of each stakeholder (e.g., adolescents' interests, available resources, knowledge of professionals in the school team) with the goal of rendering the adaptation of the intervention relevant for all.

Results

The five stages of the LM elaboration process are reported as a narrative synthesis. For each stage of the process, we describe the facilitative aspects, the challenges that were faced, and the solutions put in place to overcome these challenges.

Figure 1



Stage 1: Defining the Problem

The results of the scientific literature and consultation meetings revealed two main issues to be addressed by the intervention. First, adolescents with DLD are less able than their typically developing peers to detect other people's attempts to communicate, to respond adequately to the subject of conversation, and to be involved in the decision making (Durkin & Conti-Ramsden, 2010). Together, these difficulties result in a reduced number of positive social relationships. Second, when asked about the choice of interventions to deploy, school personnel who work with these adolescents named three challenges to be solved: (a) the need to widen the scope of speech-language interventions (i.e., talking about social communication and not only oral language skills), (b) the need to support adolescents in their professional orientation, and (c) the need to promote young people's active learning with regard to social skills.

These components of the problem were shared with the members of the advisory committee. They were invited to validate and supplement these challenges with their own needs and experiences. In the end, they unanimously agreed with these statements. When asked about the form and substance of the definition of the problem, advisory committee members did not suggest any changes.

Some challenges arose during this first stage of the LM elaboration process. Indeed, during the advisory committee meeting the families voiced concerns about the diagnosis of their adolescent (associated difficulties, changing

Table 1**Data Used at Each Stage of the Elaboration Process**

Stages	Document analysis	Field notes
1. Problem definition	Literature review on communication and social skills difficulties of adolescents with DLD pilot intervention offered in a rehabilitation centre in Québec City	Interviews with speech-language pathologists specializing in adolescents with DLD Meeting with the advisory committee Meeting with regional resources Research team meetings
2. Definition of the need for an intervention and available resources	Literature review on school-based intervention programs specifically designed for adolescents with DLD	Interviews with speech-language pathologists specializing in adolescents with DLD Meeting with regional resources Meetings with school boards Research team meetings
3. Goal establishment		Meeting with the advisory committee Research team meetings
4. Outlining of the objectives and desired outcomes	Literature review on school-based intervention programs specifically designed for adolescents with DLD Documentation from the pilot intervention	Meeting with the advisory committee Research team meetings
5. Activity content development and validation	Rounds of revision of the intervention guide Documentation from the pilot intervention	Workshop observations Research team meetings

Note. DLD = developmental language disorder.

terminologies). The families also discussed their confusion about the trajectory of speech-language services in the health and social services system, which is not specific to the proposed intervention program. These challenges required the research team to reframe the issue to keep the focus on the problem at hand (i.e., the behaviours to be modified in the context of the proposed intervention). When the interventions were of a theoretical nature, such as the evolution of labels for the language disorder, research team members were able to respond to them. When participant interventions focused on aspects removed from the expertise of the research team, such as the trajectory of services at school, parents were invited to refer to the school speech-language pathologist.

Stage 2: Defining the Need for an Intervention Program and Identifying Available Resources

The analysis of the initial intervention guide brought to light the elements of the program, as implemented in a rehabilitation centre, that required adaptation for the purpose of implementation in a school environment (e.g.,

availability of human resources). Subsequent discussions with the school teams revealed significant variability in the availability of human resources. For example, one school decided that activities would be carried out by the speech-language pathologist and the special education technician, while the other school assigned this responsibility to language-class teachers.

In terms of research, this variability represents a challenge in documenting the effectiveness of the intervention because school personnel will likely have different backgrounds, even if they have received the same training as part of the implementation of the intervention. The variability of human resources also meant that the intervention guide had to be inclusive of various categories of personnel as activity facilitators.

Stage 3: Establishing the Goal

Insofar as the goal of the intervention had to be determined in relation to the problem and the needs identified, the participants were able to rapidly agree thereon. As in Stage 1, the research team submitted a

written proposal of the goal of the intervention to the various participants. It was decided by mutual agreement that the intervention should have the general objective of supporting the communication and socialization of adolescents with DLD. If the comments put forward concerned the wording rather than the meaning, no challenges were identified at this stage.

Stage 4: Outlining the Objectives and Desired Outcomes

Similar to Stage 3, the participants agreed on the specific objectives and expected outcomes of the intervention. The comments focused on the wording rather than the objectives in substance. Again, presenting the objectives in written form seems to have facilitated this stage.

Consequently, document analysis (i.e., initial intervention guide and summary review of the literature) highlighted five objectives of the intervention that were validated through the consultation with stakeholders: (a) improving the communication skills of adolescents with DLD, (b) improving the social skills of adolescents with DLD, (c) improving adolescents' self-knowledge of their strengths and difficulties, (d) improving practitioners' knowledge of the characteristics of adolescents with DLD, and (e) raising awareness among school staff about their educational practices with adolescents with DLD.

The members of the research team asked the participating parents of adolescents with DLD about the intervention activities. At this point in the consultation process, the parents mentioned that they would like to be informed about the content of the intervention program involving their children. However, in a research context where the team wishes to document the outcomes of an intervention on parents' perceptions of their child's abilities, it is necessary to limit potential confounding biases. Following a suggestion from parents, the research team produced an information brochure offering an overall description of the planned activities. This communication tool responds to parents' need for information in a format they suggested. It gives parents a general overview of what their children have worked on, without compromising the validity of future results.

Stage 5: Developing and Validating Activities

Document analysis (i.e., initial intervention guide and summary review of the literature) made it possible to identify the scientific evidence on interventions with adolescents with DLD to integrate into the proposed activities. Activities were mainly developed and adapted by two members of the research team who are speech-language pathologists. Two guiding principles governed the intervention in a cross-cutting fashion. The first principle

states that an effective intervention must ensure learning curve progress. In other words, the progress of each activity respects an explicit instruction approach integrating teaching, modeling, application, feedback, and synthesis (Bui et al., 2006). The second principle suggests that the learner be placed in a situation of explicit learning, which is most effective for school-aged students (Dollaghan & Kaston, 1986; Palincsar & Brown, 1984; Skarakis-Doyle, 2002). For example, the tutor clearly explains to the student that they will learn communication breakdown repair strategies, communication skills, and social skills. An additional principle to be applied in the intervention emerged from a meeting with the advisory committee: the adolescents with DLD wanted their teacher to actively participate in the activities; for example, by sharing personal memories or his or her responses to a questionnaire.

When a first version of the intervention guide was submitted for review, several participants wanted to comment on and review the proposed activities. This resulted in four rounds of revision of the intervention guide by outside experts (i.e., four speech-language pathologists, three teachers, one occupational therapist, and one guidance counsellor). The research team sent a personalized message to all professionals, targeted according to their area of expertise (e.g., guidance counsellor), inviting them to comment on the working document, but also to share their perspective as educators (e.g., on playfulness or activity relevance).

At each round of revision, we integrated modifications to improve the intervention guide before submitting it to another category of professionals for revision. Although the research team made the final decision, its members incorporated most of the comments. When this was not possible, they made sure to justify their decision based on solid theoretical grounds. The recognition of the expertise of each professional involved and the research team's openness to comments resulted in constructive and pertinent criticism. In addition, the fact that practise professionals were involved from Stage 1 of the development process meant that they were aware of the objectives of the intervention and the context in which it was implemented.

That said, the wealth of experience and perspectives that participants from various fields of expertise provided was a challenge in terms of streamlining the content of the final version of the intervention guide (McLaughlin & Jordan, 2015). Indeed, the research team was concerned with producing an intervention guide that details scientific underpinnings in lay language. Balancing popularization and scientific rigour was a guiding principle for advisory committee members throughout the review process.

Moreover, to the extent that the intervention was an adaptation of a previous pilot intervention conducted by one of the project partners, the research team valued transparency about the changes made to the initial design.

Discussion

This article aimed to describe the process of developing an LM of an intervention designed for young adolescents with DLD in a secondary school setting. Our experience shows that whereas co-constructing an LM is feasible and useful, both facilitators and obstacles are encountered in the process. Findings from the elaboration process of the LM led to the formulation of eight recommendations for speech-language pathologists wishing to use this tool in their practice. They stemmed from reflexive exchanges among research team members, in light of the available scientific knowledge, which took place after the advisory committee meetings.

Recommendations

After completing the five-stage LM elaboration process, we reflected on the field notes and on the decisions reached to produce the first version of the LM. This led us to outline recommendations for speech-language pathology research teams wishing to use LM development as a basis for formalizing and synthesizing the presentation of an intervention. These recommendations (see **Table 2**), aimed at limiting challenges and enhancing facilitators, are twofold: Level 1 recommendations correspond to a general reflection on the results, while Level 2 recommendations concern specifically the experience of developing an LM in the field of speech therapy.

Level 1 Recommendations

For Stage 1, the first broad recommendation is to focus on the target population and the context in which the intervention occurs. This can direct participants' feedback and expectations about the proposed

intervention. In addition, if the LM is intended for wider use than the research context in which it is implemented, we recommend that the various sections be written in a flexible and inclusive manner. This increases the likelihood that different environments adopt the intervention and that it will benefit a larger number of participants. In accordance with the fundamental principles of the LM, we recommend promoting a collaborative approach involving as many categories of stakeholders as possible (Canadian Institutes of Health Research, 2011; Kellogg Foundation, 2004). This will ensure that the LM and the resulting program are culturally appropriate for the setting and sustainable, and that results are relevant to participants (Canadian Institutes of Health Research, 2011). In the context of this research, time was an issue because we only had a few months to prepare the intervention. Our experience has shown the importance of identifying a person or a small group to make the final decision. However, the LM will evolve throughout the longitudinal project in which it is incorporated. Stakeholders will therefore be able to participate more actively in subsequent versions of the LM.

Finally, we encourage researchers working with speech-language pathologists to become familiar with the development of an LM as part of their study design. This method is useful in specifying the various components of a given program involving many stakeholders. This in turn implies accepting that the process of developing the LM may not be suited to a stringent study design such as a randomized controlled trial, where strict control over an intervention parameter is required. Co-construction with participants, which is inherent in the development of an LM, leads to the integration of their wishes. For example, it was necessary to find a compromise to meet the parents' desire to be informed of the specific content of the activities carried out with adolescents without introducing bias concerning their perspective on the evolution of communication skills. This may be incompatible with the

Table 2	
Summary of the Recommendations	
Level 1	Level 2
Focusing on the target population and the context	Developing a common language between speech-language pathologists and participants
Writing in a flexible and inclusive manner	Submitting proposals to stakeholders for Stages 1 to 3 (problem, needs, and objectives)
Identifying one person or a small group to make the final decision	Considering from the outset the resources available in the settings concerned
Accepting that the process of developing the LM might be limiting as part of a stringent study design	Recognizing the expertise of all stakeholders involved

Note. LM = logic model.

requirements of certain study designs, such as those where the judge must be blind to the experimental condition. Thus, it is important to acknowledge the limitations of implementing a co-constructed intervention, such as the introduction of potential confounding bias.

Level 2 Recommendations

For the problem definition stage, our first recommendation is to develop a common language between speech-language pathologists and participants. This includes developing shared terms to be used throughout the LM, such as the diagnostic labels encountered in speech-language pathology. Next, we recommend submitting proposals to stakeholders for Stages 1 to 3 (problem, needs, and objectives). In our case, this was an excellent starting point for discussions with adolescents, considering that their language difficulties limited their ability to spontaneously provide elements of discussion. More specifically, we recommend that these suggestions consider from the outset the resources available in the relevant settings, such as schools or educational services for children, which are also frequently subject to budgetary constraints. This makes it easy to collectively identify a problem or an objective that corresponds to a shared reality. Finally, since speech-language interventions are likely to become increasingly interdisciplinary (Breault et al., 2019; Institut national d'excellence en santé et en services sociaux, 2017), it is important to recognize the value of the expertise that all stakeholders, including teachers and educators, bring to the elaboration process. In addition, the ecosystem-based nature of the development of the individual calls for intervention in settings attended by adolescents, including school environments.

Clinical Implications

In clinical settings, speech-language pathologists must make a number of decisions, particularly about intervention methods (Selin et al., 2019). A range of factors influences this decision-making process, namely the patient's characteristics, the peculiarities of the workplace, and the characteristics of the speech-language pathologist (Selin et al., 2019). Our experience of co-constructing an LM in the field of speech-language pathology invites these professionals to extend this decision-making process to all stakeholders who are likely to be involved in the program, such as partner institutions and users and their families, from the input required through to the expected outcomes. Considering the benefits observed at all stages, the time dedicated to developing a shared vision and goals that make sense to all those involved cannot be underestimated.

As a concrete clinical outcome of this study, the LM is represented in the Appendix. It is expected that this example will provide a concrete tool for speech-language pathologists, as well as other rehabilitation professionals who wish to develop a program using the LM as a framework. Over the next 2 years, the intervention program presented in this article will be implemented with students with DLD from Québec secondary schools. The impact on the students as well as their experience and that of the school staff will be documented. This feedback will allow for the LM to be improved before publicizing the intervention program on a broader scale.

Limitations

Two main limitations of this study should be underscored. First, the study included a convenience sample and participants were therefore not randomly selected. However, the interest and availability of participants in the context of action research are decisive for the future implementation of such research and for the longer-term commitment to the intervention. Second, the LM resulting from this study nevertheless reflects choices we made at each stage of the process, and hence inevitably includes a degree of subjectivity. That said, incorporating the best available scientific evidence and consulting with all stakeholders at each step of the process minimizes subjectivity bias.

Conclusion

This study contributes to the existing body of knowledge in science implementation by applying an LM in the field of speech-language pathology. Findings from this elaboration process have resulted in the formulation of eight recommendations—some of which are general and some more specific to speech-language practice—to support speech-language pathologists in using an LM for intervention development.

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Authors' Note

Correspondence concerning this article should be addressed to Chantal Desmarais, Rehabilitation Department, Faculty of Medicine, Université Laval, 1050, Ave de la Médecine, Québec, QC, Canada, G1V 0A6. Email: chantal.desmarais@rea.ulaval.ca.

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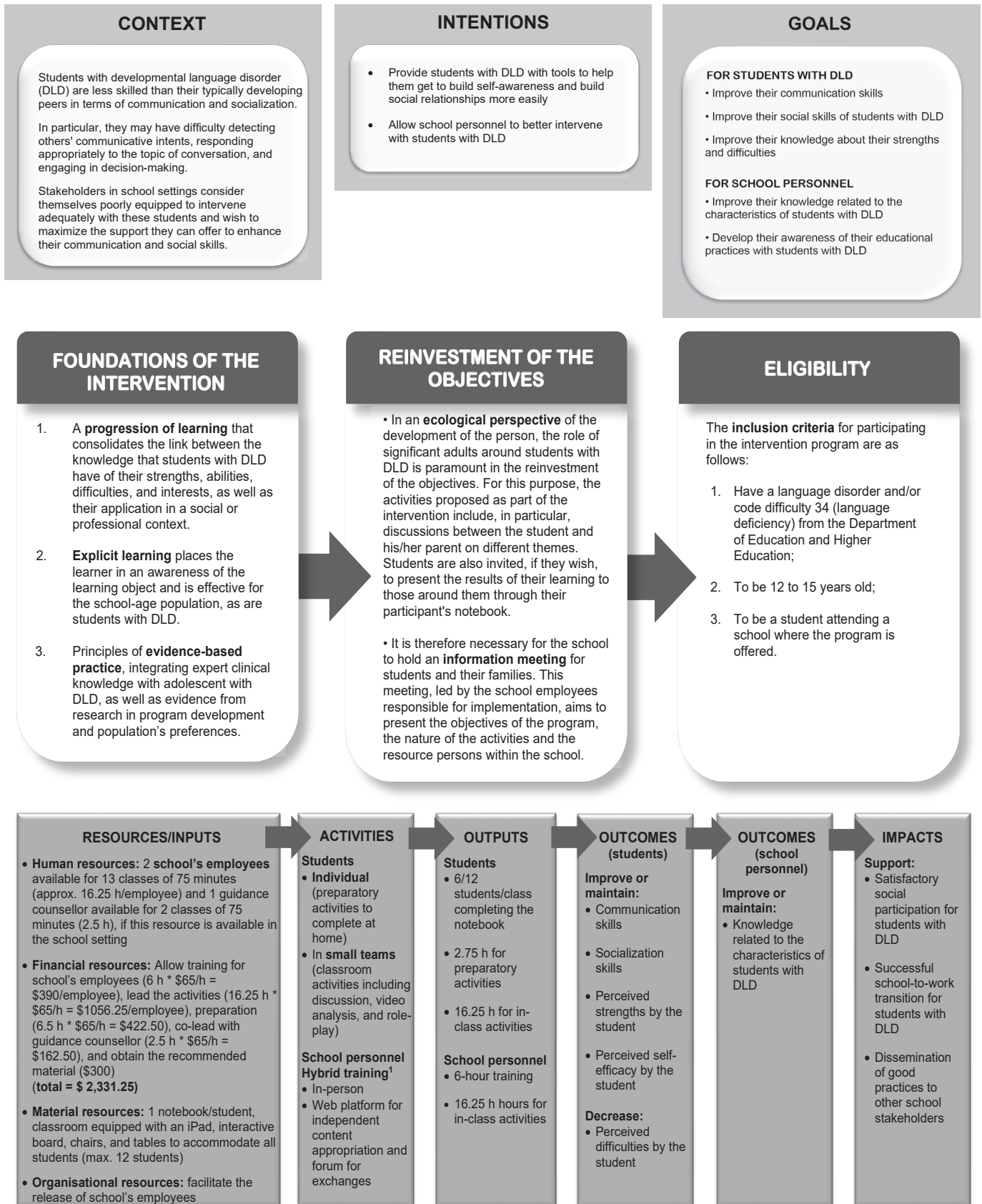
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Appendix

Logic Model of the Intervention





YouTube Videos on Voice Disorders: What can a Layperson Learn?



Les vidéos portant sur les troubles de la voix disponibles sur YouTube : ce que le grand public peut en retirer

KEYWORDS

YOUTUBE

VOICE DISORDERS

VOICE PROBLEMS

Dhanshree R. Gunjawate,¹
Rohit Ravi,¹ Monica L.
Bellon-Harn,² Abigail J.
Dueppen,² and Vinaya
Manchaiah²

¹Department of Audiology and
Speech Language Pathology,
Kasturba Medical College,
Mangalore, Manipal Academy
of Higher Education, Manipal,
Karnataka, INDIA

²Department of Speech and
Hearing Sciences, Lamar
University, Beaumont, TX, USA

Dhanshree R. Gunjawate
Rohit Ravi
Monica L. Bellon-Harn
Abigail J. Dueppen
Vinaya Manchaiah

Abstract

The primary aim of the current study was to examine the source, content, understandability, and actionability of information related to voice disorders in the most widely viewed YouTube videos. The secondary aim was to compare the difference in content, understandability, and actionability across the video sources. The terms “voice problem” and “voice therapy” were used to search and identify videos with top views on YouTube. Content of the top 50 most viewed and relevant videos was coded. Each video was rated for understandability and actionability using the Patient Education Materials Assessment Tool for Audiovisual Materials (Agency for Healthcare Research and Quality, 2013). The total number of views for the included videos was 5,474,432 and the total length of the videos was 4 hours 48 minutes. There was no significant difference in metadata including number of views, video length, thumbs up, and thumbs down across video sources. The video content mainly focused on signs and symptoms, causes, and vocal hygiene/home remedy. The understandability and actionability were found to be poor, which indicates that these videos may be of little value to consumers in managing their voice disorders. There is a need for developing videos with appropriate and evidence-based content as well as making them more understandable and actionable for self-management of voice disorders.

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Editor-in-Chief:

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Abrégé

L'objectif principal de la présente étude était d'examiner la source, le contenu, la compréhensibilité et l'application des informations portant sur les troubles de la voix disponibles dans les vidéos les plus visionnées sur YouTube. L'objectif secondaire était de comparer le contenu, la compréhensibilité et l'application des informations entre les différentes sources de vidéo. Les termes anglais « voice problem » et « voice therapy » ont été utilisés pour chercher et identifier des vidéos les plus regardées sur YouTube. Le contenu des 50 vidéos les plus pertinentes et ayant le plus de visionnements a été codé. La compréhension et l'application des informations ont été évaluées à l'aide de l'outil *Patient Education Materials Assessment Tool for Audiovisual Materials* (Agency for Healthcare Research and Quality, 2013). Les vidéos de notre échantillon ont été visionnées un total de 5 474 432 fois et la durée cumulée de ces vidéos est de 4 heures et 48 minutes. Il n'y avait aucune différence significative entre les vidéos concernant les métadonnées, ce qui incluait le nombre de visionnements, la durée des vidéos, le nombre de mentions « J'aime ce contenu » (pouce en l'air) et le nombre de mentions « Je n'aime pas ce contenu » (pouce vers le bas). Le contenu des vidéos portait principalement sur les signes et symptômes, les causes, l'hygiène vocale et les remèdes maison. Les scores de compréhensibilité et d'application se sont révélés faibles, ce qui suggère que ces vidéos seraient peu utiles aux individus qui cherchent à traiter leur trouble de la voix. La réalisation de vidéos abordant la prise en charge des troubles de la voix de façon autonome, dont le contenu est approprié, fondé sur des données probantes et plus compréhensible et applicable, répondrait à un besoin.

Voice disorders are frequent conditions with a prevalence of more than 15% of individuals diagnosed in the general population (Lyberg-Åhlander et al., 2019). Despite this prevalence, only a small proportion (i.e., 1–2%) report that symptoms occur to a great extent, whereas most respondents report symptoms to a small extent (Lyberg-Åhlander et al., 2019). It is likely that people with mild voice problems delay seeking professional services and rely on self-management. In a survey of occupational voice users, while most experienced voice symptoms, they rarely knew about professional services for vocal health (Lee, 2015). Professionals who use and depend on their voice, especially singers and teachers, commonly report voice problems (Byeon, 2019; Pestana et al., 2017). Like other health conditions, people with voice disorders are likely to use internet-based health information for various reasons including self-assessment of their condition, understanding treatment options, and self-management of the condition. However, variability in the accuracy and reliability of internet health information is noted (Sbaffi & Rowley, 2017).

Patient education materials can be evaluated across multiple dimensions including understandability, actionability, readability, suitability, and quality. Materials are understandable when users across diverse backgrounds and different levels of health literacy are able to process and describe the key messages. Materials are actionable when users across diverse backgrounds and different levels of health literacy can identify the action that can be taken based on the information (Agency for Healthcare Research and Quality, 2013). Readability refers to an objective measure of the reading skills needed to understand any reading material (Albright et al., 1996). Suitability refers to readability and understandability of content, graphics, and layout as well as whether the material stimulates learning, motivates action, and addresses diverse cultures (Doak et al., 1996). Quality refers to how well the information adequately informs the reader.

Dueppen et al. (2019) evaluated the readability and quality of internet-based information on vocal health, vocal hygiene, and prevention of voice disorders in English across 85 websites using the DISCERN tool, a tool designed to help consumers judge the quality of written material for treatment choices (Charnock et al., 1999). The information on these websites was found to be acceptable in terms of readability and quality. Also, Dueppen et al. (2020) studied the suitability of 77 websites and found them to have overall suitability based on results from the Suitability Assessment of Materials tool. The Suitability Assessment of Materials tool includes 22 items that measure readability and comprehension of content, literacy demand, graphics, typography and layout, learning stimulation and motivation, and cultural

appropriateness (Doak et al., 1996). On the contrary, an evaluation of 25 websites with information on treatment of vocal nodules reported very low quality, readability, and understandability based on results from the Patient Education Materials Assessment Tool (PEMAT; Agency for Healthcare Research and Quality, 2013) and DISCERN (Doruk et al., 2020). The PEMAT is a tool to systematically evaluate understandability and actionability of patient education material (Agency for Healthcare Research and Quality, 2013). An analysis of the 50 top websites of patient education materials on vocal fold paralysis for readability and understandability revealed a high level of readability but poor to adequate levels of understandability on the PEMAT (Balakrishnan et al., 2016). Taken together, these studies highlight the need for involving health care professionals in evaluating the content, understandability, and actionability of online material. Examining this information would help to disseminate and promote appropriate online information.

In recent years, there has been an increase in the use of social media for health information (Zhao & Zhang, 2017). Social media can be classified in multiple ways to reflect the diversity of platforms such as content communities (e.g., YouTube), collaborative projects (e.g., Wikipedia), social networking websites (e.g., Facebook), and virtual games (Kaplan & Haenlein, 2010). Consumers increasingly use social media as a means for gathering information, especially for health care concerns. Social media is rapidly changing the nature and speed of health care practices and interaction among individuals and health care providers. It is being increasingly used by the public, patients, and health care providers (Giustini, 2006; Moorhead et al., 2013). Surveys have revealed that eight out of 10 internet users accessed health related information (Atkinson et al., 2009; Rutten et al., 2006).

YouTube is a video sharing platform that allows users to view, upload, share, store, and comment on videos. Madathil et al. (2015) reviewed literature addressing health care information available on YouTube. They noted that YouTube is increasingly used as a platform for disseminating information on health. There is a high probability that a layperson may consider this information highly relevant. However, this information could be misleading and contradict reference standards. In a recent study, Bellon-Harn et al. (2020) examined the understandability and actionability of YouTube videos related to vocal health using the PEMAT. A review of 166 YouTube videos suggested adequate understandability and actionability scores. The study also showed that the videos consumers uploaded were superior to professional sources in actionability, but no difference was noted between video sources for understandability. These results are surprising because

it was expected that videos by professionals would be of higher quality than the other videos. The authors suggested that individuals with milder voice problems may be more likely to look for information pertaining to vocal hygiene and vocal health to prevent voice disorders. On the other hand, people with significant voice problems may seek health information on treatment and management of voice disorders.

The Bellon-Harn et al. (2020) study was limited to vocal hygiene. As such, information about videos related to voice disorder is needed. Based on the studies conducted so far, it is hypothesized that the YouTube videos on voice disorders would have appropriate content, understandability, and actionability for laypersons. The primary aim of the current study was to examine the source, content, understandability, and actionability of information related to voice disorders in the most widely viewed YouTube videos. The secondary aim was to compare the difference in content, understandability, and actionability across the video sources.

Method

The study used a cross-sectional design. No ethical approval was required because we did not collect any human participant data.

Video Selection and Metadata Extraction

We used the terms “voice problem” and “voice therapy” to search and identify videos with top views on YouTube. We selected these two search terms based on the Google trends—these search terms were more common than “voice disorders” and were more likely to have been used by lay users. The videos were categorized based on the most viewed videos using the above-mentioned search terms. We used a cutoff criterion of the top 50 most viewed and relevant videos because a viewer rarely views internet content beyond the initial few search results. After applying the inclusion criteria, 113 videos were not suitable for inclusion. Videos based on voice problems, vocal conditions, and voice therapy were included. We excluded videos for several reasons: audio/playback problems in online games ($n = 20$), speech and language therapy other than voice ($n = 55$), videos in languages other than English ($n = 15$), compilation videos ($n = 7$), and music/rhymes ($n = 16$). The top 50 most viewed and relevant videos were considered for the study. A predesigned Excel spreadsheet was used to extract basic data about the videos such as title, uniform resource locator link (URL link), upload date, video duration, number of views, numbers of likes (thumbs up) and dislikes (thumbs down), and video location.

Video Source and Content

Next, we identified and coded information and content in every video. The source from where the video was uploaded on YouTube was coded based on the following categories (a) television or internet channels (e.g., news channels, webpages, blogs), (b) organization (any professional body/organization), and (c) professional (e.g., singing teacher, singing/voice coach, therapist). The video content categories were determined based on the factsheet on *Hoarseness* (National Institute of Deafness and other Communication Disorders, 2011) and *Taking Care of Your Voice* (National Institute of Deafness and other Communication Disorders, 2017).

The categories for content coding included

1. Signs and symptoms: This included the signs and symptoms associated with voice problem or voice changes.
2. Causes: This included medical, non-medical, behavioural, phonotraumatic, neurological, or other causes of voice problems.
3. Risk factors: This included risk factors that could lead to voice problems.
4. Diagnosis: This included the diagnosis given for a voice disorder based on objective or subjective procedures.
5. Voice hygiene/home remedies: This included voice hygiene programs or home remedies for voice problems. Home remedies included any medication or agent with unproven effectiveness usually used without any professional prescription.
6. Medical/surgical management: This included any medical or surgical line of treatment for voice disorders. Names of any specific management options were noted.
7. Voice therapy: This included information on voice therapy techniques for voice disorders. Names of specific voice therapy techniques were noted.
8. Research/evidence-based practices: This included research or evidence-based practice related to voice disorders.

Evaluation of Understandability and Actionability

We rated each YouTube video for understandability and actionability using the PEMAT (Agency for Healthcare Research and Quality, 2013), which is comprised of 17 items.

Out of the 17 items, 13 are related to understandability and four are related to actionability. Within the understandability subsection, Items 12 and 19 were not included. Item 12 (i.e., the material uses visual cues such as arrows, boxes, bullets, bold, larger font, and highlighting) was not included because it is not applicable for video. Item 19 (i.e., the material uses simple tables with short and clear rows and column headings) was not included because no tables are included in videos. Within the actionability subsection, Item 25 (i.e., the material explains how to use the charts, graphs, tables, or diagrams to take actions) was not included because charts, graphs, tables, or diagrams are not present in videos. Each included item was to be scored 1 (*agree*), 0 (*disagree*), and NA (*no score as not applicable*).

To calculate percentages of understandability and actionability subscale scores, we divided the number of items which scored 1 (i.e., *agree*) by the number of items rated. Items that were identified as not applicable were not included in the calculation. For example, for a specific video, if 10 out of 13 items in the understandability subscale were rated and three were not applicable, the calculation would include 10 total items rated. Of the 10, if five items were rated as *agree*, the understandability score would be 50% (i.e., score of 5 from 10 items rated, $5/10 = 50$). The higher the percentage, the higher the understandability and actionability rating. Scores under 70% indicate that the information has poor understandability or actionability (Shoemaker et al., 2014). The primary author carried out the data coding and PEMAT rating. We randomly selected 20% of the videos ($n = 10$) and coded them to ascertain the inter-rater reliability.

Data Analysis

Statistical analysis was conducted using the IBM SPSS Software Version 22. The descriptive statistics were examined. Normality tests were performed on the videos' metadata (i.e., number of views, length of videos, thumbs up, and thumbs down) and Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT-A/V) understandability and actionability subscales. The visual examination of Q-Q normality plots and the Shapiro Wilk test suggested that all these variables violated the assumption of normality. Hence, non-parametric tests were used for further analysis.

The video content was coded using multiple binary variables (1 if the content was present and 0 if the content was not present). Interclass Correlation Coefficient was performed to examine the inter-rater reliability for PEMAT-A/V subscale ratings. The Kruskal-Wallis test was used to examine whether the metadata (i.e., number of views, length

of videos, thumbs up, and thumbs down) and PEMAT-A/V understandability and actionability subscales varied across the video source. Further, the Bonferroni post hoc test was used for pairwise analysis where significant differences between video source was found. Spearman's correlation was performed to examine the correlation between videos' metadata. A significance level of .05 was used for interpretation of results.

Results

We identified the top 50 most viewed videos on YouTube based on the predefined inclusion and exclusion criteria. Of these 50 videos, 22 were uploaded by different organizations (i.e., professional bodies/groups, hospitals, clinics, and singing studios), 17 were by professionals (laryngologists, voice therapists, and singers/singing coach), and 11 were from television or internet. **Table 1** provides descriptive statistics of the metadata. The total number of views was 5,474,432. The total length of all the videos together was 269.23 minutes (i.e., 4 hours 48 minutes). The duration of the shortest video was 54 seconds while the longest was 22 minutes 43 seconds. The total thumbs up/likes were 63,415, while thumbs down/dislikes were 2,771.

The Kruskal Wallis test was used to examine the metadata across video sources. There was no significant difference in metadata including number of views ($\chi^2 = 0.56, p = .75$), video length ($\chi^2 = 3.55, p = .17$), thumbs up ($\chi^2 = 1.32, p = .52$), and thumbs down ($\chi^2 = 0.88, p = .64$) across videos sources. The correlation between the different metadata measures was determined using Spearman's rank correlation coefficient. The number of views had a strong positive correlation with likes ($r_s = .72, p < .01$) and dislikes ($r_s = .84, p < .01$).

Video Content

The video content was identified and coded based on eight pre-determined themes. **Table 2** depicts the percentage of videos with respect to the content and chi-square analysis for the association between video source and content. Based on **Table 2**, 66% of videos included content related to signs and symptoms of voice disorders and 68% included content related to therapy. Only 10% of videos included content related to research or evidence-based practices. The organization-based videos included the greatest diversity of content across the different domains, compared to other sources.

Among the videos that included content related to voice therapy, 11 videos included information related to specific voice therapy techniques. These included Lee Silverman Voice Treatment ($n = 2$); resonant voice therapy ($n = 2$); and

Table 1							
Descriptive Statistics of Metadata in the 50 Most Viewed YouTube Videos on Voice Disorders by Their Source							
Source	<i>M</i>	Median	Min to Max	<i>SD</i>	<i>SE</i>	95% CI	Total
Number of views							
Television or internet	113,437	38,730	20,595 to 409,442	145,295	43,808	[15,827, 211,048]	5,474,432
Organization	99,933	39,533	19,610 to 468,357	107,798	22,982	[52,138, 147,728]	
Professional	119,298	60,183	21,682 to 431,738	117,532	28,505	[58,868, 179,728]	
All	109,488	117,801	76,009 to 142,967	117,801	16,659	[76,009, 142,967]	
Video length (mm:ss)							
Television or internet	7:36	6:56	1:44 to 22:43	5:97	1:80	[3:35, 11:38]	269:23
Organization	4:05	3:49	0:54 to 8:10	2:12	0:45	[3:11, 5:39]	
Professional	6:22	4:22	2:08 to 17:03	4:32	1:35	[4:20, 8:25]	
All	5:38	4:24	0:54 to 22:43	4:00	0:56	[4:24, 6:52]	
Thumbs up							
Television or internet	3,137	677	30 to 2,500	7,384	2,226	[-1,823, 8,098]	63,415
Organization	703	299	84 to 3,600	889	189	[308, 1,097]	
Professional	790	408	0 to 4,800	1,238	300	[153, 1,426]	
All	1,268	377	0 to 2,500	3,602	509	[244, 2,292]	
Thumbs down							
Television or internet	91	13	6 to 563	167	50.59	[-20, 204]	2,771
Organization	38	12	3 to 194	49	10	[16, 60]	
Professional	54	26	0 to 205	61	14	[22, 85]	
All	55	16	0 to 563	92	13	[29, 81]	

Note. CI = confidence interval.

one each on breathing exercises, vocal function exercises, laryngeal massage, redirected phonation, transgender voice therapy, vocal fold adductory exercises, and vocal warm-up.

Understandability and Actionability

The PEMAT-A/V scale was used to assess the understandability and actionability of the videos. The Interclass Correlation Coefficient for understandability

and actionability was .83 and .80 respectively, suggesting good inter-rater reliability. As noted in **Table 3**, in the understandability subscale, 94% of videos made the purpose evident and clear (Item 1) and 84% used common language that is easy to understand (Item 3). In addition, 84% of the videos did not provide a summary at the end (Item 11). Under the actionability subscale, 88% of the videos provided the listener with at least one action that could be

Table 2
Percentage of Videos Presenting Specific Theme Content in 50 Most Viewed YouTube Videos on Voice Disorders

Content	All	Television or internet	Organization	Professional	χ^2	<i>p</i>
Signs & symptoms	66	72.7	68.2	58.8	0.65	.72
Causes	46	63.6	50.0	29.4	3.40	.18
Risk factors	30	45.5	18.2	35.3	2.94	.23
Diagnosis	56	54.5	63.6	47.1	1.08	.58
Vocal hygiene/Home remedy	22	63.6	4.5	17.6	15.21	<.001
Medical surgical	22	36.4	18.2	17.6	1.69	.43
Therapy	68	54.5	81.8	58.8	3.50	.17
Research (Evidence-based practice)	10	0	13.6	11.8	1.60	.45

taken (Item 20). However, 72% of videos did not break down the action into manageable steps (Item 22).

Table 4 depicts the total scores for understandability and actionability subscales across the different video sources. The mean score for the understandability and actionability subscale was 59 and 54, respectively. These scores are indicative of poor understandability and actionability from the videos (Shoemaker et al., 2014). The Kruskal Wallis test revealed no significant difference in the understandability scores ($\chi^2 = 5.45, p = .07$) or the actionability scores ($\chi^2 = 5.36, p = .07$) between the different video sources.

Discussion

Social media is being used increasingly in health care both by professionals and laypeople (Smailhodzic et al., 2016; Ventola, 2014; Zhao & Zhang, 2017). Health care professionals may use social media for networking and to share health information. On the other hand, those with health conditions may use social media to seek health information. Recently, work examining YouTube information related to vocal health has been conducted (i.e., Bellon-Harn et al., 2020). The current study examined YouTube videos related to voice disorders, contributing to existing work evaluating online voice materials.

Easy access to the internet allows people to use the internet for quick searches about their health condition. YouTube videos are presented to users based on the search term used as well as their personal profile of previous search history. Although algorithms used to rank search

results are constantly changing, examination of metadata about YouTube videos provides useful insights about popularity and viewership engagement (Drozd et al., 2018; Gabarron et al., 2013). In the present study, organizations and professionals uploaded most of the videos (i.e., 78%). This was expected because consumers are likely to develop videos about vocal hygiene, as shown in the recent study, rather than voice disorders (Bellon-Harn et al., 2020). There was no difference in metadata between video sources. However, videos with a high number of views had high correlations with thumbs up and thumbs down as expected, because users will report the likability of videos only after watching them.

When examining the content of the videos, the current study revealed that most videos were based on signs and symptoms of voice disorders and therapy for voice disorders, followed by diagnosis. However, YouTube videos related to vocal hygiene, as noted in the recent study, were primarily educational and most of the content focused on tips and techniques for professional voice users (Bellon-Harn et al., 2020). Differences were expected since the nature of the videos was diverse and different consumers utilize the videos for varied reasons. These observations suggest that video content seems to be appropriate for the purpose for which the videos were created. Further, a high availability of content related to signs and symptoms of voice problems and therapy in the present study was noted.

Although the video content may be appropriate, the more important question is whether the content is accurate, the information is easy to understand, and if

Table 3					
Descriptive Statistics of the Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT-A/V) Items					
PEMAT-A/V Factors and Items			Frequency n (%)		
Factor	Item number	Item	Disagree	Agree	Not applicable
Understandability					
Content	1	The material makes its purpose completely evident.	3 (6)	47 (94)	0
Word choice & style	3	The material uses common, everyday language.	8 (16)	42 (84)	0
	4	Medical terms are used only to familiarize audience with the terms. When used, medical terms are defined.	39 (78)	11 (22)	0
	5	The material uses the active voice.	11 (22)	39 (78)	0
Organization	8	The material breaks or “chunks” information into short sections.	35 (70)	14 (28)	1 (2)
	9	The material’s sections have informative headers.	28 (56)	21 (42)	1 (2)
	10	The material presents information in a logical sequence.	14 (28)	36 (72)	0
	11	The material provides a summary.	42 (84)	7 (14)	1 (2)
Layout & design	13	Text on screen is easy to read.	2 (4)	18 (36)	30 (60)
Use of visual aids	14	The material allows the user to hear the words clearly (e.g., not too fast, not garbled).	10 (20)	37 (74)	3 (6)
	18	The material uses illustrations and photographs that are clear and uncluttered.	2 (4)	11 (22)	37 (74)
Actionability					
	20	The material clearly identifies at least one action the user can take.	6 (12)	44 (88)	0
	21	The material addresses the user directly when describing actions.	25 (50)	25 (50)	0
	22	The material breaks down any action into manageable, explicit steps.	36 (72)	14 (28)	0

Note. The Understandability subscale included 13 items, but Items 12 and 19 were not considered, while the Actionability subscale included four items, but Item 25 was not used. Items 2, 6, and 4 are for other subscales of the PEMAT-A/V.

engaging in these videos stimulate users to take action. The current study did not examine the accuracy of the video content, although it examined the understandability and actionability of YouTube videos using a standardized rating scale. The current study showed that the sampled videos were not adequate in terms of understandability and actionability and there was no difference based on video source. Regarding understandability, the videos

made their purpose evident. Although the videos used accessible language, medical terms were not defined. Items on the PEMAT-A/V related to organization indicated that the material was presented in a logical sequence. However, much of the video material was neither presented in short sections nor included summaries. Regarding actionability, some strengths were identified. Most videos did identify one action step; however, the videos did not break down

Table 4
Patient Education Materials Assessment Tool for Audiovisual Materials Scores Across Video Source Categories

Source	M	Median	Min to Max	SD	SE	95% CI
Understandability						
Television or internet	58.00	56	20 to 90	20.20	6.69	[43.08, 72.92]
Organization	67.18	67	44 to 100	17.20	3.66	[59.56, 74.81]
Professional	50.59	56	22 to 80	19.92	4.83	[40.35, 60.83]
All	59.52	56	20 to 100	20.28	2.86	[53.75, 65.29]
Actionability						
Television or internet	48.36	33	0 to 100	31.28	9.43	[27.35, 69.38]
Organization	65.18	67	33 to 100	26.32	5.61	[53.51, 76.85]
Professional	45.00	33	0 to 100	28.87	7.00	[30.16, 59.84]
All	54.62	50	0 to 100	29.23	4.15	[46.29, 62.95]

Note. CI = confidence interval.

actions into manageable steps. Overall, these results are not consistent with Bellon-Harn et al. (2020) who reported adequate understandability and actionability. Additionally, Bellon-Harn et al. found that consumer-developed and uploaded videos had significantly higher actionability when compared to professional videos.

Study Implications, Limitations, and Further Research

The findings of the present study provide valuable information to both consumers as well as professionals about the limits and benefits of available information on YouTube. It may also enable clinicians to understand the type of information a consumer has seen prior to visiting the voice therapist. The study was focused on the metadata, source, type of informational content, understandability, and actionability of YouTube videos related to voice disorders. However, it has some limitations. First, a major drawback is that the targeted context, purpose, and population in the videos was not considered. Second, some of these videos may have misinformation related to voice disorders. However, this was not considered in the current study and reliability was not obtained on type of informational content. Future studies can examine and quantify misinformation by mapping the content to the evidence base in the academic literature. Third, the PEMAT-AV was designed to be used by the general population and health professionals alike. The small number of raters in this study were faculty and graduate students with a background

in communication disorders. Consequently, they rated the videos with background knowledge. Future studies should include non-clinical individuals and professional voice users. Further, while the PEMAT-AV is a credible tool for rating the video content, the binary nature (yes, no) of the rating scale may not have captured the degree to which each element of understandability and actionability was met.

Conclusion

The current study examined the source, content, understandability, and actionability of information related to voice disorders in the most widely viewed YouTube videos. There was no significant difference in metadata including number of views, video length, thumbs up, and thumbs down across video sources. The video content was mainly comprised of signs and symptoms, causes, and vocal hygiene/home remedy with over 60% of videos including these elements. The understandability and actionability were found to be poor, indicating that these videos will be of little value to consumers in managing their voice disorders. There is a need for developing videos with appropriate and evidence-based content that are more understandable and aimed at promoting self-management of voice disorders.

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Authors' Note

Correspondence concerning this article should be addressed to Rohit Ravi, Department of Audiology and Speech Language Pathology, Kasturba Medical College, Mangalore, Manipal Academy of Higher Education, Manipal, Karnataka, India, 575001. Email: rohitravi94@gmail.com.

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Inventaire des structures syllabiques chez l'enfant francophone : un outil pour planifier l'intervention en dyspraxie verbale



Syllabic Structures Inventory for Francophone Children: A Tool for Intervention Planning in Childhood Apraxia of Speech

MOTS-CLÉS

DYSPRAXIE VERBALE

STRUCTURES SYLLABIQUES

ÉVALUATION

PLAN D'INTERVENTION

Nathalie Aubry,¹ Isabelle Bissonnette,¹ Sophie Raymond,¹ Marc Perron¹ et Louise Duchesne²

¹Centre intégré universitaire de santé et services sociaux de la Capitale-Nationale, Québec, QC, CANADA

²Université du Québec à Trois-Rivières, Trois-Rivières, QC, CANADA

Centre interdisciplinaire de recherche en réadaptation et intégration sociale, Québec, QC, CANADA

Nathalie Aubry
Isabelle Bissonnette
Sophie Raymond
Marc Perron
Louise Duchesne

Abrégé

Cet article a pour but de présenter un nouvel outil qui a été conçu pour évaluer de façon approfondie la production des structures syllabiques des enfants qui ont une dyspraxie verbale. L'outil d'évaluation décrit dans la présente étude, soit l'*Inventaire des structures syllabiques chez l'enfant francophone*, comprend plus de 190 mots qui permettent d'évaluer de manière spécifique et exhaustive la production des différentes structures syllabiques du français, dans le but de soutenir l'élaboration de plans de traitement individualisés pour les enfants francophones âgés de 3 à 6 ans qui ont une dyspraxie verbale. Nous avons effectué une étude qui décrit le processus de sélection des items de l'inventaire. En effet, il fallait inclure une large variété de structures syllabiques et bien représenter chaque mot cible par une image simple à reconnaître. Il fallait aussi que les mots sélectionnés correspondent au niveau de développement linguistique attendu chez des enfants âgés de 3 à 6 ans. D'abord, un comité d'expertes (orthophonistes) a donné son opinion sur l'outil (représentativité iconographique et choix des mots). Puis, l'inventaire a été administré à un groupe de 74 enfants ayant un développement typique âgés de 3 à 6 ans afin d'établir un taux de reconnaissance des images. Les résultats montrent globalement que l'outil propose des mots cibles adaptés au niveau de vocabulaire de jeunes enfants. Cet outil novateur se révèle donc adéquat pour l'élaboration de plans de traitement individualisés pour les enfants de 3 à 6 ans qui ont une dyspraxie verbale.

Rédacteur :
Stefano Rezzonico

Rédacteur en chef :
David H. McFarland

Abstract

The purpose of this article is to present a new tool that we designed to comprehensively test the production of various syllable structures in children with childhood apraxia of speech. The tool described in this study is the Syllabic Structures Inventory for Francophone Children [*Inventaire des structures syllabiques chez l'enfant francophone*]. The tool includes more than 190 words that allow for specific and exhaustive assessment of different syllable structures in French. The purpose of the tool is to support individualized intervention planning for French-speaking children with childhood apraxia of speech aged 3 to 6 years. We conducted a study to describe the selection process of the items included in the tool as it needed to include a large variety of syllable structures, recognizable images needed to accompany all target words, and selected words needed to correspond to 3- to 6-years-olds' expected level of language development. First, an expert committee of speech-language pathologists provided feedback on the tool (iconographic representativeness and choice of words). We then administered the tool to 74 typically developing children aged 3 to 6 years to determine the proportion of recognized words. Overall, the results show that the inventory's target words correspond to the vocabulary level of young children. This innovative tool is thus adequate for planning individualized treatment for 3- to 6-years-olds with childhood apraxia of speech.

La dyspraxie verbale est un trouble neuromoteur affectant le développement des sons de la parole. Ce trouble se caractérise par une difficulté à planifier et à programmer les mouvements qui sont nécessaires à la production des sons et à leur enchaînement (Caruso et Strand, 1999; Davis et al., 1998). Ceci mène à des erreurs dans la production de la parole et à des difficultés prosodiques (Shriberg et al., 2012). La dyspraxie verbale affecte significativement la capacité de l'enfant à produire les gestes moteurs nécessaires à la réalisation des phonèmes et des syllabes, ainsi qu'à combiner ces mêmes gestes pour produire des mots et des phrases. Ce trouble entraîne une diminution importante de l'intelligibilité chez les enfants qui en sont atteints (American Speech-Language-Hearing Association, 2007; Caruso et Strand, 1999; Davis et Velleman, 2000). Les enfants ayant une dyspraxie verbale ont d'ailleurs un risque accru de présenter des problèmes persistants sur le plan du langage expressif et des bases phonologiques nécessaires à l'apprentissage de la lecture et de l'écriture (Gillon et Moriarty, 2007; Lewis et Ekelman, 2007). Enfin, la dyspraxie verbale a des répercussions importantes sur la participation sociale, particulièrement en ce qui concerne la capacité à tenir une conversation et à participer aux activités d'apprentissage scolaire (Sylvestre et al., 2013).

La prévalence de la dyspraxie verbale demeure difficile à établir en raison du défi que pose le diagnostic (Duffy, 2013). En effet, selon les écrits scientifiques, les indices qui permettent de conclure à une dyspraxie verbale peuvent être différents (American Speech-Language-Hearing Association, 2007) et/ou partager certaines similarités avec d'autres troubles des sons de la parole¹ de degré sévère (Strand et McCauley, 2008). Par conséquent, il peut être ardu pour un clinicien de départager la dyspraxie verbale des autres troubles des sons de la parole (Charron, 2015; Murray et al., 2015; Strand, 2017). On estime néanmoins que la dyspraxie verbale toucherait environ un enfant sur 1000 dans la population en général (Shriberg, Kwiatkowski et Mabie, 2019) alors que la prévalence se situerait à environ 4,3% dans des populations d'enfants ayant des troubles neurodéveloppementaux (Shriberg, Strand et al., 2019).

Plusieurs des indicateurs de ce trouble font toutefois consensus dans la communauté scientifique et incluent des indicateurs développementaux (p. ex. quantité et qualité du babillage réduites; Charron, 2015; Strand, 2017), suprasegmentaux (p. ex. voix monotone), segmentaux (p. ex. erreurs touchant les voyelles) et syllabiques (Charron, 2015, Shriberg et al., 2012; Strand, 2017). Ce dernier type d'indicateurs est fréquent et, tel qu'indiqué dans Charron (2015), inclut : 1) la simplification de la structure syllabique,

2) l'augmentation des erreurs avec l'allongement des mots et des séquences de sons, 3) l'inconstance des productions, 4) la présence d'erreurs qui complexifient le mot, 5) le tâtonnement (c.-à-d. des essais et erreurs dans la recherche du bon mouvement articulatoire) et 6) le maintien de la structure syllabique, mais une simplification des phonèmes (p. ex. assimilations, réduplications, harmonisations vocaliques ou consonantiques). Les indicateurs au plan syllabique ont une importance capitale dans l'établissement du diagnostic de dyspraxie verbale puisque ce sont souvent ces indices qui prédominent dans le tableau clinique de l'enfant dyspraxique (Charron et MacLeod, 2010). Étant donné la complexité de ce trouble, il est nécessaire de réaliser un examen approfondi des patrons d'erreurs de l'enfant afin de bien établir le profil des capacités et incapacités liées à la parole en vue de sélectionner les objectifs appropriés et d'orienter adéquatement l'intervention orthophonique. Le choix des objectifs de traitement est en effet un élément critique de l'intervention orthophonique en troubles des sons de la parole. Kamhi (2006) indique d'ailleurs qu'il s'agit de l'une des décisions les plus importantes qu'un clinicien doit prendre dans sa pratique. Or, au-delà de l'identification de la dyspraxie verbale, les outils d'évaluation actuels ne permettent pas de soutenir l'orthophoniste dans la sélection des objectifs d'intervention.

Évaluation des sons de la parole

En clinique, les orthophonistes qui désirent évaluer les productions orales d'un enfant de manière approfondie utilisent des moyens variés. Plus spécifiquement, l'examen des structures et des praxies, incluant les diadococinésies, permet notamment d'apprécier la vitesse et la précision des mouvements des articulateurs. D'ailleurs, pour plusieurs, ces éléments devraient faire partie de toute évaluation de la parole (Murray et al., 2015; Peña-Brooks et Hegde, 2007). Les autres moyens les plus souvent employés incluent le corpus de parole spontanée et le bilan phonologique (Gordon-Brannan et Weiss, 2007; Peña-Brooks et Hegde, 2007; Strand et al., 2013). Le corpus de parole est particulièrement utile pour analyser l'effet de l'allongement des séquences de sons sur la justesse des productions de l'enfant et pour relever les indicateurs prosodiques de la dyspraxie verbale. Toutefois, puisque les cibles ne sont pas contrôlées, l'inventaire des structures syllabiques demeure très souvent incomplet. Enfin, la passation d'un bilan phonologique peut permettre d'évaluer la capacité de l'enfant à produire des mots de différentes longueurs, mais ce type d'outil n'est généralement pas conçu dans le but spécifique de dresser l'inventaire des structures syllabiques pouvant être produites par l'enfant (Lewis et

¹Nous utilisons ici le terme *trouble des sons de la parole* comme équivalent francophone de *speech sound disorders*.

al., 2004). En effet, dans un bilan phonologique, différentes structures syllabiques sont représentées mais avec un nombre insuffisant d'exemplaires pour chaque structure, ce qui ne permet pas d'effectuer une analyse exhaustive. Les épreuves les plus souvent utilisées en français incluent habituellement une trentaine de stimuli qui sont en majorité des mots mono- et bisyllabiques qui ne cernent pas l'ensemble des contextes phonétiques et ne comportent pas différentes longueurs de mots (voir MacLeod et al., 2014; Rvachew et al., 2013).

Actuellement, il existe deux outils de dépistage des troubles des sons de la parole en langue franco-québécoise : l'*Évaluation sommaire de la phonologie chez les enfants d'âge préscolaire* (MacLeod et al., 2014) et le *Test de dépistage francophone de phonologie* (Rvachew et al., 2013). Notons qu'une version longue de cet outil, le *Test francophone de phonologie* (Paul, 2009), comporte 54 items représentatifs de la distribution des sons, syllabes et longueurs de mots dans la langue franco-québécoise. Cet instrument diagnostique a été conçu pour évaluer la justesse de la production des consonnes et voyelles dans le but de déterminer la nature du trouble et de soutenir le choix des objectifs de traitement (Rvachew et al., 2013). Cet outil demeure toutefois sous-utilisé en clinique et, malgré son utilité pour élaborer un plan de traitement, le nombre de cibles évaluées reste insuffisant.

Or, tant l'*Évaluation sommaire de la phonologie chez les enfants d'âge préscolaire* que le *Test de dépistage francophone de phonologie* ont pour objectif de dépister les enfants à risque de présenter un trouble des sons de la parole, et non pas d'évaluer en profondeur les capacités de l'enfant à produire les sons dans de nombreuses structures syllabiques. Par conséquent, les outils de dépistage actuels ne sont pas suffisants pour faire l'évaluation approfondie des capacités de l'enfant à produire différentes structures syllabiques en français et, surtout, pour permettre d'élaborer un plan de traitement adapté à chaque usager des services d'orthophonie.

La présente étude

Toutes ces considérations ont mené un groupe d'orthophonistes expérimentées en dyspraxie verbale à créer un outil, soit l'*Inventaire des structures syllabiques chez l'enfant francophone* (ISSEF), qui vise à évaluer de manière approfondie et exhaustive la production de différentes structures syllabiques possibles en langue franco-québécoise chez les enfants ayant une dyspraxie verbale suspectée ou confirmée. L'aspect novateur de l'ISSEF provient du fait qu'il a été conçu pour faire ressortir les indicateurs de la dyspraxie au plan syllabique. Ainsi, les

mots cibles ont été choisis en fonction de leur pertinence et ont été classés selon les différentes structures syllabiques, allant des structures les plus simples (p. ex. CV) aux plus complexes (p. ex. CCV.CV.CVC). Chaque section de l'outil contient un nombre élevé de stimuli pour permettre l'évaluation dans une grande variété d'environnements phonétiques, et ce, afin de concevoir un plan de traitement individualisé. Le fait d'avoir plusieurs cibles différentes pour chaque structure syllabique permet d'établir un profil complet des forces et difficultés de chaque enfant.

Pour créer l'inventaire, le groupe d'orthophonistes a sélectionné un nombre élevé de mots en fonction de plusieurs critères. D'abord, les orthophonistes ont veillé à ce que les mots choisis soient représentatifs de plusieurs structures syllabiques différentes que l'on retrouve dans la langue franco-québécoise en incluant des cibles de longueur et complexité variées. Les structures syllabiques ont été choisies à partir des formes syllabiques permises dans la phonologie du français (Rose et Wauquier-Gravelines, 2007). Les orthophonistes ont ainsi pris soin d'inclure de nombreuses cibles contenant des groupes consonantiques et des consonnes en position finale de syllabe. Puis, elles ont intégré des configurations articulatoires variées afin d'évaluer leur impact sur les productions de l'enfant. Parmi les cibles choisies, certaines procurent un environnement articulatoire facilitant (p. ex. une consonne antérieure suivie d'une voyelle antérieure, comme dans /ma/) et d'autres sont d'un niveau de difficulté plus élevé (p. ex. un groupe consonantique composé d'une bilabiale suivie d'une fricative uvulaire, comme dans [bʁ]). De plus, les orthophonistes ont choisi des mots cibles correspondant au niveau de vocabulaire attendu chez les enfants âgés de 3 à 6 ans. Enfin, les cibles choisies devaient être faciles à illustrer. Les images ont été créées par un illustrateur professionnel afin de s'assurer de leur qualité et de pouvoir y apporter des modifications au besoin. Au moment de la tenue du premier volet de l'étude, l'instrument était constitué de 194 mots à présenter à l'enfant sous forme d'images à nommer, ordonnés de façon hiérarchique, c'est-à-dire en fonction de la complexité croissante des structures syllabiques et de la longueur des mots.

La présente étude porte sur le processus de sélection des items de l'ISSEF. Plus spécifiquement, l'objectif de cette étude était d'évaluer l'exhaustivité des items (c.-à-d. le fait que les items incluent une large variété de structures syllabiques présentes dans la langue franco-québécoise), la représentativité des images sur le plan visuel (c.-à-d. le fait que l'image représente bien le mot cible) et l'adéquation entre la sélection des mots et le niveau attendu de développement linguistique des enfants âgés de 3 à 6 ans, soit la population cible de l'outil.

Deux groupes de participants ont contribué à réaliser les objectifs. Le premier groupe était un comité d'expertes (orthophonistes) qui ont examiné et évalué plusieurs aspects de l'outil à partir de leur expérience clinique (volet 1). Le second groupe de participants, à qui l'inventaire a été administré dans le but de confirmer les résultats obtenus lors du volet 1, était composé de 74 enfants âgés de 3 à 6 ans ayant un développement langagier typique. De plus, nous voulions vérifier si l'âge chronologique avait un effet sur la connaissance des mots cibles. Le volet 2 a également permis d'établir les conditions d'utilisation de l'outil et celles-ci ont été consignées dans un manuel de passation.

Considérations éthiques

L'étude a reçu l'approbation du comité d'éthique de la recherche du Centre intégré universitaire de santé et services sociaux de la Capitale-Nationale (#2015-452). Les participants des deux volets ont signé un formulaire de consentement (orthophonistes et parents des enfants).

Volet 1 : Consultation d'expertes

Méthodologie

Participants

Pour la réalisation du premier volet de cette étude, nous avons constitué un groupe de cinq orthophonistes expertes. Les personnes recherchées devaient posséder un minimum de 5 ans d'expérience de travail auprès d'enfants âgés de 3 à 6 ans ayant des troubles de la parole et du langage. Toutes les orthophonistes des programmes

« Développement de l'enfant » et « Déficience du langage » du Centre intégré universitaire de santé et services sociaux de la Capitale-Nationale (environ 25 orthophonistes) ont été sollicitées par courriel pour participer au projet de recherche. Les orthophonistes qui ont manifesté un intérêt à participer au projet de recherche ont été sélectionnées² en fonction de l'ordre de réception des réponses obtenues par courriel. Le **tableau 1** présente les caractéristiques de huit orthophonistes au total qui ont participé au volet 1 ou à une étape subséquente qui avait pour but de discuter des modifications des images ayant obtenu un faible taux de reconnaissance par les enfants (voir le volet 2).

Procédure de collecte des données

Dans un premier temps, les expertes ont complété un questionnaire élaboré par les responsables du projet de recherche. Ce questionnaire visait à recueillir leur opinion sur l'outil à l'aide des questions suivantes : « Est-ce que le nombre de stimuli total est adéquat? », « Est-ce que le nombre de stimuli pour chacune des structures syllabiques est adéquat? » et « Est-ce que l'ordre de présentation des différentes structures syllabiques est adéquat? » Les expertes devaient aussi se prononcer sur la représentativité iconographique (capacité de l'image à bien illustrer le mot cible) de même que sur le choix des mots (adéquation avec le niveau de développement linguistique attendu pour des enfants âgés de 3 à 6 ans). Pour chacun des 194 stimuli, les participantes devaient répondre par « oui » ou « non » aux deux questions suivantes : « Est-ce que l'image représente bien le

Tableau 1

Informations sur les orthophonistes expertes qui ont participé au volet 1 et/ou à l'évaluation des images pour lesquelles les enfants (volet 2) avaient obtenu de faibles scores

Initiales (fictives)	Années d'expérience auprès des enfants	Champ d'expertise clinique principal
MI	15	langage
AM	20	langage
DN	14	parole
CL	30	parole
FC	8	langage
PJ	23	parole
MN	13	langage
SC	25	parole

²Le féminin est utilisé pour parler des orthophonistes expertes, car celles-ci étaient toutes des femmes.

stimulus? » et « Est-ce que, selon vous, ce mot fait partie du vocabulaire expressif d'un enfant âgé de 3 à 6 ans? ». Enfin, les répondantes avaient la possibilité d'ajouter des commentaires afin de préciser leurs réponses.

Traitement des données

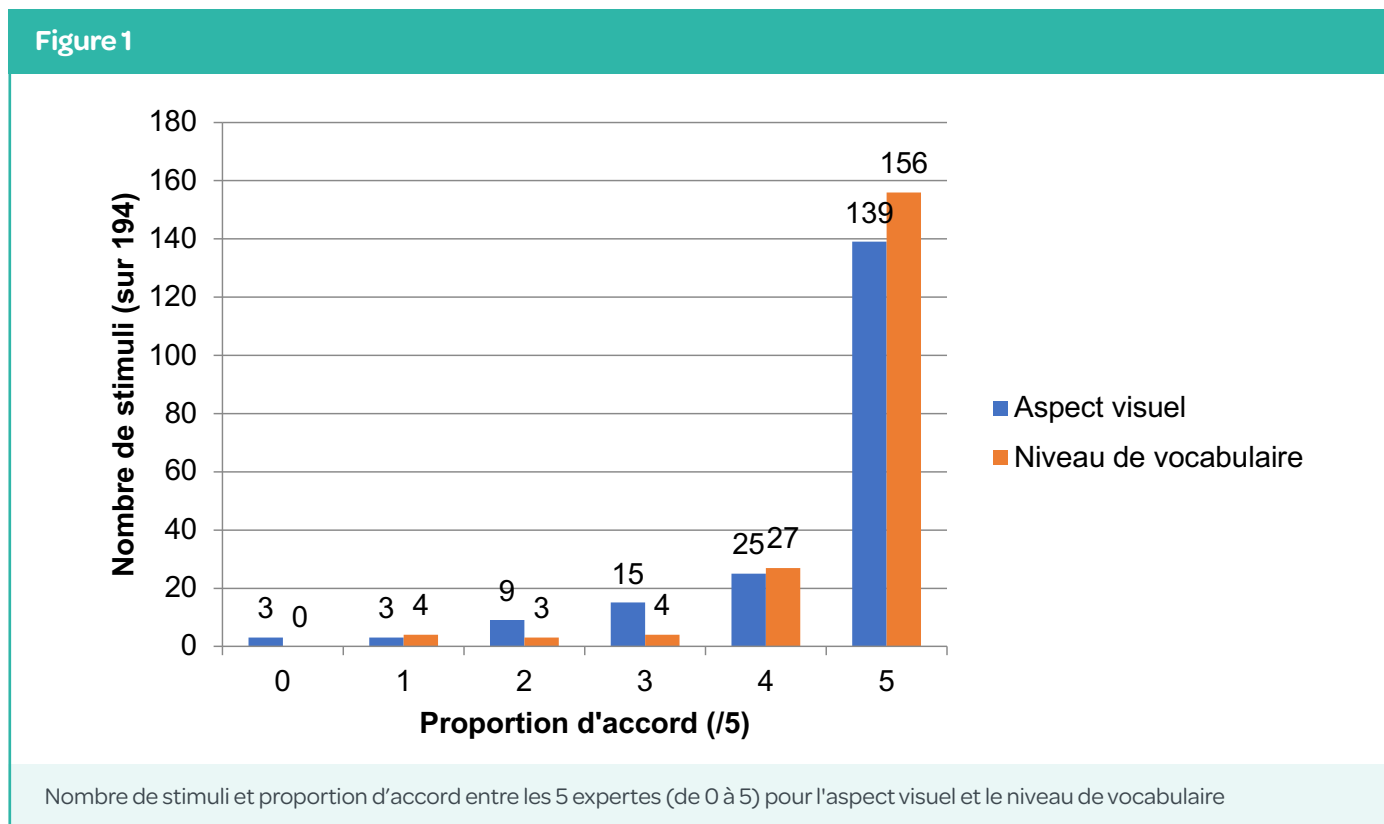
Nous avons compilé et analysé les données recueillies afin d'apporter des modifications éventuelles à l'ISSEF avant le déploiement du second volet. Pour chacune des questions, une note de 1 a été accordée à un « oui » et une note de 0 à un « non », ce qui a permis d'établir la proportion d'accord des cinq répondantes pour chaque item. Tous les stimuli qui avaient obtenu une proportion d'accord de 4/5 et 5/5 n'ont pas été modifiés. Les items pour lesquels la proportion d'accord était inférieure à 4/5 ont été examinés par les membres de l'équipe de recherche et modifiés lorsque les propositions ou commentaires écrits des répondantes faisaient consensus. Les items pour lesquels il apparaissait difficile de prendre une décision ont été soumis aux cinq orthophonistes expertes ayant complété le questionnaire lors d'un groupe de discussion entre pairs (*focus group*) de type groupe nominal (Van de Ven et Delbecq, 1972). Cette technique permet une discussion suivie d'une prise de décision, en tenant compte de l'opinion de chacun quant aux modifications à apporter.

L'image pouvait être modifiée ou remplacée et le mot cible pouvait être retiré ou remplacé.

Résultats

Concernant l'aspect global de l'inventaire (nombre de stimuli total et par structure syllabique, ordre de présentation des structures syllabiques), aucun élément n'a obtenu une proportion d'accord inférieure à 4/5. Par conséquent, cet aspect de l'inventaire n'a fait l'objet d'aucune discussion et aucune modification n'a été effectuée. Au terme de ce processus, le nombre de stimuli est demeuré inchangé (*n* = 194).

La **figure 1** illustre le nombre de stimuli de l'ISSEF correspondant à chaque proportion d'accord (de 0 = personne n'est d'accord à 5 = tout le monde est d'accord) pour la représentativité des images, ainsi que pour le niveau de vocabulaire attendu chez les enfants âgés de 3 à 6 ans. Les répondantes ont jugé que 85% (164/194) des images de l'inventaire représentaient le mot cible. Au total, 30 images ont obtenu une proportion d'accord inférieure à 4/5 en ce qui concerne l'aspect visuel (capacité de l'image à représenter le mot cible). Celles-ci ont fait l'objet d'une discussion lors de l'entrevue de groupe avec les expertes. Les solutions suivantes ont été apportées :



modification de l'image ($n = 14$), remplacement de l'image ($n = 8$), remplacement du mot cible ($n = 2$) et aucune modification ($n = 6$). Cette dernière solution a été retenue en l'absence d'un accord par la majorité. Nous avons décidé que ces images seraient présentées telles quelles aux enfants (participants au volet 2) avant de décider si une modification était nécessaire. De plus, entre la réception des questionnaires et la rencontre avec le groupe nominal, cinq stimuli modifiés conséquemment aux commentaires écrits ont été présentés aux répondantes et approuvés par celles-ci.

En ce qui concerne l'opinion des expertes par rapport à la connaissance des mots des enfants âgés de 3 à 6 ans, celles-ci ont indiqué que 94% des cibles étaient adaptées au développement linguistique des enfants âgés de 3 à 6 ans (183/194). Trente items ne faisaient pas consensus pour ce qui est de la représentation visuelle, alors que onze items ne faisaient pas consensus pour ce qui est du niveau de vocabulaire. Comme trois items (*coco*, *genou*, *prune*) se retrouvaient avec des notes inférieures à 4/5 à la fois pour l'image et le vocabulaire, ce sont au total 38 items qui ont été modifiés avant le volet 2. Les onze images qui ont obtenu une proportion d'accord inférieure à 4/5 ont été soumises aux expertes lors de la discussion de groupe. Les solutions suivantes ont été apportées : remplacement du mot cible ($n = 6$), modification de l'image ou ajout d'une flèche pour préciser la cible à nommer ($n = 2$) et aucune modification ($n = 3$). Toutes les modifications proposées par le comité d'expertes ont été apportées à l'ISSEF avant la réalisation du volet 2.

Volet 2 : Administration de l'ISSEF à des enfants de 3 à 6 ans

Méthodologie

Participants

Soixante-quatorze enfants (42 garçons et 32 filles) ayant un développement langagier typique et fréquentant des centres de la petite enfance (CPE) et des écoles de la région de Québec ont participé à l'étude. Les critères d'inclusion étaient les suivants : avoir entre 3;0 et 5;11 ans, être un locuteur unilingue du français, ne pas présenter ou avoir présenté de difficultés de langage et ne pas obtenir un score inférieur à un écart-type sous la moyenne à un test de dépistage (vocabulaire réceptif). Les enfants ont été recrutés de manière à former quatre groupes d'âge (3 à 3;5, 3;6 à 3;11, 4;0 à 4;11 et 5;0 à 5;11). La période entre 3 et 4 ans a été scindée en deux groupes d'âge afin de tenir compte des importants changements qui surviennent dans le développement du langage durant cette période (Levey, 2019). Les parents des participants devaient également être

en mesure de répondre verbalement à un questionnaire sociodémographique.

Procédure de recrutement

Afin de recruter des participants, nous avons contacté par téléphone plusieurs CPE et écoles de la région desservant des familles de milieux socioéconomiques variés, dans le but de solliciter leur participation au projet de recherche. Les CPE et écoles qui ont manifesté un intérêt ont été invités à distribuer un document expliquant brièvement le projet de recherche aux parents d'enfants ayant un développement langagier subjectivement typique. Un formulaire à compléter pour autoriser l'équipe de recherche à entrer en contact avec eux était annexé au document explicatif. Par la suite, une étudiante à la maîtrise en orthophonie a communiqué par téléphone avec les parents qui avaient accepté d'être contactés afin de leur expliquer le projet de recherche et solliciter la participation de leur enfant. Parmi les 117 personnes contactées, 15 ont préféré ne pas participer au processus de sélection ou n'ont pas retourné l'appel et 15 autres ont été exclus sur la base des critères d'inclusion (voir plus haut). Un test de vocabulaire réceptif souvent utilisé comme mesure de dépistage pour les habiletés langagières des enfants au développement typique, soit la forme A de l'*Épreuve de vocabulaire en images de Peabody* (Dunn et al., 1993), a servi de base pour l'inclusion des participants. Ce test a été choisi, car il s'agit d'une mesure standardisée d'usage répandu et rapide à administrer. De plus, elle est couramment utilisée en recherche comme mesure de base pour l'inclusion (ou le pairage) de participants (voir par exemple Elin Thordardottir, 2010). L'épreuve a ainsi été administrée aux 87 participants enfants restants. De ce nombre, treize n'ont pas obtenu le score minimal exigé, soit un score équivalent à un écart-type sous la moyenne, et ont donc été exclus. Les parents de ces enfants ont été orientés vers des ressources professionnelles externes de la région. La totalité des parents ont été contactés par les responsables du projet et les résultats de leur enfant au test de vocabulaire leur ont été transmis. Le **tableau 2** illustre la distribution des 74 participants en fonction des différents groupes d'âge. Les données sociodémographiques recueillies montrent que la tranche de revenu moyen pour chaque groupe d'âge est assez semblable (**tableau 2**) et correspond au revenu moyen des ménages de la ville de Québec, qui est de 75 724 \$ (données de 2015; Ville de Québec, s. d.).

Procédure de collecte des données

Pour la passation de l'ISSEF, les enfants ont été rencontrés individuellement dans un local fermé de l'établissement

Tableau 2

Caractéristiques des participants (enfants)

Groupe d'âge	Moyenne d'âge (écart-type) en mois	Nombre de participants (n = 74)	Ratio filles/garçons (n = 22/42)	Revenu familial moyen (catégorie)
3;0 à 3;5 ans	39 (1,33)	14	4/11	70 000–79 000\$
3;6 à 3;11 ans	43 (1,74)	17	10/6	70 000–79 000\$
4;0 à 4;11 ans	53 (3,31)	16	8/8	80 000–89 000\$
5;0 à 5;11 ans	65 (2,79)	27	10/17	70 000–79 000\$

fréquenté (CPE ou école). L'inventaire a été administré en totalité et un enregistrement audio a été effectué pour permettre une vérification ultérieure par les cliniciennes responsables du projet de recherche (au besoin). Le temps moyen de passation était d'environ 35 minutes (et pouvait aller jusqu'à 60 minutes). La passation a été réalisée en une ou deux séances, selon l'âge et le niveau de collaboration de chaque enfant. Seul un petit nombre d'enfants a eu besoin de deux séances (moins de 5). Lors de la passation de l'ISSEF, le participant devait nommer l'image présentée. L'outil a été conçu afin de faire ressortir les capacités de l'enfant à produire spontanément, sans présentation d'un modèle, les phonèmes de la langue française dans des structures syllabiques précises. Toutefois, afin de pouvoir noter si la production est influencée par le modèle reçu, trois niveaux d'indices ont été développés et une procédure standardisée a été établie. Dans le cas d'une réponse erronée ou d'une absence de réponse, un indice de nature sémantique était d'abord présenté dans le but d'encourager la production spontanée du mot. Dans le cas où la cible n'était toujours pas nommée, un modèle était offert au participant pour susciter une imitation différée et enfin, lorsque nécessaire, une imitation immédiate. Si l'enfant nommait l'image dans sa globalité plutôt que la partie ciblée ou si l'enfant donnait un synonyme, il lui était demandé de donner une autre réponse, sans qu'aucun indice ne soit fourni. Dans le cas où la première réponse de l'enfant était erronée, un indice lui était offert en respectant une progression spécifique jusqu'à la production du mot cible : 1) indice de type sémantique, formulé sous la forme d'une phrase porteuse (p. ex. pour le mot *ciseaux*, la phrase suivante a été utilisée : « pour découper on prend des... »); 2) si l'enfant ne nommait toujours pas l'image ou qu'il donnait une réponse erronée, un indice induisant une répétition différée, c'est-à-dire une répétition où un court délai est présent entre le modèle de l'adulte et la production de l'enfant, était présenté (p. ex. « Ça, ce sont des *ciseaux*.

Pour découper on prend des... »); 3) si l'enfant ne produisait toujours pas le mot, une répétition immédiate, donc sans délai entre le modèle et la production, était demandée (p. ex. « Dis *ciseaux* »).

L'évaluatrice devait noter cette progression en complétant un formulaire où figuraient les éléments suivants : 1) la capacité ou non de l'enfant à nommer la cible spontanément ou à l'aide d'un indice sémantique, 2) le type d'indice offert en cas d'absence de réponse ou de réponse erronée (p. ex. phrase porteuse sans présentation du modèle, imitation différée ou imitation immédiate) et 3) la production de l'enfant transcrite en alphabet phonétique international. Une transcription phonétique large était suffisante pour répondre aux besoins de cette étude puisque la justesse de la production n'était pas un élément faisant partie de l'étude.

Traitement des données

Pour chacun des 194 stimuli, nous avons d'abord calculé la proportion d'enfants ayant reconnu spontanément l'image en incluant ceux qui ont reconnu l'image après avoir reçu un indice sémantique. Le calcul de proportion a été effectué pour le groupe entier et pour chacun des groupes d'âge. Nous avons établi que les images qui étaient reconnues de façon spontanée ou avec indice sémantique dans une proportion de 70% et plus ne subiraient aucune modification. Nous estimons qu'elles pourraient être utilisées comme telles en contexte clinique. Si le taux fixé avait été plus bas, un trop grand nombre de réponses aurait dû être obtenu en répétition plutôt qu'en spontané lors de l'administration, et donc, une proportion plus importante de réponses aurait été influencée par le modèle reçu. D'un autre côté, si le taux de reconnaissance avait été plus élevé (p. ex. 90%), il aurait fallu retirer ou modifier un trop grand nombre de stimuli, ce qui aurait eu un impact

sur l'exhaustivité de l'outil. Les images dont le taux de reconnaissance était inférieur à 70% ont été évaluées dans le cadre d'un second groupe de discussion entre pairs. Un groupe d'expertes a été reformé selon les mêmes critères de sélection que pour le volet 1 afin de discuter des modifications des images ayant un taux de reconnaissance inférieur au seuil minimal. Le groupe était composé de cinq orthophonistes ayant en moyenne 10 ans d'expérience avec les enfants, dont deux qui avaient également participé au volet 1 (voir le **tableau 1**).

Résultats

Les résultats présentés portent sur un total de 71 participants. En effet, les données de trois participants ont dû être retirées des analyses puisque la passation l'ISSEF a révélé que ces enfants avaient des difficultés significatives de communication qui n'avaient pas été préalablement identifiées avec l'épreuve de dépistage.

Au total, 153 des 194 cibles (78,8%) ont obtenu un taux de reconnaissance supérieur à 70%. Quarante et une images ont obtenu un taux de reconnaissance inférieur au seuil de 70% (taux allant de 19,7% à 69%). À la suite d'une seconde consultation avec des expertes, les modifications apportées ont été les suivantes : retrait du mot cible ($n = 5$), modification de l'image ($n = 2$), remplacement de l'image ($n = 13$), remplacement du mot cible ($n = 11$), modification de l'indice sémantique présenté à l'enfant ($n = 2$) et production en répétition acceptée à la suite du modèle verbal de l'adulte ($n = 8$). Cette dernière solution a été retenue pour les cibles suivantes : *fée, go!, but, mamie, papi, rhinocéros, macaroni* et *igloo*. Nous avons conservé ces dernières cibles même si leur taux de reconnaissance était inférieur à 70% puisque nous les avons jugées pertinentes et essentielles pour évaluer la production de ces structures syllabiques dans les environnements phonétiques spécifiques. De plus, il n'existait aucun autre mot alternatif pouvant être illustré. Le **tableau 3** illustre la répartition des

189 mots cibles restants selon leur longueur en termes de nombre de syllabes.

Par la suite, nous avons effectué une analyse de différence de proportions entre les groupes d'âge (test exact de Fisher) pour déterminer si le taux de reconnaissance des images était lié à l'âge des enfants. En raison du grand nombre de comparaisons effectuées, nous avons fixé le critère alpha à une valeur conservatrice de $p \leq 0,001$. Une association significative entre l'âge des enfants et la reconnaissance des images a été mise en évidence pour 28 des 178 stimuli de la version à l'étude (189 stimuli moins les 11 à remplacer) qui ont été conservés dans la version finale de l'ISSEF. Le **tableau 4** présente la proportion de reconnaissance spontanée pour l'échantillon total et par groupe d'âge. Les stimuli pour lesquels un effet d'âge a été constaté ($p \leq 0,001$) sont marqués d'une étoile.

Discussion

Cette étude portait sur la sélection des items de l'ISSEF en évaluant l'exhaustivité des items de l'outil, ainsi qu'en déterminant si les images représentaient bien les mots ciblés (représentativité iconographique) et si les mots cibles choisis pour cet outil étaient pertinents (c.-à-d. adaptés au niveau de développement linguistique des enfants âgés de 3 à 6 ans). Deux étapes ont mené à la sélection finale des items, d'abord auprès d'orthophonistes expertes, puis auprès d'un échantillon d'enfants ayant un développement typique. Comme le montrent les résultats, les orthophonistes expertes ont jugé que les items contenus dans l'ISSEF présentaient une variété suffisante de structures syllabiques se retrouvant dans la langue franco-québécoise et que la grande majorité des mots et des images étaient adéquats. Un petit nombre de mots et/ou d'images ont été modifiés à la suite de l'évaluation des expertes.

Les résultats ont également montré que plus des deux tiers des participants enfants ayant un développement langagier typique ont pu nommer spontanément près de

Tableau 3

Distribution des mots par longueur et proportion du nombre total de cibles (189 cibles)

Longueur des mots	Nombre de mots cibles (%)
1 syllabe	57 (31%)
2 syllabes	99 (52%)
3 syllabes	29 (15%)
4 syllabes	4 (2%)

Note. Parmi les 194 mots ayant été administrés aux participants enfants de l'étude, un total de 189 mots ont été conservés (tels quels ou avec modification) dans l'*Inventaire des structures syllabiques chez l'enfant francophone*.

Tableau 4

Pourcentages de reconnaissance spontanée des 194 mots cibles administrés aux participants enfants en fonction de l'âge (résultats par groupes d'âge et pour le total de l'échantillon) et effets d'âge

# item	Structure syllabique	Mot cible (nombre de syllabes)	Groupes d'âge				Total de l'échantillon <i>n</i> = 74	Valeur de <i>p</i>
			3;0-3;5 ans	3;6-3;11 ans	4;0-4;11 ans	5;0-5;11 ans		
1	CV	pain (1)	100,0%	100,0%	100,0%	100,0%	100,0%	
2	CV	pont* (1)	53,8%	75,0%	100,0%	96,3%	84,5%	0,001
3	CV	but* (1)	7,7%	31,3%	66,7%	88,9%	56,3%	< 0,001
5	CV	bain (1)	100,0%	100,0%	100,0%	100,0%	100,0%	
8	CV	dents* (1)	61,5%	100,0%	100,0%	100,0%	93,0%	< 0,001
9	CV	dé* (1)	30,8%	62,5%	73,3%	92,6%	70,4%	0,001
10	CV	dos (1)	76,9%	87,5%	93,3%	100,0%	91,5%	0,040
13	CV	queue (1)	100,0%	100,0%	100,0%	100,0%	100,0%	
14	CV	cou (1)	76,9%	93,3%	100,0%	100,0%	94,3%	0,013
15	CV	gant* (1)	30,8%	87,5%	100,0%	100,0%	84,5%	< 0,001
16	CV	go* (1)	30,8%	68,8%	33,3%	85,2%	60,6%	0,001
17	CV	fée* (1)	7,7%	56,3%	73,3%	96,3%	66,2%	< 0,001
18	CV	feu (1)	100,0%	93,8%	100,0%	100,0%	98,6%	0,620
19	CV	vent (1)	69,2%	81,3%	100,0%	100,0%	90,1%	0,003
21	CV	scie (1)	38,5%	37,5%	46,7%	74,1%	53,5%	0,049
20	CV	veut (1)	30,8%	43,8%	46,7%	55,6%	46,5%	0,547
22	CV	zoo* (1)	7,7%	56,3%	73,3%	85,2%	62,0%	< 0,001
23	CV	chat (1)	92,3%	93,8%	93,3%	100,0%	95,8%	0,369
24	CV	chaud (1)	69,2%	50,0%	80,0%	77,8%	70,4%	0,227
25	CV	jus (1)	92,3%	100,0%	100,0%	100,0%	98,6%	0,183
26	CV	jeu* (1)	7,7%	87,5%	66,7%	100,0%	73,2%	< 0,001
29	CV	rond (1)	69,2%	68,8%	60,0%	92,6%	76,1%	0,051
30	CV	rue (1)	53,8%	62,5%	40,0%	77,8%	62,0%	0,098
27	CV	lait (1)	100,0%	100,0%	100,0%	100,0%	100,0%	
6	CV	meuh (1)	92,3%	68,8%	86,7%	92,6%	85,9%	0,186
7	CV	main (1)	100,0%	93,8%	100,0%	100,0%	98,6%	0,620
11	CV	nez (1)	92,3%	100,0%	100,0%	100,0%	98,6%	0,183
12	CV	non* (1)	46,2%	87,5%	100,0%	96,3%	85,9%	< 0,001
31	CV	oui (1)	84,6%	81,3%	100,0%	100,0%	93,0%	0,025

Tableau 4 (suite)

Pourcentages de reconnaissance spontanée des 194 mots cibles administrés aux participants enfants en fonction de l'âge (résultats par groupes d'âge et pour le total de l'échantillon) et effets d'âge

# item	Structure syllabique	Mot cible (nombre de syllabes)	Groupes d'âge				Total de l'échantillon $n = 74$	Valeur de p
			3;0-3;5 ans	3;6-3;11 ans	4;0-4;11 ans	5;0-5;11 ans		
32	CV.CV	pipi (2)	61,5%	56,3%	80,0%	85,2%	73,2%	0,137
33	CV.CV	papa (2)	92,3%	100,0%	100,0%	96,3%	97,2%	0,663
34	CV.CV	bébé (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
35	CV.CV	bobo (2)	84,6%	93,8%	100,0%	96,3%	94,4%	0,289
36	CV.CV	toutous (2)	30,8%	68,8%	40,0%	70,4%	56,3%	0,043
37	CV.CV	dodo (2)	76,9%	87,5%	93,3%	100,0%	91,5%	0,040
38	CV.CV	caca (2)	84,6%	93,8%	100,0%	96,3%	94,4%	0,289
40	CV.CV	poupée* (2)	30,8%	87,5%	93,3%	88,9%	78,9%	< 0,001
41	CV.CV	papi* (2)	15,4%	18,8%	53,3%	70,4%	45,1%	0,001
42	CV.CV	mamie (2)	53,8%	62,5%	66,7%	81,5%	69,0%	0,279
43	CV.CV	maman (2)	92,3%	100,0%	100,0%	100,0%	98,6%	0,183
44	CV.CV	patin (2)	61,5%	75,0%	86,7%	96,3%	83,1%	0,023
45	CV.CV	bouton (2)	53,8%	68,8%	66,7%	92,6%	74,6%	0,025
46	CV.CV	manteau (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
47	CV.CV	mouton (2)	92,3%	100,0%	100,0%	100,0%	98,6%	0,183
48	CV.CV	piquer* (2)	53,8%	75,0%	100,0%	96,3%	84,5%	0,001
49	CV.CV	beaucoup (2)	84,6%	93,8%	80,0%	92,6%	88,7%	0,553
50	CV.CV	tapis (2)	100,0%	100,0%	86,7%	100,0%	97,2%	0,074
51	CV.CV	tomber (2)	92,3%	100,0%	93,3%	92,6%	94,4%	0,751
52	CV.CV	dégât (2)	84,6%	100,0%	73,3%	85,2%	85,9%	0,173
53	CV.CV	couper (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
54	CV.CV	couteau (2)	76,9%	93,8%	93,3%	92,6%	90,1%	0,496
55	CV.CV	gâteau (2)	84,6%	100,0%	93,3%	100,0%	95,8%	0,043
59	CV.CV	ciseaux (2)	76,9%	100,0%	100,0%	100,0%	95,8%	0,005
56	CV.CV	fusée (2)	84,6%	87,5%	93,3%	100,0%	93,0%	0,111
57	CV.CV	fâché (2)	84,6%	87,5%	100,0%	100,0%	94,4%	0,069
58	CV.CV	savon (2)	92,3%	100,0%	100,0%	100,0%	98,6%	0,183
60	CV.CV	cheveux (2)	100,0%	93,8%	100,0%	96,3%	97,2%	1,000
62	CV.CV	maison (2)	100,0%	100,0%	100,0%	100,0%	100,0%	

Tableau 4 (suite)

Pourcentages de reconnaissance spontanée des 194 mots cibles administrés aux participants enfants en fonction de l'âge (résultats par groupes d'âge et pour le total de l'échantillon) et effets d'âge

# item	Structure syllabique	Mot cible (nombre de syllabes)	Groupes d'âge				Total de l'échantillon n = 74	Valeur de p
			3;0-3;5 ans	3;6-3;11 ans	4;0-4;11 ans	5;0-5;11 ans		
64	CV.CV	moucher (2)	100,0%	93,8%	100,0%	100,0%	98,6%	0,620
66	CV.CV	tousser (2)	61,5%	62,5%	60,0%	74,1%	66,2%	0,728
65	CV.CV	divan (2)	84,6%	93,8%	80,0%	88,9%	87,3%	0,700
67	CV.CV	dessin (2)	76,9%	93,8%	93,3%	96,3%	91,5%	0,241
68	CV.CV	nager (2)	46,2%	87,5%	93,3%	92,6%	83,1%	0,003
69	CV.CV	café (2)	100,0%	81,3%	86,7%	96,3%	91,5%	0,192
70	CV.CV	coussin (2)	69,2%	75,0%	60,0%	96,3%	78,9%	0,012
72	CV.CV	cochon (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
71	CV.CV	gazon (2)	53,8%	68,8%	73,3%	88,9%	74,6%	0,094
74	CV.CV	photo* (2)	69,2%	100,0%	100,0%	100,0%	94,4%	0,001
73	CV.CV	fumée (2)	23,1%	62,5%	66,7%	77,8%	62,0%	0,011
75	CV.CV	fini (2)	7,7%	12,5%	26,7%	25,9%	19,7%	0,484
76	CV.CV	sapin (2)	69,2%	87,5%	93,3%	96,3%	88,7%	0,081
77	CV.CV	sauter (2)	100,0%	93,8%	93,3%	96,3%	95,8%	1,000
80	CV.CV	château (2)	84,6%	100,0%	100,0%	100,0%	97,2%	0,031
78	CV.CV	chapeau (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
81	CV.CV	genou (2)	53,8%	68,8%	53,3%	88,9%	70,4%	0,031
79	CV.CV	jambon (2)	30,8%	50,0%	53,3%	85,2%	60,6%	0,004
86	CV.CV	lapin (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
82	CV.CV	ballon (2)	100,0%	100,0%	100,0%	96,3%	98,6%	1,000
84	CV.CV	vélo (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
87	CV.CV	robot (2)	76,9%	100,0%	93,3%	92,6%	91,5%	0,181
83	CV.CV	carré (2)	76,9%	87,5%	100,0%	100,0%	93,0%	0,016
85	CV.CV	sirop (2)	38,5%	62,5%	73,3%	88,9%	70,4%	0,008
88	V.CV	épée* (2)	30,8%	62,5%	93,3%	96,3%	76,1%	< 0,001
89	V.CV	auto (2)	53,8%	43,8%	60,0%	81,5%	63,4%	0,062
91	V.CV	amis* (2)	7,7%	25,0%	60,0%	85,2%	52,1%	< 0,001
90	V.CV	hibou (2)	100,0%	100,0%	86,7%	100,0%	97,2%	0,074
92	V.CV	outils* (2)	30,8%	75,0%	53,3%	92,6%	69,0%	< 0,001

Tableau 4 (suite)

Pourcentages de reconnaissance spontanée des 194 mots cibles administrés aux participants enfants en fonction de l'âge (résultats par groupes d'âge et pour le total de l'échantillon) et effets d'âge

# item	Structure syllabique	Mot cible (nombre de syllabes)	Groupes d'âge				Total de l'échantillon n = 74	Valeur de p
			3;0-3;5 ans	3;6-3;11 ans	4;0-4;11 ans	5;0-5;11 ans		
94	V.CV	assis (2)	84,6%	81,3%	73,3%	100,0%	87,3%	0,022
97	CVC	pomme (1)	100,0%	100,0%	100,0%	100,0%	100,0%	
103	CVC	suce (1)	61,5%	100,0%	86,7%	96,3%	88,7%	0,004
107	CVC	poule (1)	84,6%	93,8%	93,3%	92,6%	91,5%	0,825
105	CVC	bouche (1)	92,3%	93,8%	100,0%	100,0%	97,2%	0,284
101	CVC	bague (1)	61,5%	75,0%	86,7%	100,0%	84,5%	0,003
104	CVC	tasse* (1)	23,1%	87,5%	73,3%	85,2%	71,8%	< 0,001
106	CVC	cake* (1)	46,2%	87,5%	80,0%	100,0%	83,1%	< 0,001
100	CVC	phoque* (1)	38,5%	68,8%	86,7%	96,3%	77,5%	< 0,001
108	CVC	filles (1)	100,0%	100,0%	100,0%	100,0%	100,0%	
95	CVC	soupe (1)	84,6%	93,8%	93,3%	100,0%	94,4%	0,147
96	CVC	robe (1)	69,2%	93,8%	100,0%	96,3%	91,5%	0,024
120	CV.CVC	canard (2)	100,0%	81,3%	93,3%	100,0%	94,4%	0,059
112	CV.CVC	muffin (2)	46,2%	87,5%	93,3%	88,9%	81,7%	0,008
119	CV.CVC	poubelle (2)	84,6%	93,8%	100,0%	100,0%	95,8%	0,065
113	CV.CVC	banane (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
115	CV.CVC	saucisse (2)	61,5%	87,5%	80,0%	100,0%	85,9%	0,004
110	CV.CVC	fantôme (2)	84,6%	100,0%	100,0%	100,0%	97,2%	0,031
116	CV.CVC	valise (2)	61,5%	81,3%	80,0%	100,0%	84,5%	0,004
117	CV.CVC	nuage (2)	100,0%	93,8%	100,0%	100,0%	98,6%	0,620
109	CV.CVC	concombre (2)	92,3%	87,5%	93,3%	96,3%	93,0%	0,862
118	CV.CVC	orange (2)	92,3%	93,8%	100,0%	100,0%	97,2%	0,284
121	CV.CV.CV	papillon (3)	100,0%	100,0%	100,0%	100,0%	100,0%	
122	CV.CV.CV	pantalon (3)	92,3%	87,5%	100,0%	96,3%	94,4%	0,491
124	CV.CV.CV	magasin (3)	53,8%	87,5%	86,7%	88,9%	81,7%	0,067
123	CV.CV.CV	melon d'eau (3)	76,9%	100,0%	80,0%	92,6%	88,7%	0,100
127	CV.CV.CV	lavabo (3)	61,5%	62,5%	60,0%	96,3%	74,6%	0,004
125	CV.CV.CV	kangourou (3)	61,5%	81,3%	93,3%	100,0%	87,3%	0,002
126	CV.CV.CV	fatigué (3)	84,6%	100,0%	93,3%	96,3%	94,4%	0,255

Tableau 4 (suite)

Pourcentages de reconnaissance spontanée des 194 mots cibles administrés aux participants enfants en fonction de l'âge (résultats par groupes d'âge et pour le total de l'échantillon) et effets d'âge

# item	Structure syllabique	Mot cible (nombre de syllabes)	Groupes d'âge				Total de l'échantillon $n = 74$	Valeur de p
			3;0-3;5 ans	3;6-3;11 ans	4;0-4;11 ans	5;0-5;11 ans		
128	CV.CV.CV	champignon (3)	76,9%	87,5%	100,0%	100,0%	93,0%	0,016
129	CV.CV.CV	chocolat (3)	84,6%	93,8%	100,0%	100,0%	95,8%	0,065
139	CV.CV.VC	céréale (3)	92,3%	93,8%	100,0%	100,0%	97,2%	0,284
137	CV.CV.CVC	téléphone (3)	100,0%	100,0%	100,0%	100,0%	100,0%	
138	CV.CV.CVC	coquillage* (3)	46,2%	62,5%	86,7%	96,3%	77,5%	0,001
131	V.CV.CV	ananas (3)	84,6%	75,0%	66,7%	96,3%	83,1%	0,044
133	V.CV.CV	araignée (3)	92,3%	100,0%	100,0%	100,0%	98,6%	0,183
134	V.CV.CV	éléphant (3)	92,3%	100,0%	100,0%	100,0%	98,6%	0,183
136	V.CV.CVC	autobus (3)	100,0%	100,0%	93,3%	100,0%	98,6%	0,394
135	V.CV.CVC	hôpital* (3)	69,2%	43,8%	60,0%	96,3%	71,8%	< 0,001
144	CCV.CV.CV	grand-maman (3)	61,5%	62,5%	80,0%	70,4%	69,0%	0,721
143	CCV.CV.CVC	bricolage (3)	30,8%	25,0%	60,0%	59,3%	46,5%	0,074
142	CCV.CV.CV	brocoli (3)	84,6%	100,0%	86,7%	100,0%	94,4%	0,051
145	CCV.CV.CV	spaghetti (3)	61,5%	87,5%	93,3%	100,0%	88,7%	0,003
141	CV.CV.CCVC	balançoire (3)	92,3%	93,8%	100,0%	100,0%	97,2%	0,284
148	V.CV.CV.CVC	hippopotame (4)	76,9%	81,3%	80,0%	100,0%	87,3%	0,027
146	CV.CV.CV.CV	macaroni (4)	46,2%	25,0%	46,7%	51,9%	43,7%	0,383
149	V.CCV.CV.CVC	étoile de mer (4)	69,2%	81,3%	86,7%	92,6%	84,5%	0,274
147	CV.CV.CV.CVC	rhinocéros (4)	38,5%	68,8%	60,0%	81,5%	66,2%	0,058
153	CCV	moi (1)	76,9%	87,5%	86,7%	100,0%	90,1%	0,040
156	CCV	coin (1)	100,0%	100,0%	93,3%	100,0%	98,6%	0,394
155	CCV	doigt (1)	76,9%	93,8%	100,0%	100,0%	94,4%	0,013
152	CCV.CV	poisson (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
154	CCV.CVC	toilette (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
157	CV.CCV	pingouin (2)	84,6%	75,0%	86,7%	96,3%	87,3%	0,172
160	CCV	chien (1)	100,0%	100,0%	100,0%	100,0%	100,0%	
158	CCV	pied (1)	100,0%	100,0%	100,0%	100,0%	100,0%	
162	CCV.CVC	cuillère (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
161	CV.CCV	soulier (2)	69,2%	87,5%	86,7%	92,6%	85,9%	0,307

Tableau 4 (suite)

Pourcentages de reconnaissance spontanée des 194 mots cibles administrés aux participants enfants en fonction de l'âge (résultats par groupes d'âge et pour le total de l'échantillon) et effets d'âge

# item	Structure syllabique	Mot cible (nombre de syllabes)	Groupes d'âge				Total de l'échantillon n = 74	Valeur de p
			3;0-3;5 ans	3;6-3;11 ans	4;0-4;11 ans	5;0-5;11 ans		
159	CV.CCV	camion (2)	100,0%	93,8%	93,3%	100,0%	97,2%	0,381
165	CCVC	glace (1)	92,3%	87,5%	93,3%	92,6%	91,5%	0,936
163	CCVC	plume (1)	76,9%	93,8%	86,7%	100,0%	91,5%	0,036
167	CCVC	flûte* (1)	38,5%	56,3%	80,0%	92,6%	71,8%	0,001
166	V.CCV	igloo* (2)	7,7%	31,3%	40,0%	88,9%	50,7%	< 0,001
164	CV.CCV	tableau* (2)	46,2%	68,8%	80,0%	100,0%	78,9%	< 0,001
168	CV.CCV	souffler (2)	84,6%	87,5%	93,3%	96,3%	91,5%	0,558
170	CCV	bras (1)	53,8%	37,5%	80,0%	81,5%	66,2%	0,014
172	CCV	train (1)	100,0%	100,0%	86,7%	100,0%	97,2%	0,074
178	CCVC	fraise (1)	100,0%	93,8%	100,0%	100,0%	98,6%	0,620
175	CCV.CV	crayon (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
177	CCV.CVC	grenouille (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
174	CCV.CV	dragon (2)	84,6%	93,8%	100,0%	100,0%	95,8%	0,065
179	V.CCVC	ouvrir (2)	50,0%	43,8%	73,3%	70,4%	61,4%	0,213
176	CV.CCV	micro* (2)	30,8%	56,3%	73,3%	100,0%	71,8%	< 0,001
171	CV.CCV	nombril (2)	53,8%	56,3%	73,3%	92,6%	73,2%	0,011
181	CCV.CVC	squelette (2)	46,2%	75,0%	86,7%	96,3%	80,3%	0,002
184	CVCC	parc (1)	69,2%	75,0%	80,0%	77,8%	76,1%	0,941
182	CVCC	ferme (1)	84,6%	100,0%	93,3%	100,0%	95,8%	0,043
183	CVCC	carte (1)	69,2%	100,0%	93,3%	96,3%	91,5%	0,020
192	CVC.CV	serpent (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
193	CVC.CV	tortue (2)	100,0%	100,0%	100,0%	100,0%	100,0%	
188	CVC.CVC	moustache* (2)	30,8%	87,5%	93,3%	96,3%	81,7%	< 0,001
189	CVC.CVC	casse-tête (2)	100,0%	87,5%	100,0%	100,0%	97,2%	0,122
185	VC.CV.CV	accident (3)	61,5%	56,3%	93,3%	85,2%	76,1%	0,036
191	VC.CVC.CV	escargot (3)	76,9%	100,0%	100,0%	100,0%	95,8%	0,005
194	CVC.CV.CV	garderie (3)	53,8%	75,0%	66,7%	85,2%	73,2%	0,176
187	CVC.CV.CV	chauve-souris (3)	76,9%	81,3%	93,3%	100,0%	90,1%	0,028
190	CVC.CV.CV	restaurant (3)	46,2%	87,5%	60,0%	88,9%	74,6%	0,009

Tableau 4 (suite)

Pourcentages de reconnaissance spontanée des 194 mots cibles administrés aux participants enfants en fonction de l'âge (résultats par groupes d'âge et pour le total de l'échantillon) et effets d'âge

# item	Structure syllabique	Mot cible (nombre de syllabes)	Groupes d'âge				Total de l'échantillon $n = 74$	Valeur de p
			3;0-3;5 ans	3;6-3;11 ans	4;0-4;11 ans	5;0-5;11 ans		
186	CVC.CV.CVC	coccinelle (3)	69,2%	75,0%	93,3%	92,6%	84,5%	0,137
195	CVC.CCV	biscuit* (2)	46,2%	81,3%	100,0%	92,6%	83,1%	0,001
196	VC.CCVC	histoire (2)	23,1%	25,0%	40,0%	22,2%	26,8%	0,675
197	CVC.CCVC	serviette (2)	84,6%	87,5%	93,3%	96,3%	91,5%	0,558
Nouveaux mots cibles ajoutés à la suite des résultats de l'étude								
28	CV	loup (1)	---	---	---	---	---	---
39	CV.CV	coucou (2)	---	---	---	---	---	---
61	CV.CV	pinceaux (2)	---	---	---	---	---	---
63	CV.CV	bouchon (2)	---	---	---	---	---	---
93	V.CV	hockey (2)	---	---	---	---	---	---
98	CVC	tête (1)	---	---	---	---	---	---
99	CVC	lune (1)	---	---	---	---	---	---
102	CVC	mauve (1)	---	---	---	---	---	---
111	CV.CVC	tomate (2)	---	---	---	---	---	---
114	CV.CVC	girafe (2)	---	---	---	---	---	---
130	CV.CV.CV	pyjama (3)	---	---	---	---	---	---
132	V.CV.CV	animaux (3)	---	---	---	---	---	---
140	CV.CV.CVC	dinosaure (3)	---	---	---	---	---	---
150	V.CV.CVC.CVC	hélicoptère (4)	---	---	---	---	---	---
151	VC.CV.CV.CVC	ordinateur (4)	---	---	---	---	---	---
169	CCV.CVC	princesse (2)	---	---	---	---	---	---
173	CV.CCVC	citrouille (2)	---	---	---	---	---	---
180	CCVC	stop (1)	---	---	---	---	---	---

Note. Les mots marqués d'un astérisque (*) sont ceux pour lesquels un effet d'âge a été constaté ($p < 0,001$, test exact de Fisher). C = consonne; V = voyelle.

80% cibles (153/194). Ce résultat est très satisfaisant, car nous voulions obtenir un outil permettant d'évaluer de façon approfondie la production spontanée (sans modèle verbal) de la majorité des structures syllabiques composant les mots cibles présentés à des enfants âgés de 3 à 6 ans.

Les résultats ont également révélé un effet d'âge pour 28 stimuli. Il est donc possible qu'un enfant plus jeune ne soit pas en mesure de nommer spontanément ces cibles parce qu'il ne connaît ou ne reconnaît pas nécessairement le mot ou l'image. Pour ces mots, des indices peuvent être donnés aux enfants plus jeunes afin qu'ils produisent les

cibles souhaitées. Bien qu'obtenues en répétition, différée ou immédiate, les productions recueillies fournissent des informations importantes sur la stimulabilité de l'enfant et contribuent à l'élaboration d'objectifs de traitement adaptés au niveau de développement de l'enfant.

Un élément important issu des résultats concerne le niveau socioéconomique des familles ayant participé à cette étude. Au moment d'effectuer les analyses, nous avons tenu compte du niveau socioéconomique des enfants (établi selon le seuil de faible revenu des familles canadiennes) comme variable potentiellement confondante. Cependant, la faible proportion des participants se situant sous le seuil de faible revenu selon ce critère (10/71) n'a pas permis d'en tenir compte dans les analyses statistiques. Malgré nos efforts pour recruter des participants de milieux socioéconomiques variés, la représentativité socioéconomique n'a pu être assurée. Près de la moitié des enfants de l'étude provenaient de milieux socioéconomiques favorisés et la majorité des parents de ces enfants détenaient un diplôme d'études universitaires.

De nombreuses études sur le développement typique du langage ont mis de l'avant l'existence d'un lien significatif entre le développement du vocabulaire de l'enfant et le statut socioéconomique de la famille (Hoff, 2003, 2013; Huttenlocher et al., 2010; Schwab et Lew-Williams, 2016). Il est donc possible de croire que les participants de cette étude présentaient un développement du vocabulaire dans la moyenne ou la moyenne supérieure. Le niveau de reconnaissance des mots cibles aurait peut-être été plus faible avec un échantillon plus distribué. Par conséquent, il serait prudent pour le clinicien utilisant l'ISSEF de demeurer vigilant face à cette possibilité lors de son utilisation avec des enfants issus de familles de niveau socioéconomique plus faible.

Quoi qu'il en soit, l'outil n'a pas été conçu pour recueillir des observations sur le niveau de développement du vocabulaire de l'enfant, mais bien pour évaluer la capacité des enfants à produire des mots composés de structures syllabiques variées afin de concevoir un traitement individualisé. La présente étude a donc permis d'établir les conditions d'utilisation de l'outil en clinique. Ainsi, durant la passation de l'inventaire, certains des mots cibles devront être produits en répétition, après la présentation du modèle par l'adulte, car il se peut que ces mots ne correspondent pas au niveau de développement du vocabulaire de certains enfants. Une telle situation est à prévoir notamment pour les cibles pour lesquelles nous avons obtenu un effet statistique lié à l'âge des enfants. L'identification visuelle des stimuli est parfois problématique dans les outils de dépistage connus. Par exemple, dans

l'étude sur le développement de l'outil de dépistage intitulé *Évaluation sommaire de la phonologie chez les enfants d'âge préscolaire*, MacLeod et al. (2014) ont indiqué que certaines images étaient plus difficiles à identifier pour les enfants et que les mots qu'elles représentaient devaient par conséquent être produits en répétition. En fait, l'ISSEF propose des moyens pour susciter et soutenir la production des stimuli. Ceci peut être relié au principe de l'évaluation dynamique (*dynamic assessment*), où le clinicien qui évalue cherche non seulement à identifier les capacités de l'enfant, mais aussi à observer comment les réponses de celui-ci varient selon la nature d'un stimulus, ou encore, à la suite de la présentation d'un modèle linguistique (Glaspey et Stoel-Gammon, 2007; Miccio, 2002). Le bénéfice principal de ce type d'évaluation est qu'il permet de planifier une intervention personnalisée, adaptée à chaque enfant. Dans cette même optique, l'ISSEF se veut aussi un outil d'évaluation souple où l'orthophoniste peut adapter la passation de l'outil en fonction des capacités anticipées de l'enfant et n'évalue que certaines structures syllabiques étant donné son organisation hiérarchique.

Par ailleurs, il reste possible de se demander si les mots polysyllabiques auraient pu être plus nombreux compte tenu que l'un des indicateurs de la dyspraxie verbale est l'augmentation des erreurs avec l'allongement des mots et des séquences de sons. Les auteurs du *Test de dépistage francophone de phonologie* (Rvachew et al., 2013) ont par ailleurs considéré le fait que la langue française comporte un nombre relativement élevé de mots longs en incluant 30% de mots polysyllabiques ($n = 9$) dans leur test. Considérant que le nombre total de mots de plus de deux syllabes inclus dans l'ISSEF s'avère tout de même important ($n = 33$), cela permet une description étoffée de l'effet de l'allongement des séquences de sons sur les productions de l'enfant.

Limites de l'étude et pistes de recherche

La principale limite de l'étude est le fait que l'échantillon d'enfants au développement langagier typique était composé uniquement de résidents de la région de Québec qui avaient un niveau socioéconomique relativement élevé et qui étaient exposés seulement au français. Également, plus de la moitié des parents qui ont répondu au questionnaire sociodémographique détenaient un diplôme universitaire (alors qu'environ le tiers de la population de la région de la Capitale-Nationale détient un diplôme universitaire). Ces éléments nous empêchent donc de généraliser les résultats obtenus à l'ensemble de la population des différentes régions du Québec. Il faut également noter que 19 nouveaux items (voir le **tableau 4**) ont été ajoutés à la suite du processus présenté dans le

présent article et leur reconnaissance spontanée par les enfants n'a pas été évaluée. La version actuelle du bilan inclut 197 mots cibles.

Conclusion

L'ISSEF peut être employé en clinique dès maintenant afin d'évaluer de manière très fine les capacités des enfants chez qui une dyspraxie verbale est présente ou suspectée à produire une variété de structures syllabiques présentes dans la langue franco-québécoise. Le nombre élevé de cibles tient compte des différents contextes articulatoires et les cibles sont organisées de manière hiérarchique. Ceci permet aux cliniciens d'identifier rapidement les structures syllabiques qui sont difficiles et qui requièrent une intervention. L'outil répond à l'un des objectifs fondamentaux du processus d'évaluation orthophonique de tout clinicien, soit de cibler les objectifs et stratégies d'intervention (McCauley, 2001).

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Note des auteurs

Les demandes au sujet de cet article doivent être adressées à Louise Duchesne, Département d'orthophonie, Université du Québec à Trois-Rivières, 3351 boulevard des Forges, C.P. 500, Trois-Rivières, QC, Canada, G9A 5H7.
Courriel : louise.duchesne@uqtr.ca

L'inventaire des structures syllabiques chez l'enfant francophone, ainsi que le manuel de passation et ses annexes (ISBN : 978-2-550-84050-3), sont disponibles gratuitement à l'adresse suivante : <https://www.ciusss-capitalenationale.gouv.qc.ca/inventaire-des-structures-syllabiques-chez-lenfant-francophone-isef>

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Investigating Label Use by English Canadian Speech-Language Pathologists



Enquête sur la terminologie employée par les orthophonistes canadiens anglophones

KEYWORDS

DEVELOPMENTAL LANGUAGE DISORDER

LANGUAGE DISORDER

CHILD LANGUAGE

TERMINOLOGY

LABELS

Alyssa Kuiack
Lisa M. D. Archibald

Alyssa Kuiack and
Lisa M. D. Archibald

Western University, London, ON,
CANADA

Abstract

Children with unexplained language problems have been assigned a variety of diagnostic terminology throughout history. This lack of consistency has created barriers for researchers and clinicians. In 2016 and 2017, Bishop et al. conducted the CATALISE studies, which reached a consensus for the use of the diagnostic label “developmental language disorder” to describe children with unexplained language problems. Only 8 of 59 experts included in the CATALISE study were Canadian and information regarding the use of diagnostic labels, like developmental language disorder, in a Canadian context is lacking. The purpose of this study was to examine English Canadian labelling practice. In 2018, English Canadian speech-language pathologists ($n = 370$) completed a 24-question online survey addressing current use of diagnostic labels in practice, constraints on the use of labels, opinions on assessment purposes, and knowledge/use of the specific diagnostic label developmental language disorder. Label use among Canadian speech-language pathologists was found to be highly inconsistent. Several reasons for assigning/not assigning diagnostic labels were provided. Most participants reported being familiar with the label developmental language disorder, although fewer accurately selected the label’s definition. Respondents suggested that the use of the label developmental language disorder would increase if other speech-language pathologists were also adopting this practice. Most participants agreed that having a consistent label for children with language disorders would provide better advocacy for children with developmental language disorder and that children with developmental language disorder would be better off if professionals consistently used the same label.

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Abrégé

Les conclusions orthophoniques (diagnostics) attribuées aux enfants atteints d'un trouble du langage inexpliqué ont fait historiquement l'objet d'un foisonnement terminologique. Ce manque de consistance dans les termes employés constituait un obstacle pour les chercheurs et les cliniciens. En 2016 et 2017, Bishop et al. ont mené les études CATALISE (*Criteria and Terminology Applied to Language Impairments: Synthesising the Evidence* [critère et terminologie utilisés pour les troubles du langage : une synthèse de l'évidence]) afin d'arriver à un consensus quant à la terminologie à privilégier pour décrire les enfants présentant un trouble du langage inexpliqué (c.-à-d. *developmental language disorder* [trouble développemental du langage]). Cependant, seuls 8 des 59 experts inclus dans les études CATALISE étaient de nationalité canadienne et peu d'information existe actuellement sur la terminologie utilisée en contexte canadien. L'objectif de la présente étude était d'examiner les pratiques terminologiques en matière de conclusions orthophoniques au Canada anglais. En 2018, 370 orthophonistes canadiens anglophones ont répondu à un questionnaire en ligne composé de 24 questions portant sur la terminologie utilisée au moment de poser une conclusion orthophonique, sur les contraintes en matière des termes employés, sur leurs points de vue quant aux objectifs de l'évaluation d'un patient et sur la connaissance et l'emploi spécifique du terme *developmental language disorder*. Les résultats de cette étude montrent un haut degré d'inconsistance dans les termes employés par les orthophonistes canadiens. De nombreuses raisons expliquant l'attribution ou non d'un terme lors de l'établissement d'une conclusion orthophonique ont été fournies. Si la plupart des participants de l'étude ont affirmé être familiers avec le terme *developmental language disorder*, seuls quelques-uns d'entre eux ont été en mesure de l'associer à la bonne définition. Les répondants ont par ailleurs indiqué qu'ils seraient plus susceptibles d'utiliser le *developmental language disorder* si d'autres orthophonistes l'intégraient à leur pratique. La plupart des répondants s'entendent sur le fait qu'une consistance dans la terminologie utilisée pour décrire les enfants atteints d'un trouble du langage contribuerait à une meilleure défense de leurs intérêts et que ces derniers seraient mieux servis si un seul et même terme était utilisé par tous les professionnels.

Children whose language abilities fall below the abilities of their peers are at increased risk of a variety of other problems including academic failure (Durkin et al., 2012; Johnson et al., 2010), behavioural problems (Conti-Ramsden et al., 2013), later economic disadvantage (Parsons et al., 2011), and social problems (Clegg et al., 2005). It is estimated that just over 7% of young children have a persistent language disorder that impacts their learning or social interactions (Norbury et al., 2016; Tomblin et al., 1997). These findings indicate that professionals from a variety of disciplines, including speech-language pathologists (S-LPs), need to be concerned about identifying and treating children with language problems. Until recently, there was no agreed upon label for children with unexplained language problems (Bishop, 2014), which resulted in substantial variability in the practice of labelling children with unexplained language problems. Two research studies (i.e., Bishop et al., 2016, 2017) reported a new international consensus regarding the use of the term developmental language disorder (DLD) to describe children with unexplained language problems. For this terminology consensus to have an effective and timely impact, it is important to examine how this research translates into clinical practice. The purpose of the present study was to examine current labelling practice around the time of the publication and new consensus regarding the term DLD.

The Use of Diagnostic Labels

Diagnostic labels are a key tool for advancing understanding of language problems in children and providing appropriate support to these children (Bishop, 2014). There are many potential positive consequences to providing children with diagnostic labels including providing legitimacy to and an explanation for a child's difficulty; removing blame from parents, teachers, and the child; promoting an understanding and awareness of a child's particular difficulty; providing access to resources for a child; and allowing for easier communication among professionals (Bishop, 2014; Lauchlan & Boyle, 2007).

Despite potential advantages, there is also considerable potential for unintended negative consequences of diagnostic labelling. Providing a child with a diagnostic label may emphasize what a child is incapable of doing while ignoring their strengths, allow for parents to take no responsibility for a child's struggles, cause a child to feel that their failure is inevitable, lead to a denial of resources, and lead to stigmatization, among others (Bishop, 2014; Lauchlan & Boyle, 2007). It is important that professionals are aware of the potential advantages and disadvantages of label use so efforts can be made to maximize benefits

and minimize potential harm. The label chosen for a child and the process of providing a child with a label must be navigated carefully (Bishop, 2014).

Overall, it is unclear if label provision is a priority for S-LPs when they are conducting language assessments with children. In general, despite the high prevalence and persistent functional impact of DLD, it is largely underdiagnosed (Prelock et al., 2008; Tomblin et al., 1997). For example, Tomblin et al. (1997) found that in a sample of 216 kindergarten children diagnosed with specific language impairment (SLI), only 29% of parents had previously been informed that their child had a speech or language problem. This lack of identification suggests that many children with DLD are not being seen by an S-LP. Furthermore, when these children are referred to speech and language services, how an S-LP prioritizes the various purposes for conducting language assessments is unclear. McGregor et al. (2017) informally surveyed 60 American S-LPs regarding the purpose of a language assessment. These S-LPs were asked to rate the level of importance they would assign to several assessment objectives including establishing goals for intervention, determining if a child meets eligibility criteria for services, providing parents with a diagnostic label for their child, assessing the functional impact of a child's struggles, and identifying a child's strengths and weaknesses. Interestingly, providing parents with a diagnostic label was viewed as the least important assessment objective by respondents. One contributing factor to S-LPs' failure to attribute much value to the use of labels could be the longstanding lack of consensus regarding which diagnostic term to use particularly in child language disorders.

In 2014, Bishop investigated the labels that were in current use to describe children with unexplained language problems and reported finding 132 terms in use. Many of the labels in use were observed to be too general to be useful but, of the terms deemed useful, the term SLI was the most reported. Overall, it was concluded that the varied and inconsistent use of labels for children with unexplained language problems was causing confusion, limiting service availability, hampering advocacy efforts, and impeding research.

The History of Terminology Used for Children with Language Disorders

One of the earliest references to children experiencing difficulty in language, in the absence of any other condition, was by the physician Gall in 1822 (Gall, 1835). In the years following Gall, a plethora of other diagnostic labels were used to describe children with language problems (Reilly et al., 2014). From the 1980s onward, the label SLI was widely used to describe children with language problems occurring

in the absence of other developmental deficits (Reilly et al., 2014). It should be noted that the term SLI was excluded from the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013) following a recommendation by the American Speech-Language-Hearing Association in 2012. The term *language disorder* was adopted to describe persistent difficulties in the acquisition and use of language across all modalities due to deficits in comprehension or production (American Psychiatric Association, 2013). The inclusion of the term language disorder was accompanied by the removal of cognitive referencing, the practice of comparing the function of interest to performance on a cognitive measure. Children with any nonverbal IQ score could be given the diagnostic label of language disorder if they did not meet the criteria for intellectual disability.

The Criteria and Terminology Applied to Language Impairments: Synthesizing the Evidence Studies

Following calls for an international and multidisciplinary panel to establish a consensus regarding both diagnostic criteria and the label used for children experiencing unexplained language problems (Bishop, 2014; Reilly et al., 2014), Criteria and Terminology Applied to Language Impairments: Synthesizing the Evidence (the CATALISE project) was created and spearheaded by Drs. Dorothy Bishop, Maggie Snowling, Trish Greenhalgh, and Paul Thompson. The project involved a panel of 59 international experts in children's language impairments and represented 10 disciplines (e.g., education, psychology, speech-language pathology, paediatric medicine, child psychiatry) and six countries (i.e., Australia, Canada, Ireland, New Zealand, United Kingdom, and the United States).

Bishop et al. (2016, 2017) administered two Delphi Surveys involving an iterative process of rating and commenting anonymously on a series of statements such that a 75% consensus be reached and a final list of agreed upon statements produced (Hasson et al., 2000). The first exercise addressed the criteria used to identify children with language disorders requiring intervention (Bishop et al., 2016) and the second considered the terminological issues surrounding these children (Bishop et al., 2017).

Consensus was reached regarding an overarching term of language disorder to be used for children likely to endure language problems into middle childhood and beyond that significantly impact their educational progress and everyday social interactions. Rather than employing exclusionary criteria in the definition of language disorder found to be problematic in the past, it was agreed that distinctions would be drawn between differentiating conditions, risk factors, and co-occurring conditions.

Differentiating conditions were defined as biomedical conditions in which a language disorder occurred as part of a more extensive pattern of impairments (e.g., acquired brain injury, certain neurodegenerative conditions, cerebral palsy). The panel recommended that this population of children be labelled as having a "language disorder associated with 'X'" where "X" referred to the differentiating condition. It was also recommended that the term DLD be used to describe cases of language disorder occurring in the absence of any such biomedical condition. Importantly, children with low nonverbal ability, who did not meet criteria for intellectual disability, could be given a diagnosis of DLD—a specific level of nonverbal ability was not included as an exclusionary criterion.

Co-occurring disorders were defined as impairments in cognitive, sensory-motor, or behavioural realms that may co-occur with DLD and may affect that child's impairment and/or response to treatment (e.g., attentional problems, motor problems, reading and spelling problems, emotional disorders). It was also acknowledged that DLD is a large and heterogenous category that will include children with a wide variety of problems and needs. To date, attempts to identify reliable subtypes of DLD have been unsuccessful because language problems can manifest in a wide variety of ways (Conti-Ramsden & Botting, 1999; Lancaster & Camarata, 2019). As such, it has been suggested that clinicians and researchers describe strengths and weaknesses in a child's language profile including in areas such as phonology, grammar (syntax and morphology), semantics, word finding, pragmatics/language use, and verbal learning and memory.

Implementation of the CATALISE Consensus Terminology

The publication of the CATALISE studies (i.e., Bishop et al., 2016, 2017) spurred significant international advocacy efforts to raise awareness of DLD. One goal of those seeking to advocate for the use of the terminology has been early adoption of the research findings by S-LPs in clinical practice. We know, however, that research findings can take many years to impact practice (Olswang & Prelock, 2015). This observation has led to the rise of knowledge translation, a dynamic and iterative process involving the synthesis, dissemination, exchange, and ethically sound application of knowledge to improve health, and social service delivery and systems (Canadian Institutes of Health Research, 2019). Knowledge translation activities vary widely according to the intended audience and the knowledge being translated, but they are a key element in fostering clinical uptake of research findings. One important starting point is identifying current practice, beliefs, and attitudes relevant to the new knowledge to inform necessary steps for achieving change. We considered developing an understanding of how

S-LPs currently use diagnostic labels related to childhood language disorders as a particularly important first knowledge translation activity on the road to adoption of the CATALISE international consensus on terminology.

We were particularly interested in implementation of the CATALISE consensus terminology in the English Canadian context. Only 8 of 59 experts who participated in the CATALISE studies were Canadian, which could have implications for the perceived fit with Canadian clinicians and service agencies. Another important factor relates to current practice in the use of labels, which can be expected to vary across Canada due to legislative restrictions in some provinces. For example, in the province of Ontario, the Regulated Health Professions Act enacted in 1991 lists several controlled acts, that is, activities considered to have potential to cause harm if performed by an unqualified person. One controlled act prohibited for S-LPs is communicating a causal diagnosis, a restriction many professionals view as interfering with their ability to provide labels to children. A 2018 clinical practice advice document published by the College of Audiologists and Speech-Language Pathologists of Ontario specified that, when communicating assessment results, S-LPs may use terms to describe symptoms and dysfunctions falling within their scope of practice. They stated that some of the terms used to describe assessment results may include the term “disorder.” This publication indicates that S-LPs may provide children with the label of DLD because the label is used to describe a set of symptoms and does not identify the cause of those symptoms. Despite this clarification, there is still relative uncertainty among many S-LPs practising in restricted jurisdictions like Ontario. How diagnostic labels are being used in other jurisdictions, without any restrictions, and how S-LPs within restricted jurisdictions are navigating label use has not been investigated to date.

The Current Research

The purpose of the study was to understand current practice, beliefs, and attitudes regarding label use in child language disorders to inform our knowledge translation plan for fostering implementation of the international consensus terminology related to DLD. The specific aims of the study were to investigate (a) English Canadian S-LPs’ current use of labels in practice; (b) the purposes of assessment and perceived advantages and disadvantages of using labels; (c) the barriers that exist when using diagnostic labels in practice; and (d) knowledge of, and attitudes towards, the specific diagnostic label of DLD. It was hypothesized that current use of specific diagnostic labels among S-LPs in Canada would be highly inconsistent. Additionally, it was expected that barriers to English Canadian S-LPs’ use of

specific diagnostic labels for children would include a lack of agreement regarding the importance of providing a label, confusion over which label to use, and licensing/legislative restrictions in Canada. It was further hypothesized that, due to the recency of consensus regarding the use of the specific diagnostic label of DLD (Bishop et al., 2017), the label would not be well understood or commonly used by S-LPs in professional practice today but that consistent use of a label would be seen as beneficial.

Method

Participants

A total of 370 English Canadian S-LPs working with children with language disorders agreed to take the online survey, although the number of responses per question varied. Of 355 S-LP respondents, 17.2% ($n = 61$) worked exclusively with 3–5-year-old children, 3.9% ($n = 14$) worked with 6–13-year-old children, and 0.3% ($n = 1$) worked with 14–18-year-old children. Additionally, 19.4% ($n = 69$) of the S-LPs worked with children in both of the younger age categories and 7.3% ($n = 26$) worked with children in both of the older age categories. The largest proportion of respondents, 51.8% ($n = 184$), worked with children from all three age categories.

Of 353 respondents, 44.5% ($n = 157$) worked exclusively in a school board setting, 10.5% ($n = 37$) worked in private practice, 4.5% ($n = 16$) worked in a hospital setting, and 13.3% ($n = 47$) reported working in “other” locations (e.g., a children’s treatment centre, client homes, health units, government funded autism agency, First Nations Reserves). The remaining 27.2% ($n = 96$) of respondents worked in some combination of the previously listed locations.

Of 367 collected responses, most participants (67.3%, $n = 247$) reported that, at the time of survey completion, they practised in the province of Ontario. Nine provinces were represented in this sample. The percentages of total participants who reported practising in each province is presented in **Table 1**.

Questionnaire

A 24-item questionnaire, available in English, was developed using the online survey platform Qualtrics. The first three questions addressed the specifics of the participants’ work as S-LPs (i.e., population serviced and location of practice). Four questions examined the S-LPs’ current use of specific labels to identify children with language disorders. One to three questions (depending on how each question was answered) focused on the constraints placed on the S-LPs’ use of labels based on their professional licensing body or legislature. Three

Table 1
The Percentage of Total Participants who Reported Practising in Each Province

Province	Participants practising in province	
	<i>n</i>	%
Ontario	247	67.3
Alberta	42	11.4
New Brunswick	29	7.9
British Columbia	27	7.4
Saskatchewan	12	3.3
Manitoba	6	1.6
Nova Scotia	2	0.5
Newfoundland	1	0.3
Québec	1	0.3

Note. Of the 370 participants, 367 responded to this item.

questions addressed the S-LPs’ opinion regarding the purposes of assessment in practice. The final 11 questions specifically addressed each S-LP’s knowledge and use of the diagnostic label developmental language disorder or DLD. Questionnaire responses involved either choosing from provided choices, rating using provided scales, or filling in free text (see Appendix).

Procedure

This study was approved by Western University’s Non-Medical Research Ethics Board on April 11, 2018 (ethics approval number: 2018-111290-9486). Participants were recruited in person at the 2018 Speech-Language and Audiology Canada conference in Edmonton, Alberta, and online through social media and email invitation. A request for participation was also posted on the Speech-Language and Audiology Canada’s website. Additionally, a request was sent via email to all members of the preschool and school-aged interest groups of the Ontario Association of Speech-Language Pathologists and Audiologists. After anonymously agreeing to participate, indicating their involvement with a paediatric population, and indicating employment as a registered S-LP in Canada, participants completed any or all of the remaining 21 survey questions.

Results

Label Use

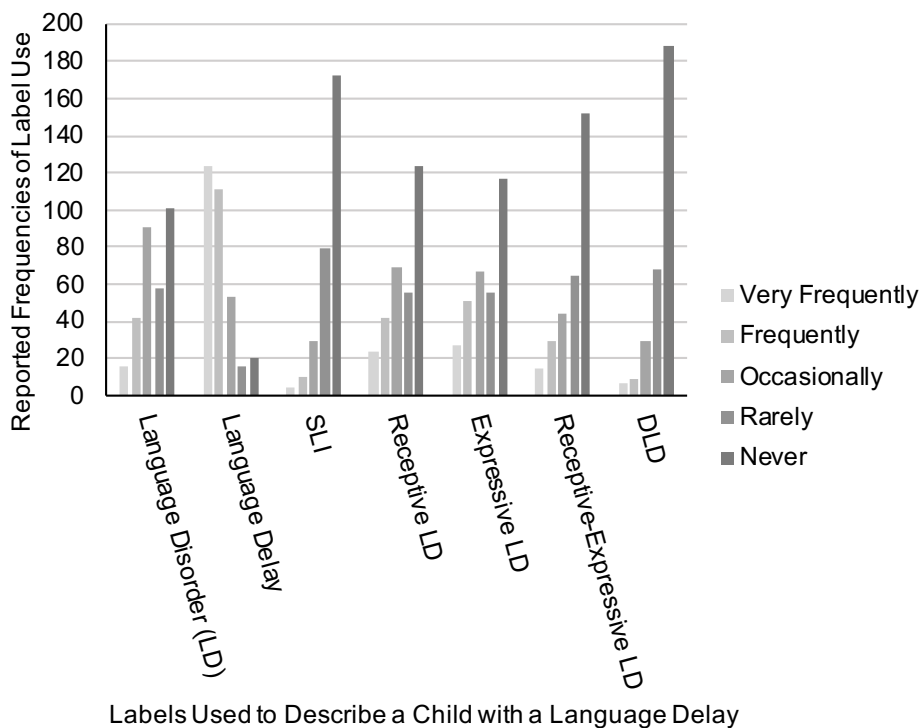
When 344 participants chose descriptions of how often they would use a specific label to describe the profile of a child presenting with a significant language delay, 12.5% (*n* = 43) reported that they would do so very frequently, 29.1% (*n*

= 100) frequently, 34.6% (*n* = 119) occasionally, 15.4% (*n* = 53) rarely, and 8.4% (*n* = 29) never.

Participants were asked how often they would use various labels when faced with a child presenting with a language delay (see Figure 1). Overall, the term language delay was used most frequently, with most respondents reporting that they used the term either frequently (34.3%, *n* = 111) or very frequently (38.3%, *n* = 124). The labels specific language impairment and developmental language disorder were used least frequently. Most respondents reported that they used the term specific language impairment rarely (26.9%, *n* = 79) or never (58.5%, *n* = 172) and the term developmental language disorder rarely (22.6%, *n* = 68) or never (62.5%, *n* = 188). In fact, a considerable proportion of respondents reported never using the labels language disorder (32.8%, *n* = 101), specific language impairment (58.5%, *n* = 172), receptive language disorder (39.5%, *n* = 124), expressive language disorder (36.9%, *n* = 117), receptive-expressive language disorder (50.0%, *n* = 152), and developmental language disorder (62.5%, *n* = 188). Additionally, it was made clear through written comments that some S-LPs preferred the term delay over disorder because it was generally perceived as less overwhelming or severe and was therefore seen as easier to apply in practice. Furthermore, some S-LPs shared, in responses, that their location of practice had prescribed labels associated with their services suggesting that constraints by individual work settings might add to the variation demonstrated in labelling practice.

S-LPs were asked to indicate reasons (from a list of six provided including “other”) that would influence their decision when choosing not to provide a child with a specific

Figure 1



Frequency of Canadian speech-language pathologists' use of various labels to describe a child with a language delay. LD = language disorder, SLI = specific language impairment, and DLD = developmental language disorder. The total *N* varied by label. LD total *N* = 308, language delay total *N* = 324, SLI total *N* = 294, receptive LD total *N* = 314, expressive LD total *N* = 317, receptive-expressive LD total *N* = 304, and DLD total *N* = 301.

label. If the respondent chose “other,” they were asked to input additional reason(s) in a free text box. Most of the 528 responses indicated that S-LPs felt that parents may not want a label applied to their child (22.9%, *n* = 121), that a label may not provide a child with any benefits or resources (19.7%, *n* = 104), and that a label focuses on what a child cannot do and may ignore their strengths (16.9%, *n* = 89). Of the 135 respondents who provided a written response, 6.7% (*n* = 9) indicated that they would not provide a label for a child who was an English Language Learner. An additional 31.9% (*n* = 43) of S-LPs commented that they would not provide a child with a specific label due to restrictions imposed upon them by their licensing/legislative body regarding their ability to diagnose or provide labels. Several S-LPs also qualified their response regarding no benefits from having a label by sharing that only particular labels were associated with service provision in their location of practice. Overall ratings for the various reasons for not providing children with a specific label are presented in **Table 2**.

Participants also indicated reasons that may influence their decision to provide a specific label to a child with language problems. Of 1109 responses, most participants reported that the following reasons would most influence their decision to give a label: a label promotes understanding and awareness of a particular difficulty (23.3%, *n* = 258), a label provides an explanation and legitimacy for a child’s struggles (22.4%, *n* = 248), a label facilitates easier communication among professionals (20.5%, *n* = 227), and a label provides access to resources and intervention (18.5%, *n* = 205). Overall ratings for the various reasons for providing children with a specific label are presented in **Table 3**.

Constraints on Label Use

Overall, 72.6% (*n* = 233) of respondents indicated that their professional licensing/legislative body limits their ability to use diagnostic labels. A subset of participants (*n* = 227) who were limited in their ability to provide diagnostic labels, reported that they would be either extremely likely (29.1%,

Table 2
Reasons Influencing the Decision to not Provide a Child With a Language Problem With a Specific Label

Reason	Responses	
	%	<i>n</i>
Other	29.5	156
Parents may not want a label to be applied to their child	22.9	121
A label may not provide a child with any benefits or resources	19.7	104
A label focuses on what a child cannot do and may ignore strengths	16.9	89
A label may lead to stigmatization or other negative consequences for the child	4.7	25
Certain resources may not be available to a child once a label is applied to him/her	4.2	22
A label may cause a child to feel that failure is inevitable	2.1	11

Note. Participants could select multiple responses to this question; therefore, the total number of responses was 528.

Table 3
Reasons Influencing the Decision to Provide a Child With a Language Problem With a Specific Label

Reason	Responses	
	%	<i>n</i>
A label promotes understanding and awareness of a particular difficulty	23.3	258
A label provides an explanation and legitimacy for a child’s struggles	22.4	248
A label facilitates easier communication among professionals	20.5	227
A label provides access to resources and intervention	18.5	205
A label removes blame from a child	6.9	76
A label removes blame from parents	6.4	71
Other	2.2	24

Note. Participants could select multiple responses to this question; therefore, the total number of responses was 1,109.

n = 66) or likely (40.1%, *n* = 91) to use diagnostic labels if the limitations posed by their professional licensing/legislative body were to change. Another 26.0% (*n* = 59) of participants felt neutral as to whether they would change their labelling practice following a change in legislation. Some participants shared that they provide appropriate labels within the constraints of their licensing/legislative body by carefully choosing acceptable wording (e.g., “symptoms/impairments are consistent with X”) or by collaborating with other professionals without such constraints (e.g., a psychologist) to provide the diagnosis.

Assessment Purposes

Participants rated the level of importance that they would assign to various assessment objectives (McGregor et al., 2017) on a scale from 1 (*very unimportant*) to 5 (*very important*). The highest rated assessment objectives

included identifying the child’s strengths and weaknesses (*M* = 4.76) and establishing goals for intervention (*M* = 4.71). The lowest rated assessment objective was providing parents with a diagnostic label (*M* = 3.12). The average ratings for each assessment objective are presented in **Table 4**.

Of 319 respondents, 27.0% (*n* = 86) reported that they felt that the outcome of their assessment would definitely put them in a position to provide a diagnostic label. Additionally, 39.2% (*n* = 125) reported that they would probably be in the position, 30.1% (*n* = 96) felt uncertain, 2.8% (*n* = 9) felt they would probably not be, and 0.9% (*n* = 3) felt they would definitely not be in the position to provide a diagnostic label following their assessment. Additionally, when invited to provide a comment about which key parts of an assessment were seen as providing diagnostic information, responses included a range of factors such as standardized assessments, language samples,

Table 4

Average Ratings of Importance of Various Assessment Objectives

Assessment objective	M	n
Identifying strengths and weaknesses	4.76	318
Establishing goals for intervention	4.71	318
Assessing the level of functional impact	4.50	318
Determining if eligibility criteria for services are met	3.73	316
Providing parents with a diagnostic label	3.12	316

Note. Rating scale ranged from 1 = very unimportant to 5 = very important. Of the 370 participants, between 316 and 318 responded to these items.

behavioural observations, parental reports, reports from other professionals, case histories, patterns of strengths and weaknesses, clinical judgement, and developmental milestones.

The Label: DLD

When 304 S-LPs reported whether they were aware of the specific label DLD, 58.9% (*n* = 179) stated that they were aware, 23.7% (*n* = 72) reported that they were maybe aware, and 17.4% (*n* = 53) reported that they were not aware. Following this response, participants were presented with four potential definitions for the label DLD and asked to choose which description they felt best matched the label. Overall, 46.2% (*n* = 141) chose the correct definition. S-LPs were then presented with the correct definition of DLD and asked if they felt that the label was effective. Of 307 respondents, 55.1% (*n* = 169) felt that the label was effective, 32.6% (*n* = 100) felt that it was maybe effective, and 12.4% (*n* = 38) felt that it was not effective. Several participants (*n* = 51) voiced concerns in the comment section of this question. These concerns included that the term “developmental” implies that a child will outgrow the disorder (12%), that the label does not include information regarding expressive versus receptive language (8%), and that the addition of the criterion “unlikely to resolve by five years of age” makes the label too challenging to use (16%).

Three-hundred and seven S-LPs responded to several questions addressing their likelihood of using the label DLD. They first rated how likely they were to use the label DLD on a 5-point scale from extremely unlikely to extremely likely (see Figure 2). The largest proportion of respondents (32.6%, *n* = 100) reported that they were neutral in their likelihood followed by 26.4% (*n* = 81) who reported they were unlikely to use the label and 25.1% (*n* = 77) who reported that they were likely to use the label. When professionals (*n* = 306) were asked how likely they would be to use the label DLD if the label were commonly used by other S-LPs, most reported that they were either likely (46.1%, *n* = 141) or

extremely likely (34.6%, *n* = 106) to also use the label (see Figure 3). Finally, participants (*n* = 306) were asked if there was an international consensus reached regarding the use of the diagnostic label DLD how likely they would be to use the label (see Figure 4). Again, most participants reported that they would be likely (45.1%, *n* = 138) or extremely likely (44.4%, *n* = 136) to use the label DLD if an international consensus were reached regarding its use.

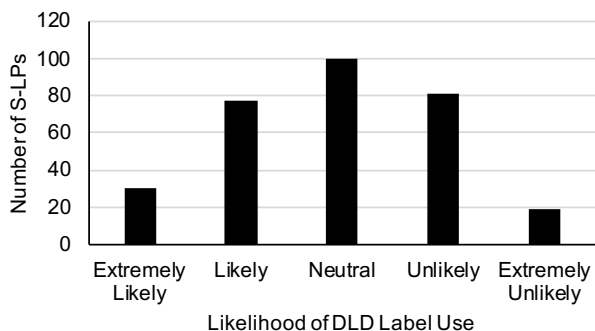
Of 307 respondents, 41.7% (*n* = 128) agreed and 45.9% (*n* = 141) strongly agreed with the statement, “having a consistent diagnostic label for children with language disorders would provide better advocacy for those children.” Additionally, of 307 respondents, 35.8% (*n* = 110) agreed and 30.3% (*n* = 93) strongly agreed with the statement, “children with language disorders would be better off if professionals were consistently using the agreed upon label of ‘DLD’.”

Discussion

The present study examined current practice, beliefs, and attitudes towards diagnostic label provision for children with language disorders in a group of 370 English Canadian S-LPs, 67% of whom practised in Ontario. Results revealed that the majority of S-LPs (76%) at least occasionally apply a specific label to describe children presenting with significant delays in their language. Of all potential labels used to describe these children, the label language delay was reported to be used most frequently while SLI and DLD were used least frequently.

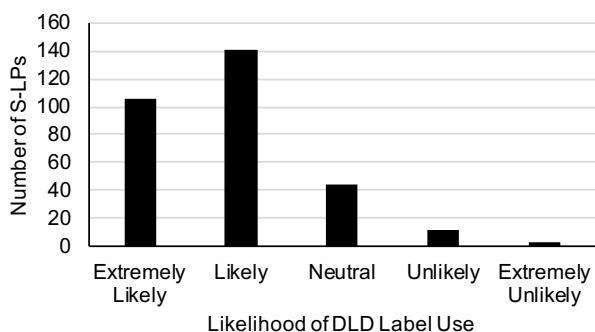
In investigating the perceived advantages and disadvantages of using labels, most Canadian S-LPs felt that disadvantages for label provision included parents not wanting their child to be given a diagnostic label, a label not being beneficial to a child, or a label focusing on what a child is not able to do, while ignoring strengths. Advantages for label provision included that a label promotes understanding of a particular difficulty, provides an explanation for a child’s difficulty, facilitates easier

Figure 2



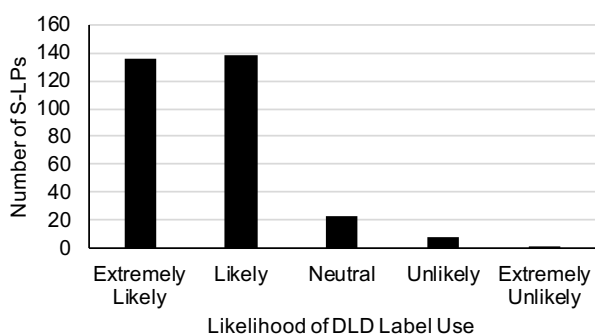
Canadian speech-language pathologists' (*n* = 307) likelihood of using the diagnostic label developmental language disorder. DLD = developmental language disorder, S-LPs = speech-language pathologists.

Figure 3



Canadian speech-language pathologists' (*n* = 306) likelihood of using the diagnostic label developmental language disorder if it were commonly used by other speech-language pathologists. DLD = developmental language disorder, S-LPs = speech-language pathologists.

Figure 4



Canadian speech-language pathologists' (*n* = 306) likelihood of using the diagnostic label developmental language disorder if an international consensus were reached regarding its use. DLD = developmental language disorder, S-LPs = speech-language pathologists.

communication among professionals, and provides access to services. When addressing the barriers to diagnostic label use in current practice, over 70% of participants indicated that their professional licensing/legislative body limits their ability to provide diagnostic labels. Regarding the specific label of DLD, over 80% of participants reported being aware or maybe aware of the label; however, less than half were able to accurately identify the definition of DLD. Nevertheless, very few Canadian S-LPs felt that the label DLD was ineffective. S-LPs indicated they would be more likely to use the label DLD in practice if their colleagues in Canada, and around the world, were also actively using the label. Nearly 90% of participants agreed that having a consistent diagnostic label for children with language disorders would provide better advocacy for these children and two-thirds agreed that children with language disorders would benefit from professionals consistently using the label of DLD.

Current Use of Labels in Canadian Practice

The majority of English Canadian S-LPs use diagnostic labels at least occasionally. Nevertheless, there is considerable diversity in the use of specific labels by English Canadian S-LPs to describe children experiencing a delay in the development of their language (see Figure 1). At the time of the current survey, Canadian S-LPs used a variety of labels with language delay being heavily favoured, followed by language disorder. The terms SLI, receptive language disorder, expressive language disorder, receptive-expressive language disorder, and DLD were reported to never be used by most respondents when labelling children. Interestingly, it was reported that the labels SLI and DLD were used least frequently overall by participants despite SLI being so commonly used throughout the recent literature and DLD being the consensus from Bishop et al.'s (2017) study regarding terminology. It is also important to note that nearly a quarter of English Canadian S-LPs rarely or never applied diagnostic labels to children at the time of the current survey. Overall, the current research provides clear support for the hypothesis that diagnostic labels by S-LPs in Canada is highly inconsistent.

The Perceived Advantages and Disadvantages of Label Use

To investigate potential advantages of label use, S-LPs were asked to indicate their agreement with each of a list of six potential positive consequences of diagnostic labelling (Bishop, 2014; Lauchlan & Boyle, 2007). The greatest number of participants agreed that a label promotes understanding and awareness of a particular difficulty, a label provides an explanation and legitimacy for a child's struggles, and a label provides access to resources and

intervention. In contrast, just under 20% of S-LPs felt that providing a child with a diagnostic label would not provide that child with any additional benefits. The most frequently endorsed reasons for not providing a label included that parents may not want a label to be applied to their child and that a label may not provide a child with any benefits or resources. Label use has previously been reported to be largely helpful and to reduce parental anxiety by providing an explanation for a child's difficulty (Lauchlan & Boyle, 2007). Nevertheless, labels have also been found to be less helpful in special education (Lauchlan & Boyle, 2007) and to have negative consequences such as rejection, exclusion, and stigmatization (Macharey & von Suchodoletz, 2008). Despite the potential benefits of providing labels, these concerns indicate that careful attention must be paid to how labels are communicated. Consistency in using a label and increasing awareness and understanding of that label may be key to reducing negative consequences.

Relatedly, English Canadian S-LPs rated "providing parents with a diagnostic label" as the least important assessment objective of five potential objectives. This finding echoed a similar informal observation made of American S-LPs by McGregor et al. (2017). Recall that 23% of the respondents in the current study indicated that they felt parents may not want a label to be applied to their child. Evidently, S-LPs hold particular beliefs about parental views of diagnostic labels—specifically, that labels will be viewed negatively by parents. Such a belief could have contributed to hesitancy on the part of some S-LPs to provide a particular label. It is also possible that the low importance placed on providing a label is related to available resources or services, a reason given for not providing a label. It is reasonable to assume that if diagnostic labels are not directly tied to access to resources, S-LPs will be less inclined to provide a label. However, this thinking causes a circular problem—if S-LPs are not consistently providing a label when describing children with DLD, then there will be fewer children with DLD seeking resources. As a result, the resources available for these children will be scarce, which may result in S-LPs being less inclined to provide the label. It is important to recognize that DLD must be consistently diagnosed before awareness of the disorder can grow and advocacy efforts can facilitate the development of appropriate resources.

Importantly, only two-thirds of participants reported that they felt the outcome of their assessment would probably or definitely put them in a position to provide a diagnostic label. When invited to provide a comment about what key parts of an assessment S-LPs felt would provide them with diagnostic information, answers were diverse and included standardized assessments, language samples,

behavioural observations, parental reports, reports from other professionals, case histories, patterns of strengths and weaknesses, clinical judgement, and developmental milestones. Given that this array of assessment tools represents common practice, further research is needed to understand the circumstances under which S-LPs feel prepared to provide a diagnostic label following their assessment. In particular, research into assessment protocols and methodology for identifying language disorders in children may be required. Greater awareness of the consensus reached regarding how to identify language impairments in children (Bishop et al., 2016) is crucial for those professionals working in the field of childhood language disorders.

Barriers to Diagnostic Label Use in Practice

Most respondents indicated that their professional licensing/legislative body limited their ability to use diagnostic labels. This result was unsurprising considering that most participants in this study were practising in the province of Ontario—a province with particular rules regarding the use of diagnostic labels. Even though the professional legislative body within Ontario has specified that S-LPs can apply the label of DLD, there is still a lack of clarity among S-LPs about these diagnostic regulations. Despite this uncertainty, it is encouraging that of the participants who felt they were not permitted to provide the label, 69% reported that they were either extremely likely or likely to use diagnostic labels if these (perceived) restrictions were to change. With some clarification regarding communicating a diagnosis, it is reasonable to assume that S-LPs will be able to use the label of DLD more actively in the future.

Some of the participants who felt limited in their ability to provide diagnostic labels chose to provide commentary on how they provided labels within the constraints of their licensing or legislative body. Most comments indicated that to communicate the problem a child was experiencing, S-LPs would collaborate with other professionals who were not restricted in their ability to provide a label or, most commonly, they would choose to communicate the problem through carefully worded phrases like, "symptoms/impairments are consistent with X" or "this profile is similar to that of other children presenting with X," where X represents a particular label. Nevertheless, the results of this study support the hypothesis that licensing/legislative bodies in Canada are a major barrier to providing diagnostic labels to children with language disorders.

Anecdotally, some S-LPs shared comments indicating that within specific practices only certain labels were associated with resource allocation—creating a barrier to

their personal provision of the DLD label. Even if an S-LP felt that a diagnostic label was warranted and beneficial for a child, there may be pressures placed on S-LPs from a higher system level to provide or not provide specific labels. This notion indicates that for widespread implementation of the label DLD, and other diagnostic labels, consensus and recognition among various institutions and practices needs to first be achieved.

One additional reason that respondents gave for not providing the label DLD was in the case of children learning English as an additional language. Of course, the challenges of assessing culturally and linguistically diverse children are well recognized (Bedore & Peña, 2008; Espinosa, 2012). English language learners tend to score at low levels on standardized tests of English language for over 3 years (Paradis, 2016). In fact, groups of DLD and culturally and linguistically diverse children have been found to score at comparably low levels on standardized English language tests in many studies (e.g., Paradis, 2005; Windsor & Kohnert, 2004). It follows that for many culturally and linguistically diverse children, their low language test scores can be entirely accounted for by their (developing) English language proficiency. These children are best described as having a language difference rather than a disorder. The CATALISE studies clearly indicated that it is not appropriate to diagnose DLD in cases where low English language proficiency *alone* accounts for low language performance. Crucially, however, this statement does not preclude a diagnosis of DLD in culturally and linguistically diverse children. In cases where assessment results indicate that the observed language learning difficulties go beyond what can be accounted for by low English proficiency alone, it would be appropriate to identify a language disorder. It can be expected that distinguishing language difference and language disorder will be particularly challenging in some cases, which could account for why some respondents considered English language learner status to be a barrier in using the DLD label.

Knowledge of, and Attitudes Towards, the Label DLD

Although just under half of S-LP respondents indicated that they are not likely to use the term DLD, a majority reported they would use it if other S-LPs commonly used it. As well, just over half of participants stated that they were aware of the label DLD, although less than half were able to select the precise definition from the CATALISE studies. Although DLD was rarely used at the time of the survey, most participants agreed that having a consistent diagnostic label for children with language disorders would allow for better advocacy and that these children would benefit from professionals consistently using the agreed upon label

of DLD. These results suggest that knowledge translation activities are more likely to be successful if they are aimed broadly at S-LPs across Canada and internationally. The findings also highlight the importance of advocacy efforts aimed at both the criteria for, and application of, the DLD label from the CATALISE studies to properly inform clinical practice. It appears that consistent international practice would encourage clinicians to put aside personal opinions regarding the specifics of the DLD label for the greater benefit of children with language impairment.

Limitations

In the current study, the label language delay was preferred by most participants. The frequency of use of this label may have been influenced, in part, by the wording used in this questionnaire. When S-LPs were asked to choose a label to describe, "a child presenting with a language delay," it may be fair to assume that many were primed to choose the label language delay. It would be useful, in future research, to gather further commentary from S-LPs describing why certain labels were preferred over others. Additionally, most participants in the current study reported practising in Ontario which may have influenced results related to the process of communicating a diagnosis or using diagnostic labels in general. Ontario is particularly diverse in terms of culture and language. Approximately 200 different languages were reported by Ontarians as a mother tongue according to the 2016 Canadian Census (Government of Ontario, 2017). This diversity may present a challenge for clinicians when completing language assessments and may directly influence their likelihood of providing the label DLD. A larger and more diverse sample would provide even clearer evidence of the reality of label use in clinical practice.

Future Directions

An important next step in furthering our understanding of DLD label use among S-LPs is to investigate change in the use of labels in practice as a result of knowledge translation activities. Future work is also needed to understand assessment activities and results that would prompt a practising clinician to apply, or avoid applying, the label DLD. Through use of another online questionnaire, we are interested in investigating clinicians' levels of comfort with the label DLD (when and how it is being applied). We are also interested in expanding the scope of our research to encompass S-LPs from other countries outside of Canada.

Conclusion

Overall, label use was found to be inconsistent in this sample of English Canadian S-LPs with barriers related to perceived disadvantages, practice restrictions, or

challenges of differential diagnosis. Although less than half could select the definition, most participants reported being familiar with DLD, the consensus term for children with a persistent language disorder with a functional impact and no associated biomedical condition. Most participants agreed that having a consistent label for children with language disorders would provide better advocacy for them and that they would be better off if professionals all used the agreed upon label of DLD. Respondents also indicated that they would be more likely to use DLD in situations when other S-LPs were perceived to be using the label as well. These findings set the stage for research, knowledge translation activities, and advocacy aimed at informing clinical practice about consensus terminology related to childhood language disorders.

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Authors' Note

Correspondence concerning this article should be addressed to Alyssa Kuiack, School of Communication

Sciences and Disorders, Western University, Elborn College,
1201 Western Road, London, ON, Canada, N6G 1H1. Email:
akuiack2@uwo.ca

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Appendix

1. With which of the following age groups do you work in your practice? Please check all that apply.

- 3–5 years old
- 6–13 years old
- 14–18 years old
- I do not work with individuals in this age range

2. Please indicate the practice settings in which you work (check all that apply):

- School Board
- Hospital
- Residential Health Care
- Nonresidential Health Care
- Private Practice
- Other

3. Please indicate the province or territory in which you practice as a registered/licensed speech-language pathologist.

- British Columbia
- Alberta
- Saskatchewan
- Manitoba
- Ontario
- Québec
- New Brunswick
- Nova Scotia
- Prince Edward Island
- Newfoundland
- Yukon Territory
- Northwest Territories
- Nunavut
- I do not practice in Canada

4. How often would you use a specific label to describe the profile of a child presenting with a significant language delay?

- Very Frequently
- Frequently
- Occasionally
- Rarely
- Never

5. For a child presenting with a language delay, how often do you use the following labels:

Very Frequently	Frequently	Occasionally	Rarely	Never
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- Language Disorder
- Language Delay
- Specific Language Impairment
- Receptive Language Disorder
- Expressive Language Disorder
- Receptive-Expressive Language Disorder
- Developmental Language Disorder

6. When you DO NOT provide a child with a specific label, which of the following reasons influence your decision:

- A label focuses on what a child cannot do and may ignore their strengths
- A label may cause a child to feel that failure is inevitable
- A label may lead to stigmatization or other negative social consequences for the child
- Certain resources may not be available to a child once a label is applied to him/her
- A label may not provide a child with any benefits or resources
- Parents may not want a label applied to their child
- Other

7. When you DO provide a child with a specific label, which of the following reasons influence your decision:

- A label provides an explanation and legitimacy for a child's struggles
- A label removes blame from a child
- A label removes blame from parents
- A label promotes understanding and awareness of a particular difficulty
- A label provides access to resources and intervention
- A label facilitates easier communication among professionals
- Other

8. Does your professional licensing/legislative body limit your ability to use diagnostic labels?

- Yes
- No

9. If the limitations posed by your professional licensing/legislative body were to change, how likely would you be to use diagnostic labels?

- Extremely Likely
- Likely
- Neutral
- Unlikely
- Extremely Unlikely

10. Are there ways you can provide appropriate labels within the constraints of your licensing/ legislative body? If so, please describe.

11. What is the level of importance you would assign to the following assessment objectives:

Very Important	Important	Neutral	Unimportant	Very Unimportant
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- Establishing goals for intervention
- Determining if eligibility criteria for services are met
- Providing parents with a diagnostic label
- Assessing the level of functional impact
- Identifying strengths and weaknesses

12. Do you feel that the outcome of your assessments puts you in a position to provide a diagnostic label?

- Definitely yes
- Probably yes
- Might or might not
- Probably not
- Definitely not

13. What key parts of an assessment would give you diagnostic information?

14. Are you aware of the label “Developmental Language Disorder”?

- Yes
- Maybe
- No

15. Pick the description that you think matches the label of “Developmental Language Disorder”

- Language that does not develop normally and presents difficulties that cannot be accounted for by generally slow development, physical abnormality of the speech apparatus, Autism Spectrum Disorder, apraxia, acquired brain damage or hearing loss.
- A communication disorder in which both the receptive and expressive areas of communication may be affected in any degree, from mild to severe and involve a difficulty understanding words and sentences.
- Language difficulties that create obstacles to communication or learning in everyday life that are unlikely to resolve by five years of age and are not associated with any known biomedical condition such as brain injury, neurodegenerative conditions, genetic conditions or chromosome disorders such as Down Syndrome, sensorineural hearing loss, Autism Spectrum Disorder or Intellectual Disability.
- Language challenges that present difficulty in expressing language or understanding language, are unlikely to resolve by five years of age, and are unrelated to sensorineural hearing loss, Autism Spectrum Disorder or Intellectual Disability.

16. Developmental Language Disorder is defined as: "language difficulties that create obstacles to communication or learning in everyday life that are unlikely to resolve by five years of age and are not associated with any known biomedical condition such as brain injury, neurodegenerative conditions, genetic conditions or chromosome disorders such as Down Syndrome, sensorineural hearing loss, Autism Spectrum Disorder or Intellectual Disability"

Do you feel that the diagnostic label of "developmental language disorder," as defined above, is an effective label?

- Yes
- Maybe
- No
- Comments

17. How likely are you to use the diagnostic label of "Developmental Language Disorder"?

- Extremely Likely
- Likely
- Neutral
- Unlikely
- Extremely Unlikely

18. Could you use the label of "Developmental Language Disorder" in your current work setting?

- Yes
- Maybe
- No
- Comments

19. How likely would you be to point parents towards resources regarding Developmental Language Disorders?

- Extremely Likely
- Likely
- Neutral
- Unlikely
- Extremely Unlikely

20. If the diagnostic label of "Developmental Language Disorder" were commonly used by speech-language pathologists, how likely would you be to use the label too?

- Extremely Likely
- Likely
- Neutral
- Unlikely
- Extremely Unlikely

21. If there were an international consensus reached regarding the use of the diagnostic label of "Developmental Language Disorder," how likely would you be to use the label?

- Extremely Likely
- Likely
- Neutral
- Unlikely
- Extremely Unlikely

22. How strongly do you agree with the following statement: Having a consistent diagnostic label for children with language disorders would provide better advocacy for those children.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

23. How strongly do you agree with the following statement: Children with language disorders would be better off if professionals were consistently using the agreed upon label of "Developmental Language Disorder."

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

24. Please share anything else that you have heard about the diagnostic label of "Developmental Language Disorder" or any other thoughts you have regarding this label and its use.



Speech-Language &
Audiology Canada

Orthophonie et
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Communicating care
La communication à coeur

613.567.9968

1.800.259.8519

1000-1 rue Nicholas St.

Ottawa ON K1N 7B7

www.sac-oac.ca | @SAC_OAC

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