Parents as Partners: The Early Identification of Children at Risk of Developmental Language Disorders Using Valid Parent Questionnaires

Roxanne Bélanger, Chantal Mayer-Crittenden, and Michèle Minor-Corriveau

1. Introduction

Developmental Language Disorder (DLD) is one of the most prevalent disabilities identified in Canadian preschool-aged children (CASLPA, 2010). According to the Public Health Agency of Canada (2018), the prevalence for Autism Spectrum Disorder is 1.52%; in contrast, that of DLD is 7.58% (Norbury et al., 2017). As speech and language problems have a negative impact on academic learning and special education status, the early identification of children with difficulties is a priority for Speech-language pathologists (Janus, Labonté, Kirkpatrick, Davies & Duku, 2019).

Parent reports are being increasingly used as a screening measure for language development because parents have extensive experience with their children under a wide variety of naturalistic situations (Bishop, Snowling, Thompson, & Greenhaigh, 2016). However, the identification of preschool children with Developmental Language Disorders (DLD) using parental information is a complex task (Dale, Price, Bishop, & Plomin, 2003). This is due to the fact that delays in the preschool population often appear to resolve at a surface level and that the tools that are currently available lack adequate sensitivity and specificity for predicting long-term problems (Law, Boyle, Harris, Harkness, & Nye, 2000a).

2. Parental report as a screening measure

In 2015, a US Preventative Services Task Force released an update to the 2006 recommendations on the screening methods for language delays in preschool-aged children (Siu, 2015). Twenty-four studies evaluating the accuracy of 20 tools were selected; of these, seven were parent-administered: the Ages &
Stages Questionnaires (ASQ), the General Language Screen (GLS), the Infant-Toddler Checklist (ITC), the Language Development Scale (LDS), the MacArthur-Bates CDI (CDI), the Speech and Language Parent Questionnaire (SLPQ), and the Ward Infant Language Screening Test (Nelson, Nygren, Walker, & Panoscha, 2016). Although test performance characteristics varied widely, parent-administered screening tools generally performed better than other tools. Studies rated as having good to fair quality reported wide ranges of sensitivity (17-100%) and specificity (45-100%) when compared with reference standards. However, many methodological issues were noted: most instruments utilized in the context of these studies were not designed for screening purposes; the instruments measured different domains; the reference standards varied across studies; few studies compared the performance of two screening techniques in one sample; and finally, few studies compared the performance of a single screening technique across different samples (Nelson, Nygren, Walker, & Panoscha, 2016). The applicability of this evidence was also limited by several factors: most studies focused on prescreened samples with a relatively high prevalence of language delays and disabilities (usually 10%), the tools and outcome measures used were different in each sample and setting, small sample sizes, and studies conducted in countries with health care systems that were not comparable to that of the United States (Siu, 2015).

The authors therefore determined that the optimal screening methods have yet to be established and suggested using instruments that measure broad developmental domains that incorporate known risk factors and parental report in order to provide information about their added value (Nelson, Nygren, Walker, & Panoscha, 2016). The goal of the present research is to address this issue. Our objective was to determine if a battery of parent reported information measuring robust predictors of DLD is as efficient as a speech-language evaluation in determining those children that are at risk for DLD.

3. DLD: sociodemographic, pre-linguistic, linguistic and non-linguistic risk factors

Given that the accurate identification of children at risk for DLD remains a complex task, some authors have focused on identifying robust predictors of outcomes in young language-delayed children. These predictors can be divided into four domains: sociodemographic, pre-linguistic, linguistic and non-linguistic. From a sociodemographic perspective, the most consistently reported factors are parental concern, family history of a communication disorder, male gender and perinatal factors (Nelson, Nygren, Walker, & Panoscha, 2016; Siu, 2015). Also reported, though less consistently, is low maternal or parental education (Nelson, Nygren, Walker, & Panoscha, 2016; Siu, 2015).

From a pre-linguistic perspective, the factors most often reported include poor use of gestures, no babbling, not responding to speech and/or sounds and minimal communication attempts (Bishop, Snowling, Thompson, Greenhaigh, 2016; Nelson, Nygren, Walker, & Panoscha, 2016; Siu, 2015). From a linguistic
perspective, factors reported include: limited verb repertoire, acquisition of first words after 15 months, acquisition of first word combinations after 24 months, severity of initial impairment in expressive ability and severity of initial impairment in receptive ability (Bishop, Snowling, Thompson, Greenhaigh, 2016; Nelson, Nygren, Walker, & Panoscha, 2016; Siu, 2015).

Reported non-linguistic factors include low performance on tasks measuring phonological short-term memory (PSTM), as well as verbal working memory (VWM) (Bryant, Bradley, Maclean, & Crossland, 1989; Diamond, 2013; Miyake, Friedman, Emerson, Witzki, Howarter, & Wagner, 2000). Studies have consistently shown that children with DLD have associated deficits in memory and other cognitive abilities (Bryant, Bradley, Maclean, & Crossland, 1989; Diamond, 2013; Miyake, Friedman, Emerson, Witzki, Howarter, & Wagner, 2000). For example, familiarity with the production of nursery rhymes has been shown to be an effective predictor of reading and academic achievement three years later (Bryant, Bradley, Maclean, & Crossland, 1989). Also, DLD has been found to frequently co-occur with attention and reading difficulties (Bishop, Snowling, Thompson, Greenhaigh, 2016). Using Baddeley’s model of working memory, the relationship between verbal working memory (VWM) and phonological short-term memory (PSTM) as predictors of DLD has been examined using tasks measuring these skills. To measure PSTM, a non-word repetition (NWR) task is often used. Children with DLD have been found to have poorer NWR skills compared to age- and language-matched controls (Archibald & Gathercole, 2007; Baird, Dworzynski, Slonims, & Simonoff, 2010; Gillam, Cowan, & Day, 1995; Marton & Schwartz, 2003). In studies of preschool children with DLD, the diagnostic accuracy of NWR performance surpassed that of other evaluation tools, suggesting that it may be a more accurate diagnostic measure (Gray, 2003). Language processing tasks like NWR have also been found to be relatively uninfluenced by social and cultural backgrounds, unlike measures of learned knowledge (Bishop, Snowling, Thompson, Greenhaigh, 2016; Gray, 2003; Thordardottir & Brandeker, 2013).

4. DLD in bilingual children

The proper identification of DLD is made even more complex when one considers children living in a multilingual environment. In particular, three characteristics of bilingual children make it difficult to identify those at risk of DLD: an uneven distribution of abilities in the child’s two languages, cross-linguistic association within bilingual learners, and individual variation due to social circumstances (Thordardottir, Kehavia, Lessard, Sutton & Trudeau, 2010). Bilingual children deserve more attention in terms of the early detection of speech and language delays because of both the lack of screening instruments for this population and because of the large diversity of this group (Maas, 2000). Several new tools and standards have been developed in Quebec and it would be desirable to use them in other provinces. However, there are important differences in the linguistic context of French between provinces: outside Quebec, Francophones
live in a minority context (Mayer-Crittenden, Thordardottir, Robillard, Minor-Corriveau, & Bélanger, 2013).

5. Method

A review of the literature demonstrates that much is known regarding the individual factors that impact language development, as well as the linguistic and non-linguistic predictors of DLD. However, given the variability of early language development, the fact that at a surface level, some children seem to catch up, and current tools’ lack of adequate sensitivity and specificity for predicting longer-term problems, the proper identification of DLD in preschoolers using parent-based information is not yet possible.

The present study aims to address this lack of optimal methods and the recommendation of using instruments measuring broad developmental domains. To date, only a few studies have examined the interaction of risk factors from multiple developmental domains on development. Taken together, the conclusions imply that examining language development requires a holistic and interactionist view, combining multiple sources of information and monitoring them over time in order to determine patterns of operating factors. This is a basic component of the person-oriented approach and falls under the purview of this research (Bergman, & Magnusson, 1997; Bergman, & Trost, 2006). The goal of the study was to assess the predictive validity of a battery of parent questionnaires measuring robust predictors of DLD by monitoring a sample of children longitudinally, from 36 to 72 months.

5.1. Participants

This project focused on unilingual and bilingual children living in Northeastern Ontario, Canada. At the time this paper was published, 46 assessments were completed. In the context of this paper, results for the 36-month assessment of the monolingual anglophone participants will be reported ($n = 27$). This information will provide preliminary data on the feasibility of this approach in the early identification of children with DLD. In total, fourteen boys and thirteen girls were assessed; mean age was 36 months (SD 4.0). Participants' characteristics can be found in Table 1.

Recruitment was done via social media networks, promotion and communication in the community, as well as by the creation of strategic partnerships with local school boards, daycares and early childhood centres. Community partners were invited to participate in recruitment by placing posters in public places and distributing them to families with children aged 30 to 42 months. The exclusionary criterion for study participation was age (less than 30 months and more than 42 months), as well as a biomedical diagnosis or chromosomal disorder associated with cognitive or language delay. Parents interested in participating were encouraged to contact the research team. On the
day of the assessment, informed consent was obtained. This study was approved by the Laurentian University Research Ethics Committee (LUREB).

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>21</td>
<td>47.7</td>
</tr>
<tr>
<td>Female</td>
<td>23</td>
<td>52.3</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>30</td>
<td>66.7</td>
</tr>
<tr>
<td>French</td>
<td>11</td>
<td>24.4</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>6.7</td>
</tr>
<tr>
<td><strong>Positive familial history of language difficulties</strong></td>
<td>Yes</td>
<td>28</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>36.4</td>
</tr>
<tr>
<td><strong>Parental concerns regarding language acquisition</strong></td>
<td>Yes</td>
<td>18</td>
</tr>
<tr>
<td>No</td>
<td>26</td>
<td>59.1</td>
</tr>
<tr>
<td><strong>Daycare</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>39</td>
<td>88.6</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>11.4</td>
</tr>
<tr>
<td>Maternal education (mean; SD)</td>
<td>Years</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>39</td>
<td>17.3; 2.8</td>
</tr>
</tbody>
</table>

5.2. Procedure

At the time of the assessment, parents completed a sociodemographic questionnaire, a language mapping tool and four standardized parent-reported screening tools. Concurrently, a standardized language evaluation occurred. The standardized language measures were used to confirm parent-reported difficulties of language delay. The evaluation and interpretation procedures followed the procedures set out in each test manual. Sociodemographic information, raw scores and standardized scores were then collected and coded for statistical analyses.

A registered Speech-language pathologist or a trained research assistant administered the assessment tools. The evaluations took place in a quiet room at the child’s daycare or at the Laurentian University Speech-language pathology Clinic. Each evaluation lasted about 60 to 90 minutes. A variety of suitable games were available for the child during breaks. The child who was too shy or was unwilling to answer was not required to perform the task.

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1 Unless otherwise indicated
5.3. Materials

Tools measuring linguistic and sociodemographic information:
- Exposure mapping tool (parent measure)
- Sociodemographic questionnaire (parent measure)

Tasks measuring language:
- Ages & Stages Questionnaires (parent measure)
- Language Use Inventory (parent measure)
- Clinical Evaluation of Language Fundamentals Preschool – Second Edition (Pragmatic Profile) (parent measure)
- Clinical Evaluation of Language Fundamentals Preschool – Second Edition (Following Directions, Recalling Sentences subtests) (standardized measure)
- Montgomery Assessment of Vocabulary Acquisition – Receptive/Expressive (standardized measure)

Tasks measuring attention and executive functioning:
- Behaviour Rating Inventory of Executive Functioning – Preschool (parent measure)
- NEPSY-II (Statue Subtest) (standardized measure)

6. Results

Raw scores on all measures were inputted into IBM SPSS 26 software in order to complete correlational analysis between parental and standardized measure. In addition, a correlational analysis was conducted between parental language concerns reported in the demographic questionnaire, scores on the parental questionnaires and standardized measures. A Pearson’s r test was computed to assess the relationship between these variables. This information yielded preliminary data on the feasibility of this approach in the early identification of children with DLD.

Overall, the preliminary results demonstrated that when parents had concerns regarding their child’s development, it was reflected in the results of both parental measures, the LUI, the ASQ, as well as the standardized vocabulary test, the MAVA – Expressive. Also, results on the parental measures were in line with those obtained by a Speech-language pathologist on the standardized measures. Interestingly, parental information as reported on the ASQ – Problem solving subtest was also strongly correlated with the vocabulary test, the MAVA. Finally, strong correlations were observed between both standardized parent-reported measures (LUI, ASQ), as well as between parent-reported measures (LUI, ASQ) and vocabulary assessment (MAVA-E/R). Data collection and analysis for all other measures are underway. Results can be found in Table 2.
Table 2
Correlations between parental & linguistic measures

<table>
<thead>
<tr>
<th>Variables§</th>
<th>Parental concerns (Y/N)</th>
<th>LUI</th>
<th>ASQ–CS</th>
<th>ASQ–PSS</th>
<th>MAVA–R</th>
<th>MAVA–E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental concerns (Y/N)</td>
<td>.535**</td>
<td>.433**</td>
<td>.238</td>
<td>.126</td>
<td>.609**</td>
<td></td>
</tr>
<tr>
<td>LUI</td>
<td>.535**</td>
<td>.476*</td>
<td>.364</td>
<td>.150</td>
<td>.342</td>
<td></td>
</tr>
<tr>
<td>ASQ–CS</td>
<td>.433*</td>
<td>.476*</td>
<td>.255</td>
<td>-.083</td>
<td>.363</td>
<td></td>
</tr>
<tr>
<td>ASQ–PSS</td>
<td>.238</td>
<td>.364</td>
<td>.225</td>
<td>-.083</td>
<td>.529**</td>
<td></td>
</tr>
<tr>
<td>MAVA–R</td>
<td>.126</td>
<td>.150</td>
<td>-.083</td>
<td>.529**</td>
<td>.476*</td>
<td></td>
</tr>
<tr>
<td>MAVA–E</td>
<td>.609**</td>
<td>.342</td>
<td>.363</td>
<td>.584**</td>
<td>.476*</td>
<td></td>
</tr>
</tbody>
</table>

7. Conclusion

As Developmental Language Disorders (DLD) are one of the most prevalent disabilities identified in Canadian preschool-aged children and have a negative impact on academic learning and special education status, the early identification of children with difficulties is a priority for Speech-language pathologists (Janus, Labonté, Kirkpatrick, Davies & Duku, 2019). However, the early identification of DLD in preschool children using parental information is not possible at this time (Dale, Price, Bishop, & Plomin, 2003). This is due to the fact that delays in the preschool population often appear to resolve at a surface level and that the tools that are currently available lack adequate sensitivity and specificity for predicting long-term problems (Law, Boyle, Harris, Harkness, & Nye, 2000a). Consequently, some authors have suggested using instruments that measure broad developmental domains that incorporate known risk factors and parental report (Nelson, Nygren, Walker, & Panoscha, 2016). The goal of the present project is to address this issue; our goal was to determine if a battery of parent reported information measuring robust predictors of DLD is as efficient as a speech-language evaluation in determining those children that are at risk for DLD.

At the time this paper was published, 46 assessments were completed. In the context of this paper, results for the 36-month assessment of the monolingual anglophone participants was reported (n = 27). The information presented will provide preliminary data on the feasibility of this approach. In total, fourteen boys and thirteen girls were assessed; mean age was 36 months (SD 4.0). Preliminary results are promising and demonstrated that when parents had concerns regarding their child’s development, it was reflected in the results of both parental measures (LUI, ASQ), as well as the standardized vocabulary measure (MAVA – Expressive). Also, results on the parental measures were in line with those obtained by a Speech-language pathologist on the standardized measures.

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2 * Correlation is significant at the 0.05 level; ** correlation is significant at the 0.01 level.
Interestingly, parental information as reported on the ASQ – Problem solving subtest was also strongly correlated with the standardized vocabulary measure (MAVA-E/R). Finally, strong correlations were observed between both standardized parent-reported measures (LUI, ASQ), as well as between parent-reported measures (LUI, ASQ) and vocabulary assessment (MAVA-E/R).

This study is ongoing; three more data points are necessary for each participant (i.e. one assessment per year). Once four data points are collected, a final standardized assessment will take place in order to determine the presence of DLD and to assess nonverbal intelligence using the Leiter-3 (Roid, Miller, Pomplum, & Koch, 2013). Children with scores below the average range will be excluded. Two experienced researchers will act as inter-raters and determine the participants that have a DLD based on the following criteria: 1) parental concern regarding the child’s speech and language development; 2) at least two scores in the child’s dominant language situated one standard deviation or more below the mean; and 3) general consensus between the two SLPs that the participant has DLD. Participants will then be divided into 2 groups: DLD and non-DLD. Using logistic regressions, mean scores for both groups will be compared. To identify the optimal independent variables that distinguish these groups, as well as the optimal ages and frequency of screening, discriminant function analyses will be completed.

The potential impact of the conclusions taken from this study will directly influence front line staff working with preschool and school-aged children. The conclusions drawn will be significant, allowing professionals to identify at an early age vulnerable children who will experience academic and social challenges and reduce the long wait times for evaluations. In many communities, especially those living in northern and rural areas, a lack of professionals is a challenge. By using parental reports to streamline the referral process, the skills of these limited professionals could be devoted more fully to active intervention rather than identification.

References


