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The relationship between language difficulties, psychosocial difficulties, and speech-language pathology service access in the community

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Declaration of Interest

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The relationship between language difficulties, psychosocial difficulties, and speech-language pathology service access in the community

Abstract

Background: A range of factors may impact on whether children access speech-language pathology services, beyond their communication difficulties. For instance, co-occurring psychosocial difficulties may amplify children's observable difficulties, leading to greater access. It is important to examine such associations, because they may reflect inherent

differences between children with language difficulties who access services and those who do not, indicating under-servicing for sub-groups in the community.

Aims: The first aim of this study was to examine possible differences in psychosocial difficulties between children with language difficulties who did versus did not access speech-language pathology (SLP) services in the past 12 months. The second aim was to examine the unique contribution of psychosocial difficulties to service access, over and above language difficulties, common predictors of service access.

Methods & Procedures: Analyses were carried out on data gathered from 808 11-year-old children who took part in the Early Language in Victoria Study (ELVS). Children were categorised as having language difficulties based on their CELF-4 Core Language Score with a cut-point of >1.25 SD below the mean. The primary outcome measure was access to speech-language pathology services in the past 12 months. Comparison and predictor variables included children's psychosocial difficulties, language skills, relevant demographic variables (gender, caregiver education), and prior SLP access.

Outcomes & Results: 42 children with language difficulties who had accessed speech-language pathology services had significantly greater psychosocial difficulties than those who had not (SDQ Total Difficulties, U = 53.00, z = -4.080, $p < .001$). Using binary logistic regression, a model examining child gender, caregiver education, psychosocial difficulties (internalising and externalising behaviours), language difficulties, and prior SLP access (in earlier years) was significant $\chi 2$ (8) = 137.285, $p < .001$, with increased externalising difficulties (OR = 1.213, $p < .001$), increased communication difficulties (OR = .949, $p < .001$), and prior SLP access (OR = 7.430, $p < .001$) identified as unique predictors of service access.

Conclusions & Implications: The results indicate that children with language difficulties who have comorbid psychosocial difficulties are more likely to access services than those who do not. Accordingly, children with language difficulties who access clinical services may require interdisciplinary support, while children without co-morbid psychosocial difficulties may be under-referred for SLP services.

What is already known on this subject.

There is evidence that a range of personal and contextual factors impact the likelihood of a person accessing healthcare services, beyond the specific issue of concern.

What this study adds.

In this population-based study, we provide statistical evidence that children with language difficulties who had higher levels of psychosocial difficulties were more likely to access speech-language pathology services than those who had lower levels.

Clinical implications of this study.

Children with language difficulties who access speech-language pathology services may require support for psychosocial difficulties while children who do not have comorbid difficulties may be underserviced in the community.

Developmental language disorder (DLD) affects approximately 1 in 5 school-age children and confers substantial social, educational, and economic risk and negative consequences for children, their families, and the broader community Norbury et al., 2016, Le et al., 2016). Accordingly, children presenting with language difficulties require timely access to speech-language pathology (SLP) services (McGill & McLeod, 2020), with those with established DLD then having access to evidence-based interventions aimed at ameliorating these difficulties (Reilly et al., 2015). However, there is growing evidence that

children's access to speech-language pathology (SLP) services depends on a range of factors beyond the presence of language difficulties. This may lead to an underutilisation of services amongst the broader community of children and families in need.

A range of factors may impact on service use amongst children and families with developmental disabilities more broadly including household education and insurance status (Benedict, 2006); race and ethnicity (Magnusson et al., 2016); proximity to services, length of wait lists, and awareness of services (O'Callaghan et al., 2005); children's gender, age, and communication status (Skeat et al., 2010), and parental concern (Skeat et al., 2010, Skeat et al., 2014). There is also some evidence (e.g., Skeat et al., 2010, Zhang and Tomblin, 2000) that children with more easily recognisable communication disabilities (e.g., speech sound disorder as opposed receptive language impairment) are more likely to access services. However, there is a lack of research regarding the possible association between common co-occurring social, emotional, and behavioural difficulties and the likelihood that children with language difficulties will access services.

Social, emotional, and behavioural difficulties have long been recognised to co-occur with language disorders To illustrate, Hollo, Wehby, & Oliver (2014) identified that approximately 81% of children aged 5-13 with emotional and behavioural disorders had unidentified below average language, based on a meta-analysis of 22 studies. These difficulties, which may present as internalising (e.g., anxiety, depression) and externalising (e.g., aggression, conduct, hyperactivity) behaviours (Durkin and Conti-Ramsden, 2010) and may, have documented observable impacts on children's education, including higher rates of absenteeism, educational exclusion, and poor peer relationships (National Centre for Learning Disabilities, 2018). Accordingly, children with language difficulties who also have high rates of social, emotional, and behavioural difficulties may be more likely to be referred

for assessment and treatment of possible underlying communication disorders, particularly if these are externalising behaviours that are more readily observable to other people (Pickles, Durkin, Mok, Toseeb, & Conti-Ramsden, 2016).

There is evidence from mental health, and more recently fluency, research that suggests children with social and emotional difficulties are more likely to present to services. To illustrate, Low, Cui, and Merikangas (2008), reported increased clustering of panic and generalised anxiety disorders in family members of individuals treated in clinical settings, compared to individuals with the same diagnoses not accessing services in the community. More recently, Smith et al. (2017) reported that children who presented for stuttering intervention presented with higher levels of social anxiety, indicating more complex presentations, than those who did not. In each case, the findings point to the need for clinical initiatives to reach currently underserved populations, but also potentially the need for greater attention to sampling methods in clinical research.

The overall objective of this study was to examine the possible relationship between language difficulties, psychosocial difficulties, and SLP service access in the past 12-months in a community sample of children. The 12-month window – which corresponded to the period parents involved in the study were asked to report on service access – was selected on the basis that it would allow for cross-sectional examination of the possible relationship, while also accounting for the fact that many children often wait many months to access services in the Australian context (Senate Community Affairs Reference Committee, 2014). Based on research to date, we had two hypotheses. First, that children with language difficulties who had accessed SLP services in the past 12 months would present with higher levels of comorbid psychosocial difficulties than children with similar language difficulties who had not accessed services. Second, that children's level of psychosocial difficulties

would predict whether or not children would have accessed speech-language pathology services in the past 12 months, over and above other possible contributing factors of language skills, caregiver education, and child gender.

Method

Design

We completed secondary analysis of cross-sectional data collected in the Early Language in Victoria Study (ELVS; Reilly et al., 2018). The study was approved by the Royal Children's Hospital Human Research Ethics Committee (27078/33195), La Trobe University Human Ethics Committee (03-32), and the Griffith University Human Ethics Committee (2015/613).

Participants

Maternal and Child Health nurses across six Melbourne (Australia) local government areas, consecutively invited all parents of 7.5-10 month old infants attending the 8-month universal well-child appointment, to take part in the ELVS. Some participants were also recruited at the 8-month hearing screening sessions and through some media attention. From September 2003 to April 2004, 1910 parents and their infants enrolled in the study. The ELVS spans 11 waves of data collection, and includes 11 parent questionnaires, two child questionnaires, five direct child assessments, and five teacher questionnaires (see Reilly et al., 2018 for a detailed overview). For the purpose of the current study, we draw on data from 808 children who completed both the Clinical Evaluation of Language Fundamentals – 4th Edition (CELF-4; Semel et al., 2003) and the Strengths and Difficulties Questionnaire (SDQ; Stone et al., 2010) at age 11 years.

The 11-year timepoint was selected on the basis that it would equate to upper primary school (grade 5-6) for the children, a time at which most children would be well established in their schools, thus minimising external stressors associated with transition periods to, and between, schools. This timing meant that parents and teachers would be in a strong position to make judgements regarding the children's development and were thus also likely to be familiar with – and have accessed - the speech-language pathology services available through the school, government, and community providers had they so desired.

Table 1 presents data comparing participant demographics for the current sample (n=808) and the children who were not eligible due to missing data (n=1,102). There were significant differences between the two samples on gender (a higher proportion of girls in the current study sample) as well as caregiver education (generally higher education levels in the current study sample). Of the 1,102 children who were not eligible (because they did not have scores for both the SDQ and CELF-4), 59 children had scores for the SDQ (but not CELF-4) and 31 children had scores for the CELF-4 (but not SDQ) allowing comparison of samples in these cases. To this end, there were no significant differences in scores between the children in the included sample and those in the excluded sample (where score on one test were available) on the Strengths and Difficulties Questionnaire scores or CELF-4 scores.

< Insert Table 1 about here

Measures

The primary outcome variable was *Access to speech-language pathology services (yes/no),* as determined by identifying children whose parents answered *yes* to either one or both of the following questionnaire items: (a) "In the past 12 months, has your child been assessed by a speech therapist/pathologist?" (b) "In the past 12 months has your child received any therapy from a speech therapist/pathologist?" Children whose parents had

answered *no* or did not answer the question were deemed not to have accessed speech-language pathology services. Service access history prior to the 12-month period was calculated (yes/no) on the basis of parents having indicated that they had accessed SLP services in any earlier data collection (study waves 2-9).

Children's *language skills* were assessed using the CELF-4 during a face-to-face assessment carried out at their school or home. The CELF assessments have been deemed to be good indicators of overall language skills (Conti-Ramsden, Botting, Faragher, 2001; Gillon & Dodd, 2005). The CELF-4 has evidence of adequate reliability for both composite scores and individual subtests as well as extensive evidence of validity (Pearson PsychCorp, 2008; also see Denman et al, 2017). The *core language*, *receptive*, and *expressive* standard scores and subscale standard scores (Word Classes, Formulated Sentences, Recalling Sentences, Concepts & Following Directions, Memory) were used to characterise the sample and in analyses. Core language standard scores have a mean of 100 and standard deviation of 15 (Semel et al., 2003). Children scoring >1.25SD below the mean (a score <81) were considered to have *language difficulties*, and those scoring ≥81 formed the *typical language (TL)* group. This is consistent with the approach used in related studies from the same dataset (e.g., McKean et al., 2017) and it is also in line with research on language difficulties including prevalence studies (Tomblin, 1997; Leonard, 2014). For example, Tomblin and colleagues used a cut-off of 1.25SD and found this cut off provided good sensitivity and specificity for the diagnosis of language difficulties in a large epidemiological sample in the United States. Children's history of language difficulties was calculated (yes/no) based on children having scored 1.25SD below the mean for the CELF Core Language Score in earlier waves of data collection (5, 6, 8).

Children's *psychosocial difficulties* were assessed using the parent-completed Strengths and Difficulties Questionnaire (SDQ – Parent Version; Goodman, 1997). The SDQ is a brief behaviour screening instrument comprising 25 items examining emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behaviour with adequate reliability and validity (Stone et al., 2010). Parents rate each behaviour as either 'not true', 'somewhat true', or 'certainly true'. A Total Difficulties Score (with a possible range 0-40) was calculated by summing 20 relevant items from the set of 25, excluding those pertaining to prosocial behaviour. To examine different aspects of children's difficulties, we used the Internalising Scale which combines the Emotional Symptoms Scale and Peer Problem Scale as well as the Externalising Scale which combines the Conduct Problem Scale and Hyperactivity Scale. Children were categorised as having a history of psychosocial difficulties if they scored in the borderline or clinical range (≥ 14; Goodman & Scott, 1999) on the SDQ Total Difficulties Score in any of the earlier waves of data collection (waves 5-9).

Caregiver education was examined based on data provided by parents when they commenced the study (when their child was 8-10 months old). Parents selected from one of four categories: Year (i.e., grade) *10 or less, year 11, year 12, or degree or post-graduate qualification*. We note that a broader range of additional factors may influence service access (e.g., race/ethnicity, proximity to services, waiting lists) but were limited to variables available in the existing dataset.

Analytical Plan

We used a Mann-Whitney U test to address the first hypothesis that children with LL who had accessed speech-language pathology services in the past 12 months would present with higher levels of comorbid psychosocial difficulties than their peers who did not access

services. Non-parametric analysis was used due to the relatively small sample size and non-normal distribution of the data. We used binary logistic regression to test the second hypothesis, that children's level of psychosocial difficulties would predict them having accessed services, over and above language skills, maternal education, and child gender. This approach allowed us to examine the variance in service access explained by variables of interest; the extent to which variation in the factors (e.g., lower language, higher psychosocial difficulties) increased the likelihood (odds ratio) of a child having accessed services; and model characteristics including accuracy (i.e. correctly predicting which children did and did not access services), sensitivity (proportion of children who accessed services correctly predicted), and specificity (proportion of children who did not access services correctly predicted). Data were analysed using SPSS Statistics version 25 (IBM Corporation, 2013) with Laerd Statistics (n.d.) used as a reference for methods and reporting.

Results

A total of 42 children accessed speech-language pathology services, of whom 15 had language difficulties (4 female, 11 male). Among the 766 children who had not accessed services, 29 had language difficulties and genders were more balanced. Consistent with our first hypothesis, we found significant higher levels of psychosocial difficulties in children with language difficulties who had, compared to those who had not, accessed SLP services in the past 12 months in relation to SDQ Total Difficulties ($U = 53.00$, $z = -4.080$, $p < .001$), internalising ($U = 76.00$, $z = -3.526$, $p < .001$) and externalising behaviours ($U = 54.50$, $z = -4.045$, $p < .001$). These findings are illustrated in Figure 1.

<Insert Figure 1 about here>

Given that there were (a) children identified as having language difficulties, but who did not access services and (b) children who did not meet our criteria for language difficulties

but who had accessed services, we completed exploratory analyses focusing on the possible relevance of child gender and maternal education. There were no significant associations between gender and having language difficulties in either the group of children who had accessed services ($\chi^2(1) = 1.29$, $p = .256$) or those who had not $\chi^2(1) = 2.34$, $p = .126$. Higher levels of caregiver education were reported amongst parents of children without language difficulties, irrespective of whether they had accessed services. However, the trend was more pronounced amongst parents of children who had accessed services. Specifically, 85.1% of parents of children who had accessed services, but whose children did not meet criteria for language difficulties, had Year 12 or higher education. This compares to only 53.3% of parents of children in the same group who had language difficulties. There was a significant association between access to SLP services in the past 12 months and prior psychosocial difficulties (SDQ Total Difficulties Score above 14) ($\chi^2(1) = 46.51$, $p < .001$), prior language difficulties (CELF Core Language Score below >1.25SD below mean) ($\chi^2(1) = 80.16$, $p < .001$), and previous access to SLP services ($\chi^2(1) = 72.46$, $p < .001$). A summary of measures for children in each group is provided in Table 2.

<Insert Table 2 about here>

Regarding our second hypothesis, the assumption for binary logistic regression of linearity of the continuous variables with respect to the logit of the dependent variable was confirmed using the Box-Tidwell procedure with a Bonferroni correction applied. Fourteen outliers (studentized residuals greater than 2) were identified, all of which were determined to be true outliers and retained following checking of individual data. Six predictors – gender, caregiver education (3 levels), SDQ Internalising Scale, SDQ Externalising Scale, CELF Core Language standard score, prior SLP service access, and the constant – were entered into the model, with access to services as the outcome variable. Note that the SDQ Total

Difficulties Score was highly correlated with both the Internalising (r = .851) and Externalising (r = .880) Scales, whereas the two scales were only moderately correlated (r = .500). To avoid multicollinearity, while offering the most parsimonious examination of the potential contribution of psychosocial difficulties to service access, only the Internalising and Externalising Scales were entered. The model was statistically significant χ^2 (8) = 137.285, $p < .001$, providing strong evidence to reject the null hypothesis (i.e., that predictor variables included in the regression model have no statistically significant impact on the response variable). The model explained 46.6% (Nagelkerke R^2) of the variation in the outcome variable and correctly classified 96.0% of cases. Sensitivity was relatively low at 42.9%, correctly predicting only 18 of 42 children who accessed services. Specificity was high at 99.0%, correctly predicting all but 8 of the 764 children who did not access services, as reflected in a positive predictive value of 69.2% and a negative predictive value of 96.8%. Of the six predictors (including interaction terms), the SDQ Externalising Scale score, CELF Core Language Score, and prior access to SLP services were statistically significant, as presented in the Table 3.

<Insert Table 3 about here>

For each unit increase in SDQ Externalising Scale score (greater behavioural difficulties), the average odds of having accessed speech-language pathology services increased by a factor of 1.213 (95% confidence interval: [1.085 – 1.356]). Similarly, for each unit increase in CELF score (improved language), the average odds of having accessed speech-language pathology services decreased by a factor of .949 (95% confidence interval: [.924, .975]). Finally, having previously accessed SLP services increased the odds of having recently accessed SLP by 7.43.

Discussion

The first objective of this study was to examine possible differences in levels of psychosocial difficulties in children with language difficulties who had and had not accessed SLP services in the past 12 months. Consistent with our first hypothesis, at 11 years of age, children with language difficulties who had accessed speech-language pathology services in the past 12 months presented with higher levels of comorbid psychosocial difficulties than their peers who did not access services, based on the parent-completed SDQ. These findings extend those reported in mental health and fluency research (e.g., Low et al., 2008, Smith et al., 2017) to children with language difficulties, with implications for both research and practice in this area. Specifically, the findings suggest that children who present to clinical services are likely to be more complex than peers with similar levels of language difficulties in the community, due to increased comorbid psychosocial difficulties. This finding is consistent with those indicating that children with psychosocial difficulties are likely to present with comorbid communication difficulties (Hollo et al, 2014). The findings may also have implications for sampling methods in research studies. Specifically, given that research often relies on recruitment of children and families to studies through their existing connection to services, any disparity in samples may limit the relevance of findings to the broader population.

Our exploratory analyses, which revealed significant associations between children having prior language difficulties and psychosocial difficulties and recent service access points to the longitudinal nature and impacts of these difficulties. Although beyond the scope of the current study, there is clearly a need for research to understand the longitudinal nature of these relationships. Such a study should could include a focus beyond structural language skills, which may become less prominent with age (Dockrell, et al., 2014; St. Clair et al., 2011; van den Bedem et al., 2018) to include pragmatic language skills which become increasingly important (Norbury et al., 2004) and are also associated with psychosocial

difficulties (Dockrell et al., 2014). Our exploratory findings also revealed an association with prior service access and current service access. Although these variables (prior needs and access) are naturally correlated, it is possible that other aspects related to prior access (e.g., parents knowing what SLP is, how to access services, familiarity, confidence) may contribute to current service seeking behaviour. Understanding, and accounting for these various factors in future studies, could help to address barriers children and families face in accessing appropriate services.

From a clinical perspective, the higher levels of psychosocial difficulties among children accessing services points to the need for services to account for children with complex needs and ensure interdisciplinary collaboration in addressing individual needs. In addition, our findings suggest that many children with language difficulties may not come to the attention of speech-language pathologists, unless they present with comorbid psychosocial difficulties. Accordingly, there is a need for ongoing efforts to ensure children are adequately screened and referred for potential language difficulties, in support of their learning, participation, and success in school and community settings. From a research perspective, the findings suggest that, in studies where recruitment occurs through clinical services, there should be increased attention to assessing, accounting for, and reporting these additional complexities.

Given evidence to suggest that a range of factors contribute to service access, we examined not only differences in communication and psychosocial difficulties between children who did and did not access services, but also the relative contribution of these and other factors. Consistent with our second hypothesis, children's psychosocial difficulties predicted whether or not they had recently accessed clinical services, but only in relation to externalising behaviours. This finding appears to support the notion that children with more

observable difficulties are likely to access services. Current language difficulties, as well as prior SLP service access, were also unique predictors of recent service access. Yet while the model was significant and had good specificity (accurately predicting which children would not access services), sensitivity was relatively low. Higher levels of externalising behaviours and language difficulties increased the likelihood of a child accessing services (with the latter to be expected), but a range of additional factors are likely to contribute. Gender and caregiver education were not unique predictors, although trends were evident that may warrant further investigation. In particular, and keeping in mind the small sample sizes, more similar numbers of boys met our criteria for language difficulties in both samples of children who did and did not access services (i.e., 11 accessed, 17 not accessed), whereas a greater proportion of girls with language difficulties were identified in the group that had not accessed services (i.e., 4 accessed, 12 not accessed). This may suggest the under-identification of girls in the community and the need for improved screening, diagnosis, and provision of services. Furthermore, there was notable difference in the education level of caregivers of children who accessed services, but did not meet our criteria for language difficulties, and those who did. This appears to support the notion that parents with higher education are likely to access services for their children, even in cases where needs may be less significant, and further reinforces the need for all parents to have access to accessible and timely information to help in identifying and addressing any communication difficulties their children may have. These inferences, based on the data available, warrant further investigation.

This study has a number of strengths, including the fact that it draws on data from a longitudinal population-based study, commencing when children were under 12 months of age, thereby reducing the risk of sampling bias. While it may stand to reason that children with more complex needs are more likely to access services, to our knowledge this is the first

study to identify the unique contribution made by internalising and externalising behavioural difficulties. Nevertheless, the findings should be interpreted with reference to the context of this investigation. First, we note that there were significant differences between the sample of children who were included in the analyses. The fact that caregiver education was generally higher in the included sample may reflect broader access to resources that would see families in a stronger position to attend the appointment and complete the surveys than those without. Indeed, our exploratory analysis indicated that children who accessed services, even without meeting our criteria for language difficulties, tended to have parents with higher education. We do not have a hypothesis as to why there was a higher proportion of missing data for males than females. Second, in relation to service access, this information was collected via parent survey and the need to interpret a lack of response to the relevant questions as "no" (conservative bias) means that we were reliant on relatively limited information about the nature of intervention services provided. It is possible, for instance, that parents may not recall that their child has received SLP support as part of group-based delivery at school. Furthermore, given speech-language pathologists cover a broad range of practice areas (e.g., speech, language, fluency, swallowing) it is possible that some services were accessed for reasons other than language difficulties. This may help to explain the relatively large proportion of children who accessed services but who did not meet our criteria for language difficulties. Third, due to the nature of the data collected, the current study is limited to examining service *access*, rather than outcomes resulting from service access. Future research could examine changes in psychosocial wellbeing following treatment of language difficulties. Fourth, the cross-sectional nature of the study means that exploring temporal relationships between variables is not possible. It is possible, for example, that psychosocial difficulties may have emerged subsequent to service access in the same year. Finally, we note that despite the relatively large sample size, our sample of 42 children who accessed services

naturally limits our power to detect significant associations within the analyses presented, but also to explore other possible relationships that are of clinical interest. For instance, it is likely that accounting for children's unique combinations of language (i.e., primarily receptive, expressive, or both) and psychosocial (i.e., internalising, externalising, both, none) difficulties would predict service access with greater precision; a proposition that warrants further research.

Conclusions

Children with language difficulties are more likely to access SLP services if they have comorbid social, emotional and behavioural difficulties. The findings of this study indicate that not only are these psychosocial difficulties likely to be higher in children with language difficulties who access speech-language pathology services compared to children who do not, but that these behaviours are a unique predictor of the likelihood of access. The findings point to the possible under-identification of children with language difficulties in the community, and the need for clinical service provision that accounts for the multifaceted needs these children are likely to have. Furthermore, while replication in other populations is required, the findings may also indicate a need for caution in the design, analysis, and reporting of studies involving children with communication difficulties to ensure findings are generalisable to the broader community, through inclusion of children who may be underrepresented in clinical services.

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Table 1. Participant demographics comparing study versus excluded samples.

	Study Sample (n = 808)	Not eligible Sample (n = 1,102)	Comparison
Gender			
Girl	439 (54.3%)	506 (45.9%)	$\chi^2(1) = 13.207$, $p < .001$
Boy	369 (45.7%)	596 (54.1%)	
Caregiver education			
Year 10 or less	46 (5.7%)	133 (12.1%)	$\chi^2(3) = 38.863$, $p < .001$
Year 11	106 (13.2%)	162 (14.7%)	
Year 12	308 (38.2%)	457(41.6%)	
Degree or post-graduate qualification	346 (42.9%)	347 (31.6%)	
SDQ Total Score[1]	7.26 (5.76, 0-34)	8.17 (6.41, 0-31)	$t(865) = 1.17$, $p = .242$
CELF Core Language Standard Score[1]	100.77 (12.73, 40-129)	97.35 (16.41, 45-123)	$t(837) = -1.450$, $p = .147$

[1] Presents mean, standard deviation, and range.

Table 2. Comparison of children who accessed and did not access services.

	Accessed Services (n = 42)		No Access (n = 766)	
	Language Difficulties[1] (n = 15)	Typical Language (n = 27)	Language Difficulties (n = 29)	Typical Language (n = 737)
Gender				
Female	4 (26.7%)	12 (44.4%)	12 (41.4%)	411 (55.8%)
Male	11 (73.3%)	15 (55.6%)	17 (58.6%)	326 (44.2%)
Caregiver education[2]				
Year 10 or less	4 (26.7%)	1 (3.7%)	2 (7.1%)	39 (5.3%)
Year 11	3 (20.0%)	3 (11.1%)	3 (10.7%)	97 (13.2%)
Year 12	6 (40.0%)	11 (40.7%)	13 (46.4%)	278 (37.8%)
Degree/Post-grad	2 (13.3%)	12 (44.4%)	10 (35.7%)	322 (43.8%)
SDQ				
Total Difficulties	19.20 (5.83, 13-34)	14.40 (7.92, 1-34)	9.65 (6.30, 0-26)	6.66 (5.17, 0-30)
Internalising Scale	8.40 (3.33, 3-15)	6.15 (4.94, 1-17)	4.08 (2.95, 0-10.42)	3.00 (2.93, 0-16)
Externalising Scale	10.80 (3.00, 7-19)	8.30 (4.11, 1-17)	5.56 (4.14, 0-18)	3.66 (3.18, 0-18)
CELF-4				
Core Language	82.67 (18.65)		101.776 (11.55)	
Receptive Language	82.71 (16.61)		100.56 (11.74)	
Expressive Language	85.07 (17.66)		102.61 (12.02)	

Word Classes Total	7.14 (2.94)	10.31 (2.52)
Formulated Sentences	8.05 (3.86)	10.73 (2.48)
Recalling Sentences	7.14 (3.21)	10.25 (2.60)
Concepts & Following Directions	6.50 (3.20)	9.74 (2.32)
Memory	82.71 (19.21)	101.46 (12.11)

Prior Needs/Access				
Communication Difficulties	14 (93.3%)	9 (33.3%)	16 (55.2%)	55 (7.5%)
Psychosocial Difficulties	11 (73.3%)	16 (59.3%)	8 (27.6%)	142 (19.3%)
SLP Service Access	14 (93.3%)	21 (77.8%)	16 (55.2%)	165 (22.4%)

[1] Based on CELF Core Language Score >1.25 SD below mean. [2] Data not available for two participants who did not access SLP services.

Table 3. Logistic regression examining predictors of access to speech-language pathology services in the past 12 months.

Variable	Coefficient	SE	Wald	*p*	Odds ratio	95% C.I.
Gender	.019	.417	.002	.965	1.019	.450 – 2.306
Caregiver Education			.630	.890		
Year 10 or less	.240	.724	.110	.740	1.272	.308 – 5.254
Year 11	-.164	.633	.067	.796	.849	.246 – 2.934
Degree/Postgrad.	-.252	.465	.293	.588	.778	.313 – 1.933
SDQ Internalising	.096	.061	2.497	.114	1.100	.977 – 1.239

SDQ Externalising	.193	.057	11.474	<.001	1.213	1.085 – 1.356
CELF Core Language	-.052	.014	14.690	<.001	.949	.924 - .975
Prior SLP Access	2.006	.478	17.634	<.001	7.430	2.914 – 18.947

Figure 1. Comparing psychosocial difficulties among children with language difficulties who did, and did not,
access SLP services in the past 12 months.