



# Early predictors of dyslexia: Parental literacy skills, home and phonics support predicting preschoolers' phonological and literacy skills

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## Abstract

*In Singapore, early identification and intervention of literacy difficulties during preschool are important due to the heavy academic demands placed on children. Previous research have shown that parents' literacy skills, amount of home support given, and prior phonics exposure are associated with reading skills. The impact of home support, phonics-based support and parental factors on preschool students' literacy and phonological skills were investigated in this study. It was found that the provision of phonics-based intervention significantly predicted better phonological processing skills. Both mothers and fathers also impacted on their child's literacy and phonological skills but in different ways, suggesting that parents play distinct roles in their child's literacy development. On the other hand, home support did not appear to confer the expected benefits in terms of literacy development. This may be associated with the differences in the learning processes at home.*

**Keywords:** Early identification, literacy difficulties, phonological skills, parents, home support

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## Introduction

Studies in preschool children on the factors predicting dyslexia can provide crucial insights in identifying those at risk at an early age. In Singapore, early identification and intervention of dyslexia before children enter formal schooling are vital due to the high academic demands placed on them. In this study, we aimed to evaluate family (i.e. parents' perceived literacy skills, home support) and environmental factors (i.e. phonics-based intervention) in relation to preschoolers' phonological processing and literacy skills at six years of age.

The first predictor of dyslexia explored in this study is how perceived parental literacy skills may predict early phonological and literacy skills in preschoolers. It has been previously found in various studies that familial history of dyslexia predicts the later diagnosis of dyslexia (e.g., McBride-Chang, Lam, Lam et al, 2011; Snowling, Muter & Carroll, 2006). Van Bergen, Jong and Maassen (2014) previously found that self-reports of parental literacy skills differentiated between children with and without dyslexia; parents of dyslexic children reported more literacy difficulties compared to those of non-dyslexic children. In line with this, Torppa, Eklund, van Bergen and Lyytinen's (2011) study likewise showed that among families who have familial risk of dyslexia, dyslexic parents whose children are also dyslexic tend to show more severe problems in literacy than those who did not have dyslexic children. This lends weight to the idea that even among dyslexic families, the level of literacy of parents does exert a certain level of influence over the

reading outcomes of their children. These findings seem logical given that it is likely that parents with poor literacy skills may be less inclined to read with their children, thereby reducing the amount of exposure to print the children might have had during their early years. However, many of these studies have not explored the differences between maternal and paternal factors in impacting children's literacy skills.

Another predictor explored in this study is the amount of literacy support given to the child at home. Scarborough, Dobrich and Hager (1991) and Scarborough and Dobrich (1994) found that children's later reading abilities were somewhat related to how often their parents read to them during the preschool years. Children who became poor readers were typically engaged in books about 2-3 times a week, while children who became normal readers typically did so almost daily. Other studies have also found that frequent storybook reading benefits a child's vocabulary, phoneme awareness and awareness of rhyme, and this consequently leads to greater independent reading ability in children when they are older (Wood, 2002). Complementary to these findings, Roberts, Jurgens & Burchinal (2005) found that children whose mothers employed more book reading strategies had higher vocabulary scores. As such, given these findings, it appears that the frequency and quality of book reading opportunities with parents at home seem to confer benefits in the development of children's reading skills. For the purpose of this study, we looked into home support provided specifically in the forms of the use of flashcards, revision of spelling

words, as well as the frequency of parents reading with/to the child, as measures of the level of literacy support given to children at home.

Lastly, the exposure to early phonics intervention was also explored in this study. Hatcher et al., (2004) reported that reading programmes with highly structured phonics components are sufficient for most preschool children (about 4.5 years old) to master the alphabetic principle and learn to read effectively. In contrast, young children at risk may need additional training in phoneme awareness and linking phonemes with letters. Additionally, a literature review by Ritchey & Goeke (2006) indicated that 9 out of 12 studies reported Orton-Gillingham instruction (a phonics-based programme) to be more effective than other interventions for at least one measured outcome, with the largest effects seen in word attack and nonsense word reading skills.

Given what has been found in the above-mentioned studies, it would be useful to further investigate relationships of perceived parental literacy skills, phonics-based intervention and home support with phonological processing, reading and spelling skills among preschoolers at the end of their preschool education (i.e. Kindergarten 2) and before they go into their first year of primary school or the year they turn seven years old. Conducting this study will give us valuable insight in understanding the role of the family and early intervention on literacy development in early years and its implications on public awareness raising efforts.

## Methods

Data was collected from 63 preschool students (44 males, aged from 6 years 0 months to 6 years 11 months; M: 6.2 years, SD: 2.8 years) to who attended from the preschool literacy programme at the Dyslexia Association of Singapore (DAS). They were referred for psycho-educational assessments and underwent cognitive and literacy assessments conducted by DAS psychologists. Consent to take part in this study was sought during parent interviews, which was part of the assessment process.

### *Phonological and Literacy Skills*

These preschool students were assessed using the Differential Ability Scales - 2nd Edition (DAS-II), Wechsler Objective Reading and Language Dimensions - Singapore (WORLD<sup>Singapore</sup>), and the Wechsler Individual Achievement Test - Second Edition (WIAT-II). Scores obtained on the following subtests were used in this study: Phonological Processing subtest of the DAS-II, Basic Reading and Spelling subtests from the WORLD<sup>Singapore</sup>, and the Pseudoword Decoding subtest from the WIAT-II. The DAS-II and WIAT-II were normed in the United States and United Kingdom respectively. The phonologically-based tests from the DAS-II and WIAT-II were used as there are currently no locally normed phonological tests available in Singapore.

### *Parent Interview*

Prior to each assessment, parents were interviewed by the psychologists to collect information on the amount of home support and phonics-based intervention

their child had received. Information for home support was obtained in terms of the types of support provided (i.e. reading to child, using of flashcards and teaching spelling to child). Data was recorded as cumulative, that is, one, two or three types of support a child received. For phonics-based intervention received, information was obtained in terms of the number of months of attendance in a phonics programme. For students who were enrolled in more than one programme, the data was recorded as a cumulative number of months.

#### *Parent Perceived Literacy Skills*

Parents filled in a Parental Literacy Questionnaire to provide an indication of their perceived level of literacy skills, as well as their educational backgrounds. The questionnaire was adapted from van Bergen, de Jong, Maassen & van der Leij's (2014) study. Parents were asked to rate their competencies in reading and spelling, the amount of exposure to literacy activities in their everyday lives (e.g. through texts and email), as well as the level of difficulty they experienced in literacy tasks, such as following subtitles on television.

Parents rated their responses on a five-point Likert scale, and an overall perceived parental literacy score was obtained for each parent by summing up their responses on the items. Items where higher ratings reflected greater exposure to literacy or higher literacy proficiency were scored according to their responses, and items where higher ratings reflected greater literacy difficulty were scored in reverse. Overall, the higher the scores obtained, the better the parental perceived literacy skills.

#### *Parental Education*

Information on parental education levels were obtained by having parents check one of seven boxes to indicate highest educational level attained. Each level was then assigned a numerical value according to their associated degree of educational qualification or training. The educational levels and their assigned numerical values are: primary: 1; secondary: 2; vocational certificate: 3; GCE 'A' Levels: 4; diploma: 5; bachelor degree: 6; postgraduate degree: 7. Data for parental educational levels were analysed according to the assigned numerical values.

#### **Results**

Two sets of standard multiple regression analyses were conducted to assess the ability of various factors in predicting students' phonological processing skills and basic literacy attainments. In Set 1, a series of analyses were done to explore the impact of Home Support (HS), Phonics-based Support (PS), Mothers' Perceived Literacy Skills (MLit) and Maternal Educational Background (ME). In Set 2, the analyses were done to assess the following predictors: HS, PS, Fathers' Perceived Literacy Skills (FLit) and Paternal Educational Background (PE).

For Set 1 predictors, analyses revealed that MLit positively and significantly predicted students' phonological decoding ( $\beta = .33, p < .05$ ), as well as positively predicted spelling skills with marginal significance ( $\beta = .33, p = .057$ ). In addition, ME was found to positively and significantly predict phonological processing skills ( $\beta = .35, p < .05$ ).

In comparison, HS negatively predicted students' phonological processing skills at a significant level ( $\beta = -.30, p < .05$ ). A summary of the findings is illustrated in Table 1.

Regression analyses for Set 2 predictors showed that PE significantly and positively predicted students' skills in phonological processing ( $\beta = .49, p < .05$ ), phonological decoding ( $\beta = .32, p < .05$ ), and basic reading skills ( $\beta = .60, p < .05$ ).

Table 1: Summary of Multiple Regression Analyses for Set 1 Predictors

Variable	<i>B</i>	<i>SE B</i>	$\beta$
<b>Phonological Processing</b>			
Home Support	-2.735	1.193	<b>-.296*</b>
Phonics-based Support	.108	.065	.215
Mothers' Perceived Literacy Level	.090	.260	.053
Maternal Educational Background	1.858	.813	<b>.353*</b>
<i>R</i> <sup>2</sup>		.271	
<b>Phonological Decoding</b>			
Home Support	-.617	.900	-.092
Phonics-based Support	.026	.049	.071
Mothers' Perceived Literacy Level	.404	.196	<b>.331*</b>
Maternal Educational Background	.647	.613	.170
<i>R</i> <sup>2</sup>		.222	
<b>Basic Reading</b>			
Home Support	-1.839	1.378	-.174
Phonics-based Support	.098	.075	.172
Mothers' Perceived Literacy Level	.466	.301	.241
Maternal Educational Background	1.392	.939	.231
<i>R</i> <sup>2</sup>		.240	
<b>Spelling</b>			
Home Support	-1.836	2.767	-.093
Phonics-based Support	.034	.151	.031
Mothers' Perceived Literacy Level	1.176	.604	<b>.326**</b>
Maternal Educational Background	.183	1.886	.016
<i>R</i> <sup>2</sup>		.123	

\* $p < .05$  \*\*  $p = .057$

Additionally, PS significantly predicted students' phonological processing ( $\beta = .32, p < .05$ ) and basic reading ( $\beta = .35, p < .05$ ) skills, while HS negatively

predicted students' phonological processing skills at a significant level ( $\beta = -.29, p < .05$ ). A summary of the results is shown in Table 2.

Table 2. Summary of Multiple Regression Analyses for Set 2 Predictors

Variable	<i>B</i>	<i>SE B</i>	$\beta$
<b>Phonological Processing</b>			
Home Support	-2.631	1.216	<b>-.285*</b>
Phonics-based Support	.161	.074	<b>.321*</b>
Fathers' Perceived Literacy Level	-.054	.164	-.060
Paternal Educational Background	2.379	.845	<b>.487*</b>
<i>R</i> <sup>2</sup>		.324	
<b>Phonological Decoding</b>			
Home Support	-.565	.913	-.085
Phonics-based Support	.107	.056	.297
Fathers' Perceived Literacy Level	-.235	.123	-.360
Paternal Educational Background	2.348	.634	<b>.664*</b>
<i>R</i> <sup>2</sup>		.271	
<b>Basic Reading</b>			
Home Support	-1.733	1.403	-.164
Phonics-based Support	.198	.085	<b>.346*</b>
Fathers' Perceived Literacy Level	-.231	.189	-.224
Paternal Educational Background	3.348	.975	<b>.599*</b>
<i>R</i> <sup>2</sup>		.295	
<b>Spelling</b>			
Home Support	-1.547	2.837	-.078
Phonics-based Support	.065	.173	.061
Fathers' Perceived Literacy Level	.208	.382	.108
Paternal Educational Background	3.444	1.971	.330
<i>R</i> <sup>2</sup>		.175	

\* $p < .05$

## Discussion

The results of this study provided evidence to suggest that both mothers and fathers are likely to impact their child's literacy development significantly, albeit in different ways. Mothers' perceived literacy skills and educational background were found to significantly predict students' phonological and literacy skills, while only paternal educational background was predictive of students' phonological and reading skills. The difference in parental factors that influence literacy development in children may be associated with the different ways that parents are involved in their child's literacy development. Morgan, Nutbrown and Hannon (2009) found that fathers tended to be less involved in providing literacy opportunities, such as providing books or writing material, to children, and this may be due to mothers taking on the supervisory role in providing such opportunities. In addition, Bingham (2007) found that maternal literacy beliefs were positively correlated with the literacy environment at home and early literacy development. As such, it is possible that mothers who have higher perceived literacy levels, may have positive beliefs about incorporating literacy activities into their child's environment, and therefore be more instrumental in providing such opportunities at home.

In comparison to mothers, fathers perceived literacy skills had no significant impact on students' literacy development, although paternal educational background was found to significantly predict students' phonological and reading skills. It may be possible that the

paternal influence of early literacy development may be related to socio-economic status (SES). Prior studies have found that family income (Davis-Kean, 2005) and parental education (Park, 2008) have had an impact on child learning through parental beliefs and home literacy environments. However, it is also possible higher family income due to higher levels of parental educational qualifications give rise to increased access to resources (e.g., books) as well as learning opportunities such as additional enrichment classes.

The findings from this study further revealed that home support may not confer the expected benefits to a child's early literacy development in that greater home support was expected to make a positive impact on phonological and literacy skills. This was inconsistent with prior studies that found home support strategies helpful in literacy development (Scarborough, Dobrich & Hager, 1991; Scarborough & Dobrich, 1994; Wood, 2002). It is possible that in this study, the method in which home support is provided may not be effective in helping students' literacy skills. In a study of first-grade children, Stoltz and Fischel (2003) found that parents may have different natural "styles" in their choice of strategies to help their children in reading. It was additionally found that the use of different strategies had an impact on children's reading performance, possibly due to their existing reading proficiency. In view that the students in this study have previously been identified to have difficulties with literacy acquisition, it may be that strategies typically used by these parents were not helpful in these cases. It is

possible that many parents have unrealistic expectations of what a preschool child can achieve, so that attempts at formal support (flashcards and spellings) are counterproductive. Moreover, if a percentage of these parents had and continue to have difficulties themselves, this can reactivate their own anxieties and create a negative learning environment based on criticism, antagonism and anger. Further, the results might have been an artefact of the way home support was measured in this study in that different types of home support might have different effects on children's phonological and literacy development. It may be helpful, therefore, for further studies to delve into the comparisons between types of support used and which ones may not be helpful to carry out at home.

In view of the earlier-mentioned familial risk of literacy difficulties (Snowling, Muter & Carroll, 2006; McBride-Chang, Lam, Lam et al, 2011; Torppa, Eklund, van Bergen & Lyytinen, 2011), it is also possible that parents of children with literacy difficulties may experience similar problems as well. As such, these parents may have limitations in the support that they are able to provide, and in this case, provided the unintended reverse effect on their children's phonological and literacy development.

Additionally, the quality and amount of home support may also have an effect on the development of literacy skills in children. It has been found that parental practices, which can include activities such as shared reading, the number and type of books available at home, as well as amount of time spent with children on

literacy tasks, can be affected by other factors. Some of these factors include the amount of stress in families' homes, and the kind of household environment. As such, it is plausible that the quality of home support, which is likely associated with parental activities, may have had an impact on a child's literacy development.

### **Limitations and Future Directions**

The current study provides some insight into the differential impact of parental factors in their child's literacy development. It would be helpful to further explore the ways in which mothers and fathers impact on their child's literacy development. For instance, mothers' attitudes, beliefs, and behaviours that are relevant to their children's literacy acquisition may elucidate areas in which parents can be targeted to help their children. In addition, investigations on possible mediating factors between paternal educational background and child's early literacy development, such as SES, can be conducted as well.

It was also found through this study that home support had an apparently negative impact on literacy development, which may be due to differences in implementation of support among parents. This gives basis for the possible utility in programmes that can equip parents with skills in literacy teaching strategies at home. Reese, Sparks and Leyva (2010) reviewed studies on parent training programmes to improve children's language and emergent literacy skills. They concluded that with training, parents can help to improve aspects of children's language and



literacy skills. As such, the findings of this study may well point to the need for parents to receive appropriate training to support their children so that home support is maximally and positively impactful. This is particularly so, given the time spent between most parents and children on a daily basis.

There were also some limitations to the study that impacted the interpretation of findings. Firstly, information on home support was restricted to the types that were provided. Other relevant data such as the length of time in which home support was provided, as well as the frequency, were not obtained. In addition, parental perceptions of home support may be subjective as well. Taken together, further studies may therefore be useful to explore aspects of, as well as the quality of home support that can impact early literacy development. These studies may also study the methods and strategies used by parents in Singapore, and how they would have an impact on a child's literacy development.

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