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Author(s)	Beth A O'Brien, Siew Chin Ng and Nur Artika Arshad
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The structure of home literacy environment and its relation to emergent English literacy skills in the multilingual context of Singapore

Beth A. O'Brien *, Siew Chin Ng, Nur Artika Arshad

Centre for Research in Child Development, National Institute of Education, Nanyang Technological University, Singapore

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ABSTRACT

Prior to formal instruction, children gain experiences within the home environment that contribute to their school readiness. The home literacy environment (HLE) has garnered much interest as an established contributor to child language and literacy development and academic achievement. While models of HLE are mostly produced from Western cultures, there is little known about how they apply to multilingual Asian cultures. This study aims to examine if these models are universal and can be applied to a multi-cultural and multilingual context of Singapore. From a population representative sample of kindergartens, 1327 children and parent participants were recruited, and provided parent-report data on their HLE and child performance on outcome measures of vocabulary, phonological sensitivity and reading and spelling. Fourteen items were included in the HLE questionnaire, while standardized measures of child outcomes included the Bilingual Language Assessment Battery (BLAB), Comprehensive Test of Phonological Processing 2nd Edition (CTOPP-2), and the Wide Range Abilities Test (WRAT-4). Latent structural analysis revealed a four-factor model of HLE that included shared reading, child interest, parent habit and parent involvement factors. Results from correlational and path analyses revealed that the shared reading factor, which included frequency of reading to the child and child asking to be read to, had the strongest relation to both language and literacy, and significantly predicted vocabulary and reading outcomes. Literacy outcomes were more specifically predicted by the child interest factor. These findings highlight the overlap and differences in theoretical models of these home-outcome links across cultural contexts.

1. Introduction

A significant number of young children are differentially prepared for entering pre-school and primary school classrooms, resulting in longer term gaps in their reading skills and overall academic achievement (Bowman, Donovan, & Burns, 2001; Raver & Knitzer, 2002). Scholars argue that their home environment plays a key role in providing optimal support for the early development of emergent literacy skills (e.g. Bowman et al., 2001; Phillips & Lonigan, 2005). In many cases which lack such support there is a mismatch between what children bring to school and what schools expect from them in order to succeed. Existing models of HLE (home literacy environment) reflect practices in Western cultures (e.g., Farver, Xu, Eppe, & Lonigan, 2006) and much research from these cultural contexts supports the models. Recently, investigations into home literacy environment have been extended to Asian contexts (e.g., Liu, Georgiou, & Manolitsis, 2018). However, the factor structure in HLE models within multi-cultural and multilingual societies such as Singapore remains a gap to be addressed.

Prior to formal schooling, children acquire foundational skills to support their literacy development, collectively referred to as emergent literacy skills. Evidence suggests that these foundational skills are initially formed through home input (e.g., Hart & Risley, 1995), while there is debate about which specific skills are included, such as vocabulary knowledge, phonological awareness and print knowledge. Sénéchal, LeFevre, Smith-Chant, and Colton (2001) argue that emergent literacy should be considered separately from oral language and metalinguistic skills, so that research findings can be more precisely applied to practice. Others, such as Rohde (2015), take a broader view to include a holistic framework of emergent literacy in a comprehensive model with language, print awareness and phonological awareness skills situated within the culture, community and demographics of learning environments.

We rationalize that the interconnection between home input and the foundational skills impacts children's literacy learning generally, but that the cultural, community or demographic settings within which the home exists may introduce variation and nuance to this equation. For example, parent beliefs may affect the types of literacy activi-

* Corresponding author at: National Institute of Education, Nanyang Technological University, 1 Nanyang Walk, Singapore, 637616.
E-mail addresses: beth.obrien@nie.edu.sg (B.A. O'Brien); siewchin.ng@nie.edu.sg (S.C. Ng); artika.arshad@nie.edu.sg (N.A. Arshad)

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ties they engage in with their children. Less direct instructional activities in the case of European (Greek, Finnish) compared with Canadian parents (Manolitsis, Georgiou, Stephenson, & Parrila, 2009; Inoue, Georgiou, Parrila, & Kirby, 2018) was posed to be due to different parent beliefs: i.e., that acquisition of early literacy skills falls under teachers' responsibilities in the former case (Liu et al., 2018). While we investigate children's emergent literacy abilities by measuring their specific skills (vocabulary, phonological awareness, alphabet knowledge, reading and spelling) and the proximal variables related to the home, we recognize that the home setting and practices may be influenced by the broader community and culture. In this study, we examine the overall multilingual and multicultural context of Singapore as a test of either a universal or more culture-specific condition of home literacy influences. While we do not directly compare data across countries, we do draw comparisons to similar published data from international settings. Much of the evidence regarding links between different home literacy experiences and specific child outcomes prior to formal instruction comes from models developed and related to practices predominantly in Western contexts (e.g., Farver et al., 2006; Han, 2008). Hence, it is essential to validate the generalization of theoretical models of these home-outcome links across different cultural contexts, particularly in Asia where such studies are lacking.

1.1. Cultural context of Singapore

The current study was conducted in the Southeast Asian context of Singapore, where different bilingual families (English-Chinese, English-Malay, English-Tamil) constitute the unique multilingual home environment. Literacy practices at home can be influenced by contextual factors such as parents' beliefs about children's literacy development, parents' and children's availability at home, as well as the utility of language. Parent beliefs may resonate with those in other cultures in that they value their child's literacy development. A parenting landscape study conducted in Singapore (ECDA, 2014) revealed that most parents surveyed (96% of 3800) said that they provided reading materials at home, and over 50% read to their children at least bi-weekly. This is similar to a survey study of Australian parents (Brown, Byrnes, Raban, & Watson, 2012) who held reading to their children in high regard, but the majority of whom (56.9% of 138) read daily for between 21 and 40 min. A larger proportion (80% of 138) stated that they read traditional, environmental, and new technology materials to their children daily. For parents in Singapore, the amount of time spent on home reading activities could be constrained by their and their children's availability. More than 90% of children are enrolled in full-day childcare programmes (ECDA, 2018), and four out of ten preschool children were reportedly enrolled in after-school enrichment programmes (The Straits Times, 2015). These statistics reflect that while parents may value their child's learning and education, there is less time to spend with their children overall, which likely impedes the frequency of home literacy practices.

What may particularly distinguish the Singapore context from others is family language policy and the use of language at home. While there is a recent shift to predominant English use in homes due to its utilitarian function (Pakir, 2001), only about one-third of residents aged five and up use English as a dominant language at home (Singapore Department of Statistics, 2015). Others experience a blend of English and mother tongue input at home. The 'mother tongues' refer to ethnic languages of Chinese, Malay or Tamil, even though these may not be the child's first language or the dominant home language. Beginning at preschool and kindergarten, children also take part in daily ethnic language lessons to prepare them according to the national bilingual education policy (O'Brien, Mohamed, Yussof, & Ng, 2019). Throughout their schooling children continue learning the mother tongue, which is taught as a subject and included in primary school exit exams, though English is the medium of instruction. This highlights the diversity of children's language experiences in Singapore.

Given this contextual background and the framework of emergent literacy, it would be essential to validate the proposed structure of what has been termed the home literacy environment (HLE) within multicultural and multilingual societies. HLE components have been investigated in terms of the factor structure within Western contexts (e.g., Farver et al., 2006), and in terms of their links to children's emergent literacy outcomes within Asian contexts (e.g., Liu et al., 2018). Advancing an understanding of the structure and links of HLE within a multicultural, multilingual context will serve to inform the planning and design of future initiatives and programmes that aim for parents and caregivers to effectively engage children in home practices. This will also provide knowledge regarding home literacy factors that affect children's literacy outcomes in such contexts. In the following sections, we first review research on the concept of the home literacy environment, and second on findings of its relation to child performance. Then we consider other, distal variables for child outcomes that may interact with the literacy environment.

1.2. Home literacy environment (HLE)

Home is most often the very first learning environment of children where parents or caregivers provide opportunities and act as role models influencing children's learning interest (Shaffer & Kipp, 2013). Parental involvement in children's education is recognized as an integral factor in achieving success at school (Hattie, 2009; Hornby & Lafaele, 2011). Resources and opportunities provided at home support the development of essential skills in children, including language and literacy competencies (Yeung & King, 2016). Aspects of the home environment that may contribute to children's early reading development came to be termed the home literacy environment (e.g., Teale & Sulzby, 1986), and these aspects were thought to include parents' value of literacy, expectations for the child's achievement, availability of reading materials, and acts of reading with their child (Hess & Holloway, 1984).

Since then, a preponderance of research shows that HLE is a key contributor to children's early language and literacy development, and that HLE is multidimensional. There are several central features that have been highlighted in various models of HLE. Some researchers have outlined the theoretical construct of HLE with dual factors. Others used data-driven approaches with factor and cluster analyses based on HLE questionnaires and found support for the multidimensional construct of HLE. We draw on these models as explained below for the current study.

1.3. Components of home literacy environment (HLE)

Several models considered dual components of HLE. Phillips and Lonigan (2009) conducted a cluster analysis of parent reports and found two independent aspects of HLE which contributed to different child outcomes. These language and literacy outcomes followed Whitehurst and Lonigan's (1998) inside-out and outside-in framework. Outside-in relates to meaning-focused skills, incorporating sources of information or influences outside of the written word, such as knowledge of particular vocabulary words or understanding of narrative structure. Inside-out refers to code-related skills that relate to sources of information or influences from within the written word, such as knowledge of print concepts and phonological awareness.

Sénéchal et al. (2001) focused on what were termed formal and informal influences of HLE, and these activities in turn aligned with children's inside-out and outside-in types of skills. Formal home literacy activities, such as teaching print, were related to written language abilities, whereas informal home literacy activities, such as storybook read-

ing, were related to children's oral abilities. Following a similar distinction, Yeung and King (2016) defined formal home literacy activities as direct instruction which engages children with print such as recognizing letters, phonics sounds and reading, whereas they defined informal home literacy activities as unintentional exposure to print such as shared reading. On the other hand, Burgess, Hecht, and Lonigan (2002) distinguished between Passive versus Active home literacy influences, where active components (e.g., shared book reading) were found to be better predictors of children's early literacy skills than the passive components (e.g., seeing parents read).

Another conceptualization of HLE encompasses three components as indicated by factor analysis (Farver et al., 2006; Lonigan & Farver, 2002). The factors include *parent literacy involvement*, which involves the degree of effort with which parents engage children's participation in language and literacy-related activities in the home setting, and parents' planning and modeling of literacy activities (Beals, De Temple, & Dickerson, 1994). These parent-child activities include, but are not limited to, shared book reading, rhyming games, story-telling, teaching the alphabet and vocabulary words, and library visits (Haden, Reese, & Fivush, 1996; Levy, Gong, Hessels, Evans, & Jared, 2006; Weigel, Martin, & Bennett, 2006). A second factor is *parent literacy habit*, which may be more aligned with the passive component, as it refers to literacy-related activities parents engage in by themselves and their own beliefs and attitudes towards literacy (DeBaryshe, 1995; DeBaryshe & Binder, 1994). These habits include the frequency of reading for pleasure, quality of reading materials, and value of reading for enjoyment. The third factor, which was not included in the earlier models, is *child literacy interest*, which denotes children's frequency of engagement and level of enjoyment in literacy-related activities (Arnold, Lonigan, Whitehurst, & Epstein, 1994; Frijters, Barron, & Brunello, 2000; Hume, Lonigan, & McQueen, 2015).

1.4. Relationship between home literacy environment (HLE) and children's language abilities

Latent factors of HLE are found to contribute to children's emergent literacy competencies (Farver et al., 2006; Farver, Xu, Lonigan, & Eppe, 2013; Frijters et al., 2000; Lonigan, Schatschneider, Westberg, et al., 2008), and particular HLE aspects are found to differentially relate to children's oral abilities, phonological sensitivity and print awareness (e.g., Anthony, Williams, & Anthony, 2012; Froiland, Powell, Diamond, & Son, 2013; Levy et al., 2006; Niklas & Schneider, 2015; Piasta, Petscher, & Justice, 2012; Rashid, Morris, & Sevick, 2005; Scheele, Leseman, & Mayo, 2010; Xu, Farver, & Krieg, 2017). Sénéchal and LeFevre (2014) distinguished that informal activities (e.g., shared reading) are related to growth in receptive vocabulary, while formal home literacy activities (e.g., direct teaching about print) are associated with growth in reading from around age 5 to 6 (kindergarten to grade 1). Informal types of activities were also found to significantly predict Chinese oral language abilities of five-year-old Chinese-English bilingual children in Singapore, even after controlling for family SES (Dixon, 2011; Li & Tan, 2016), and exposure to language through TV media was similarly correlated with children's vocabulary abilities (Dixon, 2011; Scheele et al., 2010). Findings related to the 3-factor model of Farver et al. (2006) and specific child outcomes are outlined in more detail next.

Parent literacy involvement. The provision of reading materials at home was found to have an impact on children's language and reading abilities (Chiu & McBride-Chang, 2006), as was engaging them in literacy-related activities (Dixon, 2011; Scheele et al., 2010; Sénéchal & LeFevre, 2002). Also, Weigel et al. (2006) reported that the higher frequency in children's engagement in literacy activities at home, the higher their print knowledge.

Parent literacy habit. The literacy-related activities that parents engage in by themselves and their attitudes towards their own literacy were found to be positively associated with both parent-child literacy activities and children's literacy abilities (DeBaryshe, 1995; DeBaryshe & Binder, 1994). Parents' tendency to read for their own pleasure, their beliefs and attitudes about the importance of home literacy activities, as well as beliefs about their children's interest in reading influenced their provision of home literacy activities (Baker, Mackler, Sonnenschein, & Serpell, 2001; Weigel et al., 2006; Wu & Honig, 2010; Lonigan, 1994; Whitehurst & Lonigan, 1998). However, Weigel et al. (2006) found that parents' beliefs in their children's reading abilities and their expectations (e.g. 'want my child to ask questions', 'my child is too young to learn about reading') were more strongly related to children's writing abilities than they were to parent-child literacy activities.

Child literacy interest. Children's engagement and enjoyment in literacy-related activities were associated with emergent literacy skills, including phonological awareness and letter recognition, and with later reading ability (Baroody & Diamond, 2012; Frijters et al., 2000; Hume, Allan, & Lonigan, 2016; Martini & Sénéchal, 2012). Additionally, parents with strong beliefs that their children were interested in reading and were cognitively active during literacy activities were more likely to engage in such activities with their children (Saçkes, Işıtan, Avci, & Justice, 2016). In addition, children's reading interests were also associated with parents' literacy behaviors when interacting with children, such as parents engaging the child in reading and writing, parents modeling reading and writing, as well as parents' verbal participation (Yeo, Ong, & Ng, 2014).

1.5. Home literacy environment (HLE) and cultural differences

The home literacy activities outlined above constitute proximal factors that can directly affect child outcomes. However, more distal factors such as culturally-specific expectations may in turn affect HLE by shaping parents' beliefs, attitudes and expectations, for instance. As mentioned above, parents engaged in more direct instructional activities in Canada compared with European settings (Manolitsis et al., 2009; Inoue et al., 2018). Han (2008) reported that HLE and parents' expectations, as compared to school-level factors, related to academic performance more so for children from Asian origins than for children from Caribbean and Latin America families living in the US. Within Asian families, parents tend to hold higher expectations and spend more time in learning activities with their children as compared to European and American families (e.g., Huntsinger, Jose, Liaw, & Ching, 1997), and they traditionally place more emphasis on children's learning interest and academic performance (Cheung & Pomerantz, 2011; Li, 2004; Lee & Zhou, 2014).

Studies within Asian contexts also reveal different parent perspectives and purposes related to home literacy activities. Liu et al.'s (2018) study in China revealed that higher parent expectations for their kindergarten children predicted more formal HLE activities and resources, and as well had an indirect effect on children's reading outcomes. Variation in parent priorities was found in a study comparing parent practices in Beijing, Hong Kong and Singapore (Li & Rao, 2000). More children in Beijing and Hong Kong saw their parents read in Chinese daily (65% and 76%, respectively), compared with those in Singapore (48%), and more Singaporean parents viewed such reading as important for cultural identity, versus in Hong Kong where an entertainment purpose was valued.

While the current study does not address cross-national differences in HLE, we may expect that HLE in Singapore would differ from other Western contexts. This is because of an anticipated greater emphasis on children's academic achievement and interest in supporting their school readiness. Yeo et al. (2014) study found that Singaporean parents en-

gaged with their children primarily through directly teaching them to read words and stories or informational material, and how to write their names and simple words. These activities most strongly related to children's literacy performance, whereas parents' own reading behaviors did not serve as a strong model for children's outcomes, although they were related to children's literacy interests (Yeo et al., 2014). Likewise, trips to the library did not relate to their reading performance. Adults in Singapore report low rates of book reading (only 19%, according to the National Library Board, 2016), which suggests that parents may not display reading for their own pleasure or entertainment as much as in other in cultural contexts (e.g., Li & Rao, 2000).

1.6. Other distal factors and home literacy environment (HLE)

In addition to parent expectations as shaped by cultural factors, family socio-economic status (SES) is another distal factor affecting child outcomes and HLE (Butler, 2015; Chiu and McBride, 2006; Wigfield, Essoles, Schiefele, Roeser, & Davis-Kean, 2006). SES related to children's academic achievement including vocabulary (e.g. Bradley & Corwyn, 2002; Dixon, 2011; Golberg, Paradis, & Crago, 2008; Tarelli & Stubbe, 2010), phonological awareness and letter knowledge (Inoue et al., 2018), and reading achievement (Tarelli & Stubbe, 2010). SES was also found to be related to HLE (Tarelli & Stubbe, 2010) and home literacy resources (Liu et al., 2018). In particular, Dixon (2011) reported greater English vocabulary abilities for Singaporean children from high-income families, who may be able to afford additional enrichment classes (Dixon, 2011). Thus, we included SES as a control variable in the current study along with children's age, as these affect their early language and literacy skills (Farver et al., 2006).

1.7. Current study

Given that studies suggest there are differences among contexts and cultures, we examined the types of formal and informal home literacy activities and resources within Singapore, and the relation of these to child outcomes, including phonological awareness, vocabulary, and reading and spelling. Therefore, this study builds on the body of evidence of HLE and its effects on child development within the multilingual and multicultural Asian context. In the current study, we examined the following research questions and hypotheses:

(1) Is the factor structure of HLE in a Singapore context similar to that of other countries? Our hypothesis is that HLE factor structure differs from that of Western contexts based on differences in cultural influences, with a greater emphasis on parental involvement across different home activities (e.g., Han, 2008; Huntsinger et al., 1997; Yeo et al., 2014). Thus, we may expect parental involvement to be more directive with formal, code-related activities taking prominence, and other parent-initiated activity contributing to this HLE component, such as library trips. Informal activities, like shared reading, may not contribute significantly to this component of HLE, on the other hand. Beside this, we may expect parent habit and child interest variables to merge onto a single factor, given the role of parent modeling for motivating children to engage with books and print.
(2) Do the HLE factors differentially contribute to children's oral language and early literacy? We hypothesize that, although the HLE factor structure may differ from previous literature, experiences with formal, code-based activities will relate more to print-based knowledge, whereas informal, language-based activities like shared book reading will contribute more to oral vocabulary outcomes, following overall findings of children's development (e.g., Sénéchal, Whissell, & Bildfell, 2017).

2. Method

2.1. Participants

One thousand three hundred and twenty seven parents and their children (female = 667, male = 660) participated in the study. Parents completed a questionnaire when their children entered their first year of kindergarten (mean age = 57.36 months, *SD* = 3.87) which included information about HLE, family language use, and SES. Children were administered language and literacy assessments in the middle of their second year of kindergarten (mean age = 69.76 months, *SD* = 14.25). Children were either Singaporean citizens or permanent residents, with 944 from Mandarin-English bilingual families, 159 from Malay-English, and 213 from Tamil-English bilingual families, as indicated by parent report.

Participants were recruited from selected schools based on their geographical location and school fees, as a proxy for families' SES, with a targeted sample in the average range of SES for Singapore. Schools included a variety of kindergarten operators, government-run, public, not-for-profit and commercial centres in geographically dispersed locations across Singapore and from a range of neighborhoods. From the parent questionnaire data, the central tendency of the sample was within the average SES level. Socio-economic variables were coded as follows.

Family income (combined monthly income of parent and spouse) was coded on a nineteen-point scale, from $1000 to $20,000 and above, with increments of $499. For our sample, on this scale median income = 13 ($6500–$6,99SG monthly) and *SD* = 5.95 (range = 1–19). Based on the Labour Force in Singapore Advance Release report (Ministry of Manpower, 2018), the median gross monthly income for Singaporean married couples is $8874, thus placing the income for our sample just below the national average.

Type of housing was coded on a nine-point scale: from a 1 to 2 room public housing unit to a detached or terraced house. For our sample, on this scale the mean housing type = 2.65 (3–4 room public housing unit), with *SD* = 1.25 (range = 1–5). This is consistent with average housing based on the latest statistics (Singapore Department of Statistics, 2017), where 50.4% of the population is living in 3–4-room public housing.

Mother's education was coded on an eleven-point scale: from no qualifications to doctorate or above. For this sample, the mean education level = 7.29 (obtained a post-secondary or high school qualification), with *SD* = 2.49 (range = 1–11). This is consistent with the average educational profile of Singaporeans (Singapore Department of Statistics, 2018), where 54.2% of residents aged 25 and older had at least post-secondary qualifications. An SES variable was computed as a composite of standardized *z*-scores for each of three indicators: mother's education, income and housing type (based on the overall sample).

2.2. Measures

Home literacy environment. Parent-report questionnaires included a subset of 14 items about home literacy environment, as adapted from Farver et al. (2006) (refer to Table 2). Items were rated on a 7-point scale, ranging from lesser to greater degree or frequency (e.g., "Rarely/Never" to "Often/Daily"). One question, about frequency of library visits, was rated on a 6-point scale.

Vocabulary. Children's receptive language ability was measured with the Bilingual Language Assessment Battery (BLAB, Rickard-Liow & Sze, 2008). This is a locally-developed test which has been widely used in Singapore for published research (e.g., Yeong & Rickard-

Liow, 2012). The measure was given for English vocabulary. Three practice items with feedback and 80 test items were administered on an iPad tablet. On each trial, the child listened to an audio-recorded word and selected one of four pictures that matched the meaning of the word. Total number of correct responses was scored. There were missing data for this measure due to issues with the technology during data collection. The statistical software used for the analysis (MPlus Version 8, Muthén & Muthén, 2017), uses all data available (without imputing missing data) to estimate the model with a full information maximum likelihood algorithm.

Phonological sensitivity. Children's phonological awareness was measured with the Comprehensive Test of Phonological Processing, 2nd Edition (CTOPP-2, Wagner, Torgesen, Rashotte, & Pearson, 2013). Subtests included a deletion task and a blending task, where items increase in difficulty by querying from syllable to phoneme levels of awareness. In the deletion subtest (*Elision*, 34 items), children were required to listen to and repeat a word (e.g., *cup*), then remove a segment of the word (e.g., remove /k/; *up*). Corrective feedback was given on the first 12 items. The *Blending Words* subtest (34 items) required children to listen to a series of audio-recorded words spoken in segments (e.g., /t/ and /oi/) and to reproduce the whole word (e.g., *toy*) by blending the sound segments. Corrective feedback was given on the first 12 items. For both subtests, test administration was terminated after three consecutive errors. Total correct responses were summed across subtests.

Alphabetic knowledge. Children's alphabetic knowledge was measured using the letter naming (11 items) and letter writing (15 items) subtests of the Wide Range Abilities Test (WRAT-4, Wilkinson & Robertson, 2006). All items were administered, and total correct responses were summed across the naming and writing tests.

Reading. Children's reading ability was measured using the Wide Range Abilities Test (WRAT-4, Wilkinson & Robertson, 2006). Subtests included word reading (55 items) and sentence comprehension. The Blue and Green forms of the *Word Reading* subtest were administered and the average of correct responses was taken between forms. Each test was terminated after 10 consecutive errors. The Blue form for *Sentence Comprehension* was administered if the child scored at least 5 correct on Word Reading. Each item required the child to read a sentence and fill in a missing word. There were 3 practice items, and administration was terminated after 7 consecutive errors. A total reading score was summed across the word reading and sentence comprehension subtests.

Spelling. Children's spelling ability was measured using the WRAT-4 (Wilkinson & Robertson, 2006) Blue form. The Word Spelling subtests included 42 items. Words were dictated and presented aurally in a sentence. Test administration was terminated after 10 consecutive errors. Total number of correctly written words was scored.

3. Results

To address the first research question, we analyzed the factor structure of HLE using exploratory then confirmatory factor analysis. Subsequently, we used the best-fitting structural model to calculate factor scores, which we then used to predict child outcomes in a path analysis in order to address the second research question.

3.1. Home literacy environment (HLE) structure

Prior to conducting latent structural analysis, the sampling adequacy and appropriateness of a factor model for the data were checked and found to be suitable. The Kaiser–Meyer–Olkin sampling adequacy measure, KMO = 0.889, indicated that partial correlations among variables were small and that the sample was factorable. Bartlett's test of sphericity indicated that the sample correlation matrix differed significantly from the identity matrix, χ^2 (91) = 7444.3, $p < 0.001$, and that a factor structure may therefore be present.

Latent structural analysis was conducted using maximum likelihood estimation and varimax orthogonal rotation to aid interpretation (Mplus Version 8, Muthén & Muthén, 2017). Parent responses to all 14 HLE items were included in the analysis. First, a set of exploratory factor analyses were run. Second, confirmatory factor analyses were conducted to compare between best fitting models for the theoretically-based 2-factor model (as the code-based, meaning-based structure) and 3-factor model (with parent literacy involvement, parent habit, and child literacy interest variables), in addition to the best fitting model resulting from the EFA. For each analysis, model fit indices are reported. Given that χ^2 is known to be affected by sample size and inter-item correlations (Cheung & Rensvold, 2002; Miles & Shevlin, 2001), we emphasize the other indices as better representations of the model fits. To conduct the analyses, independent subsamples of the data set were randomly selected for the EFA (n = 440) and the CFA (n = 887).

First, for the exploratory factor analysis, a scree plot indicated a three or four-factor solution. Comparison between models revealed that a 3-factor model yielded a better fit to the data than a 2-factor model. However, a 4-factor model provided a better fit than the 3-factor model. The results of comparisons for the exploratory factor analysis are shown in Table 1. Fit indices for the 4-factor model were within acceptable bounds for a good fit, while this was not the case for the 3-factor model (see Table 1).

The results of the 4-factor solution from the EFA are shown in Table 2, along with the mean and standard deviation per item. Only loadings >0.30 are shown, with the highest loading per item bolded. From the factor loadings shown in Table 2, it can be seen that the frequency of reading with the child and the child asking to be read to loaded together onto the first factor, along with number of books in the home. The second factor included three items related to *parent's literacy involvement*. The third factor included three items related to *parent's literacy habit*, but excluded library visits, which did not load significantly on any of the factors. Four items related to *child's literacy interest* loaded on the fourth factor, along with 'asks to be read to', which also showed a higher loading with the first factor. Overall, there is some overlap in the results with the 3-factor model of Farver et al. (2006), except that reading with the child did not load with the other parent liter-

Table 1
Model results from exploratory factor analysis.

HLE construct model	χ^2 model fit	*df*	*p*	RMSEA	RMSEA (CI)	RMSR	χ^2 test	
1 factor	800.23	77	0.00	0.146	0.137–0.155	0.094		
2 factor	430.19	64	0.00	0.114	0.104–0.124	0.069	370.04**	2 vs 1 factor
3 factor	197.63	52	0.00	0.080	0.068–0.092	0.042	232.56**	3 vs 2 factor
4 factor	71.39	41	0.002	0.041	0.024–0.057	0.021	126.23**	4 vs 3 factor

Note: Chi-square test of model fit (χ^2), root mean square error of approximation (RMSEA), root mean square residual (RMSR), and Chi-square difference test for comparisons between model and model with 1 less factor (e.g., 2 vs. 1 factor).
** $p < 0.001$.

acy involvement items, and asking to be read to also did not load as strongly with the other child's literacy interest items.

Second, a set of confirmatory factor analyses was run next to compare the 3-factor model of Farver et al. (2006) with a 2-factor model based on the formal code-based and informal meaning-based dimensions of home literacy activities. These models were then compared with the outcome from the EFA for the 4-factor model, in which items were assigned to the factor upon which they had the greatest factor loading (indicated in bold within Table 2). Maximum likelihood estimation was used for each CFA model.

The 2-factor items included 'informal' activities as items 2, 7, 8, 9, 10, 11 (refer to Table 2). These items focus more on language aspects of reading at the passage or story level. Items included in the 'informal' activities were items 4, 5, 6, 12, 13, 14. These items emphasize attention directed towards more code-based aspects of reading. The CFA for this 2-factor model did not yield a good fit to the data, however (χ^2 = 1107.187 (55), $p < 0.001$, loglikelihood = −19,001.586, AIC = 38,073.172, RMSEA = 0.147 [CI = 0.139–0.154], CFI = 0.798, TLI = 0.757, SMRS = 0.097).

The 3-factor model included parent's literacy involvement items (items 4, 5, and 6) parent's literacy habit items (items 2, 7, 8, 9), and child's literacy interest items (items 10, 11, 12, 13, 14), respectively. Since Library visits (item 3) did not load on any factor in the EFA, this item was not included in the model. Confirmatory factor analysis for this model was an improvement over the 2-factor model (χ^2 (54) = 748.824, $p < 0.001$, loglikelihood = −18,822.40, AIC = 37,716.809), though still not a strong fit (RMSEA = 0.120 (CI = 0.113–0.128), CFI = 0.866, TLI = 0.837, SRMR = 0.177).

A 4-factor model was built following the EFA results, with item 1, 2 and 10 as one factor; item 4, 5 and 6 as another factor; items 7, 8, 9 as a third factor; and items 11, 12, 13, 14 for the final factor. The CFA yielded a better fit to the data compared with the 3-factor model, with reduced χ^2 (59) = 302.310, $p < 0.001$, and loglikelihood ratio (−20,096.31), (AIC = 40,282.62), and good fit indicators (RMSEA = 0.068 (CI = 0.061–0.076), CFI = 0.955, TLI = 0.940, SRMR = 0.040).

In sum, the 4-factor model yielded the best fit to the data sets according to the exploratory factor analysis, as shown in Table 1, and as confirmed with the 4-factor confirmatory factor analysis model. Given this, we used the factor scores from this model in the next set of analyses, to examine the relation of HLE factors to child performance.

3.2. Relation of home literacy environment (HLE) to child outcomes

To examine the extent to which HLE components correspond to child outcomes, correlational analysis was first conducted, followed by a path analysis regression model. Child outcomes included vocabulary knowledge, phonological awareness, alphabetic knowledge, reading and spelling measured at Kindergarten 2. Factor scores from the 4-factor CFA solution were entered as predictors, and referred to as in Fig. 1: shared reading (F1), child interest (F4), parent habit (F2), parent involvement (F3). Additional variables, including age and socio-economic factors (SES) were also covaried in the analyses.

First, correlational analyses were run (SPSS Statistics v24) with the HLE factor scores and children's language and literacy scores at Kindergarten 2, as well as child's age and socio-economic status. Zero-order correlation coefficients are shown in Table 3, along with the mean and standard deviations for the child outcome variables. There were moderate statistically significant correlations between the 4 HLE factors and the 5 outcome variables, while age and SES also were significantly related to most outcomes.

Lastly, path analysis was used to examine the contribution of each of the 4 HLE factors to children's outcomes a year later at Kindergarten 2. Given that there was no issue with mulitcollinearity of the five outcome measures (all VIFs < 3.0), all outcomes were entered into one model, including vocabulary, phonological awareness, alphabetic knowledge, reading and spelling. HLE factor scores, from the 4-Factor CFA, were entered as predictors, with age covaried. SES was also entered as a predictor of each outcome, formed as a composite score from standardized '*z*-scores' for mother's education, income and housing type, with multiple imputation used when one of the variables was missing (Schafer, 1999). For all predictors, intercorrelations were estimated, and for all outcomes their intercorrelations were also estimated in the model. The model is shown in Fig. 1 and yielded a good fit to the data (χ^2 (8) = 10.10, p = 0.26, RMSEA = 0.018 (CI = 0.000–0.046), CFI = 0.999, TLI = 0.993 SRMR = 0.009).

The coefficients (standardized and unstandardized) for all paths are summarized in Table 4 per outcome variable. Age contributed to each of the outcomes except for alphabetic knowledge, while SES only contributed to reading. The HLE factors were differentially related to outcomes. For vocabulary, there were significant paths from both shared reading (F1) and parent habit (F2), but F2 involved a negative relation. It was predicted that shared reading would be specifically related to vocabulary outcomes, but this factor showed a more broad effect

Table 2
Item means, standard deviations and factor loadings from the exploratory factor analysis of the HLE four-factor model.

No.	Item description	*M*	*SD*	1	2	3	4	Communalities
1	# books at home	3.79	1.48	**0.482**				0.174
2	Shared reading	3.56	2.03	**0.703**				0.492
3	Library visits	1.92	0.72					–
4	Identify words, signs	4.29	1.82			**0.738**		0.629
5	Play rhyme games	3.15	1.87			**0.668**		0.509
6	Teach letter sounds	4.48	1.79			**0.719**		0.573
7	Parent reads	3.94	1.79		**0.645**			0.706
8	Spouse reads	3.52	1.92		**0.623**			0.521
9	Sees parent read	3.76	1.79		**0.852**			0.869
10	Asks to be read to	4.78	1.79	**0.587**			0.409	0.715
11	Looks at books	4.50	1.75	0.440			**0.523**	0.566
12	Asks about print	4.68	1.65	0.330			**0.829**	0.793
13	Tries to write	4.36	1.76				**0.533**	0.480
14	Plays computer	4.15	1.82				**0.709**	0.363

Note: Factor loadings >0.30 presented for the four-factor solution of HLE using maximum likelihood estimation and varimax orthogonal rotation. Each item's highest loading appears in bold, and any additional loadings >0.30 are underlined.

Fig. 1

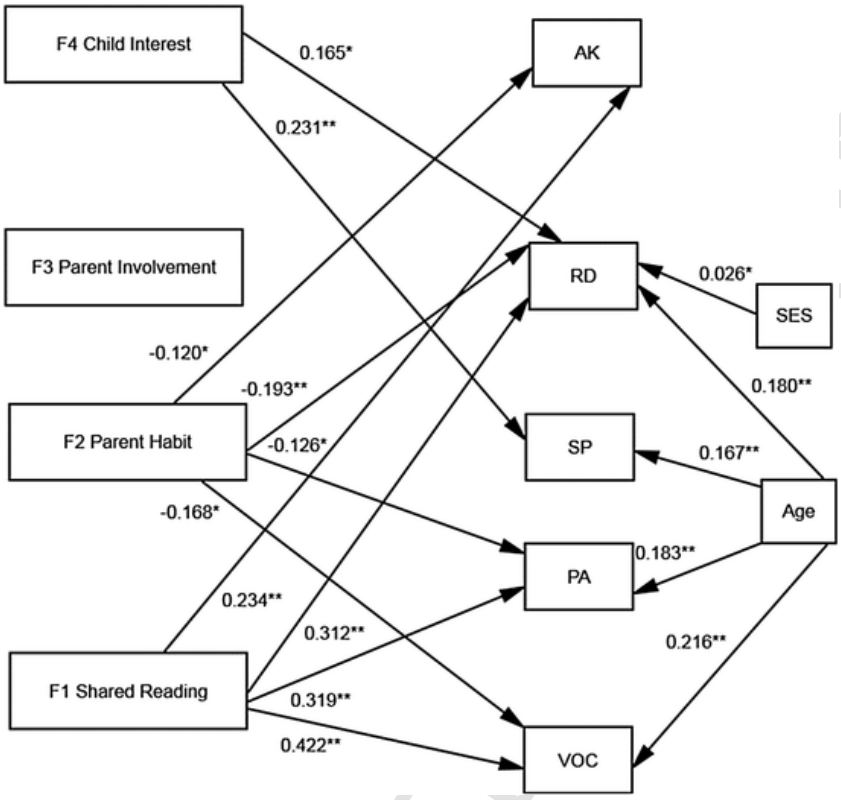


Table 3
Pearson correlations of language and literacy measures with HLE factor scores.

	VOC	PA	AK	RD	SP	F1	F2	F3	F4
Vocabulary (VOC)	–								
Phonological Awareness (PA)	0.480**	–							
Alphabet Knowledge (AK)	00.288**	0.351**	–						
Reading (RD)	0.401**	0.611**	0.252**	–					
Spelling (SP)	0.275**	0.583**	0.237**	0.701**	–				
HLE Shared Reading (F1)	0.200**	0.305**	0.164**	0.324**	0.242**	–			
HLE Parent Habit (F2)	0.085*	0.210**	0.071*	0.233**	0.205**	0.674**	–		
HLE Parent Involvement (F3)	0.126*	0.282**	0.141**	0.319**	0.280**	0.827**	0.752**	–	
HLE Child Interest (F4)	0.069	0.176**	0.057	0.162**	0.163**	0.726**	0.679**	0.667**	–
Age	0.197**	0.169**	0.046	0.167**	0.163**	−0.031	0.013	−0.008	0.019
SES	0.374**	0.398**	0.193**	0.315**	0.228**	0.221**	0.135**	0.095**	0.120**
n	639	828	835	833	833	887	887	887	887
Mean	43.04	22.90	28.87	11.17	27.55	0.00001	0.00000	0.00002	−0.00002
SD	8.133	9.269	2.949	12.029	23.763	0.911	0.909	0.941	0.952
Skew	−0.527	−0.073	−4.956	1.339	2.205	−0.235	−0.030	−0.170	0.042
Kurtosis	0.315	−0.333	28.042	1.102	10.173	−0.729	−0.669	−0.788	−0.814

Note: VOC = BLAB receptive vocabulary, PA = CTOPP-2, AK = WRAT-4 letter reading and writing, RD = WRAT-4 total word reading and sentence comprehension, SP = WRAT-4 word spelling.

* $p < 0.05$.

** $p < 0.0007$.

than was expected. For phonological awareness, there were significant paths from both shared reading (F1) and parent habit (F2), which for F2 was again a negative relation. Alphabet knowledge was also predicted by F1 and F2, showing the same positive relation to shared reading and negative relation to parent habit, respectively. Reading was predicted by both shared reading (F1) and child interest (F4), and was negatively predicted by parent habit (F2). For spelling, the only significant path was from child interest (F4). For each of the literacy outcomes, there were no significant paths from parent involvement.

Because four of the five outcomes, vocabulary, reading and phonological awareness and alphabetic knowledge, showed a negative path coefficient from the parent habit factor score (F2), we checked for possible suppressor effects, given that each of these variables showed significant and positive correlations with parent habit. The following steps were taken, following Tabachnick and Fidell (2007, p. 155): first

Table 4
Path analysis *B* and β coefficients predicting child language and literacy outcomes.

	VOC		PA		AK		RD		SP	
	B	β	*B*	β	*B*	β	*B*	β	*B*	β
HLE Shared Reading (F1)	3.804**	0.422**	3.272**	0.319**	0.762**	0.234**	4.160**	0.312**	2.940	0.113
HLE Parent Habit (F2)	−1.444*	−0.168*	−1.228*	−0.126*	−0.374*	−0.120*	−2.447**	−0.193**	−1.881	−0.076
HLE Parent Involvement (F3)	−0.017	−0.002	0.120	0.012	−0.188	−0.058	0.448	0.034	0.284	0.011
HLE Child Interest (F4)	−0.904	−0.104	0.929	0.094	0.231	0.073	2.128*	0.165*	5.825*	0.231**
Age	0.462**	0.216**	0.446**	0.183**	0.042	0.055	0.569**	0.180**	1.031**	0.167**
SES	0.006	0.031	0.001	0.005	0.001	0.013	0.008*	0.026*	−0.006	−0.010

Note: VOC = BLAB receptive vocabulary, PA = CTOPP-2, AK = WRAT-4 letter reading and writing, RD = WRAT-4 total word reading and sentence comprehension, SP = WRAT-4 word spelling.
* $p < 0.05$.
** $p < 0.001$.
SES as composite of *z* scores on 3 ranked items.

to run reduced models by systematically removing one to two of the factors, while retaining the parent habit (F2) factor; then for each model to check if the coefficient with F2 changed or remained significant; and finally, to see which variables must be present to get the suppressor effect. Accordingly, only the model with F1 (shared reading) and F4 (child interest) removed had no suppressor effects. Models without F1 (shared reading) showed that the suppressor effect of F2 only remained for the reading outcome. The model without the F2 'suppressor variable' showed a good fit to the data (χ^2 (6) = 6.79, p = 0.34, RMSEA = 0.013 (CI = 0.000–0.048), SRMR = 0.009 (see Fig. 2).

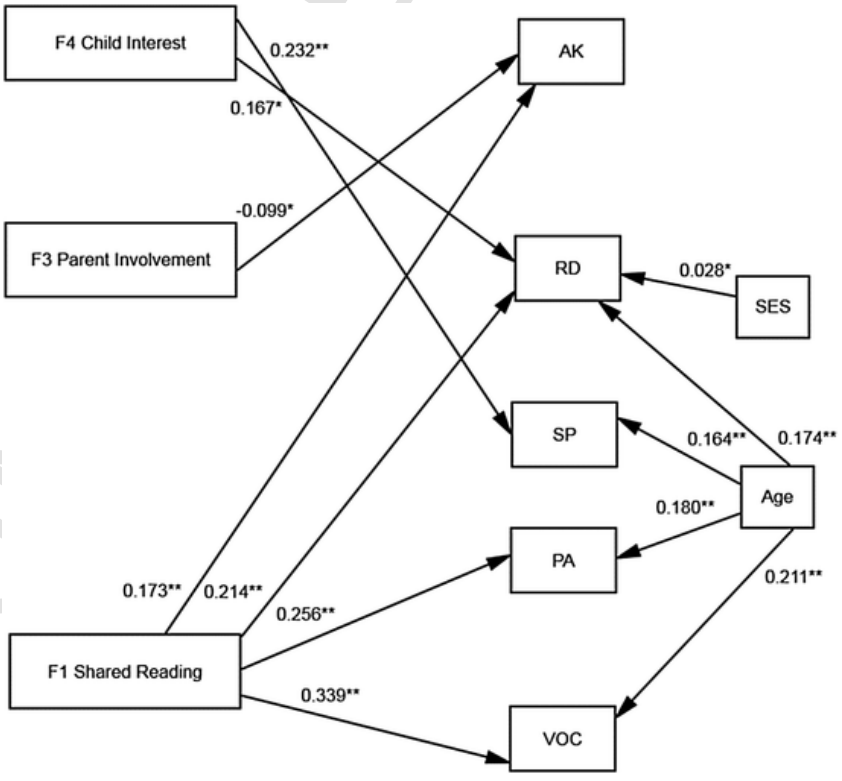
4. Discussion

In this study, we examined the home literacy environment (HLE) of preschoolers in Singapore to see whether models developed elsewhere would generalize to this multicultural and multilingual context. Our expectation that the latent structure of HLE would differ in this context was borne out: parent involvement emerged as a factor of formal, code-based activities, while informal, shared reading activities loaded on a separate factor. However, parent habit and child interest variables emerged as separate HLE factors in line with previous contexts. Our prediction that HLE factors would differentially relate to specific child outcomes was partially supported, where shared reading did contribute to oral vocabulary along with phonological awareness. However, effects of the shared reading factor were more broad, extending to alphabet knowledge and reading abilities, while the formal, parent involvement factor did not predict any of the child outcomes. On the other hand, a child interest factor emerged as an important contributor to reading and spelling outcomes.

4.1. Home literacy environment (HLE) structure

Our results from the factor analyses revealed a different model of HLE from earlier two- and three-factor models found elsewhere (Farver et al., 2006; Phillips & Lonigan, 2009). A four-fac-

Fig. 2



tor model, consisting of components we termed *parent habit, child interest, shared reading,* and *parent involvement*, yielded the best fit to the present data. Two of these factors, *parent habit* and *child interest*, were similar to those found in Farver et al.'s (2006) model. However, the *parent involvement* factor of Farver et al. (2006) was split here into two: more directed instruction of code-based information (rhyming games, letter-sounds review, and word identification; i.e., the *parent involvement* factor), versus the indirect component of frequency of shared-book reading (i.e., the *shared reading* factor). This division fits with the previous work of Sénéchal, LeFevre, Thomas, and Daley (1998) and Yeung and King (2016), who distinguished more direct instruction of print and phonics from informal activities like storybook reading. The split also fits with Phillips and Lonigan's (2009) conceptualization of inside-out (code-related) and outside-in (meaning-focused) foci of parent-child interactions. Therefore, the separation of these components of HLE holds for the present sample and contrasts with a more general parent involvement component as described by Farver et al. (2006).

The separate factor we called *shared reading* in our model suggests relative independence of code-based activities from shared reading, indicating that there may be minimal direct teaching from parents when reading with children. Instead, such reading activity could be geared towards meaning-based talk between parents and children. Hindman, Skibbe, and Foster (2014) found in a study with families of diverse ethnicity in the United States that less than 1% of mothers directed attention to letters or their sounds, and only 10% of mothers offered children the opportunity to read one or more words during shared reading. This concurs with other studies showing minimal code-based teaching during shared book reading (e.g., Hindman, Connor, Jewkes, & Morrison, 2008; Price, van Kleeck, & Huberty, 2009), and it also may fit with our findings.

Of further interest here was the loading of 'child asking to be read to' with the *shared reading* factor. This item also loaded on the *child interest* factor, as in Farver et al. (2006), but the loading with *shared reading* was stronger. An intriguing possibility is that the dynamic of parents reading with a child might differ in the present context from those found in the Farver et al. (2006) study. That these two components, 'reading with child' and 'child asking to be read to', load together on the first factor suggests that shared reading may be less adult-directed, and may be shaped by the child's interest which is met with a positive response. Children may take the lead to initiate shared book reading, in this case, where 'asking to be read to' may serve as a 'linking variable' between first and second factors of *shared reading* and *child interests*.

Similarly, the items for the child 'independently looking at books' and 'asking about print' both loaded on this first factor, as well as the fourth factor. This pattern of overlap may reflect a cycle between parent modeling and child interest. It indicates that individual interests in books by both child and parent co-exist within the HLE in the context of our study. The finding diverges from our prediction that literacy activities would be more explicitly parent-directed in this Asian context, but is similar to a study of preschoolers in China by Zhou and Salili (2008). Those authors found that children's intrinsic motivation for reading (rated as persistence and voluntary engagement) was best predicted by parents' modeling of reading. Others have found interactions amongst shared reading, child interests and parent beliefs, where Saçkes et al. (2016) reported that parents who believed their children were more interested in reading storybooks tended to read and tell stories with them more frequently, although this finding did not replicate at primary school (Ozturk, Hill, & Yates, 2016). Further, parents' specific beliefs that shared reading should be mutually participatory, along with their general engagement in literacy activities, contributed to preschoolers' interest in reading (Yeo et al., 2014). Interestingly, in Yeo et al.'s (2014) study, children's requests to be read to contributed to more formal home literacy activities (like the parent involvement factor here), and to parent beliefs about their role in fulfilling this request. Naturally, these findings and the current results rely on parent reports of their children's interests, which could differ from children's actual motivation. In the current study, child interest items included observable behaviors (self-directed reading, questions, asking to read) rather than evaluations of their affect, and this might mitigate subjective reporting. Previous reports show that such parent ratings correlate with observed child literacy interests, and are unrelated to ratings of parents' own literacy interests or shared readings with their child (Hume et al., 2016). Both direct measures and indirect parent ratings of child motivation show a significant contribution to their literacy outcomes (Dunst, Simkus, & Hamby, 2012).

Another line of evidence that suggests parents were not as directive or intentionally planful for literacy-based activities in the present study is the lack of contribution of library visits to any of the factors, including *shared reading* and the *parent involvement* factors. Since going to the library requires a parent's lead, this could be an indication that parent involvement in literacy-based activities is less invested in book reading. There is some suggestion that library visits may not play an important role in HLE in Singapore because of the local reading culture. As noted, a study conducted by the National Library Board of Singapore (2016) on the reading habits of adult Singaporeans reported only 19% of 3515 adult respondents read books (physical or eBooks) once a week, whereas 68% of the respondents read the news more than once a week. Relating this to our findings, it may suggest that in general books are not widely read due to the societal reading culture. Yeo et al. (2014) further found that parent-reported library visits in their Singaporean sample were not predictive of child literacy outcomes or interests.

Finally, the HLE factors correlated only modestly with SES within this sample (*r*'s = 0.221, 0.135, 0.095 and 0.120, for F1 to F4, respectively). These correlations are lower for F1 and F4 compared with previous research that examined SES and HLE, reporting *r*'s between 0.41 and 0.55 for shared reading (F1) and $r = 0.25$ for child interest (F4), but similar for parent habit (F2) and parent involvement (F3) (DeBaryshe, 1995; Inoue et al., 2018). As noted above, parent availability for shared reading may be limited and this may occur across a range of SES levels in Singapore.

4.2. HLE relation to child outcomes

While all four factors of HLE – *shared reading*, *parent involvement*, *parent habit,* and *child interest* – had significant moderate correlations with children's language and reading skills, the HLE factors differentially predicted the specific outcome measures. Since our factor structure neatly delineated the outside-in and inside-out oriented activities into the *shared reading* factor and *parent involvement* factor, we could examine these individually with regard to the second research question about specific child outcomes. Following Sénéchal et al. (2017), findings linking shared reading to oral language (vocabulary) were replicated, whereas parent involvement did not predict the expected literacy outcomes. Instead, shared reading predicted the literacy outcomes, as well as being a significant predictor of children's vocabulary in the following year. This pattern of effects is in line with previous findings of shared reading broadly relating to children's language outcomes (Anthony et al., 2012; Li & Tan, 2016; Scheele et al., 2010). In contrast, the present *parent involvement* factor, which included more direct teaching and attention to code-based skills, did not predict any of the child outcomes. This differs from previous findings of a strong relation between this type of direct activity and phonological or reading skills, where Puglisi, Hulme, Hamilton, and Snowling (2017) reported a positive contribution, but Manolitsis et al. (2009) and Silinskas et al. (2012) reported a negative association. The authors suggested the negative association may result from poorer readers effectively increas-

ing formal efforts by their parents to teach them about print, whereas the study by Puglisi and colleagues involved at-risk readers. In our sample, *child interest* significantly predicted reading and spelling. It is important to note that in Farver et al.'s (2006) paper, 'frequency of reading to child' was included in their parent literacy involvement factor, as the strongest item with a factor loading of 0.771, while this item loaded on a separate factor (i.e., *shared reading*) in our study.

Curiously, our *parent habit* factor did contribute to four child outcomes – vocabulary, phonological awareness, alphabet knowledge and reading – but the coefficients were all small and negative, suggesting that the more parents read on their own, the poorer their children's literacy scores. Generally, Singaporean parents were less likely to be observed by children in daily reading than their counterparts from Beijing or Hong Kong, as reported by Li and Rao (2000). To make sense of these outcomes, we could glean from the findings of the National Library study cited above, that the various genres of text that parents engage in could be uninspiring for children (e.g., the news), where books are not frequently read. Yeo et al. (2014) also found that Singaporean parents' reported reading habits of magazines, newspapers or textbooks had no effect on children's outcomes. Our finding would also suggest that passive and active elements differentially affect children's outcomes. For example, Burgess et al. (2002) reported that passive viewing of parents' reading habits was a poorer predictor of literacy skills than active shared reading between parents and children. This is supported by Yeo et al. (2014) who found a lesser effect for the passive element of parent modeling as compared to an active component of direct teaching of children's reading skills.

The set of findings underscores that the relation between these home factors and children's development is not simple, and that the home literacy environment (HLE) is multidimensional with interacting variables. Our examination of possible suppressor effects from the *parent habit* factor (F2) showed that its inclusion in the model enhanced the relation of F1 *shared reading* to the child outcomes (see Fig. 1 vs. Fig. 2). Similar to previous findings showing that parents' provision of home literacy activities related to their own reading for pleasure (Sackes et al., 2016; Baker et al., 2001), we also see that parent habit correlated with shared reading and parent involvement HLE factors. Parent habit also positively correlated with child outcome scores. Thus, it cannot be taken at face value that parents' own reading habits dissuaded children's growth in language and literacy skills. Instead, the F2 factor likely reduced irrelevant variance in the model. Other findings of complex relations of home literacy variables to children's literacy are reported. Farver et al. (2006) discussed mediation effects of child interest between parent involvement and literacy outcomes. In the present context of Singapore, Yeo et al. (2014) also reported a surprising finding that parents' belief that children should participate verbally during shared reading was negatively predictive of children's reading outcomes. These authors explained that the nature of verbal exchanges during shared reading may differ in this multiple language context because parents may have less confidence in discussing the stories in English. Further research on children's perspectives of their parents' reading materials, whether they are engaging or not, and the level of engagement which children exhibit when interacting with their parents would be required to tease apart some of these negative and complex relations between parent beliefs and behaviors to child emergent literacy.

4.3. Limitations

While this study extends previous work on HLE to an Asian context, the findings should be interpreted in light of some limitations. As with previous research, we rely on parent report for HLE, which may be subject to biases and socially desirable responses, although such reports are often found to be accurate (Pless & Pless, 1995). Further, our questionnaire items were based on previous studies of HLE factors, and did not include some aspects of expanded views of HLE, such as parent beliefs (Saçkes et al., 2016) or reader self-concept or level of enjoyment in reading (Walgermo, Foldnes, Uppstad, & Solheim, 2018). Thus, future studies could check whether this more directly influences children's literacy competencies, or which aspects may influence child literacy interests, that showed an impact on child outcomes here.

5. Conclusion

We aimed to identify a suitable HLE model that may be predictive of child academic performance in the Asian context, and that would be informative for practical purposes of intervening with children and families. We found that shared reading was an important factor on its own, and importantly included a child interest variable of asking to be read to. This factor was a particularly important aspect of HLE, as it was a significant predictor of children's vocabulary and phonological awareness, along with alphabetic knowledge and reading. This highlights the importance of shared reading frequency, responding to child initiated shared reading, and number of books in the home to both oral language and reading development. An emphasis on parents' active efforts in increasing exposure and interactions with children in literacy activities at home should be advocated. Parent literacy habits had no positive impact on child outcomes. This finding suggests a need for a modification in how parents model reading habits, more specifically to consider child interests during shared activities, instead of the passive intention in modeling reading to improve the child's reading abilities. Considering our recommendations for increasing the quantity and quality of home literacy activities, our study reiterates for policymakers and educators to promote parent education in supporting children's literacy learning at home through the development and dissemination of resources as well as workshops. Our findings would contribute to the enhancement of existing government initiatives in the production of family reading activities, such as KidSTART by ECDA (ECDA, 2017) and Early READ by the National Library Board (Ministry of Communications & Information, 2017), extending benefits to children of all SES levels. Lastly, as local parents seem more receptive to information from educators, who they ranked as more useful sources over government boards and agencies (ECDA, 2014), we recommend for early childhood educators to consistently communicate and design parent involvement activities relating to literacy practices on a day-to-day basis.

Conflict of interest

None declared.

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