# Comparing the Home Literacy Environments of Children with and without Learning Disabilities

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## Author Note

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**Abstract**

The goal of this study was to compare the home literacy environment (HLE) of children with and without learning disabilities (LDs). Participants were 1,090 children with LDs and 1,000 children without LDs from the Early Childhood Longitudinal Study–Kindergarten Cohort of 2010-2011 (ECLS-K:2011), a nationally representative sample of U.S. children entering kindergarten in fall of 2010. Parents were asked five questions about the informal home literacy environment (HLE) their children experienced the summer before kindergarten. Confirmatory factor analyses yielded three main results. First, the five questions loaded on a single informal HLE factor. Second, the factor structure of informal HLE was identical for the LD and non-LD samples. Third, the mean of the informal HLE factor for children with LDs was .208 ($p < .001$) standard deviations lower than that for children without LDs. It appears that when entering kindergarten, prior to formal reading instruction or LD identification, LD students already have less exposure to literacy and text than their peers without LDs.

*Keywords*: home literacy environment (HLE); learning disability; ECLS-K:2011

## Comparing the Home Literacy Environments of Children with and without Learning Disabilities

The home literacy environment (HLE) refers to aspects of the home environment that promote children's access to and engagement with reading related materials (Niklas & Schneider, 2017; Puglisi et al., 2017). The most widely recognized model of the HLE is the Home Literacy Model by Sénéchal and LeFevre (2002). This model conceptualizes the HLE to a culmination of various literacy-learning related aspects that can be measured in the home environment. The Home Literacy Model further posits two components of HLE: formal and informal literacy experiences. Formal literacy experiences refer to formal instructional activities such as a parent teaching the child letter sounds. Informal home literacy experiences refer to literacy-related activities and aspects of the home environment that can promote literacy but do not involve formal instruction. Examples include shared reading between the parent and child and access to print in the home.

In the current paper, we focus on the informal components of the HLE. We used confirmatory factor analysis to construct a single latent factor to represent the informal HLE. This was done using five questions parents answered that each tapped at certain observable components of children's home environment (e.g., the number of books in the home, how often the parent reads to their child, and how often the child pretends to read to themselves) that in combination captured children's informal HLE.

An advantage of measuring HLE as a latent variable with the five questions as indicators is that the questions are weighted based on how well they measure the underlying latent variable. A second advantage is that the effects of measurement error and other question-specific variance is minimized or eliminated because the latent variable represents common variance. A third advantage is that it is possible to test differences across groups on the latent variable.

Students with learning disabilities (LDs) make up the largest disability category of students in elementary schools receiving disability-related services in the United States (Data Accountability Center, 2012). These students often have more pronounced difficulties learning in one or more academic areas than would be expected, to the point of it being a disability (Compton et al., 2012; Cortiella & Horowitz, 2014; Grigorenko et al., 2020). As such, being LD is not the same as merely having low academic performance. LD is an umbrella category for many more specific LDs in the areas of reading (e.g., dyslexia), math (e.g., dyscalculia), writing (e.g., dysgraphia), and others. However, it is quite common for LD students to have more than one specific LD as they often cooccur (Willcutt et al., 2013; Joyner & Wagner, 2020). Difficulty reading is common in LD students (Chan, 1994; Pintrich et al., 1994), with it being the most common deficit among LD students and reading disabilities (RD; e.g., dyslexia) being the most commonly diagnosed LD (Cortiella & Horowitz, 2014). Learning disabilities are neurologically based differences that manifest as lifelong

disabilities (Grigorenko et al., 2020). Although early identification is important to LD student success and LDs can be detected as early as preschool, they are often not diagnosed until 3rd grade (Sanfilippo et al., 2020). Of interest is how do students with LDs differ from their non-LD peers, including whether their environmental experiences differ, even prior to formal education when their LDs are typically identified?

Our goal was to investigate how the informal HLE of LD children compared to that of their non-LD peers. There has been a dearth of research investigating the HLE of children with LDs, even though they are known to struggle with reading acquisition. However there has been research on the HLE of children who have intellectual and developmental disabilities or are at risk for LDs due to being low reader or a family history of LDs. These groups of students' HLE appear to differ in some ways from their peers. Parents of children with intellectual and developmental disabilities report prioritizing other skills over reading, as they have lower expectations for their child's literacy and general academic and life outcomes (van der Schuit et al., 2009). This was then thought to explain the observation that parents provide a lower informal HLE in the homes of children with than without intellectual and developmental disabilities (van der Schuit et al., 2009; Sevcik et al., 2019). Parents of children with dyslexia have been found to hold lower expectations of achievement for their children than parents of children with similarly low reading skills (Knight, 2021), but this has not been examined in the context of HLE.

Justice and colleagues (2016) found that preschool age disabled children who had been identified for early intervention were less interested in and initiated literacy activities less often than non-disabled children and thus engaged less with literacy materials. However, there was similar frequency of shared book reading across the groups.

Learning disabilities are heritable and tend to run in families, such that it is common for LD children to have a LD parent (Snowling & Melby-Lervåg, 2016). Hamilton et al. (2016) investigated the HLE of children with and without a reading disabled (RD) family member, using a confirmatory factor analysis (CFA) in which informal and formal HLE were each their own latent factor. They found invariance in the factor structure, such that the structure of HLE was the same across children with and without an RD parent. This meant that the components measured in the home environment that made up the latent HLE factor were the same for both groups of children. With it being established that both groups were experiencing the same kind of HLE, this allowed for comparisons of the amount of HLE experienced by children with and without RD parents.

Hamilton et al (2016), along with other studies (e.g., Dilnot et al., 2017), went on to find differences in the mean level of informal HLE of these two groups. Specifically, it appears that a lower mean level of informal HLE tends to be experienced by children with than without a RD parent (Hamilton et al., 2016; Dilnot et al., 2017). Using a sample of 1,171 6-year-old Norwegian children, Esmaeeli and colleagues (2018; 2023)

constructed a three-factor model of informal HLE; the three factors were reading-related activities, access to print, and parents' reading habits. They found that children with (compared to those without) an RD parent had lower scores on all three factors. In another paper, Esmaeeli et al. (2019) did additional analyses on the same sample, but this time constructed HLE as a single second order factor onto which the 3 previous HLE factors loaded onto, and also compared across the RD status of the children. They found that among the children without a RD parent, HLE was lower in the RD than non-RD group. However, among the children with a RD parent, there was no mean difference the latent HLE factor across children with and without RD themselves. However, they did not test to see whether the factor structure of HLE was the same across groups in either study. Finally, in a small sample of 79 Dutch children, no difference was found in shared book reading and number of books in the home across the three groups of: dyslexic children with a family history of dyslexia and non-dyslexic children with and without a family history of dyslexia (van Bergen et al., 2011).

As a note, in the studies by van Bergen et al (2011) and Esmaeeli et al (2019), the children were considered to have RD/dyslexia, not based on a formal diagnosis or evaluation of LD, but instead by scoring below at least the 10$^{th}$ and 20$^{th}$ percentile in reading. Although there is some overlap, low readers and RD children are different groups of students (Grigorenko et al., 2020; Wagner et al., 2020). Thus, the results of these studies are more representative of differences in HLE across low versus typically skilled

readers, rather than children with verse without LD/RDs. In other studies that classify these students as struggling readers and not as RD, struggling readers tend to have fewer books in the home and are read to less often than students with proficient reading abilities (Tichnor-Wagner et al., 2016).

The goal of this study was to compare the informal HLE of students with and without LDs. With LD students being the largest group of students in U.S. special education and difficulties learning to read being a chief area of deficit in these students, there is a need for knowledge on what level of background exposure in reading these children are entering kindergarten with. To establish such knowledge, studies on HLE must be done using samples of explicitly LD students (i.e., those who have been identified as being LD). The existing research on this topic has been limited to students at risk for LDs, as HLE is often measure during or before kindergarten, but LDs are most often not identified in children until later in elementary school. We were able to overcome this obstacle by using a longitudinal design which allowed us to know which of the children went on to be identified as LD later in elementary school. Furthermore, we did this using a large nationally representative sample of U.S. children, allowing for higher confidence that the knowledge gained from this study may be generalized to LD students across the U.S. The information provided by this study will help aid efforts by teachers and parents to support the reading acquisition of LD students by knowing if LD students, in addition to having reading difficulties, differ from their peers in the level of background knowledge

they are coming into kindergarten reading instruction with. For this specific paper, we did this by comparing children with and without LDs both in terms of the factor structure of informal HLE and in mean differences in factors that emerged. This allowed us to determine both if the level of HLE experienced by children with and without LDs differed, but also if the components that make up their HLE was the same for the two groups.

## Method

### Participants

We preregistered this study on Open Science Framework (Johnson & Hart, 2022; https://doi.org/10.17605/osf.io/vu65w). This study used data from The Early Childhood Longitudinal Study–Kindergarten Cohort of 2010-2011 (ECLS-K:2011; Tourangeau et al., 2017). The ECLS-K:2011 is a nationally-representative sample of approximately 18,170 United States children who were in kindergarten in the 2010-2011 school year and then followed longitudinally through fifth grade. The sample selection for ECLS-K:2011 was specifically stratified to be nationally-representative of U.S. children entering kindergarten in fall 2010 with respect to socioeconomic status, racial and ethnic background, region of the country, type of school (private and public schools), and kindergarten type (full and half-day kindergarten). A more detailed description of the ECLS-K:2011 dataset can be found in its publicly available manual and codebook (see Tourangeau et al., 2019).

For this specific paper, we used a subsample of 1,090 children with and 1,000 without LDs in the ECLS-K:2011 dataset. Children who were deaf, blind, or had intellectual disabilities were excluded from the analytic sample. The LD group was 65% male and the non-LD group was 51% male. The annual household income of both groups ranged from less than $5,000 to over $200,000, with a $40,000 average for the LD group and a $45,000 average for the non-LD group. Both groups ranged in parent level of education from a 7th grade education through a profession/doctoral degree. The median parent education level of the LD group was a vocational program after high school and for the non-LD group it was “some collage but no degree.” The breakdown by race was similar across the two groups (the LD group was 47% White, 14% Black, 30% Hispanic, 3% Pacific Islander, 1% Native American, and 5% multi-race; the non-LD group was 48% White, 12% Black, 26% Hispanic, 1% Pacific Islander, 1% Native American, and 5% multi-race).

**Measures and Procedure**

Learning disability status was determined using both parent and teacher report. First, parents reported if their child had ever been diagnosed with an LD. However, due to the skip logic of the parent interview, many parents of LD students were likely not asked if their child has an LD. Thus, this it was determined that this parent report measure alone was not adequate for identifying which students in the sample were LD. A teacher report of LD was collected as well. For children with an IEP,

the special education teacher/provider reported what disability categories the child was classified under. Children who were reported to be receiving disability services under the disability category of LD were placed in the LD group. Both parent and teacher report of LD status was collected every year (kindergarten through fifth grade) of data collection. If a child was identified as being LD during any year, kindergarten through fifth grade, by either parent or teacher report, they were considered LD for the purposes of this paper. LD status was binary coded (LD = 1, non-LD = 0). The data collected did not allow for the further differentiating of children into their specific LDs, and thus LD was operationalized as one larger umbrella category of learning disability. There is high co-morbidity across the subtypes of LDs and LD students across subtypes tend to struggle in multiple academic subject areas, but LDs primarily in reading are the most common by far (Compton et al., 2012; Cortiella & Horowitz, 2014). Using this described process, a LD sample of about[1] 1,090 was identified. We decided to limit the size of the non-LD sample to have comparable sensitivity for analyses on both groups. Thus, a random sample of 1,000 was selected from the remaining non-LD students to create the non-LD comparison group.

Home literacy environment was collected in an interview with children's parents during the fall of kindergarten. Parents were asked five questions about their children's HLE during the summer before

[1] Per the data security guidelines required by the ECLS-K:2011, all *N* sizes throughout the paper have been rounded to the nearest ten's place.

kindergarten. All five questions pertained to the informal HLE, as opposed to the formal HLE. First, they were asked how often family members reads with their child in a typical week (HLE1). This was measured on a four-point Likert scale (1=not at all, 4=every day). Second (HLE2), they were asked "how long is [child] read to at each of these times?" (reported in minutes). Third (HLE3), they reported the number of children's books in the home (including library books). Fourth (HLE4) they were asked, in the past week "how often did [child] look at picture books outside of school." This was measured on a four-point Likert scale (1=not at all, 4=every day). Fifth (HLE5), they were asked "in the past week, how often did [child] read to or pretend to read to [himself/herself] or to others outside of school?" This was measured on a four-point Likert scale (1=not at all, 4=every day).

**Analyses**

As a first step, we examined the data for missingness and outliers. Parents of children with and without LDs had a similar repones rate of about 27% on the HLE survey questions. All five HLE questions were checked for outliers and the shape of their distributions. For each variable, datapoints outside of the median plus or minus twice the interquartile range for that variable were considered outliers and adjusted to be set at the edge of that range. For each HLE questions 1-5% of the datapoints were identified as outliers and adjusted accordingly. Afterwards, descriptive statistics and Pearson correlations among all variables were run. These steps were done using R (R Core Team, 2021).

Next, confirmatory factor analysis (CFA) was carried out to examine the factor structure of HLE for students with and without LD. For each of the LD and non-LD groups, a single factor CFA which had all five HLE questions loaded onto a single latent HLE factor were run and the model fits examined. We then ran a multi-group CFA to statistically test if the factor structure was the same across the LD and non-LD groups. There are two CFA models run in a multi-group CFA. For the first (unconstrained) model, the loadings of the indicators onto the HLE latent factor were allowed to differ for the two groups. For the second (constrained) model, the loadings of the indicators onto the HLE latent factor were constrained to be the same for the two groups. A chi-square difference test was used to determine if constraining the loadings to be the same significantly reduced model fit. If the constrained model does not have significantly worse fit than the unconstrained model, we would accept the constrained model as our final model. This would indicate that there was full measurement invariance of loadings for the LD and non-LD groups, meaning the two groups had the same HLE factor structure. If there is a significant difference in model fit, we would accept the unconstrained model as our final model. This would indicate that the factor loadings for the LD and non-LD groups were different, meaning the two groups had a different HLE factor structure.

As a final analytical step, we use the final model accepted to compare mean differences between the LD and non-LD group on the latent HLE factor. The mean latent HLE of the non-LD group will be set as zero, and

the mean latent HLE of the LD group will be by how many standard deviations the LD group differs from the non-LD group in their HLE.

For all CFA models, analyses were conducted in Mplus (Muthén & Muthén, 2017), using full information maximum likelihood to handle missing data. For all CFA models, the fit of the models run was evaluated using several fit statistics. First, the chi-squared test of model fit gives the probability that the model perfectly fits the population covariance matrix. A higher p-value indicated a better fitting model, as it is the probably that the model fits the data in the population. If the model provided a perfect fit, the expected chi-squared value would be approximately equal to its degrees of freedom. However, the chi-squared test is sensitive to sample size. With large samples, it almost always will be significant indicating misfit between the model and the population covariances. Additional fit statistics examined include the Root Mean Square Error of Approximation (RMSEA) for which a value of under 0.05 indicates good fit and over 0.1 indicates poor fit. The Tucker-Lewis Index (TLI) compares the independence model to the proposed model; if the proposed model fits as poorly as the independence model it would have a value closer to 0, indicating bad fit. A Tucker-Lewis Index (TLI) value greater than .90 indicates a moderate fitting models and a value greater than .95 is an indicator of a good fitting model. The Comparative Fit Index (CFI) was examined, for which a value of greater than .90 indicates moderate fit and greater than .95 indicates a good fitting model. Finally, the standardized mean square residual (SRMR) was

examined, which is the average distance between the values of the observed and implied correlation matrix. For this test, values less than .10 indicate a good fitting model.

## Results

After doing adjustment for outliers, all five HLE variables had acceptably low skew and kurtosis values. The distribution the data for each question was also examined in a histogram as a final check. See Table 1 for depictive statistics on each variable, presented separately for the final LD and non-LD groups. See Table 2 for bivariate correlations between all the HLE questions, presented separately for each group.

### Confirmatory Factor Analysis

Results of the two single factor CFA's separately for the LD and non-LD groups suggested that the factor loadings of the HLE items onto the HLE factor were comparable across the LD and non-LD group (see Table 3 and Table 4). Turning to multi-group models, the constrained model ($\chi^2$ = 68.158) did not have significantly worse fit than the unconstrained model ($\chi^2$ = 64.497), with a non-significant chi-square difference of 3.661 with 4 degrees of freedom. The other model fit statistics (CFA, TLI, RMSEA, and SRMR) were also very similar across these two models and generally suggested acceptable fitting models (see Table 3). Thus, it was determined that there was full measurement invariance of loadings for the LD and non-LD groups, and we used the constrained model moving forward.

All five observed HLE questions significantly loaded onto the latent HLE factor (see Table 5). In looking at the standardized loadings, the second and third HLE question had the smallest loadings onto the latent factor, compared to the other three observed HLE questions. Each of the observed HLE questions had significant residual variance (all $p$'s < .001; see Table 5). Finally, the LD group had a significantly lower mean score on the latent HLE variable by 0.208 standard deviations compared with the non-LD group ($p < .001$).

## Discussion

The aim of this current study was to investigate how the home literary environment of students with learning disabilities compares to their peers without learning disabilities. Nearly all the previous studies on this topic were of children at risk for LDs, such as those with LD parents or low reader achievement, rather than of children with identified LDs. An explanation for the paucity of studies of the HLE of students with identified LDs is that HLE is typically measured prior to or at the beginning of formal schooling whereas identification of students with LDs typically occurs several years later. Comparing the HLE of students with learning disabilities to that of their peers without learning disabilities requires a multi-year longitudinal study such as that provided by ECLS-K:2011. An additional advantage of the ECLES-K:2011 is that it is a large-scale, nationally-representative study.

According to the Home Literacy Model (Sénéchal & LeFevre, 2002), the home literacy environment is made up of several observable aspects of the home environment. These observable aspects are further categorized into formal and informal literacy activities. The five HLE questions used in the present study all were measures of informal rather than formal literacy. In alignment with the Home Literacy Model, all five of these questions loaded onto a single shared latent factor of informal HLE. Furthermore, we found evidence of full measurement invariance, indicating that this single factor structure of informal HLE was equivalent for children with and without LDs. Hamilton et al. (2016), also found full measurement invariance across children with and without a RD parent in a two factor (i.e., informal and formal literacy experiences) model. It appears that the components in the home environment that together make up the HLE are the same for both children with and without LDs. This suggests that what makes up the HLE, and the extent to which each part of the HLE has the same level of importance in representing the informal HLE, is the same for both LD children and children without LD. In other words, LD children are not experiencing a different kind of informal HLE.

Having established that LD children are not experiencing a different kind of informal HLE, we wanted to determine if LD children were experiencing a different amount of informal HLE. We found that the LD children did in fact have less informal HLE than children without LD. These results suggested that even prior to entering kindergarten LD students have

had less exposure to text-based materials and activities than their peers without LD. It should be noted that we are observing these differences in LD students' home environments, specifically in their environmental exposure to text, even before a grand majority of these students have received formal education or been assessed for LDs. Most LD students are slower to learn reading skills in kindergarten and go on to have lower reading performance in early elementary school (Sullivan et al, 2017). Thus, it appears that when receiving formal reading instruction in kindergarten, LD students have less of an informal foundation in exposure to text to build on than their peers. It had been previously established that children at risk for LDs (such as low readers or those with a LD parent) have a lower HLE than their peers (Hamilton et al. 2016; Tichnor-Wagner et al. 2016; Esmaeeli et al. 2019). Our currently study goes beyond these previous studies, by specifically narrowing in on students who go onto be identified with an LD. In doing so, our study provides critically important information for parents and teachers on the background knowledge and exposure (or lack thereof) their LD students are entering into kindergarten classroom reading instruction with.

We stress that that causal mechanisms are not known, and we are not advocating that HLE differences are in part leading to later LD identification. One potential explanation for this difference in mean HLE between students with and without LDs could by a passive gene-environment correlations (Plomin et al., 1979; Scarr et al., 1981). Parents

with LDs are more likely to have children with LDs (Snowling et. al. 2005). Parent's genes related to their reading skills influence both the home environment that they create (e.g. HLE) and the reading skills of the child (Hart et al., 2021). This results in a correlation between the HME and children's reading skills that is not causal but instead due to a common third variable of their parents own genetically driven reading skills, including having LD themselves. Children of parents with LDs have been found to have a lower informal HLE than children of parents without LDs (Hamilton et al., 2016; Esmaeeli et al., 2018, 2023). Then among children with a family history of LD, mean HLE was measured at equivalent levels in those children with low and average reading achievement (van Bergen et al, 2011; Esmaeeli et al, 2019). As such, family history could be in part an explanation as to our findings that LD students have lower HLE than non-LD students.

**Limitations**

This was a secondary data analysis of the ECLS-K:2011, which brought both strengths and limitations to our analyses. As this is a large nationally representative sample of U.S. children, we are more confident that our findings apply to U.S. children in general. The advantage of this dataset was not just the large overall sample, but the fact that it provided a large LD sample. There are several types of LDs that impact different academic skills. It would be of interest to investigate of students with

specifically reading disabilities or compare across various subtypes of LDs. However, a limitation in the way in which LD status was collected in the ECLS-K:2011 surveys did not allow for differentiating among types of students' learning disabilities. Reading disabilities are the most commonly identified LDs (Cortiella & Horowitz, 2014). Future studies are needed in which the HLE of an explicit sample of children with identified reading disabilities is needed.

In addition, given the nature of the ECLS-K:2011 measurement of the HLE, we were only able to estimate a single factor for the HLE. Other studies investigating the HLE of children at risk for LD have tested varying informal HLE factor structures. Esmaeeli et al, (2018; 2019; 2023) presented results supporting a model of informal HLE that was comprised of the three latent factors of reading-related activities, access to print, and parents' reading habits. Four out of the five of the ECLES-K:2011 HLE questions were measures of reading-related activities. The question asking about number of books in the home would appear to represent access to print in Esmaeeli et al.'s framework. Our lack of having multiple measures of access to print or parents' reading habits did not allow us to evaluate Esmaeeli et al,'s (2018; 2019; 2023) model as a comparison to a single factor. Comparing LD and non-LD students' HLE using Esmaeeli et al.'s (2018; 2019; 2023) 3-factor model would be an insightful new direction for future studies.

**Conclusions**

Learning disabilities are pronounced academic difficulties, with early delays in reading development being especially common for LD students. In knowing that LD students have a particular risk for reading difficulties, the aim of this study was to examine the amount of exposure to the informal HLE LD students are getting prior to kindergarten. With this current study, we found that children with LDs have lower mean home literacy environments than their peers without LDs. Children's HLE prior to kindergarten is predictive of their early reading achievement in elementary school (Dong et al., 2020). The HLE importantly exposes children to text, giving a foundation in which in build during kindergarten reading instruction (Niklas & Schneider, 2017). It seems that prior to formal reading instruction, LD students already have lower exposure to text based materials. An important area for future research is to compare relations between HLE and subsequent growth in reading achievement for students with learning disabilities and for their non-disabled peers. A takeaway for parents and teachers from this study is that LD students not only are likely to struggle with early reading instruction due to their LD, but they likely also have had less experiential exposure to text as well.

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Table 1.

*Descriptive Statistics of all Variables for Each Group*

| | LD group | | | Non-LD group | | |
|---|---|---|---|---|---|---|
| | Mean | Standard Deviation | N | Mean | Standard Deviation | N |
| HLE1 | 3.31 | 0.76 | 790 | 3.37 | 0.71 | 740 |
| HLE2 | 20.11 | 9.68 | 780 | 20.06 | 9.01 | 730 |
| HLE3 | 64.21 | 57.37 | 790 | 74.82 | 60.68 | 740 |
| HLE4 | 3.22 | 0.80 | 790 | 3.28 | 0.78 | 740 |
| HLE5 | 2.83 | 0.95 | 790 | 3.04 | 0.87 | 740 |

Note: Per ECSL-K guidelines, all N values have been rounded to the nearest 10’s place. HLE = home literacy environment. LD = learning disability.

Table 2.

*Bivariate Correlations Among all Pairs of Variables by Group*

| | HLE1 | HLE2 | HLE3 | HLE4 | HLE5 |
|---|---|---|---|---|---|
| HLE1 | | .13*** | .29*** | .38*** | .29*** |
| HLE2 | .13*** | | .09** | .12** | .12** |
| HLE3 | .26*** | .06 | | .28*** | .18*** |
| HLE4 | .41*** | .08* | .22*** | | .47*** |
| HLE5 | .29*** | .17*** | .13*** | .47*** | |

Note: above the diagonal is the non-LD group and bellow the diagonal is the LD group. * $p < .05$, ** $p < .01$, *** $p < .001$. HLE = home literacy environment. LD = learning disability.

Table 3.

*Model Fit Statistics*

| | $\chi^2$ | df | p-value | CFI | TLI | RMSEA | SRMR |
|---|---|---|---|---|---|---|---|
| LD group, Single-factor model | 29.579 | 5 | < .001 | 0.944 | 0.887 | 0.079 | 0.033 |
| Non-LD group, Single-factor model | 16.961 | 5 | .005 | 0.971 | 0.943 | 0.057 | 0.026 |
| Multi-group constrained model | 68.158 | 18 | < .001 | 0.941 | 0.935 | 0.060 | 0.039 |
| Multi-group unconstrained model | 64.497 | 14 | < .001 | 0.941 | 0.915 | 0.069 | 0.035 |

Note: CFI = Comparative Fit Index. TLI = Tucker-Lewis Index. RMSEA = Root Mean Square Error of Approximation. SRMR = Standardized Root Mean Square Residual.

Table 4.

*Confirmatory Factor Analysis Results of the LD and non-LD groups run in two Separate Models.*

| | LD group | | | Non-LD group | | |
|---|---|---|---|---|---|---|
| | Unstandardized | | Standardized | Unstandardized | | Standardized |
| | Loading (p-value) | Standard error | Loading (p-value) | Loading (p-value) | Standard error | Loading (p-value) |
| Loadings on HLE | | | | | | |
| HLE 1 | 1.000 (999.000) | 0.000 | 0.542 (<.001) | 1.000 (999.000) | 0.000 | 0.523 (<.001) |
| HLE 2 | 4.251 (<.001) | 1.057 | 0.180 (<.001) | 4.633 (<.001) | 1.119 | 0.190 (<.001) |
| HLE 3 | 43.407 (<.001) | 6.297 | 0.311 (<.001) | 62.786 (<.001) | 8.019 | 0.383 (<.001) |
| HLE 4 | 1.472 (<.001) | 0.145 | 0.755 (<.001) | 1.587 (<.001) | 0.165 | 0.751 (<.001) |
| HLE 5 | 1.376 | 0.135 | 0.595 | 1.410 | 0.144 | 0.603 |

| | | | |
|---|---|---|---|
| (<.001) | (<.001) | (<.001) | (<.001) |

Note: HLE = home literacy environment. LD = learning disability

Table 5.

*Confirmatory Factor Analysis Results of the Constrained Model*

| | Unstandardized Estimate (p-value) | Standard error | Standardized Estimate (p-value) |
|---|---|---|---|
| Loadings on HLE | | | |
| HLE 1 | 1.000 (999.000) | 0.000 | 0.528 (<.001) |
| HLE 2 | 4.395 (<.001) | 0.763 | 0.181 (<.001) |
| HLE 3 | 53.170 (<.001) | 5.029 | 0.363 (<.001) |
| HLE 4 | 1.497 (<.001) | 0.104 | 0.745 (<.001) |
| HLE 5 | 1.415 (<.001) | 0.100 | 0.592 (<.001) |
| Residual variances | | | |
| HLE 1 | 0.407 (<.001) | 0.024 | 0.720 (<.001) |
| HLE 2 | 90.574 (<.001) | 4.652 | 0.967 (<.001) |
| HLE 3 | 2944.750 (<.001) | 157.173 | 0.868 (<.001) |
| HLE 4 | 0.284 (<.001) | 0.028 | 0.445 (<.001) |
| HLE 5 | 0.587 (<.001) | 0.038 | 0.650 (<.001) |

Note: HLE = home literacy environment