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Continuity in Children's Literacy Achievements:

A Longitudinal Perspective from Kindergarten to School

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Abstract

This study examined continuity in literacy achievements from kindergarten to school, among low SES Israeli children, controlling for family factors. Kindergartners' early oral and code-related language skills as well as family measures were assessed at age 5½. In school, 2½ years later, their literacy achievements were evaluated. Correlations emerged between all kindergarten literacy measures and school literacy achievements. Oral and code-related early literacy measures similarly predicted all school literacy achievements. Moreover, early literacy predicted literacy achievements at the end of second grade beyond home environmental measures. Results highlighted the stability in children's learning through the kindergarten-to-school transition, confirming the importance of promoting early literacy in kindergarten, especially among low SES children.

Key words: Early writing; Literacy; Longitudinal study; Morphological awareness; SES.

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Growing evidence suggests that individual differences in children's literacy-related skills remain stable from the preschool years until high school (Whitehurst & Lonigan, 2002). Acknowledging these general relations is important yet not sufficient for planning productive early literacy interventions. The scope of this relationship and the relative predictive value of the different oral and code-related early literacy measures need further examination. Moreover, the origins of this continuity require investigation, particularly with regard to the role played by home environment. A thorough investigation of these issues may help in guiding teachers as well as parents of young children to support the more productive specific aspects of early literacy.

The present study analyzed this relationship in literacy-related skills over time utilizing a range of literacy and home environmental measures among Israeli children. The study longitudinally followed children with low socioeconomic status (SES), from kindergarten to school. Code-related and oral language measures were examined in kindergarten and then again 2½ years later in school toward the end of second grade, when children in Israel stop formal acquisition of reading and writing and turn to these literacy skills to study various subject matter. When children were in kindergarten, three home environment measures were also assessed: family SES, mother's literacy level, and the presence of literacy games and tools at home. This study examined the role of these measures in predicting later literacy achievements and then studied the continuity in literacy achievements beyond these home environments measures.

Continuity in literacy achievements emerges early in life. Language level at age 3 predicts oral production and comprehension at age 5 (Beals & De-Temple, 1993); and phonological awareness skills at age 4 predict phonological awareness at age 5 (Burgess, 1997). Moreover, children who can name more letters at age 4 show a higher level of emergent writing and a greater familiarity with the alphabetic system at age 5 (Martlew & Sorsby, 1995).

A body of research on continuity during the transition from kindergarten to school has emphasized the role of linguistic knowledge, phonological awareness, and letter knowledge in kindergarten as chief predictors of decoding accuracy, reading speed, and reading comprehension at the beginning of school (e.g., Aarnoutse, van Leeuwe, & Verhoeven, 2001; Bowey, 1995; Chaney, 1998; Hurtford, Schauf, Blaich, & Moore, 1994; Levin, Share, & Shatil, 1996; Lonigan, Burgess, & Anthony, 2000; Näslund, 1990; Näslund & Schneider, 1996; Storch & Whitehurst, 2001, 2002).

Relative Predictive Strength of Oral and Code-Related Skills in Predicting Later Literacy Achievements

Facing the wide variety of early literacy predictors and school-age literacy measures, researchers have recently attempted to unravel the essence of later reading achievements' relations with oral language abilities on the one hand and with code-related skills on the other (Dickinson, McCabe, Anastasopoulos, Peisner-Feinberg, & Poe, 2003; Storch & Whitehurst, 2002; Wagner et al., 1997; Whitehurst & Lonigan, 1998). Three major approaches to these relations have emerged.

One approach posits that vocabulary provides the basis for the emergence of phonological sensitivity, which then becomes the key language ability supporting reading. In line with this view, Wagner and colleagues (1997) followed 216 children from kindergarten through fourth grade. They found that phonological awareness

correlated with subsequent reading throughout the 4 years, and vocabulary correlated with reading in the first grade, but both these relations declined with development.

A second view, the comprehension language approach, perceives oral-language and code-related skills as critical in emergent literacy and envisions both as continuing to play vital roles in subsequent reading achievements. Dickinson and Tabors (2001) conducted an 11-year longitudinal study of 74 Head Start children beginning at age 3, examining a broad range of oral language and literacy abilities. These researchers found substantial long-term correlations of oral language in preschool and kindergarten with fourth- and seventh-grade decoding and reading comprehension.

A third approach somewhat combines the previous two points of view, conceiving the oral-language and code-related skills as holding different separate roles at different points of time during the development of reading. In line with this approach, Storch and Whitehurst (2002) followed 626 children from preschool through fourth grade and found that preschoolers' oral and code-related skills intercorrelated and were both predictive of children's literacy. During first grade, code-related skills became the best predictors of reading achievements. Yet, in higher grades (third and fourth), oral language predicted higher literacy functions like reading comprehension.

The present study addressed the question of the relations between oral language and code-related skills in kindergarten and in second grade. This study also examined differences between kindergartners' oral and code-related skills in their ability to predict reading achievements in school.

Two Relatively Unattended Literacy Measures

Researchers have devoted less attention to some predictors and predicted measures of literacy than to others. The current study aimed to fill the gap regarding two of these less attended measures: word writing and morphological awareness.

Word Writing

Preschoolers spontaneously engage in writing prior to school entry (Ferreiro & Teberosky, 1982; Sulzby, 1986). Sulzby (1992) claimed that even in the earliest stages of literacy, children can write and should be encouraged to write and share their writing frequently. Though early writing is an important code-related component of early literacy, it has received relatively little attention (Aram & Levin, 2001). The few studies that examined this component followed children only up to the first grade (Lazo, Pumfrey, & Peers, 1997; Levin, Ravid, & Rapaport, 2001; McBride-Chang, 1998; Shatil, Share, & Levin, 2000). Shatil et al. (2000) found that kindergarten writing significantly predicted variance in decoding, spelling, and reading comprehension in first grade, even after controlling for general intelligence. The present study extended the inquiry up to the end of second grade, when children complete their formal reading and writing acquisition. This study inspected the relations between early word writing as a code-related skill and a variety of written and oral literacy measures at the end of second grade.

Morphological Awareness

In contrast to the many studies conducted on phonological awareness (e.g., Bus & van IJzendoorn, 1999; Ehri, Nunes, Willows, Yaghoub-Zadeh, & Shanahan, 2001), researchers have almost neglected the role of morphological awareness in literacy development (Carlisle, 2003). Morphological awareness may be centrally related to literacy development (Carlisle, 1995), and Hebrew offers a particularly appropriate language for examining the continuity between early literacy and

morphological awareness because it comprises a synthetic language with a wealth of morphological structures. Furthermore, Hebrew spelling reflects the language's morphological infrastructure (Levin et al., 2001).

The semantic core of a Hebrew word (the root) is usually consonantal, with vowels (and certain additional consonants) indicating mainly grammatical inflections such as person, number, and gender. Most content words in Hebrew are derived from roots, each composed of 3-4 consonants. Words derived from the same root share phonological and orthographic components, and are often semantically close. For instance, sɛfɛr, sofɛr, safran ('book,' 'author,' 'librarian') are derived from the root SFR. The root basis of Hebrew spelling offers spellers a clue as to how to spell a phoneme that can be spelled by homophonic letters.

Sensitivity to specific language domains, such as derivational morphology, has been shown to play a significant role in reading ability in school (Ravid & Tolchinsky, 2002). Studies have suggested that the ability to identify formal, marked morphological constructions and to produce them under certain conditions may emerge as early as the preschool years (e.g., obligatory inflection like plural suffixations: *kelev* / *klavim* ‘dog / dogs’). However, appropriate and consistent integration of morphology use in suitable contexts (e.g., optional bound morphology, as in the genitive ‘<u>her</u> palace:’ bound form = *armon-<u>a</u>,* analytic form = *ha-armon <u>shela</u>*) may be delayed until adulthood (Cahana-Amitay & Ravid, 2000). The early predictors of mature morphology production have yet to be identified (Chliounak & Bryant, 2002). The present study investigated a range of oral and code-related early literacy measures as potential predictors of schoolchildren's morphological awareness, specifically awareness about Hebrew’s root-based spelling and productivity in the oral derivation and inflection of Hebrew words.

Sources of Continuity

The studies that demonstrated impressive continuity in literacy achievements from early ages to the school years raise questions about the reasons contributing to this continuity. Do children simply follow a certain path in their literacy development, where the opening point sets a trajectory of achievement for later development? Or does the "Matthew effect" apply, whereby children not only follow a particular path but also gaps between children's literacy achievements increase over time, so that the "rich get richer" while the "poor get poorer" (Stanovich, 1986)?

Continuity in literacy development may also be explained by mediating factors that relate to the children's literacy achievements both in kindergarten and in school. Two plausible candidates suggest themselves – the child's cognitive abilities and the quality of the child's environment at home with respect to promoting literacy. To obtain a better understanding of the genesis of continuity in literacy, research must control for such potential mediators. Studies that controlled for child-related factors usually addressed general cognitive abilities like IQ (e.g., Wadsworth, Olson, Pennington, & DeFries, 2000) or specific cognitive abilities like phonological memory (e.g., Stanovich & Siegel, 1994) that affect literacy development and acquisition. When researchers directed attention to the environment, they included measures like SES (e.g., Baydar, Brooks-Gunn, & Furstenberg, 1993), parental literacy (e.g., Zady & Portes, 2001), and home literacy environment (Neuman & Celano, 2001) in kindergarten as well as later in school. Nevertheless, many studies that explored the literacy continuity issue often ignored environmental measures that may have contributed to this continuity (see Aarnoutse et al., 2001; Näslund & Schneider, 1996). Some studies referred to a global environmental measure, usually SES (Baydar et al., 1993; Levin et al., 1996). The present study focused on the

environment by controlling for three major environmental measures: maternal literacy, literacy-related tools at home, and SES. These reflect a widening range of measures surrounding the child, capturing a host of sociocultural variations.

Maternal literacy. Studies demonstrated that parents' own literacy practices appeared to determine opportunities for young children to become involved in literacy-related interactions (Bus, 2002). Differences in maternal literacy were found to correlate with children's interest in books and children's exposure to joint book-reading activities (DeBaryshe & Binder, 1994); with the amount of time children spent on reading and studying (Bianchi & Robinson, 1997); and with literacy outcomes like phonemic awareness, vocabulary, and printing performance (motor skills and visual discrimination) (Symons, Szuszkiewicz, & Bonnell, 1996).

Literacy-related tools at home. Research has shown an association between availability of literacy materials and literacy development. Ensuring a rich literacy environment begins in infancy and continues across the years of schooling (Bradley, 2002). Many studies have reported that children who have access to literacy-evocative materials and experiences (papers, pencils, books, blackboards, crayons, booklets, journals, dictionaries, cards, visits to the library, etc.) tended to become more proficient readers than did children lacking such tools and activities (Hart & Risley, 1992; Nicholson, 1999; Neuman & Celano, 2001; Stuart, Dixon, Masterson, & Quinlan, 1998).

SES. A stable, well-documented connection exists between SES and children's literacy. Ample research has indicated that children from a lower SES exhibit a lower level of achievement on such literacy measures as phonological awareness, letter naming, word writing, word recognition, text writing, receptive vocabulary, and grammar (e.g., Bowey, 1995; Duncan, 1991; Hammer & Weiss, 1999; Hoff, 2003;

Korat & Levin, 2001; Lonigan, Burgess, Anthony, & Baker, 1998; Nicholson, 1999; Reese, 1995; Walker, Greenwood, Hart, & Carta, 1994; Whitehurst, 1997).

Studies that referred to environmental effects usually compared low SES to middle or high SES groups. This approach is prone to conceiving low SES cohorts as homogeneous (Holden, 1997; Pflaum, 1986). The present study on literacy continuity sought to control for the central home environment measures among the low SES population. The current restriction of the sample to low SES aimed to shed light on interfamilial differences that may be relevant to literacy development from kindergarten to school within this cohort.

Purpose of the Present Study

The present study had three aims. The first aim was to examine the differential predictive value of oral and code-related language skills in kindergarten to literacy achievements in school. Second, the study aimed to expand knowledge about the range of competencies that contribute to literacy continuity from kindergarten to school, by including two less attended measures, word writing in kindergarten and morphology production in second grade. Third, this study aimed to investigate whether the predictive relations between kindergarten and school persevered after controlling for a broad range of home environmental measures.

METHOD

Participants

Participants lived in an Israeli development town, comprising a poor peripheral settlement characterized by low SES in terms of education, occupation, and standard of living. The kindergarten sample included 41 children recruited from seven kindergartens, one from each of the neighborhoods in the town. All kindergarten teachers used the same curriculum and received guidance from the same literacy

counselor. Kindergartners' average age was 5 years and 8 months (M = 69.59 months, SD = 2.14). To control for possible effects of children's age on children's literacy, only children born between January and June were sampled. The sample included children whose mother tongue was Hebrew and excluded children diagnosed as having special education needs. Out of the 46 children who met these criteria, 41 families (19 boys and 22 girls) agreed to participate in the study. All parents were educated in Israel. The average level of parental education (12 years for mothers and 11 for fathers) was lower than the national average of their cohort (13 years). As to occupation, among the mothers, 39% were unskilled. Among the fathers, 10% were unskilled and 12% were unemployed. The rate of unemployment in this town was 1.5 times higher than the national rate. For a more detailed description of the families, see Aram and Levin (2001).

I located a total of 38 of the original participants (20 girls and 18 boys) 2½ years later. Three children moved with their families out of the town and were not included. The loss rate of 7% over 2½ years is relatively small (Sénéchal & LeFevre, 2002). Out of the 38 children, 33 attended second grade, and 5 attended first grade because they had remained in kindergarten for an extra year. These 5 children underwent assessment at the same interval (for them, at the end of first grade). The children attended six elementary schools located in their respective neighborhoods. All schools followed the same curriculum and received guidance from the same literacy counselor. Schools employed an eclectic curriculum for teaching reading and writing, utilizing phonics as well as whole language methods. As customary in Israel, each child remained with the same teacher for both the first and second years of school.

Measures and Procedures

Children's Literacy Assessed in Kindergarten

At the kindergarten interval, children completed six tasks to tap their early literacy skills. These tasks included four code-related measures – Word Writing, Word Recognition, Recognitions' Explanations, and Orthographic Awareness – and one measure of oral language – providing Definitions. The sixth measure, Phonological Awareness, tapped to some extent into both code-related and oral language. Although Phonological Awareness clearly involves sensitivity to and awareness of oral language, some studies have shown that semantic, syntactic, and conceptual measures of oral language as measured in the providing Definitions task could be statistically separated from those in the Phonological Awareness task, and that phonological awareness correlates better with code-related measures (Storch & Whitehurst, 2001; Whitehurst & Lonigan, 1998).

Word Writing. Word Writing was assessed individually over four sessions. In each session, the child was asked to write four pairs of words presented orally. The 16 pairs of words fell into four groups, each of which encompassed different aspects of children's early literacy. In the first group, the longer sounding word in each pair denoted a smaller referent, for instance, *pil - nɛmala* 'elephant – ant.' (Note that Hebrew words are spelled by International Phonetic Alphabetic symbols.) In the second group, the two words in each pair differed in their phonological length but did not differ clearly in the size of their referents, for instance, *ɛt – iparon* 'pen – pencil.' In the third group, the two words rhymed, for instance *tsinor – kinor* 'pipe – violin,' such that they differed only in their initial phoneme. In the fourth group, the two words differed in gender, such that male and female nouns were spelled the same, but the latter were suffixed with H designating one phoneme (hɛi), for instance, *xatul* -

xatula ‘cat (M) – cat (Fm).’ In each session, the child dealt with each of the four different types of pairs, drawn randomly from each of the four groups and differently across participants. Each written word was scored on a 9-point scale adapted from Levin et al. (1996) and consisting of (1) pseudo letters, (2) random letters insensitive to phonological length, (3) random letters sensitive to phonological length, (4) basic consonantal spelling without vowels, (5) basic consonantal spelling with vowels, (6) partial consonantal spelling without vowels, (7) partial consonantal spelling with vowels, (8) advanced consonantal spelling without vowels, and (9) advanced consonantal spelling with vowels. The score on *Word Writing* equaled the sum of the 32 words. Inter-judge reliability between two independent judges, based on 20% of the sample, was significant (Kappa = .83). The possible score range on Word Writing was 32 to 288, with the higher scores indicating more conventional and accurate spelling.

Word Recognition. Word Recognition was assessed individually over four sessions. In each of the four sessions, the child was asked to recognize four pairs of printed words presented to him/her on cards. The words were the same words that the child had written before (one drawn from each group described above). Recognition was examined by asking the child to match two oral words illustrated by drawings to two printed words. The number of pairs matched correctly determined the *Word Recognition* score. The possible score range for *Word Recognition* was 0 to 16, with higher scores indicating that more pairs were correctly recognized.

Recognitions' Explanations. After each of the recognitions made by the child, he/she was asked to explain that recognition (“Why do you think that this word is X and this word is Y?”). I scored the level of explanation of each pair on a 4-point scale: (1) Pre-alphabetic explanation, which is egocentric, contextual, and does not

refer to the system of writing (e.g., “Because I know,” “I guessed,” "I don’t know why"); (2) Rudimentary incorrect alphabetic explanation, which refers to characteristics relevant to writing, by noting letter names or phonological length, but applies them erroneously; (3) Partial-alphabetic mixed correct and incorrect explanation, which refers to characteristics relevant to writing, but applies them partly correctly and partly incorrectly (e.g., providing a correct name to a letter, but deriving the conclusion that it should be a word that actually is not spelled with that letter); (4) Correct alphabetic explanation, which correctly refers to the written system by mapping the longer sounding word onto the longer written word and explaining it by reference to phonology; naming a letter correctly and deriving the correct conclusion as to the written word; and/or providing a morphological explanation or decoding. Inter-judge reliability, based on 20% of the sample’s explanations, resulted in a significant Kappa of .86. The *Recognitions' Explanations* score was determined by averaging the 16 pairs. The possible score range on the *Recognitions' Explanations* was 16 to 64, with higher scores indicating more correct alphabetic explanations.

Orthographic Awareness. Orthographic Awareness was assessed individually using an adaptation to Hebrew of Olson, Kliegl, Davidson, and Foltz’s (1985) test. The test included 19 pairs of graphic items comprising a printed word and a non-word. These non-words included seven categories: numerals, a mixture of numerals and Hebrew letters, Latin and Hebrew letters, a single letter, too many letters for a Hebrew word, unacceptable spelling, or illegal repetition of letters. Each child was asked to select the printed word and to explain his/her decision. Performance was scored twice, on *word selection* and on *explanation*, according to the number of items correctly selected and the number of categories correctly explained. A correct explanation referred specifically to the reason why a string of symbols comprises a

word or non-word (e.g., “These are numbers, so it is not a word”). The possible score range for *word selection* was 0 to 19, with higher scores indicating recognition of more words. The possible score range for *word explanation* was 0 to7, with higher scores indicating higher understanding of Hebrew orthography. The mean *Z* score of *word selection* and *word explanation* was highly reliable, Cronbach $\alpha = .91$, and served as the *Orthographic Awareness* measure.

Phonological Awareness. *Phonological Awareness* was measured individually by two tests (assessed on two different days), each including 20 monosyllabic word pairs. One test referred to the initial and the other to the final phonemes. On the initial phoneme test, children were asked if the initial sounds were similar or different. On the final phoneme test, they were asked the same question with reference to the final phonemes. The number of correct responses determined the score on *Phonological Awareness*. The possible score range on *Phonological Awareness* on each test was 0-20. The correlation between the two tests was $r = .66$, $p < .001$, and their standard deviations were similar (SD = 13.10 for initial phoneme and SD = 12.10 for final phoneme). The mean score across the two tests served as the *Phonological Awareness* measure, with higher scores indicating higher sensitivity to the initial and final phonemes in words.

Definitions. Linguistic knowledge was assessed individually using my adaptation to Hebrew of the Definitions Task (Snow, Cancino, Gonzalez, & Shriberg, 1989). Snow (1993) suggested that children who give formal definitions, that is, a super-ordinate term with an appropriately restrictive relative clause, are those who perform better in reading comprehension. Children were asked to define 14 nouns (e.g., “What is a bicycle?”). I categorized the children’s responses to each of the words into either formal or informal definitions, with the former receiving extra

points on the quality of the super-ordinate term and the relative clause. I scored each definition, formal or informal, according to Snow et al. (1989) on six categories: synonyms, definitional features, functional features, examples, descriptive features and comparisons, and communicative adequacy. Each feature from these categories, used in the definition, credited the child with points according to the manual, with higher scores indicating more elaborated and precise definitions. I used the sum of points for all the definitions as the *Definition*s score. The inter-judge reliability – based on 42 definitions, 3 definitions per word, randomly chosen from all 41 children in the kindergarten sample – resulted in a Cronbach α of .98.

Procedure at Kindergarten Interval

The data on the child's independent literate abilities were collected in the kindergartens, 4 months after the academic year began (in January), over four sessions per child, carried out individually within the same week or two. Word Writing, Word Recognition, and Recognitions' Explanations were tested on each of the four days. A test of Word Definitions appeared in the first session. The two Phonological Awareness tests (initial and final) appeared in the second and fourth sessions, counterbalanced across children. Orthographic Awareness appeared in the third session.

Children's Literacy Assessed in School

In school, 2½ years after the first assessment, the children were assessed on a total of nine measures of literacy. These included measures of Spelling (Word Writing), Word Decoding (Auditory Discrimination and Orthographic Discrimination), Text Reading (Accuracy and Fluency), Reading Comprehension (Cloze), Morphology (Written Production and Oral Production), and Oral Language (Definitions).

Spelling – Word Writing

This task assessed children's awareness of Hebrew's orthography in spelling production. Phoneme-to-grapheme relationships in Hebrew are frequently variable, with a number of pairs of (once phonemically distinct) graphemes now representing the same phoneme. The vast majority of Hebrew words contain consonants and vowels that could be spelled with alternate letters (Share & Levin, 1999). Each child was presented with 40 pairs of written sentences (i.e., 80 sentences) that each had a missing word designated by an underlined space. I read each full sentence aloud to the children (including the missing word) and asked the children to write each missing word in the appropriate blank space. The missing words were presented in the context of sentences because many Hebrew words appearing in regular text are homographic when presented out of context (Shimron & Sivan, 1994). A pilot administered to one second-grade class (N = 25) in the same town yielded an inter-item reliability of α = .92. Children completed the spelling production test in groups of ten. I distributed the tests, explained the task to the group, and gave one example. Each child worked quietly and individually on the test. To ease the load on the children, the test was divided into two parts, completed on two different days, in a counterbalanced order. Each spelling error was counted, and the sum of spelling errors served as the *Spelling* score, with higher scores indicating lower spelling production.

Word Decoding

*Auditory Discrimination***.** The child was presented with 40 pairs of written words (i.e., 80 words). In each pair, both words were spelled erroneously, but one word mapped a correct pronunciation and the other a wrong one. The child was asked to mark the sequence of letters that sounded as a Hebrew word (based on Siegel's 1994 phonological-lexical reading task). Precise decoding of pseudo words is a good

indicator of reading skills and a good predictor of later reading difficulties (Siegel, 1994; Stanovich, 1988). The strings of letters were presented with diacritics to mark the Hebrew vowels. In Hebrew, letters represent all consonants, whereas 13 diacritic vocalization marks termed *nikud* represent the five vowels *a, e, i, o,* and *u*. This diacritical system provides a complete and unambiguous representation of the vowels by means of tiny dots and dashes. Fluent reading in Hebrew includes control over the vocalization system (*nikud*) (Shimron, 1999). A pilot administered to two second-grade classes (N = 34) in the same town yielded an inter-item reliability of α = .86. Children completed the Auditory Discrimination task in groups of ten. The researcher distributed the tests, explained the task to the group, and gave one example. Each child worked quietly and individually on the test. To ease the load on the children, the test was divided into two parts, completed on two different days, in a counterbalanced order. One point was scored for each correct response, and the sum of points served as the *Auditory Discrimination* score. The possible score range for *Auditory Discrimination* was 0 to 40, with higher scores indicating better auditory discrimination skills.

Orthographic Discrimination. The child was presented with 40 pairs of written words (i.e., 80 words). The words were presented with diacritics to mark the Hebrew vowels. In each pair, the two words were pronounced the same, but one word was spelled correctly as a Hebrew word and the other erroneously. The child was asked to mark the correct spelling for each pair (based on the "visual task," Olson et al., 1985). A pilot administered to two second-grade classes (N = 34) in the same town yielded an inter-item reliability of α = .82. Children completed the Orthographic Discrimination task in groups of ten. The researcher distributed the tests, explained the task to the group, and gave one example. Each child worked quietly and

individually on the test. To ease the load on the children, the test was divided into two parts, completed on two different days, in a counterbalanced order. One point was scored for each correct response, and the sum of points served as the *Orthographic Discrimination* score. The possible score range for *Orthographic Discrimination* was 0 to 40, with higher scores indicating better orthographic discrimination skills.

Text Reading

The story "The girl who had no friends" (by R. Saporta, 1963) was used for text reading assessment. Five second-grade teachers unanimously selected the story for the present study as the most appropriate story for assessing variance in second graders' reading, among three stories of approximately the same length from contemporary Hebrew anthologies for this grade level. The story included 243 words (21 sentences). I audiotaped each child reading the story aloud individually in a quiet room in school. I analyzed the audiotapes for the *accuracy* and *fluency* of the child's reading, considering these two measures as major assessors of reading (Snowling, 2000).

Reading Accuracy. In line with Clay's (1993) suggestions for analyzing a reading record, I listened to each audiotaped reading and scored each of the following as errors: (a) omissions – of one or several words; (b) additions – of one or several words; (c) distortion of a word without an attempt to correct it or with a wrong correction (e.g., pronouncing the word erroneously by omitting part of it, switching between sounds); (d) prosodic errors – reading with the wrong intonation (e.g., not stopping at a period). No penalty was given for errors in reading that the child spontaneously corrected. The inter-judge reliability of two independent judges on the scoring of the reading records produced by a randomly selected 25% of the sample (4 boys and 4 girls) resulted in a significant Kappa of .83. Some children skipped a

line(s) or read the same line twice, and a few did not complete the reading of the entire text because it was too difficult for them; therefore, the *reading accuracy* measure was computed as the following ratio: number of errors out of the total number of words that the child read, with higher scores indicating lower *accuracy* skills.

Reading Fluency. *Reading fluency* was scored by dividing the total reading time for each child (in seconds) by the number of words that he/she read, with higher scores indicating lower *fluency*.

Reading Comprehension - Cloze.

The children read 20 sentences and completed, in writing, the missing word in each sentence, e.g., "The bell rang and the children entered the _____" (class). I selected the sentences from Hebrew booklets for promoting reading comprehension. A pilot administered to two second-grade classes (N = 56) in the same town yielded an inter-item reliability of α = .83. Children completed the sentence comprehension test in groups of ten. The researcher distributed the tests, explained the task to the group, and gave one example. Each child worked quietly and individually on the test. The score of each correct answer was one point , and the sum of points across the 20 sentences served as the *Reading Comprehension* score. The possible score range was 0 to 20, with higher scores indicating better *Reading Comprehension* skills.

Morphological Awareness

Written Production. This task assessed children's awareness of Hebrew's root-based spelling. I presented each child with 40 pairs of written sentences (i.e., 80 sentences) that each had a missing word designated by an underlined space. I read each full sentence aloud to the children (including the missing word) and asked the children to write each missing word in the appropriate blank space. In half of the

pairs, the two missing words shared the same root and the same root letters, e.g., *taramtɛm* and *lɛhatrim* (‘you donated’ and ‘to donate’), both spelled with Taf, not Tɛt. In the remaining 20 pairs, the pair of missing words derived from different roots but shared phonological components (e.g., *lɛshakɛr* and *hishtakɛr,* ‘to lie’ and ‘got drunk,’ derived from two different roots and spelled differently: *lɛshakɛr* with Kuf, and *hishtakɛr* with Kaf). A pilot administered to one second-grade class (N = 25) in the same town yielded an inter-item reliability of α = .92. Children completed the spelling production test in groups of ten. The researcher distributed the tests, explained the task to the group, and gave one example. To ease the load on the children, the test was divided into two parts, completed on two different days, in a counterbalanced order. The number of correct spelling responses, using the same letter for the same phoneme when the pair of words derived from the same root and using different letters when the pair of words derived from different roots, served as the score on *Written Morphology,* with higher scores indicating better understanding of the Hebrew roots and differentiating between roots and non-roots.

Oral Production. This task assessed the children’s productivity in oral derivation and inflection of Hebrew words. I orally presented 16 words to the child and asked the child to give more words that derive from the same root (“come from the same family”) for each word. The target words included names (e.g. ‘question,' *shɛɛla*); verbs (e.g. ‘studies' [Fm], lomɛdɛt); and adjectives (e.g. ‘big’ [Fm], *gdola*). I presented the words in random order. A maximum of four correct responses were counted for each stimuli word. The possible score range was 0 to 64. The number of correct responses served as the *Oral Morphology* score, with higher scores indicating higher oral morphological productivity.

Oral Language (Definitions)

The same test that was used in kindergarten was administered again, asking the children to individually define 14 items. The sum of points for all the definitions served as the *Definition*s score, with higher scores indicating more elaborated and precise definitions. This test assessed the level of the child's language (syntax, grammar, pragmatics, etc.).

Procedure at Second Grade Interval

Follow-up data were collected in June, the last month of school, during a total of four sessions per child held on two separate days within the same week in a quiet classroom (except for the Text Reading test held in the library). On the first day, the Definitions test and the Morphological Awareness in Oral Production test were administered individually. Later in the same day, in the same classroom, children were assessed in groups of 10 on one part of the Spelling (Word Writing) test, one part of the Auditory Discrimination test, one part of the Orthographic Discrimination test, one part of the Morphological Awareness in Written Production test, and the Reading Comprehension (Cloze) test. On the second day, each child was audiotaped individually while reading the story text aloud in the library. Later in the same day, children were assessed in groups of 10 on the second parts of the Spelling, the Auditory Discrimination, the Orthographic Discrimination and the Morphological Awareness in Written Production tests.

Children's Home Environmental Predictors of Literacy Assessed in Kindergarten

Socioeconomic Status (SES)

SES was assessed on the basis of parents' education, profession, and occupation, and a ranking of the family's residential area. Parental education was measured on a 10-point scale ranging from 0 (no schooling) to 9 (academic

education). The mean scores for mothers' and fathers' education in the current sample were *M* = 5.32 (*SD* = 1.72) and *M* = 4.60 (*SD* = 1.72), respectively. Profession and occupation were assessed on a scale adjusted to my restricted low SES sample, considering that the sample's variance was low on a national scale (Meir, 1978). Thus, I developed a 5-point scale to assess level of profession and occupation. A group of 13 middle-class adult judges ranked the 50 professions found in the study from highest to lowest. Inter-judge reliability was high, Cronbach α = .98. According to their average rank, I divided the professions into five equal groups scored 1- 5. For example, unemployed, housemaid, and industrial laborer were scored 1; carpenter, locksmith, and crane driver were scored 3; schoolteacher, practical engineer, and bookkeeper were scored 5. The mean score for mothers' and fathers' professions in the sample were *M* = 2.76 (*SD* = 1.70) and *M* = 2.90 (*SD* = 1.24), respectively. The mean score for mothers' and fathers' occupation in the sample were *M* = 2.49 (*SD* = 1.60) and *M* = 2.77 (*SD* = 1.39), respectively. The socioeconomic level of the seven residential areas was ranked on a 7-point scale by the head of the municipal welfare department and by the municipal educational superintendent, who agreed on the rankings. The mean score for residential area was *M* = 3.85, *SD* = 2.12. The mean *Z* score across all constituents was highly reliable (Cronbach α = .92) and served as the *SES* score. Despite the restricted range of SES in the sample, it still varied from middle-low to low SES, representing the population range of an Israeli development town. Higher SES scores indicated a higher socioeconomic level.

Maternal Literacy

Maternal literacy was assessed via a maternal vocabulary test and mothers' recognition of book titles.

Vocabulary Test. Maternal verbal ability was assessed using a vocabulary subtest of the MILTA IQ Test for Israeli adults (Ortar & Shakhor, 1980). The subtest presented 40 words in writing, in a forced-choice design asking respondents to select the correct explanation out of three given for each word. Each correct choice contributed 1 point to the total *Vocabulary* score. In the sample, the range found on *Vocabulary* was 25% to 88% (M = 60, SD = 17). Higher scores indicated better vocabulary.

Title Recognition Test (*TRT*). Maternal familiarity with adult literature was assessed via an adaptation to Hebrew of the TRT (Stanovich & West, 1989). Mothers were presented with a list of 30 titles of books and asked to indicate which title they recognized. The list consisted of 20 titles of current best sellers and 10 foils, which were verified as nonexistent titles in library databases. To obtain a total score on TRT, a correct recognition contributed 1 point, and an incorrect response deleted 2 points. The possible range on TRT was thus -20 to 20; the obtained range in the sample was -2 to 15, M = 3.85, SD = 3.78. Higher scores indicated better familiarity with literature.

The presented statistics indicate that the sample exhibited sufficient variance on *Vocabulary* and on *TRT*. The mean Z score of these measures was highly reliable, Cronbach α = .86, and served as the *Maternal Literacy* measure.

Literacy Tools At Home. The richness of the home environment was assessed in terms of literacy tools using an adaptation of 7 items from the "Stimulation through toys, games and reading materials" subscale of the HOME inventory for ages 3 to 6

(Bradley & Caldwell, 1979). The researcher with the child and the mother observed the child's toys, books, audiocassettes, and the like and then completed a survey form after leaving the child's home. Each item added 1 point to the *Literacy Tools At Home* score. In the sample, the obtained range was 0% to 100% (M = 60, SD = 34), where higher percentages indicated a richer home literacy environment.

The intercorrelations between the three home environment measures were all significant: SES and Maternal Literacy, $r = .63$, $p < 0.001$; SES and Literacy Tools At Home, $r = .63$, $p < 0.001$; Maternal Literacy and Literacy Tools At Home, $r = .41$, $p < 0.001$.

RESULTS

The results will be presented in four parts. The first part will describe the statistics for all the variables, their intercorrelations, and the relations between literacy skills within each age group. The second part will present the correlations between the home environment measures and the literacy measures (assessed in kindergarten and in school). To address the continuity question, the third part will present the correlations between the literacy measures assessed in kindergarten and the predicted literacy achievements assessed in school. The final part will present the results of controlling for the home environment measures when examining the continuity in literacy achievements between kindergarten and school. Inasmuch as no gender differences emerged at either age interval (kindergarten and second grade) for any of the analyses, the results below will refer to the sample as a whole.

Descriptive Statistics, Intercorrelations, and Relations Between Literacy Skills Within Each Age Group

Kindergartners' Early Literacy Measures

The upper part of Table 1 presents the early literacy descriptive statistics. The results indicate that the kindergarten sample exhibited sufficient variance in all six early literacy measures. In Word Recognition, Phonological Awareness, and Orthographic Awareness (word selection), children could answer by guessing; however, the results for these subtests showed mean performance above the chance level.

Table 2 presents the intercorrelations among the early literacy measures. Most of the correlations (except two) were significant and positive. All the code-related measures correlated robustly with each other and with Phonological Awareness. The oral language measure (Definitions) showed significant though lower correlations with most of the code-related language measures (with two exceptions: Recognitions' Explanation and Phonological Awareness). Interestingly, the correlation between Definitions, which is a clear oral measure, and the Phonological Awareness that tapped to some extent into both oral language and code-related measure, did not reach significance (r = .21, ns).

To assess the relations between the oral language and code-related skill measures in kindergarten; I transformed the correlations into Z Fisher scores and then utilized U-tests to determine if differences between each two correlations were significant. Within-domain correlations among the code-related measures were compared to between-domain correlations across the code-related and oral language domains. For example, I compared the within-domain correlation between Word Writing and Word Recognition with the between-domain correlation between

Definitions and Word Recognition and also with the between-domain correlation between Definitions and Word Writing. Table 2 reveals a diverse picture in kindergarten. The correlations between Definitions and a variety of code-related measures were significantly lower than were a number of correlations within the code-related language domain, including the correlations between Orthographic Awareness and all the other code-related measures and the correlation between Recognitions' Explanations and Word Writing. Other correlations, however, did not show this pattern, indicating that the differentiation between oral language and code-related skills was not decisive. The correlation between Phonological Awareness and the code-related measures were higher than the correlations between the Definitions and the code-related measurers but these differences did not reach significance.

Literacy Achievements in School

The lower part of Table 1 presents the descriptive statistics of literacy achievements at school. The results indicate that the sample exhibited sufficient variance in all the literacy measures. Table 3 presents the intercorrelations among the literacy achievements in the second grade. Most of the correlations (except three) were substantial and significant. Note that negative correlations appeared only for the three measures that designated higher functioning as lower scores (i.e., a lower score in Word Writing designated better Spelling, and lower scores in Accuracy and in Fluency designated better Text Reading). In general, Definitions showed lower correlations with the other code-related literacy measures. Out of the 36 possible correlations, the only correlations that did not reach significance were between Definitions and Text Reading (accuracy and fluency) (r = -.22 and r = -.24, *ns*, respectively), and between Definitions and Written Morphology (r = .16, *ns*).

Providing oral Definitions was the only measure that did not significantly correlate with all the other literacy measures.

Correlations Between Home Environment Measures and Literacy Measures

Kindergartners' Early Literacy as Related to Home Environment Measures

The upper part of Table 4 presents the correlations between the three home environment measures and all the early literacy measures. As seen in the table, significant correlations emerged almost across the board (r = .29 to .53), with only two exceptions (Phonological Awareness and SES; Definitions and Maternal Literacy).

Second Graders' Literacy Achievements in School as Related to Home Environment Measures

The lower part of Table 4 presents the correlations between the three Home environment measures and all the literacy achievements assessed at the end of second grade at school. As seen in the table, in contrast with their correlations with early literacy, the home environment measures revealed sparser correlations with literacy achievements in school. Nevertheless, a number of correlations emerged. Reading Comprehension correlated significantly with all three home environment measures (r = .28 to .47). Word Writing, Orthographic Discrimination, and Oral Morphology production correlated significantly with both Maternal Literacy and with Literacy Tools At Home. Among the home literacy measures, Literacy Tools At Home exhibited the most correlations, showing its association with six out of the nine school literacy measures. In contrast, SES correlated significantly only with Reading Comprehension (r = .28, $p < .05$). Again, note that negative correlations reflected the three literacy measures that designated higher functioning as lower scores.

Continuity in Literacy Achievements

From Kindergarten to School

To assess the continuity in literacy achievements between kindergarten and second grade, I performed correlations between the kindergartners' code-related and oral language predictors and the predicted literacy achievements in school. The results, presented in Table 5, indicate a stable continuity in literacy achievements between kindergarten and school. Out of 54 possible correlations, 48 reached significance. The results show that children generally maintained literacy achievements from kindergarten to school. Again, note that negative correlations reflected the three school literacy measures that designated higher functioning as lower scores. All the code-related measures in kindergarten comprised good predictors of a wide range of second-grade literacy measures. Phonological Awareness predicted most of the second-grade measures with one exception (Auditory Discrimination). The oral language measure (Definitions) predicted some of the second-grade literacy measures but correlated significantly neither with Morphological Awareness nor with Orthographic Discrimination. Interestingly, at the same time, second-grade Definitions scores were highly predicted by all the early literacy measures.

To assess the different predictive strength of the kindergartners' oral and language and code-related domains to their later literacy achievements in school, I transformed the correlations between the early literacy measures assessed in kindergarten and the literacy measures assessed in school into Z Fisher scores. I then utilized *U*-tests to calculate if differences between each two correlations were significant. I compared the correlations between the kindergartners' Definitions measure and each of the nine second-grade literacy measures with the parallel

correlations between the code-related skills in kindergarten and each of the second-grade literacy measures. Out of the 45 comparisons, only 5 reached significance. Oral Morphology production comprised the only second-grade measure that was significantly better predicted by the other code-related kindergarten measures than by the Definitions measure.

Continuity in Literacy Achievements From Kindergarten to School, Controlling for Home Environment Measures

In order to better understand the continuity in literacy achievements between kindergarten and second grade and to predict the separate contribution of the home environment measures and the early literacy measures, I conducted separate fixed-order hierarchical regression analyses. To condense the model, I established *Home Environment* as the mean *Z* score of SES, Maternal Literacy, and Literacy Tools At Home (Cronbach α = .62). The home environment was entered in the first step, and then alternatively each of the early literacy measures (i.e., Word Writing, Word Recognition, Recognitions' Explanation, Orthographic Awareness, Phonological Awareness, and Definitions) was entered in the second step. The criterion variables were all second grade literacy measures: Spelling, Word Decoding (Orthographic Discrimination and Auditory Discrimination), Text Reading (Accuracy and Fluency), Reading Comprehension, Morphological Awareness (Written and Oral Production), and Definitions.

Table 6 shows that Home Environment contributed significantly to six out of the nine second grade literacy measures. It contributed significantly to Spelling, Orthographic Discrimination, Accuracy, Fluency, Reading Comprehension, and Morphological Awareness in Oral Production, explaining 16%, 12%, 8%, 12%, 20%, and 12% of the variance, respectively. Beyond the Home Environment, all the early

literacy measures contributed significantly to second grade literacy measures. Nonetheless, Word Recognition and Recognitions' Explanations were the most productive predictors, inasmuch as they contributed significantly (9% to 24%) to all the second grade measures with the exception of Text Reading Accuracy. Phonological Awareness was also very productive, contributing significantly, beyond Home Environment, to Spelling, Orthographic Discrimination, Text Reading Accuracy and Fluency, Reading Comprehension, Morphological Awareness in Oral Production, and Definitions, explaining 12%, 8%, 8%, 13%, 16%, 27% and 15% of the variance, respectively. Interestingly, Definitions in kindergarten contributed beyond Home Environment only to Auditory Discrimination (14%) and to the Definitions in second grade (25%).

In summary, the correlations on Table 5 present a sporadic rather than consistent pattern of relations between oral and code-related early literacy in kindergarten and literacy achievements in school. Nevertheless, the hierarchical regression analyses in Table 6 suggest that although both oral and code-related early literacy measures contributed to second grade literacy achievements beyond Home Environment, the code-related early measures seemed to contribute significantly more than did the oral measures. Interestingly, providing Definitions in kindergarten emerged as a fairly weak predictor, whereas Definitions in second grade was strongly predicted by all the early literacy measures.

DISCUSSION

The present study aimed to further explore the nature and extent of literacy continuity from kindergarten to the end of second grade, within a range of code-related and oral measures, among a low SES sample. Moreover, I studied this continuity when controlling for home environment. Results clearly demonstrated the

continuity in literacy between kindergarten and second grade over a wide range of early literacy measures in kindergarten and of literacy measures in school. These relations upheld to a large extent even beyond major family measures (i.e., SES, Maternal Literacy, and Literacy Tools At Home). Although early code-related and oral language skills both predicted literacy measures in school, the code-related measures predicted more literacy measures in school beyond home environment.

The major findings of this study support the accumulating conclusion that literacy development is gradual and that the first steps in this process pave the road for the next ones (Scarborough, 2002). Ravid and Tolchinnsky (2002) claimed that what children know at any step in their development functions as an interpretative system for their current encounters as they establish new schemas. The present results support their conclusion that children construct ideas about written language well before they receive formal instruction in this domain, already in kindergarten. At this young age, children differ on early literacy, and these differences remain quite stable even after the children have been studying in school for two years. Moreover, children's early literacy level predicts their literacy achievements in school beyond home environmental measures.

Oral and Code-Related Language Skills As Predictors of Literacy Achievements in School

Developing linguistic literacy means becoming more aware of one's own spoken and written language systems (Olson, 1994). Based on the results of the present study, I found that both code-related and oral language measures in kindergarten comprise good predictors of literacy achievements in school. My findings offer some support for the comprehension language approach that views literacy development as a complex process in which various language skills are

critical in emergent literacy and continue to play vital roles in subsequent reading achievement (Dickinson et al., 2003). The ability to provide Definitions in kindergarten related to children's later reading achievements in school, especially Reading Comprehension and Auditory Discrimination, which rely on vocabulary, semantics, and syntax.

However, all the code-related measures in kindergarten comprised good predictors of all the literacy measures in school, including the second graders' oral literacy measures (Oral Morphology production and Definitions). The strength of the code-related measures, even beyond home environment, corroborates previous research. Vellutino and Scanlon (2002) administered a large battery of tests evaluating rudimentary literacy skills, cognitive development, language and language based skills, visual abilities, verbal memory, and attention and organizational abilities to 700 kindergartners and found that the rudimentary reading measures, which all comprised written language measures, best predicted reading in the first grade. The current results also corroborate Shatil and Share (2003) who followed 349 Israeli children from kindergarten to first grade. These researchers found that kindergartners' code-related measures accounted for substantial variance in word recognition (33%) in first grade, whereas the oral measures explained only a borderline 5% of the variance in word recognition in first grade.

Early Writing As a Predictor of Later Literacy Achievements

This study examined specific questions regarding early writing as a predictor of later literacy achievements in school. The results indicated that Word Writing comprised a good predictor of later school literacy measures. Scarborough (2002) summarized that phonological awareness and letter knowledge constitute strong early predictors of future reading achievement. Early writing combines these two skills in

an integrative way, and therefore I suggest that it deserves more attention as an important early literacy predictor. Richgels (2002) referred to invented spelling as inseparable from phonological awareness, and he claimed that invented spelling offers a holistic way for adults to facilitate children's phonemic awareness. In previous studies, I found that adult-child joint writing activities at home (Aram & Levin, 2002) and in preschool (Aram & Biron, in print) are good predictors of early literacy skill and literacy achievements in school (Aram & Levin, 2004).

Early Antecedents of Morphological Awareness in School

Acknowledging the importance of morphological awareness in school as a predictor of later reading achievements in intermediate grades (Carlisle, 2000; Leong, 2000) and considering the scant attention it received previously (Verhoeven & Perfetti, 2003), The present study focused on the early literacy origins of morphological awareness in school and yielded support for the reciprocal relationship between early code-related measures and later morphology achievements. Correlations emerged between the early code-related measures as well as phonological awareness in kindergarten and morphology in second grade. Levin and her colleagues (2001) offered a possible reason for this continuity: Becoming acquainted with the spelling of semantically related words should contribute to a grasp of the morphemic connection between them. Hebrew has a synthetic nature, and a better understanding of its code provides powerful clues to its morphological infrastructures. Hence, sensitivity to various aspects like morphemic connections at the root, stem, and/or pattern level makes it possible to derive unknown spellings from known ones (Levin et al., 2001).

Moreover, writing and reading in an alphabetical system rely on grapho-phonemic connections that require phonological awareness (e.g. Shatil et al., 2000).

Phonological awareness also lies at the base of morphological awareness (Malenky, 1997). Consequently, a network of connections may be expected between phonological awareness, morphological awareness, writing, and reading, which may promote each other (Carlisle & Nomanbhoy, 1993).

The lack of correlation of early Word Writing to the Written Morphological product may relate to the nature of the Morphological Awareness Written Production task, in which the word pairs that I asked the child to write were sometimes phonologically and semantically related but at other times were only phonologically related. Carlisle and Fleming (2003) claimed that when children in grades 3 through 6 write words derived from the same roots or from different roots, children tended to be biased by similarities of sound, without regard for differences in meaning. Note that the scoring system for the writing task in kindergarten reflected primarily phonological knowledge.

Home Environment Measures and Literacy Development

SES is usually stable across a child's life, and nearly universal agreement holds that children from a higher SES possess access to more of the resources needed to support their positive development than do lower SES children (Bornstein & Bradley, 2003). Ensminger and Fothergill (2003) criticized the way researchers are investigating SES, claiming that studies mainly utilize SES to describe samples rather than examining its potential for understanding deeper and finer differences in child development within the low SES range. They also encouraged researchers to view the role that SES plays in children's lives and its transitions over the lifespan. In light of these criticisms and recommendations, the present study inspected the continuity in literacy development within a low SES sample. I explored the relations between SES and related environmental measures (Maternal Literacy and Literacy Tools At Home)

to early literacy in kindergarten and to literacy achievements in school. The results indicate that, for kindergartners, home environment measures correlated substantially with early literacy. However, in school, fewer significant correlations emerged between home measures and literacy achievements.

These findings suggest that children's family background may be more relevant to their early literacy in the kindergarten period than it is to conventional literacy in school. In the kindergarten setting, exposure to and involvement with literacy-related activities are rather sporadic, and therefore the extent and quality of such activities at home may constitute a central factor affecting the child's early literacy. In contrast, the first two years in school are almost entirely devoted to daily teaching of reading, writing, and other literacy-related activities. Thus, perhaps the differences in family SES become less significant during this period, when examining only the lower range of SES as in the present study. My claim resembles Leventhal and Brooks-Gunn's (2003) hypothesis that out-of-home activities like schools may be more relevant for older children who have greater exposure to them than for young children. Young children are more dependent on their own home environment. Literacy Tools At Home emerged as the best home environment predictor of literacy achievements in kindergarten as well as in school, within the present study.

The availability of learning stimulations is important because it allows the child to be active in his/her environment. Participation and involvement in literacy interactions comprise a strong predictor of early literacy (Rush, 1999) and of later school literacy achievements (Sénéchal, LeFevre, Thomas, & Daley, 1998). Moreover, home environment in terms of availability of toys and literacy stimuli may be related to caregivers' motivation to promote their children's literacy through joint play and activity (Aram & Levin, 2001, 2004).

In sum, the present study showed continuity in literacy achievements from kindergarten to second grade in a low SES sample. This continuity remained stable even when SES and other home environment measures were controlled. The optimal study of literacy development must include the widest possible range of measurements. The inclusion of early writing and morphological awareness into the present study proved productive. The overall predictive value of early literacy measures, both code-related and oral, indicating that they serve as a basis for a wide range of future literacy achievements, should encourage interventions to promote a variety of early literacy aspects in young low SES children.

References

Aarnoutse, C., van Leeuwe, J., & Verhoeven, L. (2001). *Early literacy from a longitudinal perspective.* Paper presented at the 9th EARLI conference, Fribourg, Switzerland.

Aram, D., & Biron, S. (in print). *Joint storybook reading and joint writing interventions among low SES Israeli preschoolers: Differential contribution to early literacy. Early Childhood Research Quarterly*.

Aram, D., & Levin, I. (2001). Mother-child joint writing in low SES: Sociocultural factors, maternal mediation, and emergent literacy. *Cognitive Development, 16,* 831-852.

Aram, D., & Levin, I. (2002). Mother-child joint writing and storybook reading: Relations with literacy among low SES kindergartners. *Merrill Palmer Quarterly, 48,* 202-224.

Aram, D., & Levin, I. (2004). The role of maternal mediation of writing to kindergartners in promoting literacy achievements in school: A longitudinal perspective. *Reading and Writing*.

Baydar, N., Brooks-Gunn, J., & Furstenberg, F. F. (1993). Early warning signs of functional illiteracy: Predictors in childhood and adolescence. *Child Development, 64,* 815-829.

Beals, D. E., & De-Temple, J. M. (1993). Home contributions to early language and literacy development. *National Reading Yearbook, 42,* 207-215.

Bianchi, S. M., & Robinson, J. (1997). What did you do today? Children's use of time, family composition and acquisition of social capita. *Journal of Marriage and Family, 59,* 332-344.

Bornstein, M. H., & Bradley, R. H. (2003). An introduction. In M. H. Bornstein, & R. H. Bradley (Eds.), *Socioeconomic status, parenting and child development* (pp. 1-10). Mahwah, NJ: Erlbaum.

Bowey, J. A. (1995). Socioeconomic status differences in preschool phonological sensitivity and first-grade reading achievement. *Journal of Educational Psychology, 87,* 476-487.

Bradley, R. H. (2002). Environment and parenting. In M. H. Bornstein (Ed.), *Handbook of parenting* (Vol. 2, pp. 281-314). Mahwah, NJ: Erlbaum.

Bradley, R. H., & Caldwell, B. M. (1979). HOME observation for measurement of the environment: A revision of the preschool scale. *American Journal of Mental Deficiency, 84,* 235-244.

Burgess, S. (1997). The role of shared reading in the development of phonological awareness: A longitudinal study of upper class children. *Early Child Development and Care, 127-128,* 191-198.

Bus, A. G. (2002). Joint caregiver-child storybook reading: A route to literacy development. In S. B. Neuman, & D. K Dickinson (Eds.), *Handbook of early literacy development* (pp. 179-191). New York: Guilford.

Bus, A.G., & van IJzendoorn, M.H. (1999). Phonological awareness and early reading: A meta-analysis of experimental training studies. *Journal of Educational Psychology, 91*(3), 403-414.

Cahana-Amitay, D., & Ravid, D. (2000). Optional bound morphology in the development of text production. In S. C. Howell, S. A. Fish, & T. Keith-Lucas (Eds.), *Proceedings of the fifth annual Boston University conference on language development* (Vol. I, pp. 176-184). Somerville, MA: Cascadilla Press.

Carlisle, J. F. (1995). Morphological awareness and early reading achievement. In L. B. Feldman (Ed.). *Morphological aspects of language processing* (pp. 189-209). Hillsdale NJ: Erlbaum.

Carlisle, J. F. (2000). Awareness of the structure and meaning of morphologically complex words: Impact on reading. *Reading and Writing, 12*, 169-190.

Carlisle, J. F. (2003). Morphology matters in learning to read: A commentary. *Reading Psychology, 24,* 291-322.

Carlisle, J. F., & Fleming, J. (2003). Lexical processing of morphologically complex words. *Scientific Studies of Reading, 7,* 239-254.

Carlisle, J., & Nomanbhoy, D. (1993). Phonological and morphological awareness in first graders. *Applied Psycholinguistics 14*, 177-95.

Chaney, C. (1998). Preschool language and metalinguistic skills are links to reading success. *Applied Psycholinguistics, 19,* 433-446.

Chliounaki, K., & Bryant, P. (2002). Construction and learning to spell. *Cognitive Development, 17*, 1489-1499.

Clay, M. M. (1993). *An observation survey of early literacy achievement*. New Zealand: Heinemann Education.

DeBaryshe, B. D., & Binder, J. C. (1994). Development of an instrument for measuring parental beliefs about reading aloud to young children. *Perceptual and Motor Skills, 78,* 1303-1311.

Dickinson, D. K., McCabe, A., Anastasopoulos, L., Peisner-Feinberg, E. S., & Poe, M. D. (2003). The comprehensive language approach to early literacy: The interrelationships among vocabulary, phonological sensitivity, and print knowledge among preschool-aged children. *Journal of Educational Psychology, 95,* 465-481.

Dickinson, D. K., & Tabors, P.O. (Eds.). (2001). *Beginning language with literacy: Young children learning at home and school*. Baltimore, MD: Brookes.

Duncan, G. J. (1991). The economic environment of childhood. In A. C. Huston (Ed.), *Children in poverty: Child development and public policy* (pp. 23-50). New York: Cambridge University Press.

Ehri, L. C., Nunes, S. R., Willows, D. M., Yaghoub-Zadeh, Z., & Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis. *Reading Research Quarterly, 36*, 250-287.

Ensminger, M. E., & Fothergill, K. (2003). A decade of measuring SES: What it tells us and where to go from here. In M. H., Bornstein, & R. H. Bradley (Eds.), *Socioeconomic status, parenting and child development* (pp. 13-28). Mahwah, NJ: Erlbaum.

Ferreiro, E., & Teberosky, A. (1982). *Literacy before schooling*. Exeter, NH: Heineman.

Hammer, C. S., & Weiss, A. L. (1999). Guiding language development: How African American mothers and their infants structure play interactions. *Journal of Speech, Language, and Hearing Research, 42,* 1219–1233.

Hart, B., & Risley, T. R. (1992). American parenting of language-learning children: Persisting differences in family-child interactions observed in natural home environment. *Developmental Psychology, 28,* 1096-1105.

Hoff, E. (2003). Causes and consequences of SES related differences in parent to child speech. In M. H. Bornstein, & R. H. Bradley (Eds.), *Socioeconomic status, parenting and child development* (pp. 147-160). Mahwah, NJ: Erlbaum.

Holden, G. W. (1997). *Parents and dynamics of child rearing*. Boulder, CO: Westview Press.

Hurtford, D. P., Schauf, L. B., Blaich T., & Moore, K. (1994). Early identification of children at risk for reading disabilities. *Journal of Reading Disabilities, 27,* 371-382.

Korat, O., & Levin, I. (2001). Maternal beliefs, mother-child interaction, and child's literacy: Comparison of independent and collaborative text writing between two social groups. *Applied Developmental Psychology, 22,* 397-420.

Lazo, M. G., Pumfrey, P. D., & Peers, I. (1997). Metalinguistic awareness, reading and spelling: Roots and branches of literacy. *Journal of Research in Reading, 20,* 85-104.

Leong, C. K. (2000). Rapid processing of base and derived forms of words and grades 4, 5, and 6 children's spelling. *Reading and Writing, 12,* 277-302.

Leventhal, T., & Brooks-Gunn, J. (2003). Moving on up: Neighborhood effects on children and families. In M. H. Bornstein, & R. H. Bradley (Eds.), *Socioeconomic status, parenting and child development* (pp. 209-230). Mahwah, NJ: Erlbaum.

Levin, I., Ravid, D., & Rapaport, S. (2001). Morphology and spelling among Hebrew-speaking children: From kindergarten to first grade. *Journal of Child Language, 28,* 741-772.

Levin, I., Share, D. L., & Shatil, E. (1996). A qualitative-quantitative study of preschool writing: Its development and contribution to school literacy. In M. Levy, & S. Ransdell (Eds.), *The science of writing* (pp. 271-293). Mahwah, NJ: Erlbaum.

Lonigan, C. J., Burgess, S. R., & Anthony, J. L. (2000). Development of emergent literacy and early reading skills in preschool children: Evidence from a latent-variable longitudinal study. *Developmental-Psychology, 36,* 596-613.

Lonigan, C. J., Burgess, S. R., Anthony, J. L., & Baker, T. A. (1998). Development of phonological sensitivity in two- to five-year-old children. *Journal of Educational Psychology, 90,* 294-311.

Malenky, A. (1997). *The development of morphological awareness in Hebrew.* Unpublished master's thesis, School of Education, Tel Aviv University. (Hebrew).

Martlew, M., & Sorsby, A. (1995). The precursors of writing: Graphic representation in preschool children. *Learning Instruction, 5,* 1-19.

McBride-Chang, C. (1998). The development of invented spelling. *Early Education and Development, 9,* 147-160.

Meir, E. I. (1978). A test of the independence of fields and levels in Roe's occupational classification. Vocational Guidance Quarterly, 27,124-129.

Näslund, J. C. (1990). The interrelationships among preschool predictors of reading acquisition for German children. *Reading and Writing, 2,* 327-360.

Näslund, J. C., & Schneider, W. (1996). Kindergarten letter knowledge, phonological skills and memory processes: Relative effects on early literacy. *Journal of Experimental Child Psychology, 62*, 30-59.

Neuman, S. B., & Celano, D. (2001). Access to print in low-income and middle-income communities: An ecological study of four neighborhoods. *Reading Research Quarterly, 36,* 8-26.

Nicholson, T. (1999). Literacy, family and society. In G. B. Thompson, & T. Nicholson (Eds.), *Learning to read: Beyond phonics and whole language* (pp. 1-22). New York: Teachers College Press.

Olson, D. R. (1994). *The world on paper*. Cambridge: CUP.

Olson, D. R., Kliegl, R., Davidson, B. J., & Foltz, G. (1985). Individual and developmental differences in reading disability. In T. G. Waller (Ed.), *Reading research: Advances in theory and practice* (Vol. 4, pp. 1-64). New York: Academic Press.

Ortar, G., & Shakhor, A. (1980). *Extended MILTA: Set of tests for 9-18 year olds (fourth to twelfth grades)*. Jerusalem, Israel: Israeli Ministry for Culture and Education, Psychological Consulting Services. (Hebrew).

Pflaum, S. W. (1986). *The development of language and literacy*. Columbus, OH: Merrill.

Ravid, D., & Tolchinsky, L. (2002). Developing linguistic literacy: A comprehensive model. *Journal of Child Language, 29,* 417-447.

Reese, E. (1995). Predicting children's literacy from mother-child conversation. *Cognitive Development, 10*(3), 381-405.

Richgels, D. J. (2002). Invented spelling, phonemic awareness and reading and writing instruction. In S. B. Neuman, & D. K. Dickinson (Eds.), *Handbook of early literacy development* (pp. 142-158). New York: Guilford.

Rush, K. L. (1999). Caregiver child interactions and early literacy development of preschool children from low income environments. *Topics of Early Childhood Special Education, 19,* 3-14.

Saporta, R. (1963). A story about a girl who had no friends. In M. Eilon, & R. Saporta (Eds.), *Shalom Beit* (pp. 64-66). Jerusalem: The department for culture and education in the Diasporas. (Hebrew).

Scarborough, H. S. (2002). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory and practice. In S. B. Neuman, & D. K. Dickinson (Eds.), *Handbook of early literacy development* (pp. 97-110). New York: Guilford.

Sénéchal, M., & LeFevre, J. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development, 73,* 445-460.

Sénéchal, M., LeFevre, J., Thomas, E. M., & Daley, K. E. (1998). Differential effects of home literacy experiences on development of oral and written language. *Reading Research Quarterly, 33,* 96-116.

Share, D. L., & Levin, I. (1999). Learning to read and write in Hebrew. In M. Harris, & G. Hatano (Eds.), *Learning to read and write: A cross-linguistic perspective* (pp. 89-111). Cambridge: Cambridge University Press.

Shatil, E., & Share D. C. (2003). Cognitive antecedents of early reading ability: A test of the cognitive modularity hypothesis. *Journal of Experimental Child Psychology, 86*, 1-31.

Shatil, E., Share, D. C., & Levin, I. (2000). On the contribution of kindergarten writing to grade one literacy: A longitudinal study in Hebrew. *Applied Psycholinguisics, 21,* 1-21.

Shimron, J. (1999). The role of vowel signs in Hebrew: Beyond word recognition. *Reading and Writing, 11*, 301-319.

Shimron, J., & Sivan, T. (1994). Reading proficiency and orthography: Evidence from Hebrew and English. *Language Learning, 44*, 5-27.

Siegel, L. S. (1994). Phonological processing deficits as the basis of developmental dyslexia: Implications for remediation. In J. Riddoch, & G. Humphreys (Eds.), *Cognitive neuropsychology and cognitive rehabilitation* (pp. 379-400). Hillsdale, NJ: Erlbaum.

Snow, C. (1993). Families as social contexts for literacy development. *New Directions for Child Development. 61*, 11-21.

Snow, C., Cancino, H., Gonzalez, P., & Shriberg, E. (1989). Giving formal definitions: An oral language correlate of literacy. In D. Bloome (Ed.), *Classrooms and literacy* (pp. 233-249). Norwood, NJ: Ablex.

Snowling, M. (2000). *Dyslexia*. Malden, MA: Blackwell Publishers.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21*, 360-407.

Stanovich, K. E. (1988). Explaining the differences between the dyslexic and garden variety poor readers: The phonological-core variance-difference model. *Journal of Learning Disabilities, 21,* 590-624.

Stanovich, K. E., & Siegel, L. S. (1994). Phenotypic performance profiles of children with reading disabilities: A regression-based test of the phonological-core variable difference model. *Journal of Educational Psychology, 86,* 24-53.

Stanovich, K. E., & West, R. F. (1989). Exposure to print and orthographic processing. *Reading Research Quarterly, 24*, 402-433.

Storch, S. A., & Whitehurst, G. J. (2001). The role of family and home in the literacy development of children from low-income backgrounds. In P. R. Britto, & J.

Brooks-Gunn (Eds.), *The role of family literacy environments in promoting young children's emerging literacy skills: New directions for child and adolescent development* (pp. 53-71). San Francisco, CA: Jossey-Bass/Pfeiffer.

Storch, S. A., & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: Evidence from a longitudinal structural model. *Developmental Psychology, 38,* 934-947.

Stuart, M., Dixon, M., Masterson, J., & Quinlan, S. (1998). Learning to read at home and at school. *British Journal of Educational Psychology, 68,* 3-14.

Sulzby, E. (1986). Writing and reading: Signs of oral and written language organization in the young child. In W. H. Teale, & E. Sulzby (Eds.), *Emergent literacy: Reading and writing* (pp. 50-87). Norwood, NJ: Ablex.

Sulzby, E. (1992). Transition from emergent to conventional writing: Research directions. *Language Arts, 69,* 290-297.

Symons, S., Szuszkiewicz, T., & Bonnell, C. (1996). Parental print exposure and young children's language and literacy skills. *The Alberta Journal of Educational Research, 13, 49-58.*

Vellutino, F. R., & Scanlon, D. M. (2002). Emergent literacy skills, early instruction, and individual differences as determinants of difficulties in learning to read: The case for early intervention. In S. B. Neuman, & D. K Dickinson (Eds.), *Handbook of early literacy development* (pp. 295-321). New York: Guilford.

Verhoeven, L., & Perfetti, C. A. (2003). The role of morphology in learning to read. *Scientific Studies of Reading, 7,* 209-218.

Wadsworth, S. J., Olson, R. K., Pennington, B. F., & DeFries, J. C. (2000). Differential genetic etiology of reading disability as a function of IQ. *Journal of Learning Disabilities, 33,* 192-199.

Wagner, R. K., Torgesen, J. K., Rashotte, C. A., Hecht, S. A., Barker, T. A., Burgess, S. R., Donahue, J., & Garon, T. (1997). Changing relations between phonological processing abilities and word-level reading as children develop from beginning to skilled readers: A 5-year longitudinal study. *Developmental Psychology*, *33*, 468-479.

Walker, D., Greenwood, C., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development, 65,* 606-621.

Whitehurst, G. J. (1997). Language processes in context: Language learning in children reared in poverty. In L. B. Adamson, & M. S. Romski (Eds.), *Research on communication and language disorders: Contribution to theories of language development* (pp. 233-266). Baltimore, MD: Brookes.

Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development, 69,* 848-872.

Whitehurst, G. J., & Lonigan, C. J. (2002). Emergent literacy: Development from pre readers to readers. In S. B. Neuman, & D. K Dickinson (Eds.), *Handbook of early literacy development,* (pp. 11-29). New York: Guilford.

Zady, M., & Portes, P. R. (2001). When low SES parents cannot assist their children in solving science problems. *Journal of Education for Students Placed at Risk, 6,* 215-229.

Table 1

Early Literacy Assessed in Kindergarten and Literacy Achievements Assessed in School (N=38): Means, Standard Deviations, and Ranges in Percentages

		M	*SD*	Min.	Max.
	Early literacy assessed in kindergarten				
Code-related Skills	Word Writing	35.00	21.00	11.00	98.00
	Word Recognition	60.00	22.00	19.00	100.00
	Recognitions' Explanation	64.00	24.00	27.00	100.00
	Orthographic Awareness[a]	-0.02	1.02	-2.02	1.29
	Word Selection	68.00	21.00	0.00	95.00
	Explanation	59.00	32.00	0.00	100.00
	Phonological Awareness	66.00	11.00	45.00	92.00
Oral Language	Definitions[b]	72.92	46.05	20.00	186.00
	Literacy achievements assessed in school				
Spelling	Word Writing[c]	0.91	0.49	0.24	2.36
Word Decoding	Orthographic Discrimination	77.43	15.31	50.00	97.50
	Auditory Discrimination	79.80	14.94	45.00	100.00
Text Reading	Accuracy[d]	18.61	20.97	3.24	86.52
	Fluency[e]	1.79	2.38	0.52	10.64
Reading Comprehension	Cloze	70.00	24.71	0.00	100.00
Morphological Awareness	Written Production	46.58	15.93	20.22	84.67
	Oral Production	52.80	19.33	4.69	89.06
Oral Language	Definitions[b]	88.89	49.88	20.00	255.00

[a] *Z* scores; [b] raw scores; [c] mean spelling mistakes per word; [d] percentage of errors out of the total number of words read; [e] reading time for each child (in seconds) divided by the number of words read.

Table 2

Intercorrelations Among Early Literacy Measures Assessed in Kindergarten (N = 38)

		Code-related skills					Oral language
		Word Writing	Word Recognition	Recognitions' Explanation	Orthographic Awareness	Phonological Awareness	Definitions
Code-related Skills	Word Writing	-----					
	Word Recognition	.52***	-----				
	Recognitions' Explanations	.78*** [a]	.54***	-----			
	Orthographic Awareness	.82*** [a]	.67*** [a]	.83*** [a]	-----		
	Phonological Awareness	.50***	.53***	.54***	.59***	-----	
Oral Language	Definitions	.35**	.30*	.21	.35**	.21	-----

$p < .05$; ** $p < .01$; *** $p < .001$

[a] Significant *U* between the marked correlation and the parallel correlation with *Definitions*.

Table 3
Intercorrelations Among Literacy Achievements Assessed in Second Grade (N=38)

		Spelling	Word Decoding		Text Reading		Reading Comprehension	Morphological Awareness	
		Word Writing	Orthographic Discrimination	Auditory Discrimination	Accuracy	Fluency	Sentence Comprehension	Written Production	Oral Production
Spelling	Word Writing	-----							
Word Decoding	Orthographic Discrimination	-.82***	-----						
	Auditory Discrimination	-.54***	.47***	-----					
Text Reading	Accuracy	.85***	-.70***	-.69***	-----				
	Fluency	.87***	-.62***	-.51***	.86***	-----			
Reading Comprehension	Sentence Comprehension	-.83***	.72***	.59***	-.88***	-83***	-----		
Morphological Awareness	Written Production	-.82***	.83***	.31*	-.60***	-.58***	.52***	-----	
	Oral Production	-.60***	.70***	.39**	-.60***	-.49***	.65***	.48***	------
Oral Language	Definitions	-.25^	.29*	.28*	-.22	-.24	.30*	.16	.45***

Note. Negative correlations appeared only for the three measures that designated higher functioning as lower scores

.^ $p < 0.07$; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 4

Home Environment Measures As Correlated With Early Literacy Assessed in Kindergarten and With Literacy Achievements Assessed in School (N=38)

		SES	Maternal Literacy	Literacy Tools
Early literacy assessed in kindergarten				
Code-related Skills	Word Writing	.48***	.33*	.46***
	Word Recognition	.34**	.40***	.34**
	Recognitions' Explanations	.46***	.46***	.52***
	Orthographic Awareness	.44***	.38**	.53***
	Phonological Awareness	.19	.29*	.38**
Oral Language	Definitions	.39***	.18	.37**
Literacy achievements assessed in school				
Spelling	Word Writing	-.24	-.36**	-.41***
Word Decoding	Orthographic Discrimination	.24	.32*	.32*
	Auditory Discrimination	.16	.10	.16
Text Reading	Accuracy	-.14	-.19	-.38**
	Fluency	-.18	-.22	-.46***
Reading Comprehension	Sentence Comprehension	.28*	.38**	.47***
Morphological Awareness	Written Production	.09	.23	.10
	Oral Production	.26	.34*	.29*
Oral Language	Definitions	.17	.09	.11

Note. Negative correlations appeared only for the three measures that designated higher functioning as lower scores

$p < .05$; ** $p < .01$; *** $p < .001$

Table 5

Correlations Between Early Literacy Assessed in Kindergarten and Literacy Achievements Assessed at the End of Second Grade (N = 38)

			SECOND GRADE								
			Spelling	Word Decoding		Text Reading		Reading Comprehension	Morphological Awareness		Oral Language
			Word Writing	Orthographic Discrimination	Auditory Discrimination	Accuracy	Fluency	Cloze	Written Production	Oral Production	Definitions
KINDERGARTEN	Code-Related Skills	Word Writing	-.35**	.47***	.45***	-.28*	-.28*	.45***	.17	.52*** [a]	.43***
		Word Recognition	-.52***	.54***	.51***	-.33**	-.42***	.57***.	.37**	.50*** [a]	43***
		Recognitions' Explanations	-.50***	.57***	.44***	-.37**	-.42***	.61***	.36**	.59*** [a]	.36**
		Orthographic Awareness	-.40***	.44***	.16	-.28*	-.31*	.53***	.27*	.49*** [a]	.31*
		Phonological Awareness	-.47***	.40***	.24	-.37**	-.46***	.55***	.29*	.61*** [a]	.41***
	Oral Language	Definitions	-.27^	.19	.41***	-.31*	-.27^	.33**	.10	.12	.52***

Note. Negative correlations appeared only for the three measures that designated higher functioning as lower scores.

[a] Significant *U* between the marked correlation and the parallel correlation with *Definitions*.

^ $p < 0.06$; *$p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 6

Summary of Hierarchical Regression Analysis for Home Environment and Early Literacy in Kindergarten Predicting Literacy at the End of Second Grade (N=38)

Step and variables	Spelling	Word Decoding		Text Reading		Reading Comprehension	Morphological Awareness		Oral Language
	Word Writing	Orthographic Discrimination	Auditory Discrimination	Accuracy	Fluency	Cloze	Written Production	Oral Production	Definitions
	R^2 change								
1. Home Environment	.16*	.12*	.03	.08	.12*	.20**	.03	.12*	.02
2. Word Writing	.03	.11*	.18**	.03	.02	.07^	.01	.16**	.17**
2. Word Recognition	.14*	.18**	.24**	.05	.09^	.16**	.11*	.15*	.17**
2. Recognitions' Explanations	.11*	.20**	.18**	.07	.08^	.19**	.10*	.22***	.11*
2. Orthographic Awareness	.05	.09^	.01	.02	.02	.12*	.05	.13*	.08^
2. Phonological Awareness	.12*	.08^	.04	.08^	.13*	.16**	.06	.27***	.15*
2. Definitions	.02	.01	.14*	.05	.03	.03	.00	.00	.25***

^ $p < .07$; *$p < .05$; ** $p < .01$; *** $p < .001$.