

A COMPARISON BETWEEN HOMESCHOOLED AND FORMALLY SCHOOLED KINDERGARTNERS: CHILDREN'S EARLY LITERACY, MOTHERS' BELIEFS, AND WRITING MEDIATION

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The study characterized children's literacy, mothers' beliefs, and writing mediation of homeschooled compared to formally schooled kindergartners. Participants were 60 children (ages 4–6) and their mothers (30 in homeschooling). At the children's home, we assessed children's literacy, maternal beliefs, and video-recorded mother–child joint writing of a birthday invitation. Results showed that homeschooled children had lower literacy levels than those formally schooled. Homeschooling mothers reported lower levels of belief in learning activities and demands from their children and showed lower levels of writing mediation. Maternal writing mediation predicted children's writing, beyond the child's phonological awareness and schooling (home vs. formal).

Homeschooling is a term used to define the phenomenon of children being educated in the home setting with the parents as the primary educators, as opposed to a public or private school setting. Parents who choose to homeschool have a variety of motivations, including academic and pedagogical concerns, desire for greater involvement in their child's education, religious reasons, and specific child or family needs (Collum, 2005; Ice & Hoover-Dempsey, 2011; Ray, 2000). These parents often hold firm beliefs in a child-driven mode of education, where the parents use the child's interests and curiosity to guide the learning process. Parents' beliefs impact their actions and behaviors with their

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children in various domains, including in the area of early literacy (Bingham, 2007; DeBaryshe, Binder, & Buell, 2000; Korat & Levin, 2001; Meagher, Arnold, Doctoroff, & Baker, 2008).

Early literacy is considered the foundation for later literacy achievements and is recognized as an essential part of the early childhood curriculum (Education, Audiovisual and Culture Executive Agency, 2011; Oberhuemer, 2005). Yet, to the best of our knowledge, no studies have been conducted on the early literacy of kindergarten-aged children who are homeschooled. Furthermore, no study has examined the beliefs of parents who homeschool their children regarding early literacy practices or assessed the nature of their literacy interactions with their children. Learning about these issues and their impact on children's early literacy within homeschooling families, compared to those who are formally schooled, can deepen our understanding regarding the impact of parents' beliefs and practices on their young children's development. The current study therefore investigates the differences in maternal beliefs, the nature of mother's support during a writing task, and children's early literacy in a group of homeschooled children and traditionally schooled children in Israel. Beyond this, we examined whether parental mediation predicted children's writing of those who are homeschooled differently than those who are traditionally schooled.

Homeschooling and Academic Achievement

Homeschooling has increased dramatically over the past two decades (Collom, 2005; Gaither, 2008). Although the percentage of homeschooled children is highest in the United States (3%; Bielick, 2008), other countries have significant numbers as well, with nearly 2% of children in Canada, and approximately 1.5% of those in Australia being homeschooled (HSLDA International, 2015). In Israel, where the study took place, education is free from age 3 and compulsory from age 5. The number of homeschooled children is unknown but estimated to be in the hundreds and growing (Edri, 2010).

There is some evidence that children who have been homeschooled tend to perform on par with, or better than, those who have attended formal schooling frameworks (for a review, see Ray,

2000). For example, Rudner (1999) examined test scores, which were released by a privatized educational testing company, of over 20,000 homeschooled students aged 6–17 (nearly 70% were aged 7–12). Results showed that the homeschooled children outperformed traditionally schooled children across all grades and in various content areas including reading, math, science, and social studies. More recently, Ray (2010) examined the test scores of over 11,000 homeschooled children ranging in age from 5–18 (56% were between the ages of 9–13). In this study as well, homeschooled children performed better than the norms for traditionally schooled children.

Martin-Chang, Gould, and Meuse (2011) compared a group of homeschooled children aged 5–10 ($M = 7$ years 11 months) to a similar group of children in public school. This study is set apart from most of the research on homeschooling by the use of a comparison group, active data collection (rather than relying on third-party data), and the absence of direct ties between the authors and homeschooling organizations. Martin-Chang et al. found that the homeschooling group outscored the public school group on a variety of achievement tests (Woodcock-Johnson). However, the authors found a distinction within the homeschooling group between those who used a more structured style of educating their child, which relied on formal materials and clearer goals, and those who educated in a more unstructured style. The majority of the findings favoring the homeschooling children were between the “structured” homeschooling group and public school children.

In the one study that was conducted in Israel, Edri (2010) examined the achievements of 50 children from a wide age range (6–12), half of whom were homeschooled and the other half formally educated. Results showed that the children in the homeschooling frameworks outperformed the formal schooling group on their vocabulary, there were no significant differences between the groups on the math measures, and the children in formal schooling frameworks outperformed the homeschooling group on reading fluency and precision.

Most of the studies examining homeschooled children relate to children of grade-school age. To the best of our knowledge, the current study is the first to explore kindergarten-aged children who are being educated at home. We studied mothers’

beliefs and practices (the nature of writing support) in relation to their children's early literacy, particularly their early writing.

Parental Beliefs

Parents hold general beliefs that guide them while interacting with their children, which, presumably, formulate an "intuitive parenting program" (Bruner, 1971). According to their beliefs, parents select the activities and materials that they consider suitable for their children. Early literacy studies have shown links between parents' beliefs and practices (Bingham, 2007; DeBaryshe *et al.*, 2000; Meagher *et al.*, 2008; Weigel, Martin, & Bennett, 2006). For example, Evans, Bell, Mansell, and Shaw (2001) found that parents' goals and values predicted the kind of coaching they used during shared book reading. Parents whose primary goal was enjoyment added comments to the reading interaction to enhance interest, whereas parents whose primary goal was teaching gave more instructions. Skibbe, Justice, Zucker, and McGinty (2008) reported that mothers who exhibited fewer positive beliefs about literacy promotion engaged in fewer literacy practices with their children. There is also some evidence that mothers' beliefs favoring literacy knowledge and literacy activities at home predicts their children's early literacy skills (Aram & Levin, *in print*).

Gaining an understanding of parents' beliefs may lend greater insight into their actions during shared literacy activities with their children. While we did not find studies within the home-schooling population that dealt specifically with parental pedagogical beliefs, particularly their beliefs regarding early literacy, studies that have examined parents' motivation to homeschool may shed light on this subject. Studies from the United States have shown that parents who homeschool their children are critical of the public school system, question the pedagogical philosophy of schools, and feel they can provide a better education for their child at home (e.g., Bielick, 2008; Collom, 2005; Ice & Hoover-Dempsey, 2011; Ray, 2000). Similarly, in Israel, Neuman and Aviram (2003) suggested that some parents want to be more involved in their children's education and choose to homeschool them as a pedagogical alternative. The authors suggest that parents who homeschool their children believe that they should not control the child's instructional content. Rather, they act in a more

spontaneous fashion relating to language acquisition, and they support development using the child's natural curiosity. One way that parental beliefs may specifically impact their behavior is through literacy encounters with their children. In the present study, we focused on parent-child joint writing and basic early literacy skills.

Early Literacy Skills

Consensus exists across languages that children's knowledge of reading and writing develops long before they start learning at school (Aram, Korat, Saiegh-Haddad, Hassunah Arafat, Khoury, & Hija, 2013; Snow, Burns, & Griffin, 1998). Children in the formal school system in Israel usually learn to read and write in the first grade, and kindergarten education provides children with basic early literacy skills (Israel Ministry of Education, 2006). We focused on the basic early literacy skills of letter knowledge and phonological awareness, and a more advanced skill—early writing—acknowledging their importance for later reading and writing acquisition (Aram, 2005; Shatil & Share, 2003).

Letter knowledge includes children's awareness of the alphabet in their mother tongue. Many letters in Hebrew are difficult to distinguish, either because their visual form is similar or because they are homophonic. Exposure to the letters and learning their names helps children begin to make these distinctions (Levin, Shatil-Carmon, & Asif-Rave, 2006). Learning the letter names, in particular, helps children connect between the spoken and the written language (Levin, Patel, Margalit, & Barad, 2002; Treiman, Tincoff, & Richmond-Welty, 1996). Children's knowledge of letter names and sounds is a good predictor of their later reading and spelling abilities (Hammill, 2004; Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004).

Phonological awareness is generally defined as the ability to pay conscious attention to the sounds in words. The crucial factor in becoming literate in alphabetic languages involves explicit control of the phonemic segments of language (e.g., Lundberg, Larsman, & Strid, 2012). Studies in English have shown that in order to learn how to read and write, children need to acquire the ability to connect the sound of the letter to its written form (McBride-Chang, 2004). Similarly, studies have shown the

importance of phonological awareness for learning to read and write in Hebrew (Levin et al., 2006). Phonological awareness in preschool has been shown to predict literacy achievement in both English (Dickinson, McCabe, & Essex, 2006) and Hebrew (Korat & Levin, 2001; Shatil, Share, & Levin, 2000).

Young children's attempts to write begin long before they fully understand the alphabetic principle (e.g., Levin, Share, & Shatil, 1996; Neumann, Hood, & Neumann, 2008). Children imitate their parents' writing, ask questions about their parents' writing, try to write messages, and invent spellings (Aram & Levin, 2004). Their early writing mirrors their perception of the alphabetic system and their emerging understanding of letter-sound relations in reading and writing. Early writing is a major advanced early literacy skill. It predicts early literacy, literacy growth, and reading and writing achievements in school (e.g., Aram, 2005; Caravolas, Hulme, & Snowling, 2001; Mäki, Voeten, Vauras, & Poskiparta, 2001; McBride-Chang, 1998; Ritchey, 2008). Kessler, Pollo, Treiman, and Cardoso-Martins (2013) found that children's early writing at 4.5 years old predicted their writing at age 6. Garcia, Abbott, and Berninger (2010) discovered that children's early word writing at the beginning of first grade predicted their spelling at the end of sixth grade.

Researchers have learned a great deal about early reading acquisition (e.g., National Reading Panel (US), National Institute of Child Health, & Human Development (US), 2000), and the same attention is shifting to beginning writing skills (Graham, Gillespie, & McKeown, 2013; Ritchey, 2008). While the skills that contribute to early reading are better understood, less is known about those that contribute to young children's early writing (Puranik, Lonigan, & Kim, 2011). Studying parents' writing mediation with homeschooled and formally schooled children enables us to learn to what extent parents' practices during joint writing at home are central to their children's early literacy knowledge, in general, and early writing, in particular.

Parental Writing Mediation

Although children enjoy engaging in writing activities from a young age, word writing is a complex cognitive task that involves the translation of the spoken word to written symbols (Berninger,

Fuller, & Whitaker, 1996). As such, children often need parental guidance through the various stages of word writing (Levin & Aram, 2012; Shatil et al., 2000). Parent-child writing interactions thus offer a productive context for studying the features of parental mediation (Neumann & Neumann, 2010).

When analyzing the nature of parental writing mediation, researchers refer to literacy-specific features of mediation and to more general social-emotional features of mediation (Aram & Levin, 2001). Literacy-specific mediation refers to the way that the parent introduces the child to the writing system (segmenting the word into its phonemes, connecting each phoneme to a letter name, and printing the letter) and refers to the conventions of writing (e.g., writing right to left in Hebrew, morphology, etc.). These features have been found to relate to children's early literacy (Aram & Levin, 2011; Levin, Aram, Tolchinsky, & McBride, 2013; Skibbe, Bindman, Hindman, Aram, & Morrison, 2013) and to predict children's acquisition of reading and writing (Aram & Levin, 2004; Lin et al., 2009; Skibbe et al., 2013).

The more general mediation features, such as reinforcements, elaborations, and demand for precision, refer to the parent's communication with the child and the ability to keep the child attentive and cooperative during a writing task. Parental general mediation features have been found to relate to children's more general characteristics, such as initiative, self-confidence, motivation, proactivity, and interest in literacy (Leyva, Reese, & Wiser, 2012; Sparks & Reese, 2013). We did not find studies that directly analyzed the nature of parents' mediation in the context of homeschooling.

In the current study we aimed to learn about: (a) differences in the early literacy skills between children who are home-schooled and children who are schooled in a formal kindergarten; (b) differences in the maternal beliefs between those who home-school their children compared to those who send them to kindergartens; (c) differences between the two groups in the nature of a maternal literacy practice (writing mediation); and (d) the way that children's literacy skills, maternal beliefs, schooling (home vs. formal), and the mothers' literacy support (writing mediation) predict children's early writing. Based on the fact that our study is the first to ask these questions within young children, we had open-ended questions as opposed to firm hypotheses.

Methods

Participants

Sixty kindergarteners, ages 4–6 ($M = 59.62$, $SD = 8.29$), and their mothers participated in the study. The children in the home-schooling group ($n = 30$) are being raised and educated at home and did not take part in any formal educational framework. The children in the formal schooling group ($n = 30$) participated in preschool and kindergarten settings. Each group was composed of 9 boys (30%) and 21 girls (70%). Girls are homeschooled more frequently in Israel (Edri, 2010), and thus comprised a larger proportion of the homeschooling group. Using a database of the same measures collected on preschool children during the same year as the study, an MA student in education selected the comparison group to match the homeschooling group in terms of age and gender, resulting in more girls than boys in both groups. This student was blinded to the purpose of the research and only matched the groups in term of age and gender. Table 1 shows the demographics of each group. T-tests comparing the groups reveal that the homeschooling and the formal schooling groups were similar in children's age and gender and in mothers' and fathers' education.

Measures

LITERACY SKILLS

Letter knowledge. The children were asked to name 10 random letters. The total number of letters identified correctly served as the *letter knowledge* score (internal reliability $\alpha = 0.90$).

Phonological awareness. Children were asked to identify the initial phoneme of 17 one-syllable CVC words. For example, "What is the opening sound in the word 'bor'?" Children's answers were scored on a two-point scale, as follows: (2) correct identification of the phoneme (e.g., for "bor" = 'b'); (1) retrieval of sub-syllable (e.g., for "bor" = "bo"); (0) other answers. The average score across the 17 words served as the *phonological awareness* score (internal reliability $\alpha = 0.93$).

TABLE 1 Demographics, Maternal Beliefs, & Writing Skills for Homeschooling and Formal Schooling Groups (N = 60)

			Homeschooling (<i>n</i> = 30)	Formal Schooling (<i>n</i> = 30)	
	<i>Min</i>	<i>Max</i>	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>t</i>
Demographics					
Child's age	49	77	59.60 (8.80)	59.60 (7.90)	0.15
Mother's Ed.	1	4	2.76 (0.86)	2.76 (0.97)	0.97
Father's Ed.	1	4	2.87 (0.78)	2.80 (1.01)	0.31
Literacy skills					
Letter naming	0	100	41.00 (32.63)	64.67 (34.41)	2.73**
Phonological awareness	0	2	1.33 (0.46)	1.11 (0.64)	1.53
Name writing	1	12	9.67 (4.16)	11.45 (1.82)	2.14*
Words writing	1	12	6.23 (3.72)	7.28 (2.90)	1.20
Maternal beliefs					
Learning activities	1	5	2.48 (1.06)	3.18 (0.88)	2.79**
Closeness	3.2	5	4.58 (0.53)	4.37 (0.42)	1.67
Proper behavior	2.8	5	4.06 (0.54)	4.37 (0.51)	2.27*

* $p < .05$; ** $p < .01$.**EARLY WRITING**

Name and word writing. Children were given a pencil and five sheets of white paper (size A4). First, they were asked to write their name on a paper. After that, children were randomly presented with four illustrated cards (e.g., pen, carrot) one at a time, and were asked to write the corresponding words, one on each sheet of paper. The words that were chosen are part of young children's spoken vocabulary, and they represent 60% of the Hebrew alphabet, including vowels and final letters. The products of the written names and the four words were evaluated using a 12-point scale for child's writing based on that of Levin and Bus (2003), ranging from scribbles and pseudo letters, progressing through random letters, basic consonantal spellings, partial consonantal spellings without and with vowels, full consonantal spelling without and with vowels, through to formal spelling. Children received one score for name writing and the average score across the four words served as the *word writing* score (internal reliability was $\alpha = 0.97$ for name writing and $\alpha = 0.97$ for word writing).

Maternal beliefs. Mothers' beliefs were solicited using an 18-item questionnaire based on that of DeBaryshe (1990). Mothers were asked to mark their level of agreement with each item on a scale of 1–5, where 1 was not at all/almost never/not important and 5 was definitely/daily/very important. Using the items on the questionnaire, we built three measures, as follows. (1) *Attitude toward learning activities*: Included eight questions that relate to learning activities with the child. For example: How important is it to provide math workbooks for the child; is it a mother's responsibility to teach her child; how often the mother teaches the child letters, etc. The average score across the eight items served as the learning activities score (internal reliability $\alpha = 0.93$). (2) *Mother–child closeness* was based on five questions that dealt with the amount and quality of time that the mother spends with her child. For example: Frequency of intimate moments between mother and child; how much does the mother encourage her child to express his emotions; how often the mother asks the child about his day, etc. The average score across the five items served as the mother–child closeness score (internal reliability $\alpha = 0.80$). (3) *Expectations for proper behavior* consisted of five items that related to mothers' expectations for appropriate and polite behavior from their child. For example: Obeying authority, politeness, self-regulation, etc. The average score across the five items served as the expectations for proper behavior score (internal reliability $\alpha = 0.71$).

Maternal writing mediation. Mothers were asked to help their child write a birthday invitation. The mother was asked to help her child write as she deemed fit. Mother-child interactions were video recorded and then further evaluated using measures that were validated in previous studies across multiple languages (e.g., Arabic: Aram et al., 2013; Chinese: Lin et al., 2012; English: Bindman, Skibbe, Hindman, Aram, & Morrison, 2014; Hebrew: Aram, 2002). Maternal writing-specific mediation and general mediation were evaluated and coded as detailed below.

WRITING-SPECIFIC MEDIATION

Grapho-phonemic mediation. This eight-point scale reflects the degree to which the mother guides the child through the process of segmenting a word into its sounds and retrieving the required

letter for each sound when attempting to spell an orally presented word (Aram & Levin, 2001). The encoding of each letter was assessed as follows: (0) The mother does not provide any support for the child's spelling and the child writes an unconventional outcome; (1) The mother relates to the word in its entirety and does not separate it; (2) The mother says the word during writing without allowing the child to notice the connection between the sound and the written letter; (3) The mother dictates the letter name; (4) The mother retrieves the target phonological unit and immediately dictates the required letter name, for example saying: "g – GIMEL" (the sound *g* and the letter name for G); (5) The mother retrieves the phonological unit and encourages the child to link it with a letter name, for example asking, "It starts with *g* so which letter is it?"; (6) The mother encourages the child to retrieve the phonological unit and to link it with a letter name; (7) The mother encourages the child to go through the whole process independently while supporting the child along the way when help is needed. The average score across the letters served as the grapho-phonemic mediation score (internal reliability was $\alpha = 0.98$).

Printing mediation. This eight-point scale evaluates mothers' level of support and encouragement toward the child so he/she could independently produce the graphic form of the letter (Aram & Levin, 2001). The printing of each letter was assessed as follows: (0) The mother did not intervene in the child's unconventional writing; (1) The mother wrote for the child; (2) The mother helped the child print the letter by holding his/her hand or the mother outlined the letter and the child completed the lines; (3) The mother wrote a letter for the child to copy; (4) The mother reminded the child of the letter's form using a "virtual" example (e.g., the mother draws the letter with her finger in the air); (5) The mother helped the child remember the graphic form using verbal hints (e.g., "its like a square"); (6) The mother helped the child by relating to other words that the child knows (e.g., "its like the first letter in Dad's name"); (7) The mother allowed the child to write the letter independently, while watching and encouraging the child. The average across all letters served as the printing mediation score (internal reliability was $\alpha = 0.98$).

Writing conventions. The number of times that the mother related to characteristics of the Hebrew language and how it is written were tallied (e.g., vowels that are not represented with letters, morphology, separating words, final letters, and homophonic letters). We counted only comments that were accompanied by an explanation that related the situation to the writing system, e.g., “The feminine form always has the ‘hey’ (letter name) at the end”; “We write from right to left but when you write the date, you need to write it from left to right.”

General mediation. Based on mediation features in Aram (2002), maternal utterances were coded using the following categories, and the total number of instances per category were tallied.

- **Reinforcements.** The mother directed the reinforcement to a particular action or outcome throughout the writing task. For example, the mother says, “You wrote that really well”; “Yes, this time the direction is exactly right.”
- **Promoting a sense of competence.** Utterances directed towards the child’s knowledge or ability throughout the writing task, e.g., “You know this”; “You can do it”; “Next time it will be easier.”
- **Demand for precision.** The mother directed the child’s attention to the lack of precision in the written product or asked the child to alter the product. For example: “This needs to be longer”; “You wrote the two backward.”
- **Lack of demand for precision.** Instances where the child said or did something incorrectly and the mother did not respond and ignored it.
- **Entry into the child’s workspace.** Situations where the mother entered the child’s work space (the page or the pencil) without invitation, e.g., the child puts the markers on the side and the mother takes a marker and writes on the page; the mother holds the child’s hand and writes with it.
- **Organizing the activity.** Utterances where the mother helps raise the child’s awareness of the “work program” before beginning the activity. For example: “First say the word and then we’ll write it,” or “Write it small so you’ll have room for the rest of the words.”

- Choice. Situations in the context of the task where the mother allowed the child to choose. For example, the mother asks the child, “Do you want to switch markers?”; “Which word do you want to start with?”
- Elaborations. Utterances where the mother went beyond the “here and now” of the writing task. The elaboration can be a connection between the stimulus to something in the child’s world or past experiences, or a comment that invites higher order thinking skills (e.g., induction, drawing conclusions). For example, “Remember when we got an invitation to David’s party? What was written on that?”; “How old are the children in your class this year?”

Two MA students in education who were highly trained and experienced in coding parent-child writing interactions analyzed 10 complete interactions (16.66% of the interactions) randomly selected from the sample (five from each group). The raters were blind to participant group allocation. The analyses yielded 90–100% agreement across the measures. Any disagreements were discussed and agreed upon by a third trained judge.

Procedure

Families were recruited using a snowball method. In the home-schooling group, they were recruited largely via the Internet, primarily through the homeschooling network and in the formal schooling group via advertisement among kindergarten teachers. Trained MA students in education collected the data in a single meeting at the child’s home. Children’s literacy skills were first assessed without the mother present, while the mothers concurrently completed the questionnaires in a different room. Then, the joint writing task was video recorded.

Results

In this section, we first describe the children’s literacy skills and the mothers’ beliefs in the two groups, and compare between the groups. Then, we focus on the nature of the mothers’ writing mediation in both groups. Lastly, we present an analysis of the way that the measures in our study predict children’s early writing.

Literacy Skills

Table 1 presents the children's literacy skills and compares between homeschooled and formally schooled children. On average, the homeschooled children had significantly weaker letter knowledge than the formally schooled children. Homeschooled children knew an average of 4 letters (out of 10) compared to an average of 6.5 letters for formally schooled children. There were no significant differences between the groups on phonological awareness; when asked to segment the first phoneme of a word, children in both groups tended to segment a sub-syllable (consonant + vowel) instead.

Homeschooled children wrote their names at a significantly lower level than their peers in the formal schooling framework. The homeschooled children were able to write their names at the partial consonantal level, with some at the full consonantal level. On average, those in formal schooling were able to write their names correctly. Compared to name writing, the children's level of word writing was lower for both groups and the groups did not significantly differ. The children tended to use random letters to represent the word or to correctly represent one sound from the letters of the words.

Maternal Beliefs

We evaluated mothers' beliefs relating to three areas: attitude toward learning activities, mother-child closeness, and expectations for proper behavior from the child. We found that mothers in the homeschooling group reported favoring academic activities but to a significantly lower degree than those in the formal schooling group (see Table 1). Mothers in both groups reported that being close with their child was important to them and no significant differences between the groups were apparent for this measure (see Table 1). Both groups felt that proper behavior was important. Nevertheless, significant differences appeared between the groups, with the homeschooling mothers having lower expectations for proper behavior than the formal schooling mothers (see Table 1).

Maternal Writing Mediation

We evaluated maternal writing mediation, examining the writing specific mediation as well as the general mediation.

WRITING SPECIFIC MEDIATION

On the grapho-phonemic mediation measure, results showed that overall, homeschooling mothers ($M = 2.62$, $SD = 2.18$) mediated on a significantly lower level than mothers in the formal schooling group ($M = 3.88$, $SD = 1.70$; $t = 2.50$, $p < 0.01$). The homeschooling mothers tended to mediate by saying the word without giving the child the opportunity to make the connections between sounds and letters, or by dictating letters. The formal schooling mothers tended to isolate the sounds for the child and then say the letter name. It is interesting to note the larger variability between mothers within the homeschooling group compared to the mothers in the formal schooling group. That is, although they tended to mediate on a lower level as a whole, some of the homeschooling mothers mediated on a higher level than others.

Printing mediation in the homeschooling group ($M = 3.10$, $SD = 2.59$) was also significantly lower than in the formal schooling group ($M = 4.73$, $SD = 2.18$; $t = 2.64$, $p < 0.01$). Mothers in the formal schooling group gave their children greater independence and provided more encouragement to write the words on their own. The mothers in the homeschooling group tended to provide an example for the children to copy. On this measure as well, there was greater variability between the mothers within the homeschooling group. Mothers in both groups referred infrequently to *writing conventions* and there were no significant differences between the groups on this measure (see Table 2).

GENERAL MEDIATION

Results in Table 2 describe mothers' general mediation and the comparisons between the groups. As the distributions were not normal and behaved more like a Poisson distribution (Long, 1997), we used negative binomial distribution (NBD) regression analyses to compare between the groups (Hilbe, 2011). Mothers in the formal schooling group promoted their children's

TABLE 2 Mediation Characteristics During Writing By Homeschooling and Formal Schooling Mothers: Comparisons via Negative Binomial Regression (N = 60)

Variable	Formal Schooling (<i>n</i> = 30) <i>M</i> (<i>SD</i>)	Home schooling (<i>n</i> = 30) <i>M</i> (<i>SD</i>)	Intercept B (<i>SE</i>)	Variable B (<i>SE</i>)	Wald Chi-Square
Writing con- ventions	1.17 (1.46)	0.57 (1.72)	−0.57 (0.30)	0.72 (0.39)	3.39
Reinfor- cements	9.67 (7.98)	6.23 (6.36)	1.83 (0.20)	0.44 (0.27)	2.56
Promoting compe- tence	1.90 (2.71)	0.57 (0.97)	−0.57 (0.30)	1.21 (0.38)	10.23**
Demand for precision	4.17 (4.30)	0.93 (1.41)	−0.07 (0.26)	1.50 (0.33)	20.28***
Lack of demand for precision	0.77 (1.33)	3.07 (5.21)	1.12 (0.21)	−1.39 (0.35)	15.88***
Entry into workspace	1.80 (3.12)	0	−3.40 (1.02)	3.99 (1.04)	14.67***
Organizing	1.40 (2.34)	0.23 (0.43)	−1.46 (0.42)	1.79 (0.48)	13.76***
Choice	4.23 (2.97)	4.03 (2.34)	1.40 (0.20)	0.05 (0.29)	0.03
Elaborations	2.10 (2.02)	1.13 (1.17)	0.13 (0.25)	0.62 (0.33)	3.40

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

competence significantly more than homeschooling mothers. They helped their children get organized more frequently, had significantly higher demands for precision, and tended to enter their child's workspace significantly more often than the homeschooling mothers. There were no differences between the groups in terms of reinforcements, giving the children choices during the interaction, or elaborations.

Predicting Early Writing

Aiming to predict children's early writing by their early literacy skills, mothers' beliefs, method of schooling (home vs. kindergarten), and mothers' writing mediation, we first assessed the correlations between all the predicting measures and children's early

writing (a combined measure of name and word writing $\alpha = 0.93$). Children's phonological awareness and letter naming correlated significantly with writing ($r = 0.35^{**}$ and $r = 0.74^{***}$, respectively). None of the maternal beliefs significantly correlated with children's writing level. However, maternal writing specific mediation (grapho-phonemic $r = 0.69^{***}$, printing $r = 0.70^{***}$, and writing conventions $r = 0.40^{**}$) as well as a number of general mediation characteristics (reinforcements $r = 0.27^*$, demand for precision $r = 0.31^*$, choice $r = -0.23^*$, and elaborations $r = 0.33^*$) correlated significantly with the children's early writing.

Based on these correlations, we conducted hierarchical regression analyses to examine whether maternal mediation characteristics predicted children's writing to the same degree in the two educational groups (homeschooling and formal schooling), beyond children's level of phonological awareness. Due to limitations of a small sample size, we had to select only one of the literacy skills to include in the analyses. We selected phonological awareness, as the groups did not significantly differ on this measure.

Table 3 presents the results of the hierarchical regressions. In the first stage, we entered the children's phonological awareness; in the second, we added the group (homeschooled vs. kindergarten); in the third, we entered each of the mediation measures; and in the fourth, we entered an interaction between the specific mediation measure and the group. These interactions were not significant and they are not presented in the table with one exception (elaborations and group), which is presented.

As can be seen (Table 3), when predicting children's writing, at the first step, phonological awareness, positively and significantly predicted 12% of the variance between the children. At the second step, group (home vs. formal schooling) negatively and significantly added another 7%. That is, being homeschooled negatively predicts children's early writing. When the writing-specific mediation measures were entered in the third step, they explained a significant amount of variance (37%, 38%, and 10% for grapho-phonemic, printing mediation, and reference to writing conventions, respectively) beyond the child's phonology and group. Regarding general mediation measures, beyond the child's phonological awareness and the group, mothers' reinforcements and her demand for precision positively explained an extra 5%

TABLE 3 Hierarchical Regression Analysis - Phonology, Group (Home Schooling vs. Formal Schooling) and Writing Mediation Measures Predicting Children’s Writing (Words +Name)

	Variable	<i>B</i>	<i>SE</i>	β	<i>R</i> ²	ΔR^2
Step 1					.12	.12**
Step 2	Phonology	1.89	0.68	.34**	.19	.07*
	Group	−1.72	0.75	−.28*		
Step 3a			.56	.37***		
	Phonology	1.41	0.51	.26**		
	Group	−0.28	0.60	−.20		
Step 3b	Grapho-phonemic mediation	1.00	0.15	.66***	.57	.38***
	Phonology	1.32	0.51	.24**		
	Group	−0.17	0.60	−.03		
	Printing mediation	0.83	0.12	.67***		
Step 3c					.29	.10**
	Phonology	1.81	0.65	.33**		
	Group	−1.26	0.73	−.20		
Step 3d	Writing conventions	0.63	0.23	.32**	.24	.04^
	Phonology	2.03	0.67	.37**		
	Group	−1.01	0.84	−.16		
	Demand for precision	−0.21	0.12	−.24^		
Step 3e					.25	.05*
	Phonology	2.18	0.65	.40**		
	Group	−1.77	0.73	−.29*		
Step 3f	Choice	−0.27	0.14	−.23*	.24	.05^
	Phonology	2.01	0.66	.36**		
	Group	−1.35	0.76	−.22		
Step 3g	Reinforcements	0.10	0.05	.23^	.24	.08*
	Phonology	1.75	0.68	.32*		
	Group	−1.00	0.78	−.16		
	Elaboration	0.02	0.26	.01		
	Elaborations X group	2.10	0.85	.34*		

^*p* = .08. **p* ≤ .05. ***p* < .01. ****p* < .001.

and 4% of children's writing, respectively. Interestingly, mothers' giving choices added a negatively significant 5% beyond the child's phonology and the group. Lastly, an interaction appeared between mothers' elaborations and group in predicting children's writing. For children who go to kindergarten, there is no relationship between mothers' elaborations during the invitation writing and the children's early writing level ($b = 0.21$, $SE = 0.26$, $t = 80$, $p = 0.43$). For children who are homeschooled, there is a significant relation between elaborations and early writing ($b = 1.52$, $SE = 0.45$, $t = 3.37$, $p = 0.001$). Within this group, beyond phonological awareness, children of mothers who elaborated more during the writing interactions showed higher levels of early writing.

Discussion

The current study aimed to learn about the differences between families who homeschool their children and those who send them to formal kindergarten in terms of: children's early literacy (alphabet knowledge, phonological awareness, and early writing); maternal beliefs regarding learning activities, closeness to the child, and behavior expectations from the child; and the nature of maternal writing mediation—the way that they support their children during joint writing of a birthday invitation. Furthermore, we examined the contribution of the nature of maternal writing mediation to the level of children's early writing beyond the contribution of children's phonological awareness and the type of schooling (home vs. kindergarten).

Homeschooling and Early Literacy

Our results showed that there were significant differences between the homeschooling and formal schooling groups in their letter knowledge and name writing, favoring the formal schooling group. This is in contrast to studies that showed better performance of homeschooled children compared to their formally schooled peers (e.g., Ray, 2000, 2010; Rudner, 1999).

An explanation of these differences may relate to the educational philosophy of the families who homeschool. Recent research has noted an important distinction between more structured homeschooling compared to unstructured homeschooling

(Martin-Chang, Gould, & Meuse, 2011). Some of the literature also refers to this as homeschooling versus unschooling (Heller Degani, 2003). Unschooling, a term coined by Holt (Farenga, 1999), refers to homeschooling without the use of a set curriculum, which instead relies on the motivation and drive of the learner. In our study, the mothers expressed ideas and beliefs favoring unschooling. Martin-Chang *et al.* (2011) found that children homeschooled in an unstructured format had the lowest scores on standardized tests compared to both formally schooled children and those homeschooled in a structured format. Adhering to an unschooling pedagogical philosophy may provide some insight into the poorer performance of the homeschooled children in our study.

The advantage that the formally schooled children showed in letter knowledge and word writing to some degree reflects the Israeli education system. In Israeli preschools, the Hebrew alphabet is formally part of the curriculum from age 3 and is part of everyday activities (Sverdlov, Aram, & Levin, 2014). Children's name writing is part of the formally schooled child's life from the age that he/she enters the education system. In nurseries, the child's name is attached to his/her mat, bottle, each creative project, etc. Formally schooled children are required to write their name on each project in preschools from the age of three (Aram & Biron, 2004). In fact, the formally schooled children in our sample wrote their names almost perfectly. Children who are homeschooled likely encounter their name and practice writing it less frequently.

It was interesting to learn that there were no significant differences between the groups regarding phonological awareness. There was variability in children's outcomes, but children in both groups found it difficult to withdraw an opening phoneme and tended to say a sub-syllable (phoneme and a vowel) instead. Despite the phonological awareness curriculum, children who are formally schooled did not show any significant benefit. This finding is in accord with the tendency of Hebrew-speaking kindergartners to respond with the initial CV sound when asked to isolate the initial phoneme of spoken CVC words (Levin *et al.*, 2006; Share & Blum, 2005). The difficulty of Hebrew-speaking children to isolate phonemic sounds probably reflects the fact that Hebrew does not include words comprised of a single phoneme (Levin *et al.*, 2006; Share & Blum, 2005). The relatively easy access to the CV

sound probably reflects the prevalence of syllables of CV structure in Hebrew (besides those of CVC) (Share & Blum, 2005). In addition, the diacritics that serve as optional marking of vowels appear beneath the preceding consonant so that a consonant and a following vowel comprise one vertical unit.

We also did not find significant differences in word writing between the groups. Early writing practice is part of the Israeli preschool curriculum (Israel Ministry of Education, 2006), but teachers report that they practice it infrequently with the children because they think that it is difficult and belongs to elementary school (Sverdlov et al., 2014). We think that children tended to write using only consonants because the orthographic principles underlying grapho-phonemic mappings in Hebrew are obscure with respect to vowels, and children therefore use vowels later than consonants in spelling (Levin et al., 1996).

On top of these explanations, the differences in findings between the two groups in early literacy may relate to the age of the children in the study. Nearly all studies of homeschooling assessed children in elementary and high school. To our knowledge, this is the first study to explore those who homeschool kindergarten-aged children. It may be that the mothers in this study who homeschool would be inclined to increase their focus on early literacy when their children reach grade school age, and results regarding achievements would vary.

Homeschooling and Maternal Beliefs

Mothers of children who go to kindergarten favored learning activities at home and proper behavior more than mothers who homeschool their children. It was interesting to find no significant differences in mothers' beliefs regarding closeness to her child; in both groups, mothers highly favored closeness to their child.

We think that the difference between the groups regarding learning activities and expectations of proper behavior can be explained by the nature of our homeschooling group and their educational philosophy. Many expressed dissatisfaction with the educational system and selected homeschooling for ideological reasons relating to education. The mothers reported that they prefer to rely on "spontaneous" learning with minimal demands

from their children. Additionally, while research has shown that homeschooling families have increased their use of more structured learning material such as textbooks from local school districts and prepared curricula (Hanna, 2012), the homeschooling mothers in our study shied away from workbooks and formal curricula.

Homeschooling and Writing Mediation

In keeping with their pedagogical beliefs, the homeschooling mothers were significantly less likely to help their children separate the word into its component parts, draw connections between the sound of the letter and the letter name, and encourage the child to independently write the letter. They generally let the child do whatever he/she felt was right. In terms of their general mediation, the homeschooling mothers also significantly differed in that they promoted their child's competence less frequently, provided less organizational support for the activity, and demanded less precision. They were also less likely to enter into the child's workspace during the activity.

Although the mothers' beliefs did not directly correlate with the children's writing skills, it appears as though their mediation behaviors were somewhat reflective of their beliefs. This is supported by other research that has found that parental beliefs are related to their early literacy activities (Bingham, 2007; DeBaryshe et al., 2000; Korat & Levin, 2001; Meagher et al., 2008). It appears that the homeschooling mothers believe that children should not be corrected and be more free to learn as they choose. As such, during mediation, these mothers provided lower levels of grapho-phonemic and print mediation, and demanded less precision from their children.

In line with previous literature that showed that maternal mediation levels were predictive of children's early literacy skills (Aram & Levin, 2011; Levin et al., 2013; Skibbe et al., 2013), we found that maternal mediation was significantly related to the children's early writing skills. Mediation levels of grapho-phonemic, print, and writing conventions, as well as levels of a number of the general mediation features, including reinforcements, demand for precision, and elaborations,

all significantly correlated with children's name and word writing.

Predicting Children's Writing

Beyond studying the beliefs and characteristics of families who homeschool their children and children's early literacy in comparison to families who send their young children to formal education, we aimed to learn about the predictive value of the nature of maternal writing mediation to children's early writing in both groups. According to Vygotsky's (1978) model of development, parents scaffold their children's learning within the children's zone of proximal development, toward their potential development level—that is, a higher level of understanding. Indeed, we found that children's actual development level of phonological awareness significantly predicted their early writing level.

These results support studies that showed that phonological awareness before schooling is related to children's early writing (e.g., Blair & Savage, 2006; Gentry, 1982). Moreover, within phonological awareness, tasks like the one that we used that require segmentation of a word and production of a phonological element are the most productive measures in predicting children's literacy achievements (Blair & Savage, 2006).

We found that the nature of mothers' writing mediation had a unique contribution to children's writing level beyond children's phonological awareness and type of education (homeschooling vs. formal schooling). In both groups, the mothers' task-specific mediation, the way they encouraged their children to retrieve a phonological segment in the word and connect it to a letter name (grapho-phonemic mediation), the autonomy that they gave their child in producing the letter (print mediation), and their references to Hebrew writing conventions (writing conventions mediation) uniquely contributed to the prediction of their children's writing level. The more general mediation measures (reinforcements and demands for precision) also contributed, though to a lesser extent, to the prediction of children's writing level.

Writing is a mentally challenging task (Graham & Harris, 2000), which in alphabetic orthographies requires the understanding of letter-sound mappings. Mothers in our study

demonstrated a range of mediation strategies. Previous studies showed that although mothers are generally sensitive to their children's literacy level, some mothers better utilize their children's knowledge during writing than others (Aram, Korat, & Levin, 2006). In our study, the unique contribution of mothers' mediation to their children's writing level shows that mothers who targeted higher than their children's actual level of phonological awareness to guide their children upward toward their potential writing performance had children who better understand the writing system. As in previous studies across languages, mothers' task-specific mediation in the current study contributed more to the prediction of children's early writing than the more general mediation elements (e.g., Aram & Levin, 2011).

Interestingly, giving children choices during the writing interaction negatively predicted children's writing. It may be that in writing tasks, providing choices somehow distracts children's attention from the main task. The number of mothers' elaborations predicted children's writing only in the homeschooling group. We saw that in general within this group, mothers tended to let the child just perform the task according to his/her will or wrote for the child, but when the mothers in this group discussed the task with their children and elaborated, their children showed higher writing levels.

Limitations

In the present study, the homeschooling group believed mainly in "unschooling" (Farenga, 1999). Given the diversity within the homeschooling community, we think that when comparing homeschooling and formal schooling, future research should include groups reflecting both structured homeschooling and unschooling. This would enable greater comparison between the impact of the type of schooling in terms of maternal beliefs and mediation and children's early writing.

While this study was the first, to our knowledge, that examined homeschooled kindergartners, following the children over time may shed light on changes in parental early literacy beliefs and practices. Specifically, do parents maintain their unschooling pedagogical beliefs once children reach grade-school age,

or do they increase the structure and teach their children more formally? Additionally, the sample in our study contained a much greater number of girls than boys. Although this reflects the population of homeschooled children in Israel, future studies should consider larger samples that are more balanced by gender. This would facilitate greater understanding into the potential impact of type of schooling based on children's gender.

Lastly, the current study is correlational in nature. While it shows a relationship between parental early literacy beliefs and practices and children's writing, it is not possible to conclude the nature of the direction of the relationship. Future studies should utilize experimental designs that would allow for an understanding of the causal nature of these relationships.

Practical Implications

In contrast to previous research, our results indicated significantly lower early literacy skills among the homeschooled children compared to the formally schooled. Given the importance of early literacy skills for later reading and writing success, it is important to find ways to help those choosing to homeschool to provide appropriate support for their children's early literacy. Even within a more unstructured pedagogy, parents can be guided to include early literacy activities (e.g., writing a phone number or a shopping list) into their everyday activities.

In sum, the present study adds to the body of literature on parent-child writing interactions and highlights the importance of maternal mediation during early literacy interactions, even beyond the type of schooling. As homeschooling continues to grow worldwide, examining preschool-aged homeschooled children's achievements broadens the context of understanding of the homeschooling population.

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