In: Family Relations Issues and Challenges
Editor: Rafael N. Ramirez
ISBN 1-60021-926-8

PREDICTORS OF MATERNAL WRITING MEDIATION TO KINDERGARTNERS: ANALYSIS VIA A TWINS STUDY

Dorit Aram*
Constantiner School of Education
Tel Aviv University

* Correspondence should be addressed to Dr. Dorit Aram, School of Education, Tel Aviv University, Israel 69978. Phone: 972-3-6341348. Fax (home): 972-3-634-1318. Email: dorita@post.tau.ac.il

ABSTRACT

This chapter explored the nature of mothers' writing mediation to their kindergarten-age twins and attempted to better understand some of its predictors, including mothers' pedagogical beliefs and estimation of their children's literacy skills, and children's early literacy. The chapter also tried to identify a consistent maternal writing mediation style employed with both twins. Participants were 28 sets of twin kindergartners (56 children, mean age 68.89 months) and their mothers. Children's early literacy (letter naming, phonological awareness, and word writing) underwent individual assessment in their kindergartens. During home visits, the mother's pedagogical beliefs and estimation of each of her children's early literacy were assessed, and two mother-child word writing interactions (one with each twin) were videotaped. Findings demonstrated that maternal pedagogical beliefs were not related to maternal writing mediation. Children's actual literacy level contributed to task-specific mediation measures (grapho-phonemic mediation, printing mediation, demand of precision, and reference to orthography), even beyond the mother's pedagogical beliefs and her estimation of her children's literacy. The mother's estimation of her children's literacy contributed, beyond maternal pedagogical beliefs and the children's actual level of literacy, to the more general mediation measures (atmosphere, mutuality, reinforcements, and task perception). This study revealed that, along with sensitivity to the child's level, mothers of twins possessed a mediation style.

PREDICTORS OF MATERNAL WRITING MEDIATION TO KINDERGARTNERS: ANALYSIS VIA A TWINS STUDY

INTRODUCTION

Literacy is a central socio-cultural tool in Western society, a skill that can only be learned through social interaction. When exploring the sources of literacy, researchers focus on families as the setting where children learn the basic skills that establish the foundations for later literacy development (Wasik & Herrmann, 2004). Parents are their children's main literacy mediators. Yet, the complexity of parent-child literacy interactions has yet to be unraveled. The present chapter explores the nature of mothers' writing mediation to their kindergarten-age twins and attempts to further examine some of its predictors. More specifically, the chapter presents a study that investigated the mothers' pedagogical beliefs regarding early literacy, their estimation of their children's early literacy, and the children's actual early literacy skills as predictors of the mothers' writing mediation traits. Furthermore, within the interesting and complex parent-child interactions, this chapter attempts to determine if mothers adapt their mediation to each of their twins depending on the child's literacy level or if they reveal a consistent mediation style that they employ with both twins. Studying twins offers a fruitful method for exploring parenting traits because it reveals how a parent interacts with two same-age but different children within the same household.

PARENT-CHILD WRITING INTERACTIONS

Observations in homes show that children engage in writing activities. They pretend to write, invent spellings, type words using a computer, dictate words or sentences for others to write down, make posters or signs for special events, play with writing toys like Etch A Sketch ®, play with magnetized letters, copy letters or words, and so forth. During such situations, children often question their parents on what they write, and parents utilize these opportunities to explain the spelling of words (e.g., Marvin & Ogden, 2002).

Parent-child writing interactions offer a productive context for studying the complexity and features of parental mediation because writing (acquiring the basic principles of the alphabetic system) is a complicated cognitive activity that poses a challenge for both parents and their children. Scrutiny of writing mediation characteristics may further illuminate parental roles in children's early literacy development. This contribution is important, considering the solid evidence whereby parent-child writing characteristics correlated with basic alphabetic skills in kindergarten (Aram & Levin, 2001; Sénéchal & LeFevre, 2002) and with later literacy achievements in school (Aram & Levin, 2004). Aram and Levin (2001) videotaped mothers and their children at home while performing writing tasks (writing words and names). Their findings indicated that the quality of maternal writing mediation predicted kindergartners' literacy skills even after controlling for socio-cultural measures (SES, maternal literacy, and the richness of the literacy environment at home). A follow-up study (Aram & Levin, 2004) assessing the participants 2½ years later found that maternal writing mediation in kindergarten predicted second-grade spelling, reading comprehension, and language beyond the predictive capacity of SES and of early literacy measures assessed in kindergarten.

The parental roles in writing mediation are multiple. Kindergartners usually cannot spell new words autonomously (Aram & Levin, 2001; DeBaryshe, Buell, & Bender, 1996). When writing a new

word, the child must segment the word into its sounds, retrieve the right letters, and produce them on the paper appropriately. The child needs an expert's support to perform these tasks adequately. Thus, writing interactions encourage parents' task-specific mediation, such as reference to the basic skills of letter knowledge, teaching the grapho-phonemic code, guiding the child's printing of letters (e.g., Shatil, Share, & Levin, 2000), and reference to language features like morphology or orthographic characteristics (Aram, 2002). Furthermore, like any other challenging interaction, writing interactions concomitantly include general mediation features such as atmosphere, mutuality, reinforcements, and so on. When mediating a challenging task to their children, parents should be sensitive to their child's level of competence, understand the task, and provide guidance accordingly.

SOURCES OF PARENTAL MEDIATION

Different factors may affect the nature of the parent-child interaction and the parents' mediation characteristics. Parents modify the level of their support in accordance with the nature of the activity. That is, when tasks are more difficult or structured, require specific outcomes, and are less familiar to the child, parents tend to be more directive and offer more help (e.g., Baker, Sonnenschein, & Gilat, 1996; Kermani & Brenner, 2000).

Aside from task-related effects, some evidence has suggested that parents demonstrate individual differences in their mediation characteristics (Gonzalez, 1996). What molds parental writing mediation style? It may stem from several non-mutually exclusive sources. Perhaps parents mediate according to their pedagogical beliefs regarding early literacy development and about themselves as literacy mediators (Korat & Levin, 2002; Levine, 1993; Lightfoot & Valsiner, 1992). Alternatively, parents' strategies for mediating writing may be linked to their perceptions of their children's literacy knowledge (Korat & Levin, 2001). At the same time, parents' mediation may stem from their responsiveness to their children's actual early literacy skills during the interaction (DeBaryshe et al., 1996). This chapter presents a study that focused on all three of these sources (maternal pedagogical beliefs, maternal estimation of their children's literacy, and children's literacy skills) as optional factors that mold maternal writing mediation.

PARENTAL PEDAGOGICAL BELIEFS

Adults hold some perceptions regarding child development and some general pedagogical beliefs that guide them while interacting with a child (Bruner, 1971). Presumably, these beliefs formulate an "intuitive parenting program" (Keller, Scolmerich, & Eibl-Eibesfeldt, 1988). According to their beliefs concerning age and cultural appropriateness, parents select the activities and materials that they consider suitable for their children. By making such choices and adjusting tasks and materials to children's interests and skills, parents guide children's development (Rogoff, 1990). Positive evidence has linked parental pedagogical beliefs about children's development and learning with parents' behavior toward children (e.g., Sigel, McGillicudy-DeLisi, & Goodnow, 1992).

In the context of early literacy interactions, Evans, Bell, Mansell, and Shaw (2001) examined how parents' pedagogical beliefs about shared book reading related to parental coaching of children to learn to read, from kindergarten through second grade. They found that parents' goals and values indeed 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 and story comprehension, whereas parents whose primary goal was teaching gave more instructions. The study presented the

present chapter investigated maternal general beliefs toward early literacy by asking mothers what kindergartners should know about early literacy and what the parent's role should be in this context.

PARENTAL ESTIMATION OF THEIR CHILDREN'S DEVELOPMENT

In addition to their global pedagogical beliefs, parents also hold more specific beliefs regarding their estimation of their own child's performance (Murphey, 1992). Parents who show greater accuracy in estimating their children's knowledge will probably organize more appropriate, interesting, and challenging experiences for their children (Granot, 2003; Hunt & Paraskevopoulos, 1980). With respect to early literacy, Granot asked parents of kindergartners to estimate their child's performance on early literacy tasks (naming letters, retrieving first phonemes, and writing words). She found significant correlations between maternal estimation of their children's performance and the children's achievements. Parents were familiar with their children's early literacy knowledge. The assumption is that these attributions are related to the mothers' sensitivity and responsiveness during mother-child interactions (Keller, 2000) and that such attributions might affect parental behavior towards the child and shape the mothers' intuitive parenting program (Keller et al., 1988). The study presented in the present chapter asked each mother to predict each of her twins' performance on several early literacy tasks.

SENSITIVITY TO CHILDREN'S ACTUAL DEVELOPMENT LEVEL

Parallel evidence suggests that parental mediation affects children's development and, at the same time, children's characteristics affect their parents' mediation (Bornstein, 2001; Maccoby, 2000). Parents reveal sensitivity to their children, attuning responses to the child's needs and developmental level along different interactions within the child's zone of proximal development (Vygotsky, 1978). For example, DeBaryshe et al. (1996) studied kindergartners attempting to write a letter alone and with their mothers' assistance. They reported that, despite the fact that the mothers directed their children to use conventional spelling, the mothers attuned their mediation to their children's independent ability. In the same manner, Evans, Moretti, Shaw, and Fox (2003) reported that parents provided more feedback clues when their second grade children were unsuccessful in rereading a word after initial feedback. Children with weaker word recognition skills were offered feedback at a higher level. The study presented here assessed each child's early literacy skills (word writing, letter knowledge and phonological awareness).

STUDYING TWINS AS A SOURCE FOR UNDERSTANDING PARENTING

Parents develop unique and special relationships with each of their offspring, and siblings experience childrearing efforts differently because of each child's distinctive characteristics such as temperament, personality, gender, and age. Good parents take these characteristics into account in adapting their general childrearing practices to their specific encounters with each child (Shonkoff & Phillips, 2002).

Studies on parenting of twins have focused mainly on the emotional atmosphere of the home and parental characteristics (Deater-Deckard, 2000), particularly warmth, control, mutuality, cooperation, and emotional reciprocity (Kochanska, 1997). Deater-Deckard and O'Connor (2000) found that

overall mutuality in parent-child interactions was predictable from one parent-twin dyad to the other parent-twin dyad within the same family. Other studies reported less stability, showing that mothers treated their twins differently in terms of warmth, positive and negative control, and responsiveness (Deater-Deckard et al., 2001). To the best of my knowledge, no research thus far has examined teaching aspects of parenting to twins in general or writing interactions in particular.

THE CURRENT STUDY'S OBJECTIVES

In the realm of early literacy, the study to be reported here examined several questions: How are mothers' pedagogical beliefs regarding early literacy and maternal literacy mediation, their estimation of their children's early literacy, and their children's actual early literacy knowledge linked with the way that they mediate word writing to their kindergarten-age children? Furthermore, if indeed these factors are linked to maternal mediation, how do they predict maternal mediation traits? Are they linked in the same manner to different aspects of maternal mediation? Lastly, do mothers of twins have a consistent mediating style that they employ for both of their twins? If so, to what extent do mothers possess their own writing mediation style and to what extent do they reveal sensitivity to the differences between their two children and, as a result, adapt their mediation level to their twins' different literacy levels?

METHOD

Participants

The sample included 28 sets of kindergarten-age twins (N = 56) and their mothers (N = 28) from urban middle class neighborhoods in Tel Aviv. The 32 boys and 24 girls ranged in age from 55 to 76 months (M = 68.89 months, SD = 4.70). Out of the 28 twin sets, 5 were identical twins (3 male sets and 2 female sets), and 23 were fraternal sets, of whom 11 were same-sex sets (7 male sets and 4 female sets). The twins were born between the 35^{th} and 40^{th} weeks of pregnancy (M = 37.48 weeks, SD = 1.31). Note that only one set of twins was born in the 35^{th} week of the pregnancy, and only 7 infants were hospitalized in the premature infant care unit (between 1-5 weeks). The time difference between the birth of the first and second twin was 1-20 minutes (M = 6.14 minutes, SD = 5.51). Weight at birth ranged from 1370 to 3250 grams (M = 2346.53 grams, SD = 402.70) for the firstborn and from 1370 to 2900 grams (M = 2296.53 grams, SD = 391.39) for the secondborn.

Mothers or fathers were invited to participate in the study, but only mothers volunteered. Mothers' age ranged from 28 to 48 years (M = 38.61; SD = 4.31). Maternal education ranged from a high school diploma to a masters' degree: 33.33% of the mothers had finished high school; 48.20% had a university B.A. degree, and 18.50% had an M.A.

MEASURES

Children's Early Literacy Measures

The twins individually completed three early literacy tasks in their kindergartens: word writing, letter knowledge, and phonological awareness.

Word writing

Each child was asked to write four word pairs presented both orally and visually. Children received four cards, each of which displayed identifying drawings of two nouns (e.g., *iparon – et* [pencil – pen])[1]. The oral instructions were straightforward: "Write X and then Y" (where X and Y referred to the nouns illustrated on one card). The eight nouns are all frequently used in discourse with children; thus, participants were expected to be familiar with their oral usage. Each written word was scored on a 15-point scale adapted from Levin, Share, and Shatil (1996) and Levin and Bus (2003), ranging from scribbling (1), through use of random letters (6), partial consonantal spelling with vowels (10), advanced consonantal spelling with distortions and additions (11) to conventional writing (15). Figure 1 illustrates different writing levels. The mean score across the eight words served as the *word writing* score (α = .98).

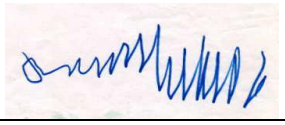
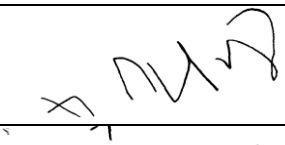
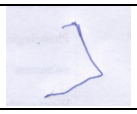
נמלה – ***nɛmala*** **– [ant] – NMLH**	
	**(1) scribble**
	**(3-5) use of writing-like schemes – linearity, segmentation, or diverseness (each added 1 point)**
	**(6) pseudo letters**
	**(7) random letters** (ו ר ה ג **= V R H G)**
	**(8) basic consonantal spelling without vowels** (נ **= N)**
	**(10) partial consonantal spelling with vowels** (נ ל א **= N L A)** **(A) is a vowel 'א'The letter**
	**(13) advanced consonantal spelling with vowels** (נ מ ל **= N M L)**
	**(15) conventional writing** (נ מ ל ה**)**

Figure 1: *illustrations of different writing levels*

[1] Note that Hebrew words are spelled by International Phonetic Alphabetic symbols.

Letter naming

Each child was asked to name the 27 letters in the Hebrew alphabet, presented randomly on 27 cards. For each card, the child was asked: "Which letter is this?" The sum of correct letter names determined the *letter naming* score (α = .94).

Phonological awareness

Phonological awareness was assessed by two tests, each pertaining to a separate list of 15 monosyllabic words. One test referred to the initial phonemes and the other to the final phonemes. On the initial phoneme test, children were asked to derive the opening phoneme of each word, for example: "What is the opening sound of *kor* [coldness]?" On the final phoneme test, the same question was asked with reference to the final phonemes. Responses to both tests were scored on a 4-point scale: (1) no answer or incorrect answer; (2) partial answer comprising the retrieval of a sub syllable (e.g., "*kor* starts with */ko/*"); (3) retrieval of the correct initial phoneme pronounced with a vowel ("*kor* starts with /*ka*/") or retrieval of the correct letter name "*kor* starts with a Kaf (a letter name);" or (4) correct phoneme retrieval ("*kor* starts with /k/"). The mean score on each test determined the score on initial phoneme and on final phoneme. The mean score across the two tests served as the *phonological awareness* measure (α = .98).

MATERNAL PEDAGOGICAL BELIEFS QUESTIONNAIRE

The pedagogical beliefs questionnaire included 16 statements that referred to two aspects of early literacy: the level of literacy knowledge expected from kindergartners in terms of letter naming, phonological awareness, and word writing; and the level of literacy involvement and mediation expected from kindergartners' parents. Sample statements included: "Parents should teach their kindergartners the alphabet"; "A mother who tells her child that a word, let's say *kadur* [ball], starts with the sound /*k*/ is overloading her child with unnecessary information"; "A kindergartner should be able to write some of his/her family members' names" and "A kindergartner doesn't have to know the alphabet yet." Half of the sentences were phrased positively and half negatively to prevent set responses. Mothers rated these 16 statements in their homes, along on a 5-point scale ranging from *I do not agree at all* (1) to *I totally agree* (5). The mean score across the 16 statements (after reversing the negative questions) served as the *maternal pedagogical beliefs* score. Higher scores indicated a stronger belief that the child should know more in literacy and that the mother should be more involved in literacy mediation (α = .82).

MATERNAL ESTIMATION OF CHILDREN'S EARLY LITERACY

To tap the mothers' familiarity with their children's early literacy skills, mothers completed the same three literacy tasks at home that their children completed in the kindergartens. Each mother completed the word writing, letter knowledge, and phonological awareness tasks twice, once for each twin. Each mother was asked to complete each task as if she were each of her children, and she received all the directions and examples that her children received. The scores for the *mothers' estimations* were calculated according to the above scoring for the three children's early literacy scales. Reliabilities for word writing, letter knowledge, and phonological awareness were α = .99; α = .95; and α = .97, respectively.

MATERNAL WRITING MEDIATION

To tap the mother's writing mediation to her twins, two mother-child writing interactions were videotaped at home, one for each twin, on the same afternoon. The mother mediated each of her twin's writing of four word pairs. Similarly to the word writing literacy task that children completed in the kindergartens, here each mother-child dyad received four cards that each displayed identifying drawings of two nouns. The word pairs for the mother-child writing interactions at home differed from the pairs written independently by the children and differed for the two twins. For example, out of the following four pairs, a different pair was used for each of the twins' independent writing, and a different pair was used for each of the twins' writing with the mother: (a) *zakɛn – zkɛna* [old-man – old-woman] 'זקן-זקנה'[2]; (b) *yɛlɛd- yalda* [a girl – a boy] 'ילד-ילדה'; (c) *nasix - nɛsixa* [prince – princess] 'נסיך –נסיכה'; and (d) *xatul-xatula* [a male cat – a female cat] 'חתול –חתולה'. The videotapes' analyses yielded four *task-specific* mediation measures: grapho-phonemic mediation, printing mediation, demand for precision, and reference to orthography. The analyses also yielded four *general* mediation measures: atmosphere, cooperation, task perception, and reinforcements.

Task-Specific Mediation Measures

Grapho-phonemic mediation

This scale reflected how the mother mediated the child's segmentation of a word into its sounds and the child's retrieval of the required letter for each sound when attempting to represent an oral word in writing (Aram & Levin, 2001, 2002). Mediation of each letter ($N \sim 30$) received a separate score because mothers sometimes used different strategies for different letters in the same word. An 8-point scale emerged: (1) Mother refers to the word as a whole, saying the word and then either writing it down herself or writing a model and letting the child copy it; (2) Mother refers to the word as a sequence of sounds, uttering the sequence (*mɛ-la-fɛ-fo-n*, [cucumber]) and then writing the whole word down herself or writing a model and letting the child copy it; (3) Mother refers to the word as a sequence of letters, uttering the letter names while writing the whole word down herself or writing a model for the child to copy; (4) Mother says the word and then dictates the letters one by one to the child; (5) Mother retrieves a phonological unit (syllable, subsyllable, or phoneme) and immediately dictates the required letter name; (6) Mother retrieves a phonological unit and encourages/helps the child to link this unit with a letter name; (7) Mother encourages/helps the child to retrieve a phonological unit and to link it with a letter name; and (8) Mother encourages the child to go through the whole process independently while supporting the child along the steps. Thus, the encoding process included segmenting the word into its sounds, isolating a sound, and connecting a segmented sound with a letter. The average across the 30 letters for the eight words served as the *grapho-phonemic mediation* score, with higher scores indicating a higher level of maternal mediation. Higher level of mediation meant that the mother supported her child's own fuller encoding process for the retrieval of more letters ($\alpha = .97$). The appendix presents two examples of mother-child dialogues. Sharon's[3] mother demonstrated a higher grapho-phonemic and printing mediation levels, whereas Adam's mother demonstrated lower grapho-phonemic and printing mediation levels.

2 In brackets are the Hebrew words written in Hebrew letters.

3 All names were changed to maintain children's confidentiality.

Printing mediation

This measure assessed the autonomy allowed or encouraged by the mother and accepted or assumed by the child. The printed production of each letter ($N \sim 30$) received a separate score along the following 6-point scale: (0) No production of a conventional letter; (1) Mother writes the letter on her own; (2) Mother holds the child's hand and produces the letter together with the child; (3) Mother writes and the child copies the letter; (4) Mother scaffolds the child in writing the letter; and (5) Child writes the letter on his/her own, usually encouraged by mother (Aram & Levin, 2001). The average across letters for the eight words served as the *Printing Mediation* score, with higher scores indicating more autonomy encouraged by the mother and accepted by the child ($\alpha = .96$).

Demand for precision

This measure assessed the amount of precision the mother demanded from the child in shaping the letters, spacing between them, and writing the words horizontally and approximately in the same size. The demand for precision was assessed for each word on a 4-point scale: (1) low demand, where the mother hardly refers to the outcome, letting the child write freely and accepting the product even if unconventional; (2) moderate demand, where the mother tries to make the child produce the proper letter in the proper position but compromises when the child shows difficulties, accepting a less conventional product; (3) higher demand, where the mother insists that the letters and the words be written accurately and requires corrections if any product is unsatisfactory; and (4) full demand, where mother insists that words be written absolutely conventionally. The average score across the eight words served as the *demand of precision* score ($\alpha = .85$).

Reference to orthography

This measure included maternal references to two aspects of Hebrew orthography: morpho-phonology and medial/final letters. Maternal mediation on morpho-phonology was scored for each word that allowed reference to the number-gender structure, which is highly salient in Hebrew morphology and already emerges in the invented spellings of advanced kindergartners (Levin & Korat, 1993). Maternal mediation on medial/final letters was scored on each word that required a final letter form. Five Hebrew letters have two written forms, medial and final, the latter used only in the last position of a word. The same 3-point scale was used for morpho-phonology and for medial/final letters: (0) no reference; (1) reference without explanation; and (2) reference with explanation. The mean score across those words that allowed reference to orthography rules served as the *reference to orthography* score.

General Mediation Measures

Atmosphere

Atmosphere within the mother-child dyad while writing the words was scored on a 3-point scale as follows: (1) negative ambiance between the mother and the child; (2) neutral ambiance, where the observer received the impression that mother and child felt that a task required completion and should be performed; and (3) warm, contented ambiance, where mother and child were obviously enjoying their dyadic activity. Each word pair was scored, and the average across the eight words served as the *atmosphere* measure, where higher scores indicated a more positive atmosphere ($\alpha = .92$).

Mutuality

The mother's ability to keep her child working on-task and maintain willingness to accept her suggestions, instructions, and directions while writing the words was scored on a 4-point scale as

follows: (1) The child shows clear objection or ignores the mother's suggestion; (2) The child argues with the mother but eventually the mother makes him/her partially accept her suggestion; (3) After negotiation, the child accepts his/her mother's suggestion; and (4) The child simply accepts the mother's suggestion. Each word pair was scored, and the average across the eight words served as the *mutuality* measure (α = .95).

Reinforcements

All maternal reinforcements like "Good," "Very nice," and "You wrote this letter beautifully" were counted throughout the eight words.

Task perception

Mothers' perception of the task was coded as separate (scored 1) or as mutual (scored 2). Perception of the task was coded as separate when the mother either behaved as if the task were her own by becoming very involved and leaving a very small space for the child to contribute, or else she behaved as if the task were the child's by leaving the child to perform the task with hardly any help from her. Perception of the task was coded as mutual when the mother collaborated with the child and gave the impression that the task was a joint one. Each word pair was scored, and the average across the eight words served as the *task perception* score, where higher scores indicated perceptions of more mutuality (α = .91).

DATA COLLECTION

The education department of the Tel Aviv municipality helped locate 35 families with kindergarten-age twins living in central Tel Aviv. These families received a letter about the study and 30 families agreed to participate. Two families dropped out due to illness in the family, resulting in the sample of 28 sets of twins.

Children's early literacy was assessed individually in the kindergartens. The tests were conducted in one session that lasted approximately 30 minutes in the same order: phonological awareness (first phoneme), letter naming, phonological awareness (last phoneme), and then word writing. The experimenter visited the twins' homes for two sessions on separate days within the same week as each other and also within the same week as the session in the kindergartens. In the first session, the experimenter interviewed the mother for her demographic variables and pedagogical beliefs and then asked the mother to estimate both her twins' literacy knowledge. A randomly selected half of the mothers estimated their firstborn first and their second born next, whereas the other half of the mothers estimated their children in the opposite order. In the second session, the experimenter videotaped the mother mediating word writing to each twin separately. A randomly selected half of the mothers first mediated writing to their firstborn twin and then to their second, whereas the other half mediated writing to their twins in the opposite order.

RESULTS

Links between Mothers' Beliefs, Maternal Estimation of their Children's Literacy, Children's Actual Literacy, and Maternal Mediation Measures

In line with the study's first aim, to examine possible links between the three aforementioned possible sources of parental mediation (mothers' pedagogical beliefs, mothers' estimation of their

children's early literacy, and the children's early literacy) and measures of these mothers' writing mediation with their twins, correlations were calculated (see Table 1). As seen on the table, mother's pedagogical beliefs correlated with only one general mediation measure: the atmosphere during the mother-child interaction. Mothers who believed that kindergartners should have more literacy skills and that mothers should be more involved in literacy mediation created a less positive atmosphere during their writing interactions with their children.

Table 1.
Maternal Mediation Measures: Correlations with Mothers' Pedagogical Beliefs, Estimations of Their Children's Early Literacy, and the Children's Literacy Skills (N=56)

		Maternal beliefs	Maternal estimation of child's literacy			Child's actual early literacy skills		
	Maternal mediation measures		Word writing	Letter naming	Phonological awareness	Word writing	Letter naming	Phonological awareness
Task-specific mediation measures	Grapho-phonemic mediation	.03	.68***	.60***	.36*	.82***	.77***	.45**
	Printing mediation	-.06	.58***	.63**	.19	.73***	.83***	.33**
	Demand for precision	-.11	.26*	.30*	.23	.46***	.51***	.23
	Reference to orthography	.08	.25^	.28*	.24	.31*	.37*	.25
General mediation measures	Atmosphere	-.27*	.37**	.24	.20	.31*	.31*	.14
	Mutuality	-.19	.22	.24	.33*	.02	.03	.02
	Reinforcements	-.06	-.12	-.09	-.03	.07	.03	.14
	Task perception	-.16	.08	.04	.01	.02	.07	.11

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

Maternal estimation of her child's literacy skills was related to most of the task-specific mediation measures. Mothers who estimated their children's literacy skills as higher were those who: further helped their children to segment words into their sounds and to retrieve the required letters, allowed the children more independence in printing the letters, demanded more precision, and referred more to the Hebrew orthography. These results were particularly notable for word writing and letter naming.

Regarding the relations between maternal estimation of her child's literacy skills and the more general mediation characteristics measured here, three significant correlations emerged. Positive correlations appeared between atmosphere and word writing as well as between mutuality and phonological awareness. When mothers estimated their kindergartners' literacy skills as higher, the dyad revealed a warmer atmosphere during the interaction and more mutual mother-child relations.Children's actual early literacy skills exhibited similar correlations to those of mothers' estimation of their children's literacy

Predicting Maternal Writing Mediation Measures

After determining the links between the three factors and maternal mediation measures, the study's next aim was to investigate: Do these factors contribute to the prediction of maternal mediation measures beyond one another? Are they similarly linked with the different measures of maternal mediation?

To analyze the separate contribution of maternal pedagogical beliefs, maternally estimated child literacy, and the child's actual literacy level to maternal mediation measures (task-specific and

general), separate fixed-order hierarchical regression analyses were conducted. Maternal pedagogical beliefs were entered in the first step. Maternal literacy estimation and the child's actual literacy level were then entered alternately in the second step, and again, alternately, maternal literacy estimation and the child's actual literacy level were entered in the third step. The criterion variables comprised all the mediation measures (i.e., grapho-phonemic mediation, printing mediation, demand for precision, reference to orthography, mutuality, reinforcements, and task perception). To condense the model, mothers' estimation of the three literacy measures were combined (word writing, letter naming, and phonological awareness; reliability of α = .71 between them) and labeled "maternal literacy estimation." Similarly, the three actual literacy measures were combined (word writing, letter naming, and phonological awareness; reliability of α = .76) and labeled "child's literacy."

Table 2

Summary of Hierarchical Regression Analysis for Maternal Pedagogical Beliefs, Maternal Estimation of Her Children's Literacy, and Children's Early Literacy Skills As Predicting Maternal Mediation Measures (N=56)

	Task-specific mediation measures				General mediation measures			
Steps and variables	Grapho-phonemic mediation	Printing mediation	Demand for precision	Reference to orthography	Atmosphere	Mutuality	Reinforcements	Task perception
1. Maternal beliefs	.00	.00	.01	.00	.07*	.04	.01	.03
2a. Maternal literacy estimation	.48***	.35***	.11*	.10*	.12**	.11*	.01	.00
2b. Child's actual literacy	.67***	.44***	.21***	.13**	.07*	.05	.01	.00
3a. Maternal literacy estimation	.01	.02	.00	.01	.06^	.07*	.06^	.00
3b. Child's actual literacy	.22***	.11**	.10*	.03	.00	.00	.07^	.00

Note. Steps 2a (Maternal literacy estimation) and 2b (Child's actual literacy) alternatively follow Step 1 (Maternal beliefs). Then, Step 3a (Maternal literacy estimation) follows Step 2b (Child's actual literacy), and Step 3b (Child's actual literacy) follows Step 2a (Maternal literacy estimation).
^ $p < .07$; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 2 shows that mothers' pedagogical beliefs regarding early literacy and maternal literacy mediation at the first step contributed significantly only to the atmosphere during the interaction (7%). Maternal literacy estimation contributed significantly on the second step, beyond maternal pedagogical beliefs (see Step 2a), to all of the task-specific measures (grapho-phonemic mediation, printing mediation, demand for precision, and reference to orthography; 48%, 35%, 11%, and 10%, respectively) and to two of the more general mediation measures (atmosphere, 12%, and mutuality, 11%). When entered on the third step, beyond maternal pedagogical beliefs and the child's actual literacy skills (see Step 3a), maternal literacy estimation contributed significantly only to the more general mediation measure of mutuality (7%), and it neared significance in its contribution to atmosphere (6%) and to reinforcements (6%). The child's early literacy, when entered in second step, beyond maternal pedagogical beliefs (see Step 2b), also contributed significantly to all of the task-specific measures (grapho-phonemic mediation, printing mediation, demand for precision, and reference to orthography; 67%, 44%, 21%, and 13%, respectively) and to only one of the more general mediation measures (atmosphere, 7%). When entered in the third step, beyond maternal pedagogical

beliefs and maternal literacy estimation (see Step 3b), the child's literacy level continued to contribute significantly to three task-specific measures (grapho-phonemic mediation, printing mediation, and demand for precision; 22%, 11%, and 10%, respectively). It also neared significance in its contribution reinforcements (7%).

In sum, children's actual level of literacy and maternal estimation of the children's literacy made unique contributions to different aspects of maternal writing mediation, beyond that of maternal pedagogical beliefs and that of each other. The child's actual literacy level constituted a major contributor to the task-specific maternal mediation measures, even beyond mother's literacy estimations. At the same time, maternal literacy estimation constituted a major contributor to the general mediation measures beyond the child's actual level of literacy.

Thus, when studying the possible predictors of maternal mediation, the present study's findings indicate that despite the significant correlations between both (a) mothers' estimation of their children's literacy and (b) children's actual literacy achievements with maternal mediation measures, each revealed a unique contribution to different aspects of maternal mediation. The task-specific measures were better predicted by children's actual literacy achievements, whereas general writing mediation aspects were better predicted by the mothers' estimation of their children's literacy.

Is Mother's Mediation Sensitive to Her Children's Aptitude? Do Mothers Have a Mediation Style?

The third aim of this study examined whether mothers possess a personal mediation style, and, if so, to what extent they employ that style and to what extent they adapt their mediation to their children's literacy levels**.** The twin-based paradigm of this study promoted such an investigation of maternal sensitivity and maternal mediation style. To that end, the original sample of 28 biological twin sets underwent two different matching procedures.

In the first matching procedure, to determine if a mother of twins would mediate more similarly to her twins than would two different mothers to their children who showed the same literacy levels (same divergence) as the twins, 27 "same-divergence" pairs of non-biologically related children were created (2 children could not be matched). In these pairs, each set of biological twins was matched to two unrelated children who exhibited a gap in literacy level that resembled the gap between those twin siblings. In other words, the gap in actual literacy level was calculated between each set of twin siblings (using the combined literacy variable described above), and then that set of twins was matched with two non-twins who showed that same gap in literacy.

For example, Participant #1 scored .48 on literacy and his twin brother (Participant #2) scored .20; at the same time, Participant #21 score was .22 on literacy and Participant #17 scored .48. Therefore, Participant #1 was matched with Participant #21 and Participate #2 was matched with Participant #17 and they became a same-divergence pairs. Both of these two same divergence couples showed approximately the same gap in their literacy scores as Participate #1 (.48) and his twin brother Participate #2 (.20).

In a second matching procedure, to determine whether a mother of twins would mediate more similarly to her twins than would two different mothers to their children who showed an almost identical literacy level to one another, 28 "matched-literacy" pairs were created by matching each child with another child (other than his/her own twin) who showed a similar score on the combined actual literacy measure. For example, both Participant # 13 and Participant #42 scored .78 on the combined actual literacy measure and thus were paired as matched-literacy pairs.

Table 3 presents these three "samples" (biological twins, same-divergence pairs, and matched-literacy pairs) including means, standard deviations, *t*-tests, and correlations for the three early literacy

measures (word writing, letter naming, and phonological awareness). Note that in the two samples where pair members differed from one another on literacy level (the biological twins sample and the same-divergence pairs sample), the child who scored higher appears in the left column and the child who scored lower appears in the right column. Also note that the same-divergence pairs and the matched-literacy pairs refer to pairs of children and their two mothers, whereas the biological twins refer to one mother and her two children.

Table 3

T-Tests and Correlations Comparing Three Samples on Children's Early LiteracyBiological Twins, Same-Divergence Pairs, and Matched-Literacy Pairs

Children's actual early literacy measures	Biological twins (*N*=28)				Same-divergence pairs (*N*=27)				Matched-literacy pairs (*N*=28)			
	Higher scoring twin	Lower scoring twin			Higher scoring child	Lower scoring child			Child A	Child B		
	M (*SD*)	*M* (*SD*)	*t*	*r*	*M* (*SD*)	*M* (*SD*)	*t*	*r*	*M* (*SD*)	*M* (*SD*)	*t*	*r*
Word writing	10.56 (2.74)	8.33 (2.75)	5.19***	.66***	10.68 (2.65)	8.19 (2.73)	4.79***	.50**	9.45 (2.78)	9.44 (3.14)	0.07	.83***
Letter naming	20.14 (6.22)	14.46 (7.68)	5.03***	.65***	20.81 (5.62)	14.00 (7.23)	4.62***	.31	17.39 (6.57)	17.21 (8.43)	0.18	.78***
Phonological awareness	3.10 (0.86)	2.58 (0.99)	3.04**	.55**	2.95 (0.95)	2.74 (0.99)	1.04	.40*	2.93 (0.89)	2.75 (1.02)	0.95	.42*

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

As seen in the table, the biological twins and same-divergence pairs presented fairly similar outcomes regarding means, standard deviations, and gaps between the higher and lower scoring children. The matched-literacy pairs sample revealed very similar statistics for all literacy measures between them, thus validating their matching procedure.

Sensitivity to children's literacy skills

Table 4 presents the means, standard deviations, t-tests, and correlations for the biological twins, same-divergence pairs, and matched-literacy pairs on all the mediation measures, including the task-specific and the more general ones. The t-tests on Table 4 show that when mediating writing, mothers refer to differences and similarities in children's level of literacy, especially in their task-specific mediation measures. The mothers of biological twins mediated most of the task-specific measures at a significantly higher level for their higher scoring twin, with the exception of reference to orthography. In the same manner, in the same-divergence pairs, the mothers of children with higher literacy scores mediated the task-specific measures at a significantly higher level than did the mothers of children with lower literacy scores (again with the exception of reference to orthography). In contrast, for the matched-literacy pairs, no significant t-test emerged. When different mothers mediated writing to children whose literacy scores were similar, mothers did not differ in their task-specific mediation measures.

Table 4

T-Tests and Correlations Comparing Maternal Mediation Measures: Biological Twins, Same-Divergence Pairs and Matched-Literacy Pairs

Maternal mediation measures		Biological twins (*N*=28)				Same-divergence pairs (*N*=27)				Matched-literacy pairs (*N*=28)			
		Higher scoring twin	Lower scoring twin			Higher scoring child	Lower scoring child			Child A	Child B		
		M (*SD*)	*M* (*SD*)	*t*	*r*	*M* (*SD*)	*M* (*SD*)	*t*	*r*	*M* (*SD*)	*M* (*SD*)	*t*	*r*
Task-specific measures	Grapho-phonemic mediation	6.11 (1.27)	5.35 (1.36)	4.86***	.80***	6.20 (1.22)	5.329 (1.25)	4.00***	.54***	5.57 (1.31)	5.80 (1.43)	-0.65	.68***
	Printing mediation	4.58 (0.56)	4.15 (0.71)	3.66***	.54***	4.65 (0.51)	4.11 (0.67)	3.33***	-.02	4.29 (0.67)	4.44 (0.68)	-1.25	.58***
	Demand for precision	3.60 (0.45)	3.26 (0.67)	2.75*	.41*	3.67 (0.48)	3.19 (0.63)	3.20***	.04	3.39 (0.62)	3.46 (0.58)	-0.45	.06
	Reference to orthography	2.01 (0.47)	1.89 (0.52)	1.56	.68***	2.07 (0.43)	1.86 (0.53)	1.48	-.16	1.84 (0.49)	2.07 (0.49)	-1.72	-.02
General measures	Atmosphere	2.86 (0.34)	2.79 (0.44)	0.82	.38*	2.85 (0.37)	2.80 (0.42)	0.45	-.20	2.72 0.49)	2.92 (0.23)	-1.97	.09
	Mutuality	3.22 (0.48)	2.96 (0.49)	3.18***	.55***	3.16 (0.52)	3.02 (0.46)	.96	-.02	3.00 (0.48)	3.18 (0.48)	-1.38	.02
	Reinforce	6.54 (3.17)	7.53 (3.34)	-1.68	.55***	7.02 (2.99)	7.06 (3.54)	-.05	.16	6.54 (3.08)	7.54 (3.42)	-1.15	.00
	Task perception	1.88 (0.30)	1.82 (0.33)	0.96	.62***	1.89 (0.28)	1.81 (0.36)	0.83	-.22	1.91 (0.27)	1.79 (0.3)	-1.58	.15

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

Regarding the more general mediation measures among the three samples, these measures did not appear to be sensitive to differences in children's literacy level (with the exception of mutuality in biological twins). The atmosphere of the interaction, the way the mother perceived the task as separate or mutual, and the amount of reinforcements used by mothers did not differ if the children scored higher or lower on literacy.

Did mothers of biological twins evidence a style of mediation?

The significant correlations on Table 4 indicate that indeed mothers of biological twins possess a mediation style. Despite the differences in literacy level between twins, if a mother mediated on a high level to one twin, she mediated on a high level to her second twin as well, even if the twins scored differently on literacy. This trend emerged across the board, with the task-specific as well as the general mediation measures. A different picture emerged when examining these correlations with regard to the matched-literacy pairs & the same-divergence pairs. In the matched-literacy pairs, the two mothers in each pair mediated similarly to the two children only regarding the grapho-phonemic

and the printing mediation measures, despite the likeness in child literacy level within each pair. In the same-divergence pairs, the only significant correlation appeared in grapho-phonemic mediation, showing that the two mothers in each pair mediated similarly only on this measure.

DISCUSSION

Individual differences in early literacy predict later acquisition of reading and spelling in school (e.g., Shatil, Share, & Levin, 2000). In the realm of early literacy, parental mediation is considered a main prerequisite route to early literacy knowledge and to later literacy achievement (Aram & Levin, 2004). The alphabetic system is complicated; hence, children need adults' mediation in understanding it. The ways in which parents help children develop literacy skills are important and of great interest to researchers, practitioners, policy makers, as well as parents. What are the possible sources of maternal mediation traits? The present chapter studied this important question by exploring the relative role of mothers' pedagogical beliefs regarding early literacy, mothers' estimation of their children's early literacy, and their children's actual early literacy knowledge in predicting maternal writing mediation. Furthermore, the twin kindergartners in this study design permitted an investigation of the flexibility and the consistency of maternal writing mediation. To what extent are mothers sensitive to their twins' literacy level and to what extent do they possess a mediation style that they utilize with both of their twins?

POSSIBLE SOURCES OF MATERNAL MEDIATION

Interestingly, in the present study, maternal pedagogical beliefs were found to be unrelated to the nature of maternal writing mediation. Some previous studies have shown links between mothers' beliefs and their practices (DeBaryshe & Binder, 1994). However, other researchers revealed only weak connections between parents' pedagogical beliefs and their behaviors (Murphey, 1992). For example, Sigel et al. (1992) reported links between parents' stated beliefs and their stated ideas about teaching, but only weak or no relations emerged between parent-reported beliefs and actual behaviors toward children. Studies have mainly investigated the relations between parental beliefs and the frequency with which parents engage in home literacy practices (DeBaryshe, 1995; Lynch, &erson, Anderson, & Shapiro, 2006; Weigel, Martin, & Bennett, 2005). When studying maternal pedagogical beliefs as related to the nature of mothers' writing interactions with their second graders, Korat and Levin (2001) found that mothers did not differ in their pedagogical beliefs, despite the fact that they differed in the types of interactions they had with their children during a writing task. The study presented in the present chapter expands these prior results to encompass kindergartners as well.

Why didn't the expected relations emerge between parental beliefs and the nature of their literacy interactions with their children? Murphey (1992) claimed that finding valid measures to assess parental beliefs is difficult, and, even if such measures were available, parental beliefs are not expressed in one isolated observation but rather in various contexts along children's development.

Nowadays, educators and experts in early literacy and in child development, and even politicians, express their varying opinions internationally regarding the "right" way to promote early literacy. There are voices suggesting that parents ought to teach their children and initiate literacy interactions with them, whereas others strongly assert that parents should not intervene and that early teaching may harm children's literacy development. Parents are exposed to this variety of opinions. It may be suggested that mothers' beliefs are affected by these sometimes contradictory lines of advice. Likewise, Rogoff (1990) stated that parents have become "socially oriented." Perhaps mothers do not

possess their own personal beliefs regarding early literacy but rather swing along in line with the wit the oscillating norms that they absorb from their surroundings. In support of this assumption, mothers' pedagogical beliefs in the present study were close to the center of the scale. It seems that mothers did not hold firm beliefs one way or the other regarding the knowledge expected from their children and their role as literacy mediators.

Unlike maternal pedagogical beliefs, both the child's actual level of literacy and maternal estimation of the child's literacy were significantly related to maternal mediation. Mothers in the present study were aware of their children's literacy, and their writing mediation was related to these estimations. These results corroborated literature regarding parents' familiarity with their children's health and general development (Glascoe, 1999), cognitive development (Miller, 1986), and school performance (Korat, 2004). Moreover, the outcomes of the present study added data regarding specific early literacy aspects in kindergarten. Apparently, parents of middle SES kindergartners are highly involved with their children's literacy activities and, as a result, they generally know their children's literacy level, and they mediate writing to their children accordingly.

Children's early literacy also correlated significantly with maternal mediation. These results showed that mothers were sensitive in their writing mediation to their children's actual literacy level. Interestingly, this sensitivity was relevant only in regard to the task-specific mediation measures. These findings were more pronounced for the twins' results. The *t*-tests revealed that only on the task-specific measures, mothers of twins mediated significantly higher to the higher-scoring twin. In the same-divergence pairs, the mothers of higher-scoring children mediated significantly higher on task-specific measures than did mothers of lower-scoring children. Moreover, different mothers of children who exhibited the same level of literacy (matched-literacy pairs) did not differ significantly in their mediation. It seems that task-specific mediation efforts derived considerably from the child's literacy level. Mothers of twins were sensitive to their children's literacy level, showing awareness of the differences in literacy levels between their twins, and mediating accordingly. The mediation aspects related to the task – grapho-phonemic mediation, printing mediation, demand for precision, and reference to orthography – largely depend on the child's knowledge, to which mothers reacted. Children's zone of proximal development (Vygotsky, 1978) is probably known to parents, and the mothers in this study seem to have been mediating the task-specific measures within the children's zone. According to Rogoff (1990), parental sensitivity involves understanding of the skills and knowledge needed to independently handle the situation and of the course of action needed to promote the child's skill development in a particular situation. To assist her child properly, a mother needs to know both how the specific task could be accomplished and how her child is likely to approach it. The mother's initial model of how to mediate is based on her preconceptions about both the task and the child.

When exploring the sources of maternal writing mediation, the present study suggests that different aspects of the mediation are predicted by distinctive sources. The child's literacy level serves as a major predictor of the task-specific mediation measures (e.g., grapho-phonemic mediation). At the same time, maternal estimation of her children's literacy contributes to the more general mediation measures (e.g., atmosphere).

Maternal sensitivity to the child's literacy was related to the task-specific measures but not to the general mediation measures. The more general mediation characteristics appeared to be unaffected by early literacy differences. They may be more stable and perhaps affected more by other differences between the children. Mothers seemed to hold preconceptions of their children's literacy. These ideas probably leaned on general past experiences; thus, the mother may have entered the writing interaction with more positive or more negative notions about her child's knowledge, which may have affected the general measures like atmosphere and mutuality.

DO MOTHERS POSSESS A MEDIATION STYLE?

The present study highlighted that along with their sensitivity to the child's level, mothers of twins possessed a mediation style. Moreover, mothers' style of mediating writing to her twins was more consistent than the styles of mediation shown by two mothers mediating writing to their two children who were matched to the twins and exhibited the same gaps in literacy level as the twins (same-divergence pairs) or even than the styles of mediation shown by two mothers mediating writing to their children who revealed similar literacy scores (matched-literacy pairs).

Usually, shared and nonshared environmental effects on twins or siblings are inferred and, less often, are observed directly. Researchers have claimed that direct measurement is necessary before firm conclusions can be drawn about shared and nonshared influences (Shonkoff & Phillips, 2002). The methodology of the study presented in this chapter allowed for direct observation of these environmental effects. The videotaped interactions and the matching procedures between biological twins, same-divergence pairs, and matched-literacy pairs provided an opportunity to directly tease apart shared and nonshared environmental effects regarding early literacy and maternal literacy mediation. Twins emerged as different in their literacy levels, and their mothers responded to these differences in their mediation of task-specific measures. At the same time, mothers demonstrated a

mediation style that they employed with both of their twins. Significant correlations emerged between maternal mediation to her two children, across the board, including task-specific and general mediation measures. Mothers who mediated higher to one twin mediated higher to the second twin. For example, a mother who demanded more precision or referred more to orthography (task-specific measures) with one of her twins, did so also with her second twin. The same held true for the general mediation measures; a mother who created a better atmosphere or gave more reinforcements to one of her twins acted similarly with her other twin.

The picture differed considerably among the pairs of children who were not twins and who did not share the same environment. Almost no significant correlations emerged between the two mothers' mediation to same-divergence pairs, whose literacy gap resembled those of the biological twins, or between the two mothers of matched-literacy pairs, who showed similar literacy achievements. Two mothers mediated differently to their children, regardless of their literacy level. The present results corroborate previous studies that reported stability in maternal mediation to siblings. These studies referred to general characteristics of the interaction like mutuality, cooperation, or control (Deater-Deckard & O'Connor, 2000; Dunn, Plomin, & Nettles, 1985) and characteristics of verbal interactions (Haden, 1998; Moore, Cohn, & Campbell, 1997). The study presented here broadened this conclusion of stability across twins to early literacy writing interactions (for further elaboration, see Aram, 2007).

To conclude, parental mediation is crucial to child development. Most people have an abundance of ideas and assumptions regarding parental mediation but not enough scientific information. The present chapter explored the complexity of parent-child teaching interactions and gave comprehensive information on maternal literacy mediation. It provided an in-depth look at three major sources known in the literature to have a bearing on parent-child interaction: maternal pedagogical beliefs, maternal estimation of children's early literacy, and children's actual early literacy skills. The chapter's conclusions support the stance that children's early literacy predicts specific maternal writing mediation traits. That is, during early literacy interactions mothers reveal sensitivity to children's early literacy skills in the measures that are related to the writing task itself (like reference to orthography). This sensitivity is demonstrated when mothers of twins adapt the level of their mediation to each of their children's different literacy levels. Maternal estimation of their children's early literacy is also related to maternal mediation but it predicts the more general mediation measures like atmosphere and mutuality. It may be suggested that these more general characteristics of the interactions are mainly

related to previous interactions of mothers with their children and to their perception of their children as learners. Studying mothers' mediation with their twins showed that beyond their sensitivity to the differences in their twins' literacy skills, they revealed a mediation style that they employed with both of their twins.

Acknowledgments

The study was supported by a grant from the Israel Foundations Trustees (Special Fund for Post-Doctoral Research Grants - No.5). Warm thanks are extended to Sagit Hoshmand for collecting the data and to Dee B. Ankonina for her editorial contribution**.**

REFERENCES

Aram, D. (2002). Joint writing in Hebrew of dictated words versus proper names: Analysis of low SES mother-kindergartner dyads. *Journal of Research in Childhood Education*, 17, 47-61.

Aram, D. (2007). Sensitivity and consistency in maternal writing mediation to twin kindergartners. *Early Education and Development*, 18, 71-92.

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: An Interdisciplinary Journal*, 17, 387-409.

Baker, L., Sonnenschein, S., & Gilat, M. (1996). Mothers' sensitivity to the competencies of their preschoolers on concept-learning task. *Early Childhood Research Quarterly*, 11, 405-424.

Bornstein, M. H. (2001). *Parenting: Science and practice*. 1, 1-4.

Bruner, J. S. (1971). *The relevance of education*. New York, USA: Norton.

Deater-Deckard, K. (2000). Parenting and child behavioral adjustment in early childhood: A quantitative genetic approach to studying family processes and child development. *Child Development*, 71, 468-484.

Deater-Deckard, K. & O'Connor, T. G. (2000). Parent-child mutuality in early childhood: Two behavioral genetic studies. *Developmental Psychology*, 36, 561-570.

Deater-Deckard, K., Pike, A., Petrill, S. A., Cutting, A., Hughes, C. & O'Connor, T. G. (2001). Nonshared environmental processes in social-emotional development: An observational study of identical twin differences in the preschool period. *Developmental Science*, 4, F1-F6.

DeBaryshe, B. D. (1995). Maternal belief systems: Linchpins in the home reading process. *Journal of Applied Developmental Psychology*, 16, 1-20.

DeBaryshe, B. D., Buell, M. J. & Binder, J. C. (1996). What a parent brings to the table: Young children writing with and without parental assistance. *Journal of Literacy Research*, 28, 71-90.

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.

Dunn, J. F., Plomin, R. & Nettles, M. (1985). Consistency of mothers' behavior toward infant siblings. *Developmental Psychology*, 21, 1188-1195.

Evans, M. A., Bell, M., Mansell, J., & Shaw, D. (2001, April). *Parental coaching in child-to-parent book reading: Associations with parent values and child reading skill*. Paper presented in M. A. Evans' (Chair) symposium: Classroom and home experiences and their associations with reading skill development, the Society for Research in Child Development, Minneapolis, USA.

Evans, M. A., Moretti, S., Shaw, D., & Fox, M. (2003). Parent scaffolding in children's oral reading. *Early Education and Development*, 14, 361-388.

Glascoe, F. P. (1999). The value of parents' concerns to detect and address developmental and behavioural problems. *Journal of Paediatrics and Child Health*, 35, 1-8.

Gonzalez, M. M. (1996). Tasks and activities. A parent-child interaction analysis. *Learning and Instruction*, 6, 287-306.

Granot, A. (2003). *Precision in parental estimation of their kindergartners' literacy knowledge*. Unpublished master's thesis, Tel Aviv University, Israel. (Hebrew).

Haden, C. A. (1998). Reminiscing with different children: Relating maternal stylistic consistency and sibling similarity in talk about the past. *Developmental Psychology*, 34, 99-114.

Hunt, J. M. & Paraskevopoulos, J. (1980). Children's psychological development as a function of the inaccuracy of their mothers' knowledge of abilities. *Journal of Psychology*, 136, 285-298.

Keller, H. (2000). Human parent-child relationships from an evolutionary perspective. *American Behavioral Scientist*, 43, 957-969

Keller, H., Scolmerich, A. & Eibl-Eibesfeldt, I. (1988). Communication patterns in adult-infant interactions in western and non-western cultures. *Journal of Cross-Cultural Psychology*, 9, 427-445.

Kermani, H. & Brenner, M. E. (2000). Maternal scaffolding in the child's zone of proximal development across tasks: Cross-cultural perspectives. *Journal of Research in Childhood Education*, 15, 30-52.

Kochanska, G. (1997). Mutually responsive orientation between mothers and their young children: Implications for early socialization. *Child Development*, 68, 94-112.

Korat, O. (2004). Mothers' and teachers' attributions of the academic functioning of Israeli second graders: A comparison between social groups. *Early Childhood Research Quarterly*, 9, 485-501.

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.

Korat, O. & Levin, I. (2002). Spelling acquisition in two social groups: Mother-child interaction, maternal beliefs and child's spelling. *Journal of Literacy Research*, 43, 209-236.

Levin, I. & Bus, A. (2003). How is emergent writing based on drawing? Analyses of children's products and their sorting by children and mothers. *Developmental Psychology*, 39, 891-905.

Levin, I. & Korat, O. (1993). Sensitivity to phonological, morphological, and semantic cues in early reading and writing in Hebrew. *Merrill-Palmer Quarterly*, 39, 213-232.

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, and S. Ransdell (Eds.), The science of writing (pp. 271-293). Mahwah, NJ, USA: Lawrence Erlbaum.

Levine, H. G. (1993). *Context and scaffolding in developmental studies of mother-child problem solving dyads*. In S. Chalklin, and J. Lave (Eds.), Understanding practice: Perspectives on activity and context (pp. 306-326). Cambridge, MA, UK: University Press.

Lightfoot, C. & Valsiner, J. (1992). *Parental beliefs systems under the influence: Social guidance in construction of personal cultures*. In I. E. Sigel, A. V. McGillicudy-DeLisi, and J. Goodnow (Eds.), Parental beliefs systems (pp. 393-414). Hillsdale, NJ, USA: Lawrence Erlbaum.

Lynch, J., Anderson, J., Anderson, A. & Shapiro, J. (2006). Parents' beliefs about young children's literacy development and parents' literacy behaviors. *Reading Psychology*, 27, 1- 20.

Marvin, C. A. & Ogden, N. J. (2002). A home inventory: Assessing young children's contexts for emergent literacy. *Young Exceptional Children*, 5, 2-10.

Maccoby, E. E. (2000). Parenting and its effects of children: On reading and misreading behavior genetics. *Annual Review of Psychology*, 51, 1-27.

Miller, S. A. (1986). Parents' beliefs about their children's cognitive abilities. *Developmental Psychology*, 22, 276-284.

Moore, G. A., Cohn, J. F. & Campbell, S. B. (1997). Mothers' affective behavior with infant siblings: Stability and change. *Developmental Psychology*, 33, 856-860.

Murphey, D. A. (1992). Review: Constructing the child: Relations between parents' beliefs and child outcomes. *Developmental Review*, 12, 199-232.

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. New York, USA: Oxford University Press.

Sénéchal, M. & LeFevre, J. (2002). Parental involvement in the development of children's reading skill: A 5-year longitudinal study. *Child Development*, 73, 445-460.

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

Shonkoff, J. P. & Phillips, D. A. (2002). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC, USA: National Academy Press.

Sigel, I. E., McGillicudy-DeLisi, A. V. & Goodnow, J. J. (1992). *Parental belief systems: The psychological consequences for children*. Hillsdale, NJ, USA: Lawrence Erlbaum.

Vygotsky, L. S. (1978). *Mind and society: The development of higher psychological processes*. Cambridge, UK: Harvard University Press.

Wasik, B. H. & Herrmann, S. (2004). Family literacy: History, concepts, services. In B. H. Wasik (Ed.), *Handbook of family literacy* (pp. 3-23). Mahwah, NJ, USA: Lawrence Erlbaum.

Weigel, D. J., Martin, S. S. & Bennett, K. K. (2005). Ecological influences of the home and child-care center on preschool-age children's literacy development. *Reading Research Quarterly*¸40, 204-233.

Appendix

Two Illustrations of Grapho-Phonemic and Printing Mediation

Case 1 - Sharon: Relatively high grapho-phonemic and printing mediation levels

Sharon's mother mediated Sharon in writing the word *yad* [hand]. The word *yad* in Hebrew is spelled YD, with the letters Yod and Daleth.

Mother: Good, now you have to write *yad*. Which letters do we have in *yad*? *Yad* - what do you hear?

Sharon: *Aleph* [letter name].

Mother: /ya/, /y/ [letter sound]. *Yod* [letter name]. Not *Aleph*, *Yod*, *yad*.

Sharon: [writes the letter *Yod*].

Mother: You wrote *Yod* very nicely by yourself. Now *yad* – what do you hear after the *Yod*?

Sharon: *Daleth* [letter name]?

Mother: Very good, /*d*/ is *Daleth*.

Sharon: So will I do it alone, the way that I know to write Daleth?

Mother: OK, do it your way.

Sharon: [writes a different letter].

Mother: [looks at the letter] *Daleth*, Sharon, like in the word *kad* [jar].

Sharon: Ah, *Daleth*. The first or the second letter in *kad*?

Mother: The second.

Sharon: [writes the letter Daleth].

Case 2 - Adam: Relatively low grapho-phonemic and printing mediation levels

Adam's mother mediated Adam in writing the word zakɛn [old man] spelled in Hebrew ZKN, with the letters Zayin, Kuf, Nun.

Mother: I will write for you and you will copy.

Adam: I don't want to. I know myself.

Mother: [writes the word on a paper and puts it in front of Adam]. Write *zakɛn* like this. Do you see Adam, *zakɛn*? You have to be more cooperative. Copy it like this.

Adam: I want to do it alone.

Mother: Copy it!

Adam: [copies the word].

Mother: [looks at him while he writes and utters the letters' names]. *zakɛn*, *Zayin*, *Kuf*, *Nun* (letter names).