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Mother-Child Joint Writing and Storybook Reading:

Relations with Literacy Among Low SES Kindergartners

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Abstract

Maternal mediation in joint writing was compared to storybook reading in terms of their relations with emergent literacy, among kindergartners in a low SES population. Joint writing was examined by dyadic writing. Storybook reading was assessed by the storybooks recognition. Child's literacy was measured by word writing and recognition, phonological and orthographic awareness. Kindergarten teachers ranked the children's verbal, graphic and mathematical abilities. After partialling out home environment measures, and storybook reading, maternal writing mediation explained added variance of word writing/recognition and phonological awareness. Storybook reading explained added variance of verbal ability above home environment and maternal writing mediation. Mediation in joint writing is linked to reading and writing acquisition, and storybook reading is related to verbal abilities.

Mother-Child Joint Writing and Storybook Reading:
Relations with Literacy Among Low SES Kindergartners

This study investigates the nature of maternal mediation in joint writing with their kindergarten-age children, and compares the relations of joint writing and of storybook reading with emergent literacy. Parental mediation, through which children are introduced to the written system and the written language in their home environment, constitutes a central factor in the development of early literacy (Hiebert & Adams, 1987; Rogoff, 1990). Mediation comprises an active process that takes place in a sociocultural setting (Wertsch, del Rio & Alvarez, 1995). Mediated learning is experienced when the environment is mediated to the child by a person who takes an active role in making components of the environment compatible with the child's conceptions (Feuerstein, 1980). Children share with their parents a variety of literacy related activities that may enhance the children's literacy skills: family conversations, rhyming games, reading environmental print, storybook reading, joint writing, playing with letters, and watching educational TV programs. However, studies of parent-child literacy related activities have focused mainly on joint storybook reading as a context that promotes literacy (e.g., Allison & Watson, 1994; Bus, van IJzendoorn, & Pellegrini, 1995; Neuman, 1996; Scarborough & Dobrich, 1994; Sénéchal, 1997).

Programs have been developed to induce caregivers, especially from low SES, to read more to children and to encourage them to be active listeners (e.g., Karweit & Wasik, 1996; Whitehurst et al., 1994). A position paper issued by the International Reading Association and the National Association for the Education of Young Children (1998), regarding the appropriate practices for promoting literacy, declares: "the single most important activity for building these understandings and skills essential for reading success appears to be reading aloud to children (p. 198)".

A meta-analyse (Bus, et al., 1995) and a review (Scarborough & Dobrich, 1994) pertaining to the relationship between parent-child joint reading and the development of literacy conclude that joint reading reliably accounts for about 8% of the variance in children's literacy. However, Bus et al. (1995) concluded that joint book reading is very productive, whereas Scarborough and Dobrich (1994) raised doubts as to its unique importance.

The nature of the transactions involved in joint storybook reading may help to clarify the possible limitations of this activity as a context for promoting literacy. Joint reading rarely focuses on letter knowledge or on the reading process itself (Phillips & McNaughton, 1990; Scarborough & Dobrich, 1994). Instead, parents dwell at length on the illustrations (Shapiro, Anderson, & Anderson, 1997), expose children to the conventions of books (Sulzby & Teale, 1991), and clarify word and story meaning (Hale & Winkeckler, 1993). Thus, the experience of joint storybook reading is primarily linguistic: "Children may talk about the pictures, retell the story, discuss their favorite actions… . It is the talk that surrounds the storybook reading that gives it power, helping children to bridge what is in the story and their own lives" (IRA and NAEYC, 1998, p. 199).

However, the basic skills of letter knowledge and grapheme-phoneme mapping are significant for the acquisition of reading and writing (e.g., Adams, 1991; Muter, Hulme, Snowling, & Taylor, 1997; Naslund & Schneider, 1996; Shatil, Share, & Levin, 2000). These skills may be promoted through other joint literacy related activities with young children.

The present research compares mother-child collaborative writing with storybook reading. Storybook reading occurs in many homes on a routine basis, often at bedtime, whereas writing interactions take place more sporadically and at different

times of the day. Observations in homes have revealed that children pretend to write, invent spellings, and question their parents on what they write, and that parents utilize opportunities to explain the spelling of words (Baker, Fernandez-Fein, Scher, & Williams, 1998; Bissex, 1980; Burns & Casbergue, 1992; Gundlach, McLane, Stott, & McNamee, 1985; Hall, 2000; Teale, 1986; Tudge & Putnam, 1997).

Little is known, however, about the nature of joint writing and its contribution to emergent literacy. DeBaryshe, Buell, and Binder (1996) observed kindergartners writing a letter, both alone and with their mother's assistance. Almost all the mothers helped their child use conventional spelling in the dyadic condition, irrespective of the child's independent spelling level. Nevertheless, qualitative analysis revealed that the mothers used different mediation strategies, in accordance with the child's independent writing level. In explaining the relations found between maternal mediation and children's independent writing level, however, DeBaryshe et al. did not address the possibility that mothers may contribute to their children's literacy. Sénéchal, LeFevre, Thomas, and Daley (1998) investigated among middle-to-high SES families, the effects of storybook reading compared to parental report of teaching reading and writing, on kindergartners' literacy. No correlation emerged between storybook reading and parental teaching. Moreover, storybook reading was found to predict oral language, whereas parental teaching predicted written language skills.

In the present study, parental teaching behaviors refer specifically to writing mediation, which was assessed through direct observations of mother-child joint writing at home among low SES families. Children from a low SES display a lower level of emergent literacy (e.g., Levin, Share, & Shatil, 1996; Smith & Dixon, 1995; Whitehurst & Lonigan, 1998). Although these children are at a higher academic risk, little is known about their acquisition of literacy (e.g., Whitehurst & Fischel, 1999).

Substantial variations have been found in low SES populations in the number of books and other literacy related materials in the home, and the amount of parental engagement in literacy (e.g., Bus et al., 1995; Taylor & Dorsey-Gaines, 1988; Teale, 1986). In analyzing the relations between emergent literacy and maternal mediation in joint writing on the one hand, and storybook reading on the other, we therefore controlled for home environment measures.

Our study examined the following questions: Does the quality of maternal mediation in joint writing on the one hand, and joint storybook reading (Title Recognition Test) on the other, predict the child's emergent literacy skills, beyond home environment measures? Do they explain the same variance in kindergartners' skills, or does each factor add uniquely to the prediction? Furthermore, in order to assess whether storybook reading (Title Recognition Test) and the quality of mediation in joint writing are related specifically to literacy, we also tested other competencies, i.e., mathematical and graphic ability, with the expectation that no relations would be found with the literacy related activities.

Method

Participants

The participants consisted of 41 mothers and their children (19 boys and 22 girls) with an average age of 5 years and 8 months ($\underline{M}$ = 69.59 months, $\underline{SD}$ = 2.14), who resided in an Israeli development town. "Development towns" comprise poor, peripheral settlements characterized by a low SES in comparison to the general population of Israel – in terms of education, occupation, and standard of living. In the studied township (pop. 19,500), about 25% of residents were treated by the local welfare services. The children were recruited from seven neighborhoods representing the town's SES range. All kindergartens followed the same curriculum.

Most of the families (38) were intact. The average number of children per family was 3.32, higher than the national average of 2.20. All parents were educated in Israel. The average level of parental education, 12 years in school for the mothers and 11 for the fathers, was lower than the national average of their cohort (13 years). About 27% of the mothers and 51% of the fathers did not complete high school (i.e., under 12 years of schooling). For mothers and fathers, respectively, 24% and 12% completed vocational high school, 27% and 10% regular high school, 10% and 20% vocational courses beyond high school, and 12% and 2% college. None of the mothers and two fathers graduated from a university, in comparison with 23% of their Israeli cohort. As to employment, 12% of the fathers were unemployed, and 34% of the mothers were housewives. As to level of professional qualification, 10% of the fathers and 39% of the mothers were unskilled. The rate of unemployment in this town was 1.5 times higher than the national rate (National Center for Statistics, 1996).

Measures

The study included measures of mother-child activities (joint writing and storybook reading), child's emergent skills (based on tests and teacher evaluations), and measures of home environment (SES and games and literacy related materials).

Mother-Child Activity: Joint Writing

Videotapes of mothers guiding their children in two writing activities served as the basis for measuring maternal mediation in joint writing. Whereas storybook reading in this study was measured quantitatively, joint writing was assessed qualitatively due to the difficulty in obtaining reliable quantitative measures. Joint writing, unlike joint reading, appears sporadically and in different forms during daily activities, and not as a distinct ritual. Parents may be less aware of writing mediation, and hence unable to provide a valid estimation of the amount and nature of their joint

writing activities (Sénéchal et al., 1998). As joint writing thus appears to be a natural activity, we assumed that each mother had her own approach to writing mediation, which could be captured by observing the mother and child writing jointly.

Two mother-child joint writing activities were videotaped. One was a structured activity on which the mother guided her child's writing of four pairs of dictated words (a total of 30 letters). The dyad was presented with four cards, each of which displayed visual illustrations of two nouns (e.g., cucumber – carrot, 'mɛlafɛfon – gɛzɛr'). (Standard spelling, displayed by capital letters, is MLPPON – GZR.) The other was an unstructured activity on which the mother guided her child's writing of a list of guests to be invited to the child's imaginary birthday party. The mother and the child discussed their guest list and whom they wanted to invite. The majority of the names were initiated by the child (M = 7.10, SD = 3.20), and the minority by the mother (M = 2.10, SD = 2.30). The total number of guests' names on these lists ranged from 4 to 15, M = 9.3, SD = 2.8 (a mean of 22 letters). Note that Hebrew words are written with relatively few letters because vowels are often unmarked, and typical Israeli names are short. To assess maternal mediation in joint writing, videotapes were analyzed for two maternal components: (a) grapho-phonemic mediation and (b) mediation of orthographic rules.

Maternal grapho-phonemic mediation. To examine the mother's interventions that potentially promoted her child's understanding of the written system, our scale assessed the level of mediation that the mother used in guiding her child's attempts to write orally presented words. Mediation comprises a process whereby the expert guides the novice in solving a problem, thus introducing gradual changes in the novice's conceptions of the problem's space (Rogoff & Wertsch, 1984). The joint mother-child grapheme-phoneme encoding

process included segmenting the word into sounds, connecting a segmented sound with a letter, retrieving the letter's shape, and printing it. The earlier the step in the grapho-phonemic process that the mother encouraged her child to carry out, the more complete was the process that the child underwent, and, hence, the higher the score was on mediation. The mediation of each letter, within the words that were written, was considered as an event and was analyzed and scored separately. The researchers viewed the videotapes, paused the tape after each letter that was written, and scored maternal level of mediation for that letter. Note that the score reflected the mother's original mediation level, even when the child needed more assistance in writing a specific letter. The following 6-point scale emerged from analyzing mother-child joint writing protocols:

1. Mother wrote down all the letters of the word for the child. Example: The boy sat on his mother's lap holding a pencil. She held his hand, murmured the word to herself, and wrote the word by leading his hand. The child looked at his mother and at the written word.

2. Mother wrote down all the letters of the word as a model for copying. Example: The mother wrote the word silently. The child copied the word beneath the mother's model, looking at her mother for reassurance after printing each letter.

3. Mother dictated a letter. Example of writing N in '<u>zaken</u>' (old man):
Mother: Now, write Nun (last letter name). (The child wrote the letter after getting some help regarding its shape.)

4. Mother retrieved a phonological unit (syllable, sub-syllable or phoneme) and immediately dictated the required letter name. Example of writing R in '<u>gɛzɛr</u>' (carrot):
Mother: <u>gɛ-zɛ-r</u>, /rrr/, like at the end of <u>ʃaxar</u> (name) (stressing the last phoneme).

It's Rɛiʃ (final letter name). (The child wrote it down.)

5. Mother retrieved a phonological unit (syllable, sub-syllable, or phoneme) and encouraged/helped the child to link this unit with a letter name. Example of writing P in 'mɛlafɛfon' (cucumber):

Mother: /mɛ-la-fɛ/ /fɛ/ /fɛ/. What is it?

Child: Bɛt? (letter name).

M: No. Bɛt sounds as /bɛ/ and /vɛ/ (letter that stands for /b/ or /v/).

C: Pɛi? (letter name).

M: Right. Pɛi is for /pɛ/ and /fɛ/.

6. Mother encouraged/helped the child to retrieve a phonological unit (syllable, sub-syllable, or phoneme) and to link it with a letter name. Example of writing Z in 'gɛzɛr:'

M: What do you hear next? Listen carefully to the sound.

C: Ze.

M: How do we write it?

C: Zayin? (letter name)

M: Great!

To support the ordinal nature of this scale, three independent judges read the introduction to the scale and the description of the levels with their examples. They were asked to order the levels, randomly presented, from lowest to highest. These judges were chosen because they are leading professionals in research and practice of emergent literacy in Israel. All three independently ordered the levels according to the order in the scale.

Inter-judge reliability of two independent judges was computed on the scoring of the mediation of each letter in eight protocols (four structured activities

and four unstructured activities) produced by 20% of the sample – four boys and four girls randomly selected – resulting in a highly significant Kappa of .91.

For each of the two activities (structured and unstructured), the mediation of each letter was scored, and an average score was computed across all of the letters for that activity. A comparison between the average maternal mediation scores for the two activity types revealed no differences between structured and unstructured activities ($t = -1.13$, $p > 0.05$). The correlation between the scores obtained on the two activities was high ($r = 0.88$, $p < 0.001$). Thus, the maternal grapho-phonemic mediation score was computed by averaging across the two activities.

Maternal mediation of orthographic rules. Maternal mediation of two aspects of Hebrew orthography was coded: (a) morpho-phonology and (b) 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 letterform. Five Hebrew letters have two written forms, medial and final, the latter used only in the last position of a word. Kindergartners learn to name and print medial before final letters (Levin, Patel, Margalit, & Barad, in press). The same 3-point scale was used for morpho-phonology and for medial/final letters: no reference to number-gender structure or medial/final letter differentiation (0); reference without explanation (1); reference with orthographic explanation (2). The inter-judge reliability of two independent judges on the mediation scores of four randomly selected children (on the two writing activities) was found to be Kappa = .91. The morpho-phonology score and the medial/final letters' score were entered into a reliability analysis, Cronbach α =

.78. The mean score across the two variables served as the maternal mediation of orthographic rules score.

The levels of grapho-phonemic mediation score and of orthographic rules score were converted to z scores and entered into a reliability analysis, Cronbach α = .85. Their mean z score served as maternal mediation in joint writing score.

Mother-Child Activity: Storybook Reading

Storybook reading was assessed by two measures of recognition of children's storybooks: one reported by mother and one reported by child. We assumed that mothers who read more frequently to their children, and that children who were read to more frequently, would both recognize more children's storybooks (Stanovich, 1993). Unlike self-report questionnaires, the storybook exposure measure seems unbiased by social desirability; yet it appears sensitive to individuals' actual exposure to books. This measure has been shown to be reliable and valid and to predict language and literacy better than traditional self-reports of storybook reading (e.g., Sénéchal, LeFevre, Hudson, & Lawson, 1996; Sénéchal et al., 1998).

We assessed the frequency rather than the quality of storybook reading because it is simpler to measure, and due to the similarity found in predictions of children's literacy by quality and quantity (Bus et al., 1995; Scarborough & Dobrich, 1994). We used both the mother and the child as converging informants because both parties take part in mother-child joint reading. For purposes of this study, the Title Recognition Test (TRT; Stanovich & West, 1989) was adapted to Hebrew. The resulting children's TRT includes 30 titles, 20 of which are recommended popular children's books, and 10 of which are foils verified not to be real titles in library databases. The mothers were presented with this list at home, and were asked to read it and mark the titles they recognized (TRT – M). The children were presented with the same list,

individually, in their kindergarten. The experimenter read it aloud, and the child was asked to indicate which titles s/he recognized (TRT – C). Scores were obtained for both checklists by giving one point for a correct recognition of a title and deducting two points for an incorrect response (i.e., the possible range on each list: -20 to 20).

Child's Independent Literacy Skills: Word Writing/Recognition

Children were asked to write, recognize, and explain their recognition of 16 pairs of words (e.g., elephant – ant). In each of four testing sessions, the following 3-part process was repeated for four pairs: First, in the writing task, the child was asked to write down a pair of words that was simultaneously presented orally by the researcher and visually by a pair of illustrated cards. Second, in the recognition task, the child was shown the same two words presented on a pair of printed word cards and was asked to match the printed word cards with the appropriate illustrated cards. Third, the child was asked to explain his/her printed word recognition.

Each written word was scored on a 9-point scale, adapted from Levin et al. (1996) and consisting of: (1) pseudo letters, (2) random letters insensitive to phonological length, (3) random letters sensitive to phonological length, (4) basic consonantal spelling without vowels, (5) basic consonantal spelling with vowels, (6) partial consonantal spelling without vowels, (7) partial consonantal spelling with vowels, (8) advanced consonantal spelling without vowels and (9) advanced consonantal spelling with vowels. The score on word writing was equal to the sum of the 32 words, with a possible range of 32 to 288, with the higher scores indicating more conventional and accurate spelling. Inter-judge reliability between two independent judges, based on 20% of the sample, was significant (Kappa = .83).

Scores were also given for recognition and explanation. The number of pairs matched correctly determined the recognition score. Explanation scores were assigned

according to four levels: (1) pre-alphabetic reasoning that does not refer to the writing system; (2) rudimentary incorrect alphabetic reasoning that refers to writing, such as noting letter names, but involves an erroneous application such as the incorrect naming of a letter; (3) partial alphabetic reasoning that refers to writing but involves both correct and incorrect applications; and (4) correct alphabetic explanation. The score on explanation was averaged across the 16 pairs of words. Inter-judge reliability, based on 20% of the sample, was significant (Kappa = .86).

The child's scores on writing, recognition, and explanation were converted to z scores and were entered into a reliability analysis, Cronbach α = .93. The mean of these three z scores served as the child's word writing/recognition score.

Child's Independent Literacy Skills: Phonological Awareness

Phonological awareness was measured by two tests we developed, each including 20 monosyllabic word pairs. One test referred to the initial phonemes (e.g., bat – bul); children were asked if the initial sounds of the two words were similar or different. On the second test, of final phonemes, children were asked the same question with reference to two words' final sounds (e.g., xum – yam). The correlation between the test scores was, $r = .66$ $p < .001$. The final score on child's phonological awareness was determined by the percentage of correct responses, averaged across the two tests. This task is a relatively easy test of phonological awareness and thus appropriate for kindergartners of low SES (Adams, 1991, p. 80).

Child's Independent Literacy Skills: Orthographic Awareness

We adapted the test of orthographic awareness developed by Olson, Kliegl, Davidson, and Foltz (1985) to Hebrew. The test consisted of 19 pairs of graphic items, each containing one printed word and one non-word comprised of a mixture of Latin and Hebrew letters, numerals, or the illegal repetition of letters. Children were

asked to select the printed word and to explain their choice as to why one item in the pair was acceptable as a written word in Hebrew and the other item was not. The test provided two scores, one for the number of items correctly selected and one for the number of selections correctly explained. Explanation was scored as correct if the child referred in his/her explanation to the relevant orthographic characteristic (e.g., "one letter is not a word"). These scores were converted to z scores and were entered into a reliability analysis, Cronbach $\alpha = .77$. Their mean z score served as the child's orthographic awareness score.

Kindergarten Teachers' Evaluations of Children's Emergent Skills

Teachers of young children are considered a reliable and valid source of information on their students' competencies, as their knowledge is accumulated by observing the children engaged in various activities over time. (e.g., Enz & Vukelich, 1997; Merrell & Holland, 1997). The kindergarten teachers were asked to rank all the children in their class (including those in the sample), from most to least competent, in three domains: verbal ability, mathematical ability, and graphic ability. Whereas verbal ability is related to literacy, mathematical and graphic abilitie were included as controls, as we did not expect storybook reading or joint writing to predict them. This rating procedure was found productive when previously administered with teachers of young children (Levin et al., 1997; Newman, Noel, Chen, & Matsopoulos, 1998).

A brief description of the content of each domain was printed on a card. Verbal ability referred to vocabulary, syntax, and conversation; graphic ability to drawing, copying shapes, and human figure drawing; and mathematical ability to counting, number recognition, and understanding basic mathematical facts.

With the researcher's assistance, the children's names were printed on cards, and the teacher was asked to perform three Q sorts according to a normal curve (once

per domain). For each domain, the teacher first sorted all the names into five groups including 7%, 23%, 40%, 23%, 7% of the class, from the most to the least competent group. Then she ranked the cards within each group in descending order, thus arranging all her students from low to high in each domain.

Measure of Home Environment: SES

SES was assessed on the basis of parents' education, professional qualification, current occupation, and a ranking of the family's residential area. Parental education was measured on a 10-point scale ranging from 0 (no schooling) to 9 (academic education). The mean scores and standard deviations for mothers' and fathers' level of education were M = 5.32, SD = 1.72 and M = 4.60, SD = 2.16 respectively. Professional qualification and current occupation were assessed on a 5-point scale adjusted for our low SES sample. Both professional qualification and current occupation were assessed because the studied families live in the periphery, where the rate of unemployment is relatively high and people's occupations are often lower then their professional qualification, thus affecting income. The 50 professions found in the study were ranked from highest to lowest by 13 middle-class adult judges. Inter-judge reliability was, Cronbach α = .98. The professions were then divided into five equal groups according to their average rank. For example, housemaid, and industrial laborer were scored 1; carpenter and locksmith were scored 3; schoolteacher and bookkeeper were scored 5. The mean scores and standard deviations for mothers' and fathers' professional qualification were M = 2.76, SD = 1.70 and M = 2.90, SD = 1.24, respectively. The mean scores and standard deviations for mothers' and fathers' current occupation were M = 2.49, SD = 1.60 and M = 2.77, SD = 1.39, respectively. The residential area was ranked by the head of the municipal welfare department on a 7-point scale of socioeconomic level from relatively the

lowest (1) to the highest (7). The mean scores and standard deviations for residential area were M = 3.85, SD = 2.12. All of the scores for the SES components were converted to z scores and were entered into a reliability analysis, Cronbach α = .92. The mean z score for these seven constituents served as the SES score.

Measure of Home Environment: Games and Literacy Related Materials

Based on the "Stimulation through toys, games and reading materials" subscale of the HOME inventory for ages 3 to 6 (Bradley & Caldwell, 1979), we created an instrument for the observation of games and literacy related materials (GLM) at home. Accompanied by the child and the mother, the interviewer asked to observe each of the items on the following list in the home: ten books, cards for learning numbers, three puzzles, five children's audiocassettes, crayons and pencils, blocks, notebooks, readiness workbooks, and computer. After leaving the home, the interviewer completed a form indicating the presence or absence of each item. Scores ranged from 0 to 9 (M = 5.73, SD = 2.52), and inter-item reliability was found to be Cronbach α = .78.

Procedure

The data concerning mother-child joint activities and family environment were collected in their homes on two afternoons within a few days. The home sessions started with the videotaping of joint writing. In the first session, upon completion of the unstructured writing interaction, the mother completed a demographic questionnaire to assess SES, and the interviewer observed the home and filled in the GLM inventory. In the second session, upon completion of the structured writing interaction, the mother completed the TRT – M.

The data concerning the child's independent literate abilities were collected in the kindergartens in four sessions per child conducted individually within a few days.

In the first session, the child completed the TRT – C. The two phonological awareness tests (initial and final) were administered in the second and fourth sessions, counterbalanced across children. The orthographic awareness test was administered in the third session. Word writing/recognition was tested on each of the four days upon completion of the other tests in the session. Teacher evaluations of children's skills were conducted in the teachers' homes, with the three skill domains counterbalanced.

Results

This section will first present descriptive variables and their intercorrelations. Next, we compare the prediction of the child's emergent literacy by maternal mediation in joint writing and by joint storybook reading, beyond home environment measures (SES and GLM). Finally, we examine whether joint writing on the one hand, and joint reading on the other, explains the same variance in kindergartners' literacy, or whether each adds to the prediction over the other, beyond home environment measures.

On grapho-phonemic mediation, the mothers displayed a large diversity of levels almost across the scale, ranging from 1.21 to 5.37 on a 1-6 scale ($\underline{M}$ = 3.26, $\underline{SD}$ = 1.08). On maternal mediation of orthographic rules, the range was sufficient (0.00 to 1.83 on a 0-2 scale), and the low mean ($\underline{M}$ = 0.65, $\underline{SD}$ = 0.56) indicated mothers' tendency to ignore these rules or to mention them without explanation. As to joint storybook reading, the children's title recognition scores (range: -7.00 to +11.00, $\underline{M}$ = 5.39, $\underline{SD}$ = 3.74) were lower than the mothers' (range: -1.00 to +14.00, $\underline{M}$ = 6.15, $\underline{SD}$ = 3.52). This suggests that mothers were better acquainted with children's book titles than were their kindergarten age children.

The statistics for the child's independent literacy skills and teacher evaluations (see Table 1) indicate that our sample exhibited sufficient variance on these measures.

It should be recalled that each teacher evaluated all the children in her class; thus, the scores for the present sample reflect within-kindergarten assessments unrelated to any SES differences between the kindergarten classes.

----------Insert Table 1 about here----------

The inter-correlations among home environment measures, mother-child joint activities, and the child's emergent skills are presented in Table 2. A substantial correlation was found between the two home environment measures – SES and GLM ($\underline{r}$ = 0.65). Unexpectedly, storybook reading reported by the child was not significantly correlated with storybook reading reported by the mother ($\underline{r}$ = 0.16). Moreover, mother's report of storybook reading was correlated significantly with maternal mediation in joint writing ($\underline{r}$ = 0.57), but child's report was not.

Substantial correlations were found between mother-child joint activities (i.e., joint writing, storybook reading) and both child's emergent literacy and teacher evaluations. Maternal mediation in joint writing correlated substantially with all independent emergent literacy skills, (i.e., word writing/recognition: $\underline{r}$ = 0.82; phonological awareness: $\underline{r}$ = 0.59; and orthographic awareness: $\underline{r}$ = 0.52). Further, maternal mediation in joint writing correlated significantly with verbal (r = 0.37) and mathematical abilities ($\underline{r}$ = 0.40) as evaluated by the teacher, but not with the teacher's assessment of graphic ability.

Child's report and mother's report of storybook reading were significantly correlated with word writing/recognition ($\underline{r}$ = 0.34, $\underline{r}$ = 0.52), with phonological awareness ($\underline{r}$ = 0.35, $\underline{r}$ = 0.39), and with orthographic awareness ($\underline{r}$ = 0.39, $\underline{r}$ = 0.49), respectively. Only child's report was significantly correlated with verbal and mathematical abilities ($\underline{r}$ = 0.40, $\underline{r}$ = 0.35). Mother's report as well as child's report were not correlated significantly with graphic ability.

----------Insert Table 2 about here----------

To compare the links between joint writing and emergent skills on the one hand, and joint storybook reading and emergent skills on the other, the contribution of each activity was calculated after controlling for the variance associated with the environmental variables (SES and GLM) (see Table 3). Separate fixed-order hierarchical regression analyses were carried out with SES in the first step and GLM in the second, and with, alternatively, maternal mediation in joint writing, storybook reading reported by mother, or storybook reading reported by child in the third. The criterion variables were all of the child's emergent skills: the three tests and teacher evaluations. After partialling out SES and GLM, joint writing (in the third step) explained an impressive added variance of word writing/recognition and phonological awareness, 41% and 26%, respectively. It also added significantly to the explained variance of mathematical ability as evaluated by the teacher,11%.

After partialling out SES and GLM, storybook reading reported by the mother added significantly to the explained variance of word writing/recognition, 9%, whereas storybook reading reported by the child added significantly to orthographic awareness and verbal ability, 8% and 15%, respectively.

----------Insert Table 3 about here----------

To examine whether joint writing and reading explain the same variance of child's emergent skills, or whether one adds to the prediction beyond the other, we added a fourth step to the separate hierarchical regression analyses described above. Maternal mediation in joint writing was added in the fourth step after storybook reading reported by child, as well as after storybook reading reported by the mother. Alternatively, storybook reading, as reported by the two parties, was added in the fourth step after joint writing. Analyses of the fourth steps in Table 3 indicate that

after partialling out SES, GLM, and storybook reading as reported by child or by mother, maternal mediation in joint writing still explained a substantial significant added variance of word writing/recognition, 36% and 32%, respectively, and phonological awareness, 22% and 20%, respectively. Further, after partialling out SES, GLM, and storybook reading reported by the mother, joint writing explained 11% of mathematical ability.

After partialling out SES, GLM, and joint writing, storybook reading as reported by the child explained significant added variance of verbal ability, 11%. Mother's report of storybook reading no longer added explained variance to any of the variables. In sum, each of the joint activities, joint writing and joint storybook reading, made a unique contribution to different aspects of emergent literacy skills, beyond that of home environment measures, and that of the other joint activity.

Discussion

This study compared the quality of mother-child joint word writing to storybook reading (TRT) as predictors of emergent literacy among low SES Israeli kindergartners. In contrast to the wide agreement on the exclusively prominent role of joint storybook reading in promoting literacy, we found that another activity - joint writing - was strongly related to basic literacy skills. The child's skills that were predicted by maternal mediation in joint writing, beyond home environment measures, were word writing/recognition (41%) and phonological awareness (26%). Moreover, the ability for joint writing to predict these two skills remained significant even after storybook reading was also partialled out (ranging from 20-36%). Note that the prediction by maternal mediation in joint writing was substantial, and higher than the 8% of prediction attributed to storybook reading (Bus et al., 1995; Scarborough & Dobrich, 1994). This predictive value of maternal mediation in joint writing makes

sense in that it reflects the mother's guidance of her child through the process of encoding, i.e., segmenting the word, mapping a segment to a letter name, retrieving the letter's shape, and printing it. Our results substantiate the importance of joint writing, because the predicted skills (word writing/recognition and phonological awareness) have been repeatedly found to predict reading and writing acquisition in school (e.g., Adams, 1991; Muter et al., 1997; Naslund & Schneider, 1996; Shatil et al., 2000). It should be noted, however, that our correlational data between predictors and predicted variables does not permit any causal interpretation.

Storybook reading was assessed through two informants, via child's and via mother's recognition of children's book titles. Unexpectedly, as we discuss below, the two measures were not intercorrelated. Storybook reading assessed through child's report was found to account for variance in orthographic awareness (8%) and verbal ability (15%), after partialling out home environment measures. The prediction of verbal ability remained significant even after partialling out joint writing. The unique contribution to verbal ability amounted to 11%, in comparison to 8% reported in previous meta-analyses (Bus et al., 1995; Scarborough & Dobrich, 1994). Verbal ability would indeed seem most apt to be promoted by exposure to books, because the nature of the interaction in storybook reading actually focuses on language, more than on the written code (e.g., Hale & Winkeckler, 1993; McNaughton, 1998).

Maternal report of storybook reading added significant explained variance (9%) to word writing/recognition beyond home environment (SES and GLM), in line with the literature. However, this contribution disappeared when the prediction of maternal mediation in joint writing was partialled out as well. Two possible explanations should be considered here. First, the literature on the effect of storybook reading on children's literacy did not take into account its possible common variance with

maternal mediation in joint writing; hence, it may have been overestimated. Secondly, the disappearance of the predictive value of storybook reading may be an underestimation, because we attributed the common explained variance by the two activities – joint reading and joint writing – exclusively to joint writing, by putting it in the third step, before storybook reading.

The lack of a significant correlation between the title book recognition reported by the mother and by her child deserves consideration. It may be the case that children recognize titles less accurately. This conclusion is supported by the findings that mothers recognized more books, and children erred more often in recognizing foils as real books. We suggest that this finding may be related to kindergartners' limited oral word recognition relative to their mothers. Moreover, it should be recalled that mothers based their title recognition on their own reading of these book titles and on rereading them in the TRT. Consequently, they could have remembered the titles as amalgams of the orthographic, phonological, and semantic aspects (Ehri, 1998). In contrast, children heard the titles when read to, and heard them again in the TRT. Their recognition could only have been based on the phonological and semantic aspects. Further, in line with this suggestion, maternal report of storybook reading was correlated with maternal mediation in joint writing, whereas child's report of storybook reading was not. This suggests that the maternal report better reflects storybook reading than does the child's report.

An intriguing, and unexpected, finding of this study was that maternal mediation in joint writing predicted mathematical ability, beyond home environment measures. It is hard to imagine that the quality of maternal writing mediation contributes directly to the development of mathematical skills (see Maclean, Bryant, & Bradley, 1987; Stanovich, 1993). However, writing mediation as assessed here, in

terms of the mother's analysis of the problem's space and her guidance of her child through the steps of problem solving, may reflect the mother's general approach to mediation in academic tasks. Future research might thus do well to examine the generality of parental mediation styles across domains.

In their meta-analysis, Bus et al. (1995) concluded that joint storybook reading has similar outcomes in different SES samples. They claimed, therefore, that despite rather low literacy among low SES families, joint reading is still productive in this population. Our study supports their conclusion and provides a possible explanation. The findings here show that mothers in a low SES sample differ greatly in their quality of mediation, as expressed in joint writing, and that this quality is related to minor SES differences even within a low SES sample.

Several limitations of this study must be kept in mind. First, we used different measures to address joint writing and joint reading. We assessed the quality of the first and the quantity (proxy measure) of the second. Future studies would do well to employ a wider lens by assessing each of these joint literacy behaviors in several ways, including their process and frequency in the home. Second, the usage of hierarchical analysis with four independent variables and a rather small sample of only 41 children may limit the implications from our results.

In sum, we believe that if parents were more aware of the potential importance of joint writing, they would be more sensitive to sporadic occurrences of writing interactions and may initiate more writing activities at home. Since the nature of writing mediation is significant, parents who practice joint writing with their children may through their gained experience possibly learn how to mediate writing fruitfully and thereby enhance important aspects of literacy.

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Table 1

Child's Emergent Skills: Means, Standard Deviations, and Ranges in Percentages (N = 41)

	M	SD	Min	Max
	Independent literacy skills			
Word writing/recognition	53	21	24	99
Word writing	35	21	11	98
Word recognition	60	22	19	100
Explanation of recognition	64	24	27	100
Phonological awareness	66	11	45	92
Orthographic awareness	64	24	15	97
Orthographic word selection	68	21	0	95
Explanation of selection	59	32	0	100
	Teachers' evaluations of emergent skills			
Verbal ability	69	24	11	99
Mathematical ability	68	23	8	99
Graphic ability	67	22	16	99

Table 2

Intercorrelations Among Variables of Family Environment , Mother-Child Joint Activities, and Child's Emergent Skills (N = 41)

Variable	1	2	3	4a	4b	5	6	7	8	9	10
1. SES	--										
2. Literacy related materials	.65***	--									
3. Mediation in joint writing	.54***	.55***	--								
4a. Reading – Child's report	.06	.31*	.28	--							
4b. Reading – Mother's report	.44**	.53***	.60***	.16							
5. Word writing/recognition	.46**	.47**	.82***	.34*	.52***	--					
6. Phonological awareness	.19	.38*	.59***	.35*	.39*	.58***	--				
7. Orthographic awareness	.44**	.54**	.52**	.39**	.49*	.63***	.54***	--			
8. Verbal ability	.21	.22	.37*	.40**	.24	.44**	.44**	.39*	--		
9. Mathematical ability	.17	.23	.40**	.35*	.16	.39*	.36*	.36*	.62***	--	
10. Graphic ability	-.04	.08	.07	.23	.06	.15	-.05	.24	.29	.50***	--

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

Table 3

Summary of Hierarchical Regression Analysis for Joint Writing and Storybook Reading (Reported by Child and by Mother) Predicting Emergent Skills (N=41)

Step and variables	Word writing/ Recognition	Phonological awareness	Orthographic awareness	Verbal ability	Graphic ability	Mathematical ability
	R2 change					
1. SES	0.21**	0.04	0.19**	0.04	0.00	0.03
2. Games and literacy related materials	0.05	0.11*	0.11*	0.01	0.02	0.01
3. Maternal mediation in joint writing	0.41***	0.26***	0.06	0.08	0.00	0.11*
3. Storybook reading (reported by child)	0.06	0.06	0.08*	0.15**	0.04	0.08
3. Storybook reading (reported by mother)	0.09*	0.06	0.05	0.02	0.01	0.00
4. Maternal mediation in joint writing (after reading reported by child)	0.36***	0.22***	0.04	0.05	0.00	0.07
4. Maternal mediation in joint writing (after reading reported by mother)	0.32***	0.20***	0.03	0.07	0.03	0.11*

4. Storybook reading reported by child (after maternal mediation in joint writing)	0.01	0.02	0.05	0.11*	0.03	0.06
4. Storybook reading reported by mother (after maternal mediation in joint writing)	0.00	0.00	0.02	0.00	0.00	0.01

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