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## Beyond Mother Education: Maternal Practices as Predictors of Early Literacy Development in Chilean Children from Low-SES Households

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### ABSTRACT

*Research Findings:* To extend findings that are mainly based on North American studies with English speakers, we studied 989 Chilean mothers from households of low socioeconomic status and their prekindergarten children, posing 2 questions: (a) Do mothers' self-reported practices about literacy development predict early literacy outcomes over and above child characteristics and maternal education? (b) Do these maternal practices mediate the relation between maternal education and these child outcomes? Confirming previous studies, exposure to texts and non-present talk predicted vocabulary, and teaching practices predicted child code-related skills. Contrary to previous studies, exposure to texts also predicted child code-related skills. We also found that maternal practices partially mediated the relation between maternal education and early literacy skills. *Practice or Policy:* Findings suggest the need to target children before prekindergarten with interventions that increase the studied maternal practices and to do so in family, day care, and health care settings with special emphasis on families with incomplete elementary education. The broad effect of exposure to texts on early literacy outcomes and the low social value on reading in Chilean culture suggest that teacher preparation programs need to include ways to engage children in literature as a frequent experience.

Emergent literacy is an approach that views literacy acquisition as a continuous developmental process with roots in both toddlerhood (when vocabulary skills first develop) and the preschool years (when code-related skills such as letter knowledge and emergent writing develop; Snow, Burns, & Griffin, 1998). In addition, this approach suggests that instead of being exposed to formal instruction, children develop such skills by participating in interactions and activities in which literacy is embedded (Whitehurst & Lonigan, 1998). Unfortunately, vocabulary and early code-related skills are less developed in children living in low socioeconomic contexts than in children of higher socioeconomic status (SES), which results in cumulative and pervasive disadvantaging effects (Dickinson, 2011).

According to the bioecological theory of development, early literacy is the result of *proximal processes* (i.e., frequent interactions between children and their significant caregivers), which in turn are conditioned by genetic and other distal characteristics (e.g., characteristics of the socioeconomic context generally; Bronfenbrenner & Morris, 2006). A recent review of studies comparing children with and without shared genetic markers living in the same home revealed that environment explains a greater proportion of the variance in the reading ability of children living in disadvantaged homes than more affluent ones, for which genes explain a greater proportion of the variance. Thus,

genetic potential might be suppressed by a disadvantaged environment but amplified by an advantaged one (Buckingham, Beaman, & Wheldall, 2014). Thus, to formulate culturally appropriate interventions that can help compensate for socioeconomic disparities educators, health professionals, families, and policymakers need first to understand the role proximal processes play in the development of children from low-SES backgrounds within the specific cultural context studied, which in turn can help identify mechanisms that promote early literacy in this population. In sum, this study aims to contribute to understanding these type of processes in a Spanish-speaking Chilean sample from low-SES backgrounds. It differs from studies conducted on Latino samples living in the United States (Farver, Xu, Eppe, & Lonigan, 2006; Farver, Xu, Lonigan, & Eppe, 2013; Schick, 2014), whose children face the challenges of both becoming literate in Spanish as well as English and acculturating to a different set of values, beliefs, and practices.

### Home Literacy Environment (HLE) as a Mediator Within Low SES

Mediation models have deepened understanding of the traditional associations between SES and literacy development by focusing on proximal processes such as maternal literacy-related practices. These practices refer to actual activities in which mothers engage with their children that research has found to be related to their children's development of literacy skills (e.g., reading books, teaching letters, talking about the past). Such mediational models clarify that SES exerts both direct and indirect influences on literacy outcomes, with the implication that maternal practices are an appropriate target when designing interventions.

Studies testing mediation have assessed SES and outcomes in diverse ways. With regard to SES, assessing it with a composite of family income and parent education, Foster, Lambert, Abbott-Shim, McCarty, and Franz (2005) found that family practices mediated the effect of SES on a composite of language and early code skills in a U.S. sample of mainly African American families. Coddington, Mistry, and Bailey (2014) found that family practices mediated the effect of SES on vocabulary in prekindergarten children in Chile, the country of the present study. In contrast, Zadeh, Farnia, and Ungerleider (2010), when exploring the indirect and direct effect of SES on word reading in Caucasian U.S. first graders, advocated using only maternal education as a marker of SES, arguing that maternal education is one of the best predictors of parenting. In the present study, following Zadeh and colleagues, we use maternal education as a marker for SES. Advantages include the fact that (a) it has been shown to be the most important SES component in predicting language development (Hoff, 2013), (b) its variability is typically higher than that of family income in low-SES households, and (c) a single variable identifies groups in need of intervention with greater clarity.

With regard to outcomes, Foster et al. (2005) used a composite approach, melding vocabulary and phonemic awareness. In contrast, based on the HLE principle, which asserts that specific practices might influence specific outcomes (Sénéchal & LeFevre, 2002), in our study we explore mediation by considering vocabulary, letter knowledge, and emergent writing skills separately; this allows us to identify specific outcomes as potential targets for intervention.

In sum, a major goal of the present study is to explore in a low-SES sample whether relevant maternal practices mediate the effect of maternal education on language and early literacy skills. We hypothesize direct and indirect effects of maternal education on literacy outcomes, with indirect effects depending on specific maternal practices. In the following section we explain the rationale for choosing the maternal literacy practices we studied.

### HLE and Early Literacy Skills

Literacy-related practices and resources at home are proximal processes that have been widely studied during the past 40 years. The HLE model posed by Sénéchal and LeFevre (2002, 2014) suggests that informal activities—those for which the code is not the main focus of the interaction

(e.g., book exposure)—contribute to language development but not to code skills (e.g., alphabet knowledge, writing skills). A consistent result was found in a Chilean study, in which number of books at home and frequency of shared reading predicted vocabulary in prekindergarten (Coddington et al., 2014). Moreover, under the HLE model informal and formal activities are considered to be independent practices based on the lack of relation found between them (Sénéchal & LeFevre, 2002, 2014; Sparks & Reese, 2013).

The presumed lack of relation between informal activities and early code-related skills proposed by the HLE model is not clearly supported by previous research. On the one hand, studies using different ways of surveying informal activities (parent self-report; parent knowledge of children's book titles in a checklist; and wider composites including frequency of shared reading, number of books at home, and frequency of library visits) did not find a relation between these activities and code skills. These results were applicable to Caucasian kindergarten or first-grade children living in either middle- or high-SES conditions (Sénéchal & LeFevre, 2002, 2014) and to prekindergarten children from low-SES and a high proportion of non-White (African American or Latino) families (Baroody & Diamond, 2012; Bracken & Fischel, 2008; Storch & Whitehurst, 2001).

On the other hand, a positive relation between frequency of shared reading and code skills was also reported in a meta-analysis of studies including different SES populations (Bus, van Ijzendoorn, & Pellegrini, 1995) and in a more recent study targeting only low-SES households (Sparks & Reese, 2013).

Although less research on this topic has been conducted with Spanish speakers, similarly puzzling results have been found. Not supporting the HLE model, exposure to enriched language through either a checklist of book exposure at home or a mother's book reading style has been related to code skills, but not to language development, in first grade in Chilean high-, middle-, and low-SES groups and in Latino immigrant preschoolers in the United States (Strasser & Lissi, 2009, and Caspe, 2009, respectively). Moreover, the link between book exposure and early code skills has also been found in school settings: A study based on the larger sample from which the present sample was selected showed that the more time teachers were observed reading aloud to children during prekindergarten and kindergarten, the higher the writing skills of children at the end of kindergarten (Mendive, Weiland, Yoshikawa, & Snow, 2016). The puzzling results then suggest that the effect of book exposure on language and code-related skills development might be different in different populations.

Among the relations we explored, and with the exception of Sparks and Reese's (2013) study, formal activities like teaching letters or practicing decoding have consistently been shown to be associated with code skill development longitudinally in low- to high-SES populations (Hood, Conlon, & Andrews, 2008; Sénéchal & LeFevre, 2002, 2014; Storch & Whitehurst, 2001). A meta-analysis of interventions in which parents were trained to do literacy exercises with their children from kindergarten to Grade 3 (Sénéchal & Young, 2008) reached similar conclusions.

The content of language used by parents when talking with their children is another family variable that has been found to predict child language. The positive effect of decontextualized conversations (i.e., talking about and elaborating on events not present or immediate) on vocabulary and on narrative richness has been found in correlational studies (Cote, 2001; Reese, 1995) and has been proven experimentally in groups ranging from 2 to 5 years old and of different ethnicities and SES levels (Jordan, Snow, & Porche, 2000; Peterson, Jesso, & McCabe, 1999; Reese, Leyva, Sparks, & Grolnick, 2010; Reese & Newcombe, 2007). The role of mother-child decontextualized conversations is of particular importance considering evidence that (a) shared book reading is an infrequent practice in low-SES groups in the United States (Raikes et al., 2006) and in the Chilean context as well (Susperreguy, Strasser, Lissi, & Mendive, 2007; Strasser & Lissi, 2009), and (b) interventions that expose children to texts have smaller effects in low-income populations (Mol, Bus, De Jong, & Smeets, 2008). The lesser amount of evidence in favor of mother-child conversation compared with the extensive evidence on shared reading increases our interest in further exploring the relevance of mother-child conversation in diverse populations.

Considering the studies cited, there remains a need to explore further the effects of maternal literacy practices on children from low-SES backgrounds in Chile. The beginning of prekindergarten is the last time when researchers can study the influence of Chilean families alone on children because it is when the majority of children start attending an early care institution (Ministerio de Educación, 2014). Thus, a secondary aim of this study is to explore the role of three maternal literacy practices—exposure to texts, teaching practices, and decontextualized conversation—not only on language development but also on early code skills in low-SES households at the beginning of the prekindergarten year.

Given the correlational nature of our study, included in our analyses are variables—children’s age, gender and previous preschool experience—that have been associated with literacy outcomes (Bracken & Fischel, 2008; Burgess, Hecht, & Lonigan, 2002; Duncan & Magnuson, 2013; Storch & Whitehurst, 2001).

### **Generalizability or Particularity of Current Knowledge?**

Most of the literature cited has dealt with English speakers, primarily from the United States, yet there are many differences with respect to literacy practices between American and Chilean families. For example, a lower frequency of shared reading activities, less time spent by parents reading for pleasure, and less access to children’s books have been reported in Chilean than in U.S. homes (Susperreguy, Strasser, Lissi, & Mendive, 2007). Similarly, access to books is more restricted, books are more expensive, and there are fewer libraries per inhabitants in Chile than in the United States (Strasser, Vergara, & Del Río, 2016). Moreover, mothers of kindergarten children attending public schools in Chile reported buying coloring books from street vendors instead of bookstores, which suggests that children’s access to literature is of lower quality (Strasser & Lissi, 2009). Thus, the lower social value attached to books and reading in Chile makes it reasonable to question whether the same family practices found to be relevant for early literacy skills development in the United States would also apply in the Chilean context. For example, it might be that family interaction processes other than text exposure promote the development of oral language skills or, alternatively, that exposure to texts does not predict children outcomes because of low variability.

The relation between maternal practices and children outcomes can also vary according to the nature of the language being analyzed. For example, there is more consistency in letter-sound correspondence in Spanish than in English (Seymour, 2005), which could imply that some family practices, such as teaching letters and their sounds, might require less effort to achieve similar effects for children learning Spanish compared to English. The study by Farver and colleagues (2013) with bilingual children from Latino immigrant families living in the United States supports the hypothesis that the influences of family practices on early literacy skills are language dependent. They found that, for English measures, exposing children to texts and parent’s frequency of reading predicted oral language skills and that only literacy resources predicted print knowledge. In contrast, for Spanish measures, family practices predicted both print knowledge and oral language, with no additional effect of literacy resources on early literacy skills.

The major factors that led us to undertake the present study included the differences between Chilean and U.S. contexts; the paucity of research on the influences of family practices on early literacy skills in Latin American countries, especially in low-SES families; and the general need for studies that take into account the influence of diverse family practices on different types of early literacy skills. Specifically, we hope to confirm that processes widely reported in the literature play a similar role in a Spanish-speaking Chilean low-SES sample, thereby extending the generalizability of these findings. We address two primary questions:

- (1) Do maternal practices predict early literacy outcomes at the beginning of prekindergarten over and above child age, gender, previous preschool experience, and maternal education?
- (2) Do maternal practices mediate the relation between maternal education and children’s early literacy outcomes at the beginning of prekindergarten?

## Method

### Data Source

The data analyzed for this study came from a randomized controlled trial that was used to evaluate the impact of *Un Buen Comienzo* (“A Good Start”), a professional development program for preschool teachers. *Un Buen Comienzo* was implemented between 2008 and 2011 in prekindergarten and kindergarten classes in 64 public schools located in six low-income municipalities in Santiago, Chile. Municipalities were invited to participate in the program if at least 20% of their students were at or below the poverty level. All schools within each selected municipality were considered eligible for the study. Full sample selection details are available in the impact study (Yoshikawa et al., 2015).

### Participants

The 989 mother–child pairs whose data were analyzed for this report were selected from the second and third cohorts ( $n = 1,611$ ) of the full impact study baseline ( $N = 1,876$  children). (The questionnaire used for the first cohort,  $n = 265$ , did not ask explicitly about maternal education; this was corrected in the questionnaire used for subsequent cohorts.) To ensure comparability with previous studies, we included only cases for which the mother answered the questionnaire ( $n = 1,210$ ; 401 excluded, of which 113 were fathers, 177 other caregivers, and 111 others who did not state their relationship with the child), and of those, only cases that had complete data for the variables of interest to us ( $n = 989$ ; 221 excluded).

Independent-samples  $t$  tests revealed that children in the selected sample scored significantly lower on picture vocabulary ( $M = 18.1$  vs.  $19.0$ ,  $p = .014$ ), but otherwise the selected and nonselected samples did not differ with regard to children’s gender, age, or preschool experience or maternal education ( $ps = .84, .34, .11, .88$ , respectively). Children were about 4 years old on average when the dependent variables were assessed ( $M = 52$  months,  $SD = 3.8$ , range = 36–68), 47% were male ( $n = 464$ ), and 49% had previous preschool experience ( $n = 487$ ).

Of the mothers in the study sample, 11% reported not completing elementary education (<8 years), 14% completed elementary school (8 years), 23% reported incomplete high school (<12 years), 38% completed high school (12 years), and only 14% reported any postsecondary education.

To estimate household income we asked mothers which of eight ranges characterized their monthly income and which characterized the father’s monthly income; 43% gave a range for their income and 76% gave a range for the father’s income (for mother’s income, 6% replied “don’t know” and 51% did not answer or replied “not applicable”; for father’s income, 13% replied “don’t know” and 11% did not answer or replied “not applicable”). (To contextualize these percentages, it is worth noting that 54% of the mothers in this sample were not presently living with their child’s father.) We computed household income as the sum of the mother’s and father’s incomes, estimating each as the middle of the range (see Table 1); 14% of the

**Table 1.** Household Income.

Range	Midpoint	n	%
None given		95	10
1–100,000	50,000	99	10
100,001–150,000	125,000	127	13
150,001–200,000	175,000	192	19
200,001–300,000	250,000	244	25
300,001–500,000	400,000	163	16
500,001–700,000	600,000	42	4
700,001–1,000,000	850,000	20	2
More than 1,000,000	1,250,000	7	1

Note.  $N = 989$ . Range and midpoint are in Chilean pesos per month. Midpoints were used to estimate mother’s and father’s incomes, which were then combined into household income. No range given indicates a response of “don’t know,” did not answer, or “not applicable.”

sample reported mother's income only, 47% father's only, 29% both, and 10% neither (i.e., responses for both mother's and father's income were "don't know," did not answer, or "not applicable"). Household income statistics are given in Table 1; 23% of the sample reported a household income less than 150,000 Chilean pesos, and an additional 10% reported no household income ("don't know," did not answer, or "not applicable"). For comparison, the average national Chilean minimum wage per month between 2009 and 2010 was 162,000 Chilean pesos (approximately \$300 USD). Overall, these data reflect the low SES level of families in this study.

## Procedure

Data for this study came from baseline parent self-report questionnaires and child language and literacy assessments. Parental permission to participate in the study and parent questionnaires were collected by the evaluation team in the participating schools, at parent meetings scheduled by the school, or at home if parents did not attend. Trained research assistants administered the questionnaires and read through the questions on request from parents who had low literacy levels. If parents did not know how to write, the research assistant wrote the answers for them. Questionnaire administration took 75 min on average.

In Chile the school year starts in March and ends in December. Thus, baseline assessments took place between March and May. To give children time to adapt to the classroom setting, pretest assessments began 2 weeks after the start of the school year. Child assessments were conducted at the schools during one or two individual 30- to 50-min pull-out sessions. Assessors built rapport with the child and spent time in the classroom before assessing him or her individually.

All research assistants were Chilean and had a college degree in psychology or sociology; in addition to performing other duties, they were responsible for recruitment and consent procedures. Their training included not just how to administer assessments but also practice administering the assessments (role play with other research assistants and with children from schools not participating in the *Un Buen Comienzo* evaluation). To ensure reliability, a group of doctoral- and post-doctoral-level assessment experts visited the research assistants during the first month of data collection and gave continuous feedback to the assistants and their supervisors to ensure proper test administration.

## Measures

### Parental Measures

Parental measures, adapted for Chile, were obtained from the Family Environment Survey. This questionnaire has been used in Latin American studies (in Costa Rica, Mexico, El Salvador); its language and early literacy measures have shown adequate psychometric properties (Romero-Contreras, 2006). Four variables, used to address the research questions of this study, were derived from the survey:

- (1) *Maternal education*. Maternal education was measured in number of years and grouped into five categories meaningful in the Chilean context (1 = incomplete elementary, 0–7 years; 2 = complete elementary, 8 years; 3 = incomplete high school, 9–11 years; 4 = complete high school, 12 years; and 5 = postsecondary education, 13–17 years).
- (2) *Exposure to texts at home*. This variable was computed as the average of three items: shared reading at home (a 4-point scale—1 = never or almost never, 2 = one to two times per month, 3 = one to two times per week, 4 = three or more times per week—was rescored as 1, 2.33, 3.67, and 5, thereby giving it the same range as the other two items), number of children's books at home (a 5-point scale with categories from 0 to 30 or more books), and number of books at home (a 5-point scale from 0 to 60 or more books). These same

questions have been used in previous studies to assess book exposure at home or shared reading (e.g., Strasser & Lissi, 2009; Froiland, Powell, Diamond, & Son, 2013; van Kleeck, 2004). Cronbach's alpha for exposure to texts at home was .55, and correlations among items were small to medium ( $r_s = .18-.47$ , all  $p_s < .001$ ).

- (3) *Teaching practices*. This variable was computed as the average of two items: helping the child to write, and to read, letters and numbers (4-point scales: 1 = never or almost never, 2 = one to two times per month, 3 = one to two times per week, and 4 = 3 or more times per week). This variable was used previously in a home literacy study in Chile (Strasser & Lissi, 2009). Cronbach's alpha for teaching practices was .84, and the correlation between the items was high ( $r = .73$ ,  $p < .001$ ).
- (4) *Non-present talk*. Non-present talk was computed as the average of three items (or two items for eight mothers who answered only two): talking with the child about a special past event, child hears personal or family stories, and speaking about stories from when the child was a baby (4-point scales: 1 = never or almost never, 2 = one to two times per month, 3 = one to two times per week, and 4 = three or more times per week). Non-present talk was previously used by Cote (2001) to describe discussions between children and adults about experiences and events in the present and the future. Cronbach's alpha for non-present talk was .49, and correlations among items were weak ( $r_s = .22-.28$ , all  $p_s < .001$ ).

Subsequently when we use the term *maternal practices* we mean these last three measures: exposure to texts, teaching practices, and non-present talk.

### **Child Measures**

In addition to children's age when tested, their gender and previous preschool experience, which were collected from parental questionnaires, their language and literacy skills were assessed using the Picture Vocabulary, Letter-Word Identification, and Dictation subtests from the Woodcock-Muñoz Language Survey-Revised Spanish Form (Woodcock, Muñoz-Sandoval, Ruef, & Alvarado, 2005). The Picture Vocabulary subtest measures expressive and receptive vocabulary and requires the child to point to named pictures (scores = 0-58). The Letter-Word Identification subtest is a measure of symbolic learning as well as reading identification skills. It requires the child to match pictures with words, name letters, and read words aloud from a list (scores = 0-75). The Dictation subtest measures prewriting and writing skills (scores = 0-59). In this task, the child writes letters and words from dictation. Reliability coefficients for these three tests ranged from .76 to .97 in the full impact study (Yoshikawa et al., 2015). Raw scores were used in all analyses.

## **Results**

### **Descriptive Results**

Means, standard deviations, and correlations between our variables are given in Table 2. In general, girls scored higher than boys on dictation ( $M = 6.17$  vs.  $5.77$ ,  $p = .002$ ), and were exposed more to the three maternal practices than boys ( $p_s = .012-.024$ ). Children with previous preschool experience scored higher than those with no preschool experience on vocabulary ( $M = 18.6$  vs.  $17.6$ ,  $p < .001$ ) and dictation ( $M = 6.21$  vs.  $5.76$ ,  $p = .001$ ). Older children tended to score higher on outcome measures, and mothers with more education tended to score higher on maternal practices and have children who scored higher on outcome assessments. Maternal practices were weakly to moderately intercorrelated ( $r = .31$  for teaching practices with exposure to texts,  $r = .28$  for non-present talk with both teaching practices and exposure to texts), whereas outcome assessments were moderately intercorrelated ( $r = .46$  for letter-word identification with picture vocabulary,  $r = .40$  for dictation with picture vocabulary,  $r = .41$  for dictation with letter-word identification).

The Woodcock-Muñoz battery allows transforming average scores into age equivalence considering a Latin American sample of reference (Muñoz-Sandoval, Woodcock, McGrew, & Mather,



**Table 2.** Descriptive Statistics and Correlations for Key Variables.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1. Child gender (1 = male)	.47	.50	—									
2. Child age (months; 36–68)	52.3	3.82	.05	—								
3. Preschool experience (1 = yes)	.49	.50	-.07*	.13**	—							
4. Maternal education (1–5)	3.30	1.21	-.04	.01	.09**	—						
5. Exposure to texts (1–5)	2.99	0.92	-.07*	.05	.02	.30**	—					
6. Teaching practices (1–4)	3.39	0.82	-.08*	.08**	.01	.13**	.31**	—				
7. Non-present talk (1–4)	3.17	0.70	-.08*	.01	.03	.12**	.28**	.28**	—			
8. Picture vocabulary (0–33)	18.1	4.47	-.04	.29**	.11**	.24**	.23**	.17**	.14**	—		
9. Letter-word identification (0–17)	5.49	2.46	.02	.18**	.04	.16**	.16**	.17**	.07*	.46**	—	
10. Dictation (0–13)	5.98	2.01	-.10**	.30**	.11**	.12**	.12**	.16**	.05	.40**	.41**	—

Note.  $N = 989$ . Mean for gender is proportion male, and mean for preschool experience is proportion yes. For gender, negative correlations indicate that males tended to score lower; for preschool experience, positive correlations indicate that those with experience tended to score higher.

\* $p < .05$ . \*\* $p < .01$ .

2005). For all measures, the Latin American age of reference is 4 years and 4 months, which was the average age of our sample. The children in our sample obtained better results on prewriting skills compared with vocabulary in relation to the Latin American sample of reference. In letter-word identification, our average score was equivalent to 4 years and 5 months, which was slightly over the Latin American sample of reference of 4 years and 4 months. In dictation, our average score was equivalent to 4 years and 4 months, which was essentially equal to the sample of reference. In picture vocabulary, however, our average score was equivalent to 3 years and 10 months, which was under the value of the sample of reference.

As shown in Table 2, on average mothers reported performing teaching activities connected with reading and writing ( $M = 3.39$  on a 4-point scale) more frequently than exposing their children to texts ( $M = 2.99$  on a 5-point scale). In addition, 58% of our sample reported helping their child write letters and numbers, and 61% reported helping their child read or identify letters and numbers, three or more times per week (the highest frequency on the questionnaire). In contrast, 23% reported never reading to their children, and an additional 18% said they did so just one to two times per month; 10% reported owning no children's books, and an additional 60% reported owning 10 or fewer books.

### Question 1: Maternal Practices Predicting Early Literacy Outcomes

The first research question addressed whether maternal practices (exposure to texts, teaching practices, non-present talk) predicted children's early literacy outcomes over and above child characteristics (gender, age, and preschool experience) and maternal education. Results of hierarchical regressions, one for each child outcome, are shown in Table 3. For all three outcomes, maternal practices accounted for significant additional variation beyond that accounted for by child characteristics and maternal education. Together, all seven predictors accounted for 18%, 9%, and 13% of the variance in picture vocabulary, letter-word identification, and dictation, respectively.

Standardized coefficients for specific variables are shown in Table 4; these indicate associations between predictors and outcomes when the other predictors included in the model were controlled. In general—when we controlled for other variables—the strongest predictors of outcome

**Table 3.** Hierarchical Regression Results: Changes in  $R^2$  at Each Step.

Step	Variables Entered	df	Dependent Variable					
			Picture Vocabulary		Letter-Word Identification		Dictation	
			$\Delta R^2$	p	$\Delta R^2$	p	$\Delta R^2$	p
1	Child gender, age, preschool experience	3, 985	.092	<.001	.034	<.001	.105	<.001
2	Maternal education	1, 984	.051	<.001	.027	<.001	.012	<.001
3	Maternal practices	3, 981	.031	<.001	.025	<.001	.015	.001

Note.  $N = 989$ . The changes in proportion of variance accounted for at each step ( $\Delta R^2$ ) and their associated  $p$  values are from three separate hierarchical regressions, one for each dependent variable. The degrees of freedom and  $p$  values are for the  $\Delta R^2$ s.

**Table 4.** Unstandardized and Standardized Regression Coefficients.

Variable	Dependent Variable								
	Picture Vocabulary			Letter-Word Identification			Dictation		
	B	$\beta$	p	B	$\beta$	p	B	$\beta$	p
Child gender (1 = male)	-.232	-.026	.38	.167	.034	.27	-.375	-.093	.002
Child age	.318	.272	<.001	.108	.168	<.001	.149	.284	<.001
Preschool experience	.478	.053	.070	.010	.002	.95	.223	.056	.066
Maternal education	.653	.176	<.001	.258	.126	<.001	.140	.084	.007
Exposure to texts	.602	.124	<.001	.207	.077	.024	.109	.050	.13
Teaching practices	.334	.061	.053	.366	.121	<.001	.259	.105	.001
Non-present talk	.412	.064	.038	.019	.005	.87	-.045	-.016	.62

Note.  $N = 989$ . The unstandardized and standardized regression coefficients ( $B$  and  $\beta$ , respectively) and their associated  $p$  values are from the last step of three separate hierarchical regressions, one for each dependent variable.

assessments were the child's age and maternal education; in addition, exposure to texts was a significant predictor for picture vocabulary and letter-word identification, teaching practices for letter-word identification and dictation (and marginally for picture vocabulary), and non-present talk only for picture vocabulary.

Unstandardized coefficients (the *B*s in Table 4) show the specific contributions of different maternal practices to child outcomes. Specifically—when we controlled for other variables and highlight statistically significant and marginal results—for each 1.0 increase in exposure to texts, picture vocabulary increased 0.60 and letter-word identification increased 0.21 points; for each 1.0 increase in teaching practices, picture vocabulary increased 0.33, letter-word identification 0.37, and dictation 0.26 points; and for each 1.0 increase in non-present talk, picture vocabulary increased 0.41 points.

### **Question 2: Maternal Practices as Mediators Between Maternal Education and Early Literacy**

The second research question addressed whether maternal practices mediated between maternal education and child outcomes. To test mediation, we again used hierarchical regression. We first regressed each assessment outcome on the three maternal practices (Step 1) and then added maternal education (Step 2). If mediation were perfect, adding maternal education would account for no additional variance and its partial regression coefficient would be 0; if there were no mediation, the partial regression coefficient for maternal education (its direct effect) would be the same as the simple correlation between maternal education and the outcome (its total effect). In fact, for picture vocabulary, letter-word identification, and dictation, respectively, the simple correlations were .24, .16, and .12 (see Table 2), whereas the partial regression coefficients were .18, .12, and .09; thus 24%, 25%, and 27% of the total effect of maternal education on the specific outcome was mediated by maternal practices (for path diagrams, see Figure 1).

Given the partial mediation shown by our results, we deemed it important to analyze how maternal practices varied by maternal education levels (see Figure 2). Exposure to texts, teaching practices, and non-present talk all differed significantly by maternal education level,  $F(4, 984) = 25.7, 6.3, \text{ and } 5.2$ , respectively, all  $ps < .001$ . First, mothers with less education exposed their children to texts significantly less than mothers with more education per Tukey post hoc tests ( $p < .05$ ), except that mothers who completed elementary school and with incomplete high school did not differ, nor did mothers with incomplete high school and who completed high school. Second, mothers with incomplete elementary school scored significantly lower on teaching practices and non-present talk than mothers in the other four groups representing more education, but means in these four groups did not differ significantly among themselves, again per Tukey post hoc tests ( $p < .05$ ).

### **Discussion**

This study used maternal self-report to investigate whether in a non-U.S., non-English-speaking context—specifically, in a low-SES sample in Chile—maternal literacy practices would predict early literacy outcomes at the beginning of prekindergarten over and above child characteristics and maternal education. In addition, we investigated whether maternal practices mediated the relation between maternal education and child outcomes. It is interesting that in this low-SES sample we found significant variation in maternal practices, suggesting that beyond distal characteristics (here, maternal education) other mechanisms influence early literacy skills within this group. In our study, and consistent with previous work (Bracken & Fischel, 2008), maternal education was the strongest predictor of children's language and literacy skills at the start of prekindergarten, but exposure to texts, teaching practices, and non-present talk significantly improved prediction (i.e., explained additional unique variance in child outcomes). In addition, these maternal practices mediated approximately 25% of the total effect of maternal education on children's early language and literacy skills.

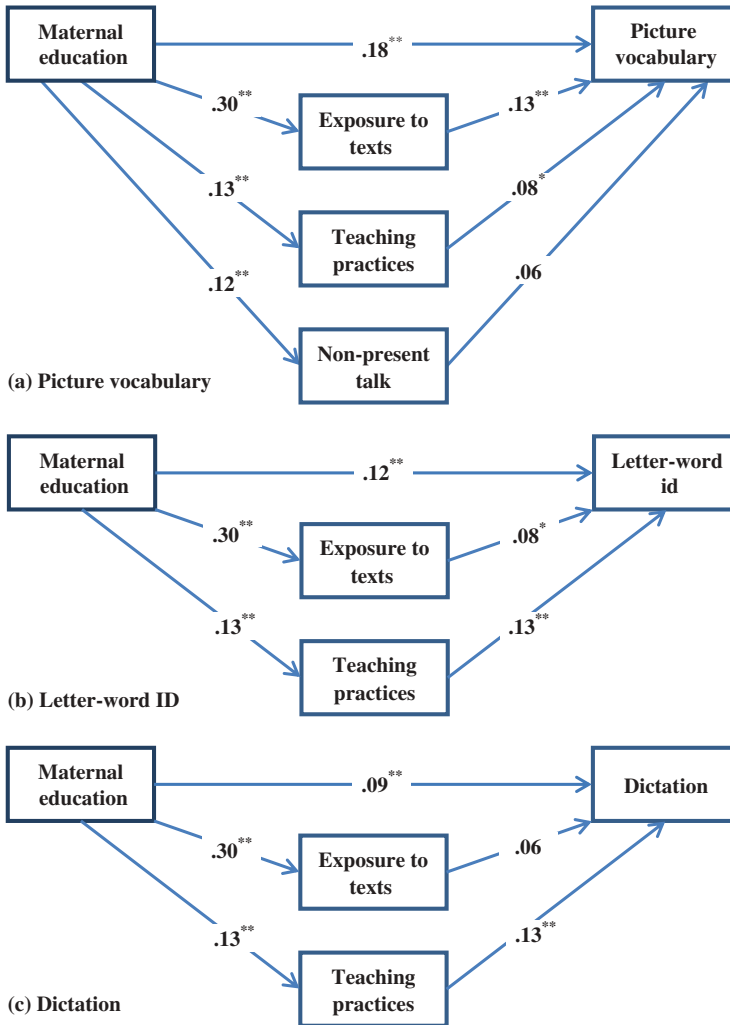


Figure 1. Path diagrams of the direct effect of maternal education on early literacy outcomes and its indirect effect through maternal practices. Coefficients for non-present talk to letter-word ID and dictation were near zero; thus, these paths are not shown. ID = identification. \* $p < .05$ . \*\* $p < .01$ .  $p < .10$  for other paths.

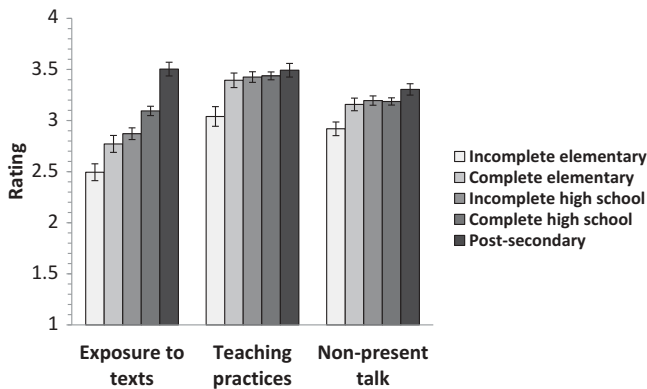


Figure 2. Means for maternal practices shown separately by levels of maternal education. Error bars are standard errors of the means;  $n = 112, 137, 223, 375,$  and  $142$  for incomplete elementary, complete elementary, incomplete high school, complete high school, and postsecondary, respectively.

Our results replicate previous findings, indicate specific influences of maternal practices on specific language and early literacy skills, but also do not support an HLE model postulate. Consistent with previous studies with low-SES samples conducted in the United States (Baroody & Diamond, 2012; Bracken & Fischel, 2008; Hood et al., 2008; Storch & Whitehurst, 2001), in our low-SES Chilean sample we found that exposure to texts predicted picture vocabulary and that teaching practices predicted child code-related skills (i.e., letter-word identification and dictation). This pattern of results allows generalizing the different roles that maternal practices play in predicting language and early literacy from a North American English-speaking population to a Spanish-speaking population living in low-SES households in a developing country like Chile.

The relation between non-present talk and vocabulary found in this study is consistent with previous studies conducted in English-speaking populations (Cote, 2001; Peterson et al., 1999; Reese, 1995). However, it also has been found that non-present talk might influence narrative skills instead of vocabulary in a low-SES sample in the United States (Reese et al., 2010). Further research evaluating the influence of non-present talk on both vocabulary and narrative skills might shed light on the eventual relative role of enriched conversations in Spanish-speaking populations.

Our findings do not support the HLE postulate that exposure to texts triggers children's language but not code-related skills (Sénéchal & LeFevre, 2002, 2014). In fact, in our sample exposure to texts also predicted children's letter-word identification, a result that also has been found in other studies of Spanish speakers (Strasser & Lissi, 2009; Caspe, 2009) and low-income diverse ethnic groups (Sparks & Reese, 2013). One possible explanation for this is that mothers from this study exposed children to worksheets or ABC books in equal proportion to or instead of narrative texts; or it is possible that during episodes of shared reading, even with narrative texts, mothers took advantage of this activity to help their children identify and read letters and words, which is consistent with results from Goldenberg, Reese, and Gallimore (1992), who observed Latino immigrant families in the United States directing children's attention more to the code instead of giving extratextual comments. Both explanations are supported by the significant correlation found in this study between exposure to texts and didactic practices, which also does not give support for the HLE claim that formal and informal practices are independent. More research with additional low-SES Spanish-speaking samples is needed to understand how generalizable the relation between exposure to texts and letter-word identification is, as well as what type of texts parents use with their children and how they use them.

We cannot rule out that mothers tend to read more frequently to children who already know or show interest in learning letters as an explanation for the relation found in this work between exposure to texts and code skills. This possibility also might be consistent with a vision from mothers that reading is a significant activity if the child is already prepared or if the child already knows letters. Further randomized controlled studies could address this issue and clarify the direction of the relation between exposure to texts and code skills.

The finding that maternal practices partially mediate the effect of maternal education on child outcomes suggests that further randomized trials should be conducted to evaluate whether exposure to texts, teaching practices, and non-present talk cause the outcomes predicted in a Spanish-speaking low-SES context. It would be of particular importance to evaluate the effect of these interventions on mothers who have not completed elementary education, as our post hoc comparisons revealed that children in this group would be at an especial disadvantage compared with their peers. Our findings are correlational; experimental evidence would put us in a stronger position to recommend these practices as fruitful targets for interventions with Chilean children 4 years of age and younger.

The broad effect of exposure to texts on language and code-related skills found in this study highlights the relevance of further exploration of this maternal practice for Spanish speakers, particularly in a developing country like Chile. This is important when we observe that, on the one hand, the effect of exposure to texts for literacy acquisition remains relevant not only during the preschool years but also in the early elementary grades in Chile (Strasser et al., 2016). On the other hand, exposure to texts was not frequent among the families in our study, the majority of whom owned only 10 or fewer children's books, or among preschool teachers like those who participated in the larger study of which this work was a part (Mendive et al., 2016).

Vocabulary development is a concern for us because children in our low-SES Chilean sample performed 6 months behind what is expected for their age as specified in a Latin American sample of reference. The accumulative negative effects of low vocabulary development during the first 3 years on later language development, oral and text comprehension, and school achievement are well documented (Dickinson, 2011). Yet we have consistently found that preschool teachers in Chile do not explicitly teach vocabulary (Strasser, Lissi, & Silva, 2009; Mendive et al., 2016). We attribute this to the lack of research-based teaching models to foster children's early vocabulary in preschool teacher programs (Facultad de Educación—Pontificia Universidad Católica/Ministerio de Educación, 2011), which leads to two recommendations: first, that preschool teacher programs teach evidence-based methods that increase children's exposure to texts; and second, that they explicitly teach vocabulary during the preschool years. It is also important that teachers learn how to engage parents in these practices.

### **Limitations of the Present Study and Implications for Further Research**

The present study has some limitations that should be acknowledged. First, reliability for two out of three of our maternal practices—exposure to texts and non-present talk—was marginally acceptable, which can be partially explained by the small number of items they included. Scales with low reliability usually underestimate effects on target variables (Kline, 2011); had our reliabilities been better, estimates of the effects of both practices on outcome likely would have been higher. In particular, the low reliability for non-present talk might reflect parents failing to identify and report the content of their conversations with children, something that might be better detected through direct observation. Thus, further research is needed to explore whether similar results would be found in similar samples using a combination of self-report and direct observation of maternal practices.

Second, in this study (as in most previous studies) we considered only maternal practices, but, aligning with new conceptualizations of parental influences in child development (Cabrera, Fitzgerald, Bradley, & Roggman, 2007), further studies should include also the influence of other significant caregivers, such as fathers and grandparents.

Finally, our measures were based on mothers' self-reports, which allows for the possibility of social desirability bias. Further studies including observational measures of maternal practices might help to calibrate the role of maternal practices, such as the ones included here, on early language and literacy development.

### **Conclusion**

This study contributes to the sparse literature on the specific influence of maternal practices on different early literacy skills in Spanish speakers living in low-SES conditions. Children living in poverty, especially those who have experienced low levels of the maternal practices studied here, are at risk for later poor literacy performance. Aiming to compensate for this risk, the results suggest as a next step to evaluate the impact of interventions targeted at parents and preschool teachers with children 0–4 years of age that focus on increasing exposure to texts, teaching letters, and increasing and enriching daily conversations. For exposure to texts, fruitful avenues to test could be increasing libraries in low-SES neighborhoods and providing good-quality child literature, especially to families with mothers with incomplete elementary education.

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