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Situated Literacy Practices of Chilean Families to Support Early Development in their
Pre-reading Children

by

Mónica del Pilar Zegers Larrain

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

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in the

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of the

University of California, Berkeley

Committee in charge:

Professor Anne Cunningham, Chair
Associate Adjunct Professor Erin Murphy-Graham
Professor Laura Sterponi

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Abstract

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Professor Anne Cunningham, Chair

While the study of family literacy in Latino communities has grown in the U.S. since the 1990s, this is a nascent research area in Latin America, with Chile being no exception. Limited information is available about the impact of parents' literacy practice on child literacy outcomes at different developmental stages, the shared reading practices implemented by Chilean caregivers with their young children, and the distribution of said practices by family members. To address this gap, this dissertation seeks to explore the situated literacy activities conducted by Chilean parents with their pre-reading children.

Using a mix-method approach, this dissertation explores family literacy practices from three different dimensions, each represented by a study. In the first study, using a nationally representative longitudinal database from Chile, it is explored how mothers and fathers share the responsibility of conducting practices that support child language and cognitive development. Random effects at the child level and fixed effects at the time level were used to identify the causal impact of mother-child and father-child activities on child development. In the second study, utilizing the same database and a similar methodology, it is analyzed how the frequency of parents' literacy practices change across early childhood and how changes in these practices are associated with child language and literacy outcomes. Finally, in the last study, caregivers' behaviors during a shared reading event with their toddlers using a video data set from 120 Chilean families are examined. The goal of this dissertation is to highlight the assets and possible needs of Chilean parents when supporting their young children's literacy acquisition process.

Keywords: Family literacy, socialization, language development, cognitive development, Chile.

To my husband, Cristián, and our children Elena and Gregorio.

Table of Contents

List of Figures

List of Tables

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"To think of human development as marked primarily by age, maturational change, or differential levels of stimulation is to underestimate profoundly the power of the cultural place and projects of parents and families." (Weisner, 1997, p. 178).

Introduction

Literacy as a situated practice

The theoretical conceptualization of literacy has shifted significantly since the 1960s. Literacy was initially conceptualized as an intellectual tool that brought about abstract thinking and the transmission of knowledge (Goody & Watt, 1963), with cognitive consequences for literate societies (Olson, 1977).

The aforementioned theories –later called "great divide" theories– have been challenged by theoretical and empirical studies suggesting that each community's socio-cultural organizing principles shape literacy socialization. One of the most influential studies was conducted by Scribner and Cole (1981) with the Vai community in Liberia. The Vai community used three different writing systems associated with different institutions and social activities. Consequently, Scribner and Cole were able to measure the impact that the use of the different writing systems had on the community member's cognitive development, observing task-specific instead of generalized consequences of the use of alphabetic writing systems. Scribner and Cole's results supported a new conceptualization of literacy as a situated socio-cultural practice. Another critical research piece that challenges the great divide theories was developed by Shirley Brice Heath (1982), a pioneer in participatory ethnographic research when studying two socioculturally different groups in the Piedmont Carolinas. Her observations led her to conclude that each community has rules for socially interacting and sharing literacy knowledge.

The studies mentioned above supported the emergence of a new theoretical framework for studying literacy. One of the most renowned proponents of this theoretical movement was Brian Street (1984). He proposed an "ideological model" of literacy that view literacy practices as shaped by the socioeconomic, political, and cultural context in which they are practiced. This school of thought has provided a rationale for community-centered qualitative research that explores the heterogeneity of literacy use functions in non-dominant communities.

In my dissertation, literacy will be conceptualized as the set of oral, graphic, and symbolic practices embedded in a particular socio-cultural, economic, and ideological context, shaped by individual user characteristics and technological affordances. This definition will be used to explore the functions and uses of literacy in Chilean families with young children.

Family socialization as socioculturally embedded

The study of parenting and conceptualization of socialization has also undergone substantial changes since the 1900s. It started with the behaviorist theory proposed by Skinner, Hull, and Watson, followed then by the configurationist perspective proposed by Benedict and Mead, who sought to determine which are the general patterns of socialization across societies and

domains within societies. Later, anthropologists relied on Freud's theory in an effort to correlate childhood experiences with adults' customs and beliefs. However, current trends in research have taken a more socioculturally aware approach (Bronfenbrenner & Morris, 1998; Harkness & Super, 2002; Maccoby, 2007). Prevalent theoretical frameworks like Harkness and Super's developmental niche (2002) and Weisner and colleagues' eco-cultural model (Gallimore et al., 1989; Weisner & Garnier, 1992; Weisner et al., 1996) seek to understand parenting practices embedded in cultural and developmental systems. These authors maintain that parenting practices are produced within a context and thus, cannot be studied in a vacuum. Although each of them has somewhat different perspectives on parenting, these paradigms share two fundamental assumptions. The first is that daily life settings embody cultural meanings, with routine activities reflecting cultural constructions. The second tenet is that parenting is mediated both by the parents' cultural experiences and the child's individual characteristics.

Family literacy as socioculturally-embedded practices

As discussed above, both the study of literacy and family socialization have more recently leaned towards a socioculturally-oriented exploration of community practices. Consequently, one of the prevailing research trends in family literacy is the study of sociocultural literacy practices implemented at home, which considers that family literacy practices cannot be abstracted from the context in which they are implemented (Gutiérrez, 2002). There are many perspectives on the use of this framework (Rodriguez-Brown, 2011), but these perspectives share the following principles: (1) Literacy is not a neutral practice; considering it as a neutral practice can lead to the exclusive promotion of the practices valued by the groups in power, (2) knowledge, literacy uses, literacy practices, beliefs, values, and resources observed in non-mainstream families are not always recognized and valued, and (3) children exposed to overlapping or more similar home and school discourses, practices, and cultural ways, have greater chances of academic success. This research trend on family literacy shares one of the most important premises of the sociocultural approach to family socialization: the importance of exploring both the practices or activities that parents do with their children since these reflect cultural traditions and the settings of daily life as they embody cultural meanings (Harkness & Super, 2002; Weisner, 2002). Sociocultural studies in family literacy have sought to uncover each community's particular literacy practices, valuing and validating their cultural richness (e.g., Delgado Gaitán, 1994; Duranti & Ochs, 1986; Heath, 1980; Pahl, 2004). The sociocultural approach to the study of family literacy advocates that if we study literacy practices under extrinsically defined parameters –like the idea of "good vs. bad parent literacy practices"– not only we will limit our understanding of the cultural practices of the community, but we will also promote deficient perspectives regarding their family literacy traditions (Auerbach, 1989, 1995)

There is a second critical premise proposed by the proponents of the sociocultural perspective on family socialization, however, that has not been considered in the study of family literacy. This premise is that parenting is mediated both by the parents' cultural experiences and the child's individual characteristics. Although the research on family literacy has uncovered a wealth of heterogeneous parent literacy practices, these findings have not informed the quantitative research on child literacy development. Currently, most quantitative studies on child development consider a limited range of parent literacy practices as predictors of child literacy development.

Disconnection between family literacy and child development research

   Disconnection reflected in the research focus. As Super and Harkness (1986) problematize, there has been a historical shortfall in the communication between anthropological studies on human development (which focus on adult socialization of children) and studies in developmental psychology (which seek universal patterns of human development). Both Harkness and Super (2002) and other authors such as Weisner and colleagues (Gallimore et al., 1989; Weisner, 1997, 2002), have sought to offer theoretical models that take into account both socialization practices (which are a manifestation of cultural customs and the psychology of the caregiver) and child development. These investigators' goal was to promote convergence between anthropological studies in socialization and psychological studies in development. However, their theoretical framework has not been applied yet in the research on the impact of family literacy practices on child literacy development (see Figure 1).

Figure 1

Theoretical framework diagram.
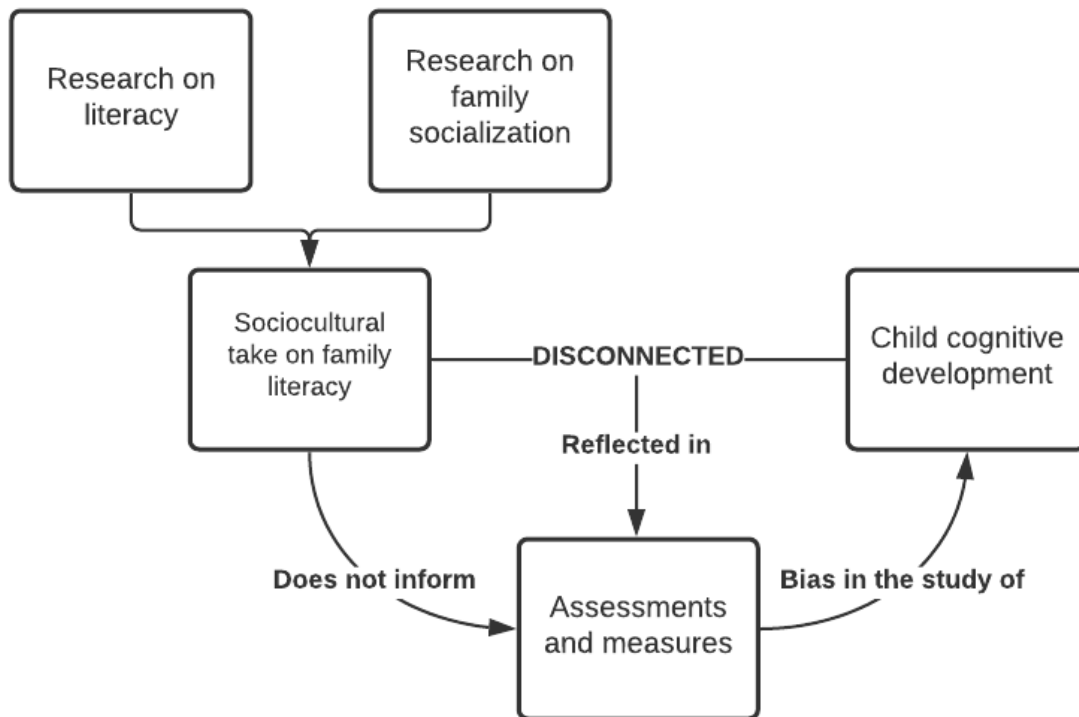
   Disconnection reflected in the methodologies used. The disconnect in the research on family literacy practices and child literacy development can also be explained by differences in methodology. The sociocultural studies on family literacy have prioritized the use of ethnographic research as a methodology that helps uncover micro-processes within the phenomenon to be

studied. Larson (1996) argues that through ethnographic research, the microgenetic levels of literacy are made visible. Similarly, Weisner (1997) proposes that "Ethnography is best suited to understanding human development as an adaptive project of individuals and communities –that is, what families and communities are trying to accomplish to meet their goals in their cultural world (...)" (p. 177).

On the other hand, developmental psychology has recently prioritized quantitative methodologies in its effort to discern universal patterns of development. While developmental psychology emerged based on single-case studies like the ones conducted by Preyer (1882) and Piaget (1931), nowadays, this discipline has leaned away from this method. As posited by Yoshikawa and colleagues (2008), nowadays, the developmental growth in time is usually estimated by analyzing the change in competencies and skills, commonly using quantitative methods.

Disconnect reflected in existing measures of family literacy. The disconnect in research is also reflected in the measures or assessments used to evaluate family literacy practices and their impact on child development. While there has been an increase in sociocultural studies in family literacy, and researchers acknowledge the variability of functions and uses (Heath, 1982) of literacy (Heath, 1986; Street & Street, 1984), in the study of child language and literacy outcomes, dominant parenting forms are still more frequenty employed. For example, the Home Literacy Environment (HLE) is frequently operationalized as the number of books available at home and/or the frequency of shared reading. These measures are often correlated with aspects of language and literacy development in Western countries (Schick & Melzi, 2015). Yet, books might not be a common literacy resource in other communities, nor might be shared reading a usual practice (Anderson et al., 2010).

As qualitative research on situated literacy practices expands, it is critical to use uncovered information about the diversity in family literacy practices to inform family literacy measures. As Greenfield (1997) states, "when testers use tests developed in their own culture to test members of a different culture, testees often do not share the presuppositions about values, knowledge, and communication implicitly assumed by the test." (p. 1115). These presuppositions can generate critical misunderstandings that can bias the evaluation results and promote deficit perspectives of the community being studied. For example, Rivadeneira (2018) reports a misunderstanding in her research about literacy practices implemented by Chilean mothers. During her interviews with Chilean mothers, Rivadeneira asked them what actions they did to ensure their children had a good vocabulary. The researcher was concerned about vocabulary size. The mothers, however, interpreted this question to be about teaching their children not to say bad words. The parents' interpretation is understandable if we know that Chilean parents believe they have a higher responsibility in supporting their child's socio-emotional and moral development than academic development (Catalán & Egaña, 2004; Rivadeneira, 2018). Because this question was presented in the context of a semi-structured interview, Rivadeneira was able to include clarifying comments to create a shared understanding with the participants. This is not possible in standardized assessments, so it is critical to inform tests with qualitative, culturally-aware research or employ a mix-methods approach that supports the integration of qualitative and quantitative data (Greene et al., 1989; Yoshikawa et al., 2008).

Disconnect reflected in the family figures being considered. The concepts "home literacy environment" and "family literacy practices" are often used interchangeably to operationalize children's literacy stimulation at home. Assessments evaluating these constructs, however, often use maternal reports exclusively, excluding the report of other relevant family members. Nevertheless, the family organization is changing, with males assuming more childcare responsibilities (Lamb, 2000) and other family members, like grandparents, participating more actively in the young children's lives (Zegers & Reynolds, 2022).

Empirical evidence of the importance of the role of fathers and other family members in child development has increased in recent years. For example, there is evidence that fathers promote child language development differently than mothers by using a larger and more challenging vocabulary (Lamb & Tamis-LeMonda, 2004; Pancsofar et al., 2010; Ratner, 1988). Furthermore, fathers' involvement has a significant positive correlation with child language development (Pancsofar et al., 2010; Varghese & Wachen, 2016) in a way that is independent of mother influences (Tamis-LeMonda et al., 2013). Research on grandparents reveals they can provide aid in multiple areas, like economic support (DeLeire & Kalil, 2002; Mutchler & Baker, 2009), babysitting (Villar et al., 2012), and household chores (Harrigan, 1992). Future research should consider the report of other adults close involved in the child's life when exploring their influence on child development.

Family literacy research in Chile

The study of the impact of family practices on the development of literacy precursors in Chile is new (Susperreguy et al., 2007). Consequently, there are multiple areas in which additional research is needed. Almost all the literature currently available focuses on prekindergarten and kindergarten children and on mothers' reports. A significant number of the available studies are based on the same group of low-income children.

Until now, most of the studies conducted in Chile use the same or highly similar instruments and measures to the ones used with middle-class U.S. and Canadian populations, without considering the literacy practices and characteristics of the Chilean samples. For example, when exploring parent literacy practices, most studies focus on shared reading or letter teaching (Förster & Rojas-Barahona, 2014; Mendive et al., 2017; Pezoa et al., 2019; Susperreguy et al., 2007). When analyzing the family literacy resources, most of the studies only consider the number of books available at home (Mendive et al., 2017; Pezoa et al., 2019; Strasser & Lissi, 2009; Susperreguy et al., 2007).

Currently, the field of family literacy in Chile requires additional research that includes other methodologies (e.g., longitudinal studies, qualitative research), family members (e.g., fathers and grandmothers), subjects (e.g., infants, toddlers), resources beyond book availability (e.g., other literacy toys), and alternative uses of literacy (e.g., storytelling, Bible reading, following recipes). This dissertation seeks to contribute to closing this gap by

1. employing a longitudinal database to examine how changes in parent practices impact child development,

2. exploring the effect of the use of other practices (e.g., storytelling) and literacy resources (e.g., learning toys) on child development,
3. considering the role of fathers in addition to mothers in child development,
4. and providing in-depth analysis of the shared reading practices of mothers with their infants and young toddlers

Dissertation Significance

The significance of this dissertation study is reflected in two dimensions. While the study of family literacy has grown in the U.S. and other developed countries since the 1980s (Wasik & Herrmann, 2004), this is a nascent research area in Latin America, with Chile being no exception. The extant body of research on family literacy among Latino communities has primarily focused on Spanish-speaking immigrant families in the U.S. (Hammer & Miccio, 2004). This research has been of significant contribution, as it has brought to light literacy practices that were previously disregarded or ignored (e.g., Delgado Gaitán, 1990; Gallimore & Goldenberg, 1993). However, an important distinction is overlooked when we seek to translate this body of research to the practices in Latin America. The traditions, resources, and beliefs of Spanish-speaking immigrant families in the U.S. are different from those of Chilean families (Rogoff, 1990). This is because Latino parents in the U.S. belong to a wide range of socio-cultural groups, raise their children in a bilingual and bicultural environment, and have access to resources that usually low- and middle-class Chilean families do not have. Exploring Chilean families' situated literacy practices –that is, their socio-cultural and historically contingent organizing principles that structure their involvement with the text (Sterponi, 2012)– and how they differ from our standard models will advance our knowledge about the variability in activities, resources, and beliefs about literacy that Latino communities might present.

Second, the study of situated literacy practices of Chilean families is critical for developing targeted, effective interventions that seek to encourage parent literacy involvement while considering the family existing routines and validating culture-specific literacy practices. Like in the U.S., there is a gap in language and literacy development in children from low and high SES. Chilean children from wealthy families have a higher receptive vocabulary at 30 to 60 months (Contreras & Puentes, 2017). In kindergarten, this difference in performance related to socioeconomic level is manifested in all reading precursors, including phonological awareness, letter knowledge, vocabulary, and listening comprehension (Espinoza & Rosas, 2019). A culturally informed literacy curriculum that draws on parental knowledge and familiar activities can help to improve these children language and literacy development.

Study 1

Mothers and Fathers Differential Effect on Child Language and Cognitive Outcomes:
Evidence from Chilean Families.

Abstract

Purpose: This study seeks to estimate the effect of Chilean mother and father practices (e.g., book reading, storytelling) on child (ages 0 to 7) receptive vocabulary (measured using the PPVT) and cognitive outcomes (measure using the BDI). It presents two contributions with respect to the previous literature: (1) the empirical strategy used gives a clearer causal interpretation, and (2) our data allows for the differentiation of the effects of mother vs. father practices.

Methods: A nationally representative longitudinal database from Chile (Estudio Longitudinal de la Primera Infancia, ELPI) was employed. Random effects at the child level and a fixed effects at the time level were used to identify the causal impact of parent-child activities on child development. Maternal and paternal level of education, labor participation, child school attendance, and parental co-residence with the child were used as covariates.

Results: A higher percentage of mothers relative to fathers were reported to engage in each type of the practices examined. Furthermore, the estimated coefficients for mothers' practices were generally higher than for fathers. However, some of the fathers' practices significantly affect child vocabulary and cognitive outcomes, controlling for the mother's input. It is argued that the estimated effect of mothers' and fathers' practices on child development are independent of each other and both mother and father practices should be accounted for when studying child development as they have additive effect on child outcomes.

Implications: Fathers' have a critical and unique role in supporting children's linguistic and development. When exploring the child's home environment, father's participation in shared activities with their children should be examined in tandem with mother's activities. Suggestions for the development of fathering programs are also offered.

Keywords: father practices, mother practices, language development, cognitive development, random effects.

Mothers and Fathers Differential Effect on Child Language and Cognitive Outcomes:
Evidence from Chilean Families.

Gender roles are changing. Today, more men assume responsibilities that women have traditionally fulfilled (Lamb, 2000), generating a more equitable distribution of domestic duties. Father involvement in childcare and child education, in particular, has increased consistently (Lamb, 2000). The increased participation of men in parenting requires new research that considers the differential effect of the practices performed by fathers from the practices of mothers on child development.

Research on parenting practices that promote children's development has been a critical research topic in the last 50 years, but the tendency has been to focus on the role of mothers (Ortiz, 2004). The effect of fathers on children's development, on the other hand, has been a topic of interest mostly in the last 20 years (Varghese & Wachen, 2016). Research on the effect of fathers has also tended to focus on families from English-speaking, very high-income countries. However, as Weisner (2002) and Super and Harkness (1986) suggest, parenting activities and practices are highly influenced by the sociocultural context, including the beliefs, resources, and dynamics associated with the particular community. Therefore, it is critical to explore the parenting practices of parents belonging to other cultural backgrounds to better identify the effect of their actions on their children's development. Using a nationally representative sample, this study explores the effect of the practices carried out by Chilean fathers and mothers on children's receptive language and cognitive development.

Research Context

Father Impact on Child Development

Existing studies reveal that the practices implemented by fathers with their children are related to their children's language and cognitive development. For example, empirical evidence on child language development suggests that fathers' vocabulary use predicts child language development (Pancsofar et al., 2010) independently of mother influences (Tamis-LeMonda et al., 2013). This may be because fathers and mothers interact differently with their children. For example, when mothers talk with their children, they tend to use more familiar words to ensure that the child comprehends what is being communicated. On the other hand, fathers tend to use a larger and more cognitively challenging vocabulary (Lamb & Tamis-LeMonda, 2004; Pancsofar et al., 2010; Ratner, 1988). Furthermore, evidence from a review conducted by Varghese and Wachen (2016) indicates that, while mean levels of mothers' involvement were higher than of fathers' (Varghese & Wachen, 2016), fathers' involvement has a positive association with child language outcomes.

Similar results have been obtained by studies looking at child cognitive outcomes. Children tend to have higher scores on vocabulary and cognitive development tests when their fathers respond to their initiatives, try to teach them new content during playtime (Shannon et al., 2002; Tamis-LeMonda et al., 2004), show high supportiveness in their interactions (Cabrera et al., 2007) or spend time reading together (Duursma, 2014). Father-child interactions in early childhood independently predict educational outcomes even until adolescence (Flouri & Buchanan, 2004).

Cultural Differences in Parenting and Gender Roles

Parenting activities are culturally embedded, reflecting the values, goals, resources, relationships, scripts of normative and cultural knowledge (Weisner, 2002). These activities are also the result of how the responsibilities are distributed and negotiated within the family (Tamis-LeMonda, 2004; Zegers & Reynolds, 2022). Thus, parenting activities and their impact on their children's development should be explored in context. A recent meta-analysis conducted by Anderson and colleagues (2021) examined the relationship between parental language input and child language development. The authors problematize the findings of their meta-analysis as the samples were highly homogeneous with many of the reported studies focused on middle- to upper-SES Caucasian participants. The authors conclude: "In order to increase the generalizability of findings, efforts to include more diverse samples in terms of SES, minority status, languages spoken, and cultural factors should continue." (p. 498). Similarly, in their systematic review on parent involvement and child cognitive development, Rollè et al. (2019) determined that, although the literature on father involvement is becoming more heterogeneous, it is important to consider how contextual factors (including culture) impact father participation in their children's lives.

Research conducted with Latino fathers in the U.S. has focused on determining race/ethnic differences in parent engagement and practices and their relation to child developmental outcomes. The results vary. For example, Shears (2007) and Cabrera et al. (2011) indicate that African American and Latino fathers report higher levels of participation in social and play activities with their children than European American fathers, but there was not a consistent association between child cognitive outcomes and fathering activities across race and ethnicity. Duursma et al. (2008), on the other hand, observed that the frequency of father-child book reading among Spanish-speaking families was related to child cognitive outcomes at age 3. Nevertheless, as pointed by Cabrera, Aldoney, and Tamis-LeMonda (2013), the cultural context of Latino fathers in the U.S. can be a combination of customs from their own country in conjunction with the norms and practices of the United States. This study extends the existing literature on mother and father practices and their child outcomes by focusing on Chilean parents.

Chile, like other Latin countries, has a family ("familista") orientation (Staab, 2012), which can mean that members of this community can have stronger family ties than people from North America and Europe (Rojas, 2018). Within the family as the social nucleus of the family, gender roles are still very fixed, with women assuming the role of caregivers in Latin America (Hite & Viterna, 2005) in general and in Chile (SERNAM, 2012) in particular. For example, while female labor participation has increased significantly in the last years in Chile, from 31.3% in 1990 to 42.4% in 2019 (OECD, 2019), women still are responsible for most of the household work and caregiving responsibilities, even while having a full-time job (PNUD, 2010). Results of the International Men and Gender Equality Survey (IMAGES) in Chile indicates that 61.9% of the respondents believe that their role as their children caregiver is secondary to their female partners, and 87.5% think that they are responsible for providing for their family (Aguayo et al., 2011). These beliefs about fathering can influence the fathers' level and type of involvement with their children.

Fathers Activities with their Children

The parent-child activity most frequently reported by Chilean fathers with young children is playing with them (Aguayo et al., 2011). However, as Tamis-LeMonda (2004) problematizes, "if researchers are to understand fathers' role in child development more fully, fathers' and mothers' participation and contribution in multiple areas should be examined in tandem. Play is only one piece of the puzzle, and fathers are much more than activators" (p. 224). Play (Anderson et al., 2019; Shannon et al., 2002) and shared reading (Baker et al., 2015; Duursma et al., 2020) are often the target activities examined in research. Other activities, like storytelling, have been less explored. This study seeks to identify the effect that mother and father activities have on children's language and cognitive development (as measured by the PPVT and BDI), in order to account for variability in parenting practices and identify those that better predict these dimensions of child development

Research Overview

The present study uses a nationally representative longitudinal database from Chile to simultaneously consider the impact of changes in practices from both mother and father on children's early receptive language and cognitive development while controlling for the possible impact of maternal and paternal level of education, labor participation, child school attendance, and parental coresidence. It uses random effects at the child level and fixed effects at the time level to control for non-observable characteristics of the child that are constant over time and for every systematic change for the outcome variable to identify the causal impact of parent-child activities in child development. Most of the time, the study of fathering practices uses empirical strategies that, while contributing to the understanding of father roles on child development, do not support causal interpretation of the data (e.g., linear regression [Jeong et al., 2016]; multiple regressions [Fagan & Lee, 2012; Shannon et al., 2002]; hierarchical regressions [Flouri & Buchanan, 2004; Sun et al., 2018]).

Furthermore, this study attempts to evaluate the possibility of omitted variable bias in the estimation of the effect of mother and father practices on child development caused by not controlling for the other parent's practices. It does so by testing if the effect of the practices conducted by fathers is different from the practices undertaken by mothers. Additionally, it evaluates if the effect of both mother and father practices on child outcomes are statistically different from zero.

Finally, this study also contributes to the existing research on father-child activities and language development by considering a wider time frame in child development, including children ages 0-7. Existing studies on father input on child language development usually focus on ages 1 to 3 (e.g., Pancsofar, & Vernon-Feagans, 2006; Shannon et al., 2002; Tamis-LeMonda et al., 2004). However, it is possible that for Chilean families, some activities that are predictive or correlated to language development, like book reading (e.g., Wasik et al., 2016), might not be frequently conducted by parents until their children are older (around 3 or 4 years of age). Examining a wider developmental time frame can better account for the effect of these particular practices.

Research Questions. The guiding questions for this paper are:

1. How do changes in father vis-à-vis mother practices impact child language and cognitive development?
2. Is the impact of mother practices different from the impact of father practices on child language and cognitive development?
3. Is the effect of father practices independent from the effect of mother practices?

Methods

Data source

Data was taken from the Chilean Longitudinal Study results for Early Childhood (Encuesta Longitudinal de la Primera Infancia, ELPI), a nationally representative survey of children born between January 1, 2006, and August 31, 2009. The ELPI has three data waves, collected in the years 2010 (n=14,070), 2012 (n=14,279), and 2017 (n=5,015). The survey's main respondent is the child's primary caregiver, who provides information about sociodemographic characteristics and the child's achievement of developmental milestones.

This data is publicly available on the webpage of the Chilean Ministry of Social Development: http://observatorio.ministeriodesarrollosocial.gob.cl/elpi-tercera-ronda. The analysis of this data was not pre-registered.

Measures

The response variables will be the child language and cognitive outcome measures obtained through standardized tests. Mother and father activities, reported by the main caregiver, will be used as explanatory variables. Finally, demographic information, child school attendance, and parental coresidence with the child will be used as covariates.

Father and mother practices. Dummy variable (No=Never in the last week, Yes=At least once in the last week) for whether the mother or father (including adoptive and step-parents who act as main or secondary caregivers) reported conducting a particular activity with their child in the last week. In this study, four mother and father practices were examined: (1) reading or looking at books, (2) telling stories, (3) participating in recreational activities (going to the park, library, zoo, or museum), and (4) spending time conversing or drawing with the child.

Child outcome measures. As outcome measures, two child outcomes were used: the Peabody Picture Vocabulary Test (PPVT) and the Battelle tests. These measures were standardized with respect to the mean across age (a running variable), assuming normal distributions given age (Reynolds, 2019).

PPVT. The Spanish adaptation of the PPVT (Test de Vocabulario en Imágenes Peabody) was applied to children from 6 to 131 months and 30 days to evaluate receptive vocabulary. The PPVT has been found to be a valid and reliable measure of language in Chile (Strasser et al., 2010). PPVT scores have shown a high correlation with verbal ability scores on the Spanish versions of the Wechsler Intelligence Scale for Children (WISC–III; $r = .91$) and Kaufman Brief Intelligence Test (K-BIT) Vocabulary test ($r = .81$) (Narea, Toppelberg, et al., 2020).

BDI. The Battelle Developmental Inventory (BDI) was applied in 2010 to evaluate children from 6 to 24 months on their motor, communication, adaptation, socialization, and cognitive skills. In 2012 and 2017, the Battelle Developmental Inventory Screening Test (BDI-ST; Berls & McEwen, 1999) was applied. The BDI-ST uses a selection of the items that are more correlated with the total score and does not support analysis by subscale (Centro de Microdatos, 2013a). Both assessments had been validated for the Chilean population. BDI's test-retest reliability ranges between .90 and .99 depending on the child's age and has high validity (Berls & McEwen, 1999).

Covariates. The following covariates were included in the regressions:

Parent education. Parent level of education will be grouped in the following variables: "never attended" (reference group), "daycare", "preschool", "prekindergarten and kindergarten", "primary school", "secondary school", "tertiary school incomplete", "tertiary school complete", "postgraduate education", and "special education". Parents still enrolled in school were included in the category corresponding to the higher level of education completed.

Parent school attendance. Dummy variables for mother and father school/college attendance (Not in school=0, In school=1) at the time of the assessment.

Parent employment. Dummy variables for mother and father employment state (No employed=0, Employed=1) at the time of the assessment.

Household monthly income. Average household income in 2010 Chilean pesos (CLP)[1] during the last 12 months considering all sources of income, adjusted for inflation.

Child preschool/school attendance. Dummy variable (No=0, Yes=1) for child attendance in daycare, preschool, or school at the time of the assessment.

Mother and father coresidence. Dummy variables (No=0, Yes=1) for biological mother and father coresidence with the target child at the time of the assessment.

Identification strategy

Multiple steps are taken to ensure a clear identification of the effect of parent practices and to test the robustness of the estimations. First, the effect of changes in parent practices on receptive vocabulary and cognitive development is estimated using a mixed effects model. For each language and cognitive outcome $y_{i,t}$ of individual i at time t, I estimate the equation,

$$y_{i,t} = \alpha_t + \alpha_i + \beta \, X_{i,t} + \delta \, P_{i,t} + \varepsilon_{i,t} \; ;$$

where α_t and α_i are time fixed effects and individual random effects, respectively. $X_{i,t}$ is a vector of characteristics of individual i at time t, and $P_{i,t}$ is a vector of parent practices of parents of child i at time t, respectively. Finally, $\varepsilon_{i,t}$ is the residual of the model. The presence of random effects at the child level allows accounting for any non-observable characteristic of the child that is

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[1] This means, income is adjusted for inflation using 2010 as base year.

constant over time (e.g., abilities due to innate characteristics as genetic information or education before the observations). The presence of time fixed effects allows controlling for every systematic change over time in the outcome variable (e.g., any change in how the scores are computed over time).

The parameter of interest is δ: the changes in average score associated with changes in parent practices (that is, from not doing to doing the practice or viceversa). The presence of child random effects implies that the information obtained by these parameters came only from parents who change their practices over time and solves the problem of bias due to differential educational experiences. For example, if parents who perceive a higher language ability in their child choose to spend more time with them doing some of the practices examined, a systematic higher outcome associated with more intense practices would be observed, when the case is, in fact, that the higher outcome is due an unobserved variable (i.e., the child's ability) and not the practice itself. This is not a problem in this specification, as this effect will be absorbed in the child random effect instead of the parameters of interest.

Random vs. Fixed Effects. Both random effect (RE) and fixed effects (FE) models generate a person-based constant. Assumptions associated with the RE model make it more efficient and precise, reducing the variance of the estimator. However, the person-based coefficient can be biased in RE models. Nevertheless, it can be argued that this is not a problem in this study because the person-based parameter is not the variable of interest In other words, because the variable of interest in this study is not the random effect itself but the change in the practices examined, it is less likely that the assumptions associated with the random effects model will bias the estimated coefficient associated with the practice (see Chetty et al., 2011 for a further discussion of this problem).

Sequential inclusion of covariates. Four different regression models were conducted. The models are presented in Figure 2.

Figure 2

Regression Models Developed by Sequential Addition of Covariate Variables.
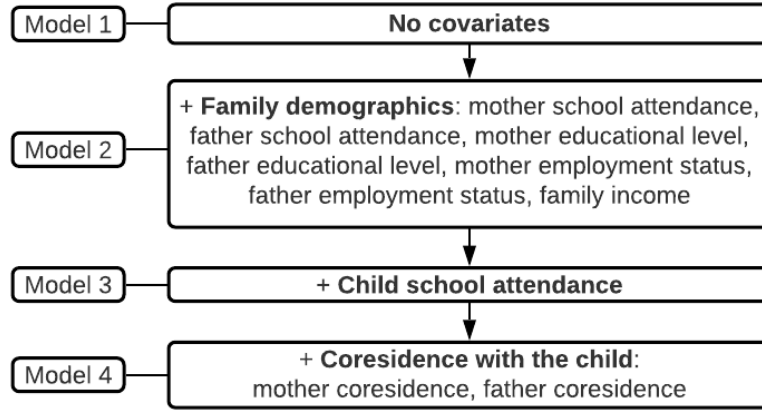
Principal Component Analysis. To differentiate the effect of the change in multiple mother and father practices on child language and cognitive outcomes, all the practices must be included simultaneously in the regression. Because it is likely that these variables of interest are correlated, including all of them simultaneously in the regression can increase model error and decrease its statistical power. To address this issue, Principal Component Analysis (PCA) was used for data reduction. PCA allows to reduce dimensionality in a dataset by using linear combinations of the uncorrelated components among the variables of interest, so the first few components retain most of the variation of the original variables (Jolliffe, 2002). Two Principal Component (PC) variables were developed in this study: one for mother practices and one for father practices.

The identification strategy used to estimate the effect of change in father and mother PC variables on child language outcomes was the following,

$$y_{i,t} = \alpha_t + \alpha_i + \beta\, X_{i,t} + \delta\, PC_{i,t} + \varepsilon_{i,t}\;;$$

where $y_{i,t}$ is the language outcome of individual i at time t, α_t and α_i are time fixed effects and individual random effects, respectively. $X_{i,t}$ is a vector of characteristics of individual i at time t. $PC_{i,t}$ are the Principal Component variables of parent practices of the mother and/or father of child i at time t, respectively. Finally, $\varepsilon_{i,t}$ is the residual of the model.

Interactions. It is possible that mother and father practices are not independent. To test the assumption that each father practice is independent of the same practice when implemented by the mother, interactions of mother and father practices were generated for each type of practice. Then, a regression using mother and father practices in addition to the interaction terms was conducted.

Results

Sample Descriptive Statistics

The sample is comprised of children between 0 and 7 years of age, 50.45% are male. Child school attendance, as expected, increased with age, from 43.5% in 2010 to 99.7% in 2017. Less than 1% of this sample attended special education.

Mother's mean age in 2010 was 29 years. In this dataset, mother school attendance was 8.8%, while employment was 45.7%. With the passing years, mother's school attendance decreased, and employment increased. In 2017, mother's school attendance was 5.7% and employment was 63.1%. This increase in female employment is likely due to children attending school for the full day. Father's mean age in 2010 was 33 years old, with an employment rate of 94.3% and a school attendance rate of 2.6%. As with mothers, school attendance decreased in 2017, although employment rate did not change, as it was high to begin with, and fathers' employment is less likely to be constrained by childcare responsibilities among Chilean families. The participating families' mean monthly income also increased with time, from an average of 468,538 CLP in 2010 to 566,744 CLP in 2017[2]. Additional information about family demographics is available in Table 1.

Table 1

Sample Descriptive Statistics.

		2010	2012	2017
Child characteristics				
Sex (1=Female)		49.55%	49.40%	48.98%
Age				
	0	7.56%	1.69%	-
	1	28.01%	5.67%	-
	2	27.44%	8.20%	-
	3	26.68%	24.36%	-
	4	10.31%	24.17%	-
	5	-	23.19%	0.14%
	6	-	12.73%	5.29%
	7	-	-	6.71%
	8	-	-	14.69%
	9	-	-	23.41%
	10	-	-	23.14%
	11	-	-	22.31%
	12	-	-	4.32%
Currently attending school (1=Yes)		43.51%	76.51%	99.70%

[2] That is, from 563.18 USD in 2010 to 681.23 USD in 2017, based on 2010 CLP value.

Education level			
No school attendance	55.87%	21.71%	0.04%
Daycare	7.37%	1.51%	N/I
Preschool	27.54%	21.98%	0.01%
PK and K	8.56%	45.72%	2.43%
Primary	N/I	8.75%	96.93%
Special education	0.65%	0.33%	0.59%
Mother characteristics			
Age	29.3 (7.14)	31.2 (7.21)	36.3 (7.22)
Education level			
Less than primary	0.38%	0.30%	0.30%
Primary	17.48%	16.58%	15.32%
Secondary	59.42%	63.07%	55.39%
Tertiary incomplete	10.57%	8.63%	8.79%
Tertiary complete	11.32%	10.64%	19.07%
Postgraduate	0.67%	0.65%	1.04%
Special education	0.15%	0.12%	0.09%
Employed (1=Yes)	45.74%	49.59%	63.07%
Attending school (1=Yes)	8.76%	7.22%	5.69%
Father characteristics			
Age	33.5 (7.7)	35.1 (7.8)	39.9 (8.0)
Education level			
Less than primary	0.47%	0.48%	0.39%
Primary	19.84%	19.32%	18.65%
Secondary	57.58%	62.13%	55.43%
Tertiary incomplete	8.25%	6.16%	6.81%
Tertiary complete	13.03%	10.96%	17.14%
Postgraduate	0.73%	0.80%	1.55%
Special education	0.10%	0.14%	0.03%
Employed (1=Yes)	94.34%	95.86%	94.66%
Attending school (1=Yes)	2.55%	2.55%	1.81%
Household characteristics			
Family income (mean in CLP)	468,538.9	473,583.1	566,744.7
Family income (SD in CLP)	(806,400)	(459,041)	(668,342)
N	14,070	14,279	5,015

Percentages might not add up to 100% due to missing information

Table 2 lists the percentages of mothers and fathers who implemented each type of practice as reported by the child's main caregiver. Drawing and/or conversing was the most common practice in 2010 and 2012, followed by recreational activities. In 2017, recreational activities took the lead, likely because children are spending more time in school and parents

are spending time with them during the weekends. Book reading and storytelling practices are less common. All mothers and fathers' practices increased in 2012, when most of the participating children were between 3 and 6 years of age, to later decrease in 2017 to the lowest value. This decrease in practices in 2017 is likely due to time constraints since children spent more time in school. When comparing mother and father practices, the main difference is that more mothers are reported conducting each type of practice than fathers, with mothers' percentages being more than double father percentages for each practice.

Table 2

Percentage of Mothers and Fathers that Conducted the Practice in the Last Week.

	2010	**2012**	**2017**
Mother practices			
Book reading	66.40%	74.95%	53.15%
Storytelling	64.93%	75.30%	39.16%
Recreating	74.55%	67.20%	69.86%
Drawing and conversing	90.70%	93.59%	56.06%
Father practices			
Book reading	24.00%	43.45%	17.58%
Storytelling	24.40%	46.06%	14.94%
Recreating	35.78%	47.19%	27.38%
Drawing and conversing	39.39%	61.70%	20.95%

Estimation of the Effect of Parent Practices on Child Language and Cognitive Outcomes.

When including one type of practice. Regressions using a mixed-effects model were conducted utilizing each kind of mother and father practices as independent variables in separate models to identify changes in practices on child language and cognitive outcomes. When using the PPVT as the outcome variable, mother's book reading, storytelling, and recreational practices had a significant positive effect on children's vocabulary. For fathers, only storytelling was significant (Coef.: 0.0453; $p<0.05$; see Appendix A.1.). Chi-square tests, however, indicate that it is not possible to reject the null hypotheses that the estimated coefficients for mothers and fathers for each one of these practices are the same (see Appendix A.1.). When using the BDI as the outcome variable, all mother practices and father storytelling and book reading practices show a positive significant effect on their children's cognitive outcomes. A chi-square test indicates that the effect of recreational practices on children's cognitive outcomes is different when conducted by mothers than when conducted by fathers (see Appendix A.2.).

When including all practices simultaneously. Correlation results indicate that some of the practices implemented by fathers and mothers are, in fact, correlated (see Appendix A.3.). Running regressions with only one type of practice might lead to omitted variable bias, obtaining coefficients that are higher than those obtained when accounting for the effect of other practices.

Thus, a new mixed-effect model was run, in which all mother and father practices were included simultaneously in the regression.

Results using the PPVT as outcome variable revealed that only mother and father storytelling had a positive significant effect on children's receptive vocabulary, after including all covariates (see Table 3). This means that, when considering all mother and father practices simultaneously, the mother's book reading and recreational activities stop having a significant effect on children's receptive vocabulary. These differences in results can have different explanations, one of them being the fact that maternal book reading and recreational activities are moderately correlated, thus, their effect on child vocabulary disappears when both of these practices are included in the same regression.

The null hypothesis that the addition of the mother and father estimated coefficients are equal to zero for storytelling was rejected. For drawing and/or conversing, the estimated coefficient for both mothers and fathers was negative, although not statistically significant. For fathers, recreational activities also had a non-significant negative coefficient. Nevertheless, no differences were observed in mother and father coefficients for any examined practices (see Appendix A.4.).

Table 3

Regression of All Mother or Father Practices on Child Receptive Vocabulary.

		Model 1	**Model 2**	**Model 3**	**Model 4**
Book reading					
	Mother	0.0693***	0.0316	0.0276	0.0285
		(0.0194)	(0.0257)	(0.0257)	(0.0257)
	Father	0.0451**	0.00666	0.00734	0.00478
		(0.0223)	(0.0270)	(0.0269)	(0.0270)
Storytelling					
	Mother	0.0763***	0.0787***	0.0814***	0.0820***
		(0.0191)	(0.0257)	(0.0256)	(0.0256)
	Father	0.0531**	0.0563**	0.0543**	0.0525*
		(0.0223)	(0.0271)	(0.0271)	(0.0272)
Taking the child to the park, library, zoo, or museum					
	Mother	0.0415**	0.0311	0.0303	0.0342
		(0.0169)	(0.0234)	(0.0234)	(0.0234)
	Father	0.0291	-0.00510	-0.00506	-0.00892
		(0.0194)	(0.0247)	(0.0246)	(0.0247)
Drawing and/or conversing					
	Mother	-0.0314	-0.0439	-0.0433	-0.0406
		(0.0282)	(0.0373)	(0.0373)	(0.0373)
	Father	0.0216	-0.0175	-0.0170	-0.0235
		(0.0197)	(0.0248)	(0.0248)	(0.0249)
Observations		19,216	10,627	10,626	10,626

Note. Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

For cognitive development outcomes (see Table 4), mother book reading, storytelling, and recreational activities had a statistically significant effect in Model 4. For fathers, only storytelling practices had a positive statistically significant coefficient. Like with the PPVT results, fathers recreational and conversational activities had a negative effect on children's cognitive outcomes, although not significant. The addition of mother and father estimated coefficients is different from zero in book reading, storytelling, and recreational practices. Nevertheless, mother and father coefficients in recreational practices are still statistically different (see Appendix A.5.), like they were in the previous regression, in which each practice was considered independently. This result reinforces the idea that the effect of recreational practices on children's cognitive outcomes is different when practiced by mothers versus fathers.

Table 4

Regression of All Mother or Father Practices on Child Cognitive Outcomes.

		Model 1	**Model 2**	**Model 3**	**Model 4**
Book reading					
	Mother	0.104***	0.0782***	0.0751**	0.0753**
		(0.0215)	(0.0296)	(0.0296)	(0.0296)
	Father	0.0501**	0.0419	0.0410	0.0402
		(0.0245)	(0.0296)	(0.0296)	(0.0296)
Storytelling					
	Mother	0.0749***	0.0528*	0.0513*	0.0512*
		(0.0211)	(0.0290)	(0.0290)	(0.0290)
	Father	0.0481**	0.0581*	0.0587*	0.0586*
		(0.0243)	(0.0302)	(0.0302)	(0.0302)
Taking the child to the park, library, zoo, or museum					
	Mother	0.0654***	0.0935***	0.0915***	0.0925***
		(0.0194)	(0.0274)	(0.0274)	(0.0275)
	Father	0.0412*	-0.0224	-0.0235	-0.0248
		(0.0211)	(0.0277)	(0.0277)	(0.0278)
Drawing and/or conversing					
	Mother	0.0145	0.0276	0.0286	0.0292
		(0.0332)	(0.0455)	(0.0454)	(0.0455)
	Father	-0.00364	-0.0151	-0.0128	-0.0143
		(0.0205)	(0.0270)	(0.0270)	(0.0272)
Observations		17,405	9,567	9,567	9,567

Note. Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Similar to the PPVT outcomes, it was observed that some of the practices that were significant in the previous regressions, were not anymore when all mother and father practices were included in the same regression. Mother's drawing and/or conversing practices were non-significant in this regression, likely due to being strongly correlated to mother's storytelling practices (see Appendix A.3.). The significant effect of father book reading also disappeared, although it is not clear the reason for this change. Nevertheless, the differences in results obtained when considering all practices at the same time provides evidence of the increase robustness in the identification of the effect of each practice, otherwise obscured by the moderate to strong correlations among certain practices.

PCA of Parent Practices and Child Language and Cognitive Outcomes

PC variables for all practices. Including all the practices in the model would account for the correlation in the estimated effect, but the estimation would lose statistical power. To address this problem, two Principal Component (PC) variables were developed: one for mother practices and one for father practices (see Appendix A.6.). PC variables reduce dimensionality in the parent practices while preserving as much of the data's variation as possible by adding the correlated content of the included variables. While this method does not allow to identify which particular practices have a higher impact on child outcomes, it prevents losing statistical power.

When looking at receptive vocabulary, mother –but not father– practices were statistically significant (see Appendix A.7.), increasing 0.05 standard deviations in their children's PPVT results. The effects of mother and father practices are statistically different. Father practices have a significant effect (albeit small) until Model 3, which disappeared once controls on mother and father coresidence with the child were included in the regression. From these two covariates, only father coresidence with the child was significant (Coef.: 0.1458, p<0.01, table available upon request), suggesting that father coresidence with the child impacts their chances of doing activities with their children.

Results using the BDI as outcome variable yielded statistically significant results for mother and father practices (See Appendix A.8.). This outcome indicates that both mother and father practices independently increase child outcomes in cognitive standardized tests in 0.08 and 0.03 standard deviations, respectively. Like with the receptive vocabulary outcomes, mother and father estimated coefficients are not the same, and their combined effect is higher than zero.

PC variables for practices subtypes. Empirical evidence on the relationship between parent book reading practices and children's vocabulary is abundant (e.g., Mol & Bus, 2011). For Chileans, there is additional evidence that non-present talk (that is, talking about something outside the here-and-now, like reminiscing about a past event) clearly influences child vocabulary (Mendive et al., 2017). This evidence, in addition to the negative coefficients for father recreational and conversing practices obtained in the regression with all practices (presented in Tables 3 and 4), supported the decision to develop four additional PC variables: (1) mother storytelling-book reading, (2) father storytelling-book reading, (3) mother recreational and conversational practices, and (4) father recreational and conversational practices (see Appendix A.9.). Separating the PC variables into two types will also increase the accuracy in pinpointing the practices that are more effective in promoting child development while ideally maintaining estimation preciseness.

Regression results show that mother and father storytelling-book reading practices significantly increase child vocabulary outcomes. Mother practices increased their children's vocabulary outcomes by 0.04 standard deviations and father practices by 0.02 (see Table 5). The estimated coefficients for mother and father are not statistically different (see Appendix A.10.). Consistent with the results obtained in previous regressions, recreational and conversational practices do not significantly affect child receptive language outcomes, and even the addition of mother and father coefficients does not yield a result different from zero.

Table 5

Regression of Book Reading-Storytelling and Recreational-Conversational Activities on Child Receptive Vocabulary.

	Model 1	**Model 2**	**Model 3**	**Model 4**
PC Mother Storytelling & Book Reading Practices	0.0600***	0.0446***	0.0441***	0.0447***
	(0.00853)	(0.0115)	(0.0114)	(0.0114)
PC Father Storytelling & Book Reading Practices	0.0406***	0.0254**	0.0248**	0.0229**
	(0.00912)	(0.0110)	(0.0111)	(0.0111)
PC Mother Recreational & Conversing Practices	0.0142	0.00820	0.00792	0.0105
	(0.00907)	(0.0122)	(0.0122)	(0.0122)
PC Father Recreational & Conversing Practices	0.0238**	-0.00732	-0.00719	-0.0115
	(0.00934)	(0.0122)	(0.0122)	(0.0124)
Observations	19,216	10,627	10,626	10,626

Note. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Using the BDI as the outcome variable, regression results indicate that, except for father recreational and conversational practices, all other activities had a positive significant effect on child cognitive outcomes (see Table 6). Moreover, even though the estimated coefficient for fathers' recreational and conversing practices was non-significant, the addition of mother and father coefficient was significantly different from zero (see Appendix A.11.).

Table 6

Regression of Book Reading-Storytelling and Recreational-Conversational Activities on Child Cognitive Outcomes.

	Model 1	**Model 2**	**Model 3**	**Model 4**
PC Mother Storytelling & Book Reading Practices	0.0752***	0.0544***	0.0525***	0.0526***
	(0.00946)	(0.0127)	(0.0127)	(0.0127)
PC Father Storytelling & Book Reading Practices	0.0398***	0.0418***	0.0418***	0.0414***
	(0.00966)	(0.0120)	(0.0120)	(0.0120)
PC Mother Recreational & Conversing Practices	0.0370***	0.0495***	0.0484***	0.0490***
	(0.0102)	(0.0137)	(0.0137)	(0.0138)
PC Father Recreational & Conversing Practices	0.0176*	-0.0138	-0.0134	-0.0145
	(0.0100)	(0.0137)	(0.0137)	(0.0139)
Observations	17,405	9,567	9,567	9,567

Note. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Interactions of Mother and Father Practices

To test the assumption that each father's practice is independent of the same practice when implemented by the mother, mother and father practices and their interaction terms were included in a regression. Results (presented in Appendices A.12. and A.13.) indicate that the interaction terms are not statistically significant, except for recreational practices when using the BDI as the outcome variable. These results suggest that father's practices have an effect that is separated from the effect of mother practices for storytelling, book reading, and conversing.

Two additional regressions including mother and father PC variables and an interaction term of both were conducted for each outcome variables. Although interaction terms with PC variables are difficult to interpret, the primary objective here was to evaluate the significance of this interaction. Consistent with the results of the previous regressions, the interactions were not statistically significant (see Appendices A.14. and A.15.). Thus, it can be argued that mother's practices influence child cognitive and language outcomes in a way that is different from the impact of father's practices.

Discussion

The study of family socialization and child development has historically been centered on the mother's role, only recently considering the father's role due to changes in family structure and gendered role division. Research on Latino fathering is a pending an open topic as most of the research available has focused on ethnic/racial differences among males without considering how the caregiving responsibilities are shared within the family system (Cabrera et al., 2013). Furthermore, as posited by Tamis-LeMonda (2004), to better understand the role of fathers on their children's development, it is necessary to explore mother and father participation in multiple dimensions at the same time. This study sought to contribute to this area of research by considering the differential effect of multiple mother and father practices on child development in a population where childrearing practices are considered the mother's responsibility and where fathers often believe they have a secondary role in childcare, using a strong identification strategy.

Using a mixed-model method allowed controlling for any non-observable characteristic of the child that is constant over time time (random effects at the child level) and for every systematic change over time in the outcome variable (fixed effects at time level). This empirical strategy allows regression results to be interpreted as causal. Moreover, including simultaneously multiple mother and father practices in the regression supports the estimation of the effect of each practice while reducing the risk of omitted variable bias. The existence of omitted variable bias is evidenced when comparing the estimated coefficients for each practice independently versus all practices simultaneously (see Table 7). When including all practices simultaneously, only storytelling emerges as a strong predictor for most outcomes. The only exceptions are mother book reading and recreational practices when using the BDI as outcome measure.

Table 7.

Positive Significant Mother and Father Practices on Child Development: Estimation Comparison.

	PPVT		BDI	
	Mother	Father	Mother	Father
Each Practice Independently	Book reading Storytelling Recreational	Storytelling	Book reading Storytelling Recreational Draw/Convers.	Book reading Storytelling
All Practices Simultanously	Storytelling	Storytelling	Book reading Storytelling Recreational	Storytelling

While the significant estimated effects might be considered small –ranging from 0.053 to 0.082 standard deviations for receptive language outcomes and from 0.051 to 0.093 standard deviations for cognitive outcomes–, these results are proportional –or even bigger– to the ones obtained by other studies using similar methodologies. For example, Cano et al. (2019) examined mother and father practices with their children using the Longitudinal Study of Australian Children (LSAC), which collects 24-hour time-use diaries for children on multiple occasions. Using a random effect model, the authors observed that the total time with the father had a small but significant positive effect on the child PPVT scores (Coef.: 0.014, p<0.1). Similarly, in a study conducted by Araujo and colleagues (2016) with 24,000 Ecuadorian children, it was observed that improvements in teachers' behaviors and practices (as measured by the classroom observation tool CLASS) in 1 s.d. improved children's receptive language outcomes (measured using the PPVT) in 0.11 s.d.

This study also uses PC variables to address the problem of the loss of statistical power when multiple independent variables are included in the regression, while keeping as much of the data's variation as possible. When using PC variables, results suggest that both mother and father storytelling and book reading practices had a significant effect on child language and cognitive outcomes. Father results are consistent, albeit smaller, with the ones obtained by Cano et al. (2019), who observed that fathers' educational activities with their children had larger positive associations with children PPVT outcomes (Coef.: 0.167, p<0.01) than structured activities like extracurricular activities (Coef.: 0.103, p<0.01) or unstructured activities like watching TV or using a computer (Coef.: 0.020).

Another contribution of this study is that it provides evidence that most mother practices are different and independent from father practices. To be able to discuss the individual contributions of mother and father practices on child development it is important, first, to evaluate if their practices are, in fact, independent of each other. Otherwise, it is possible that the effect of the practices of one parent are conditional on the practices of the other parent, and the estimation of the individual effect of each parent will not be clear. Interaction terms of mother and father

practices were included in two types of regressions: (1) with all mother and father practices, and (2) with PC variables. Results from all four regressions indicate that the mother and father practices are, in fact, independent. The only exception was recreational activities when using the BDI as the outcome variable.

To test if mother and father practices are different, chi-square tests comparing the estimated coefficients for each one of the mothers and fathers' practices were used. It was possible to reject the null hypotheses that the effects of mother and father practices are the same for all practices, with the exception –again– for recreational practices when using the BDI as the outcome variable (Coef.= 0.0185, $p<0.05$). One possible explanation for these results is that recreational activities are often conducted as a family (unlike the others, where it is easier to have a one-on-one interaction with the child).

Overall, because the coefficients of mother and father practices are both significant, and the interaction between mother and father practices is not significant, we can reasonably conclude that fathers make a unique contribution to their children's language and cognitive outcomes. This result is consistent with Varghese and Wachen's (2016) systematic review of the literature about the impact of father involvement on child language and literacy outcomes.

Conclusion

This study contributes to the existing literature by estimating the causal effects of father and mother practices on child language and cognitive outcomes. A nationally representative survey of Chilean families that includes information of both father and mother educational practices was used as data source. Results of this study coincide with other studies examining different sociocultural communities in that the mean level of mothers' involvement was higher than fathers' (Varghese & Wachen, 2016). Nevertheless, this study provides additional evidence that fathers' practices have a positive effect on child outcomes, independent on whether the mother implements the practice or not, that is, fathers' practices have a significant positive effect on child vocabulary and cognitive outcomes, separated from the mother's input.

Additionally, this study offers some methodological contributions: it highlights the value of considering multiple mother and father practices, as a way to address possible omitted variable bias on the estimation of their effect, in addition to the use of PC variables to solve the loss of statistical power when multiple independent variables are included in the regression.

Limitations

The results from this study are limited by the data available and the method being used. The mixed-model method used required the same data to be available at the three data points. Only four parent practices were examined in the three datasets. Furthermore, because the estimation of the effect of changing parent practices on child outcomes focused on children ages 0-7, only a small number of participants have data available on the three data points.

Another possible limitation is that parent practices were reported by the child's main caregiver which, in most of the cases, was the mother. It is possible then, that the mother's report

on father's practices is biased. However, because the mixed-method model used focused on changes in parent practices, bias in maternal report would only add noise to the estimation. Consequently, it could be argued that the coefficients are underestimated, and the estimations are conservative.

Future research

Future research should consider the effect of the practices of other members of the family that are actively involved in child's upbringing. In Chile grandmothers have a critical role in child rearing, especially with children between the ages of 1 and 6 (Zegers & Reynolds, 2022). Including grandmothers' report of their practices with their grandchildren would help better understand the different roles and responsibilities that adult members of the families have in relation to children and their development.

Policy Implications

There is a widespread belief among Chilean fathers that they have a secondary role as their children's caregivers, mostly by acting as support figures for mothers (Aguayo et al., 2011). Results from this study should be used to change that perspective, highlighting the important contribution of fathers on their children's development independent of what mothers do. To achieve this goal, it is critical to promote the communication between fathers and the service providers of the institutions in which children usually partake. Early childhood educators, teachers, and pediatricians should engage fathers in the childrearing decision-making process while providing them with information about child development. Programs that seek to increase father participation in childbirth and health checks have shown positive results in Chile. For example, the Active Paternity Program (Programa Paternidad Activa, CIDE) guides professionals in promoting father participation in prenatal check-ups, childbirth, and health checks, with positive results (Aguayo & Kimelman, 2012). However, additional father-oriented parenting programs are still needed (Aguayo et al., 2016), starting for fathers with preschool and school-age children.

In developing fathering programs, researchers and policymakers should consider how the suggested strategies align or conflict with the father's role beliefs. As concluded by Anderson and colleagues, "practitioner interactions that value fathers, promote child learning and enjoyment, and support fathers in developing parenting skills that strengthen positive father–child relationships may change father-role construction to facilitate engagement in the programme and with their young children." (p. 360). For these programs to be effective in changing father's perceived roles and participation in their children's lives, they should be able to adapt the content being taught to their own practices, interactions and resources (Saracho, 2008).

Study 2

Beyond Book Reading: Exploring Changes in Parent Practices and Consequential Child
Language and Cognitive Outcomes Among Chilean Families.

Abstract

Purpose: This study seeks to examine how practices of Chilean parents change by child's age and how changes in parent practices impact language and cognitive outcomes in children between 0 and 7 years of age.

Methods: This study uses a nationally representative database from Chile with three data points: 2010, 2012, and 2017 to explore the effect of changing parent practices on child outcomes while using a mixed-effect model with child random effects and time fixed effects.

Results: Only storytelling, and not book reading, had a significant effect (10%) on child language outcomes. For cognitive outcomes, book reading and recreational activities had a significant effect (1%), while the effect of storytelling disappeared after controlling for resources. Additionally, each one of the literary resources examined had a positive effect on both types of child outcomes.

Implications: The importance of studying the effect of culturally situated parental practices on child development and the need for additional qualitative research on parental practices among Chilean families are discussed.

Keywords: parent practices, child development, language, cognition

Beyond Book Reading: Exploring Family Literacy Practices and Resources and Child Language Outcomes Among Chilean Families.

There is a general agreement with Bronfenbrenner's (1986) statement that "family is the principal context in which human development takes place" (p. 723). Cumulative evidence has supported this statement by demonstrating that parents play a critical role in their children's development. However, the study of parenting as a context for child development has suffered "a creative tension, at best a dialogue, between the drive for clarity, concreteness, and universality on the one hand, and for synthesis, thematicity, and the understanding of cultural uniqueness on the other" (Harkness & Super, 2002, p. 276), with cultural uniqueness being on the losing side as research tends to be focused on a limited number of populations.

Parent practices reflect socio-cultural, economic, and historical contexts; there is no universal way parents implement a practice, even if the practice receives the same name regardless of the context. Because of this variability in practice implementation, they affect child development differently. Exploring how parents change their practices and, in consequence, how these changes affect child development can provide insight into cultural variability in the practice implementation. The purpose of this study, then, is to understand the unique cultural effect of four parent practices (book reading, storytelling, participation in recreational activities, and conversing and drawing) on child receptive language and cognitive development among Chilean families.

Research Context

Parental Practices and Children Development

Current trends in the study of parent practices and child development have supported the use of what Sameroff (2010) calls the "transactional model" (p. 16). Under this model, child development is considered the result of dynamic interactions between the child and its context. The child is no longer considered a passive receptacle of the influence of the context but as having an interdependent effect with their environment. However, it can be argued that there is value in knowing the unique effect that a change in parent practices has on child development. It allows estimating the effect of a particular parent practice (nurture) has on the child that goes beyond the child's temperament (nature) to respond and react to the parent practice. Furthermore, it helps to account for cultural variability in the effect of parent practices in promoting and supporting child development. As mentioned above, parent practices are not universal; there is high variability in which parents implement their practices, likely influencing child development in different ways. As put forth by Weisner (2002), parental activities crystallize the child's culture directly in everyday experience as they encompass (a) the parent values and goals, (b) the resources needed to make the activity happen, (c) the tasks the activity is there to accomplish, (d) the emotions and motives of those engaged in the activity, and (e) scripts defining the appropriate, normative way to engage in that activity, among other elements. Examining parent practices, then, contributes to identifying and estimating the parental effect on child development beyond the child's response to the practice while considering sociocultural differences in the implementation of said practices.

Changes in Parent Practices by Child Age

As children age, parents are likely to change their practices based on their child's needs and their own cultural belief systems and expectations related to the child's age (Harkness & Super, 1992; Maccoby, 1980). Research on changes in parental practices during childhood has tended to focus on the years surrounding the transition from preschool to kindergarten and first grade (Korucu & Schmitt, 2020; Powell et al., 2012; Son & Morrison, 2010). However, the results from these studies are inconsistent. For example, Hayes and colleagues (2018) observed that the level of involvement of Australian parents in shared reading and home activities (e.g., storytelling, singing songs, playing with children indoors and outdoors) declined from baseline, when children were two years, to age six years. In contrast, Son and Morrison (2010) reported that the Home Learning Environment (including parental academic and linguistic stimulation) of a sample of American families increased from when the children were 36 to 54 months. Powell et al. (2012) somewhat contradict both of previous studies by reporting that parental cognitive stimulating activities (e.g., book reading, storytelling, teaching) decrease as children transition from prekindergarten to kindergarten and then to first grade, while outdoors play activities (e.g., going to the library, zoo, park or playground; participating in an athletic or sporting event) increase as children went from kindergarten to first grade. General similarities across these studies regarding the practices studied and the methodologies used, make it plausible to posit that socio-cultural differences might explain these inconsistencies in the results obtained in the studies mentioned above. Changes in parent practices are likely to impact children's development; looking at parental continuity and change in their activities can provide insightful information about the effect of parent practices on child development.

Chilean Sociocultural Context and Parent Practices in Chilean Families

Research on parent practices among Chilean families is still nascent (Bush & Peterson, 2013). Nevertheless, existing research on parent language and literacy practices reveals differences between Chilean parents and parents from developed countries. For example, one of the most vastly studied parental practices in wealthier countries is book reading, regarded as a significant predictor of child language development (Raikes et al., 2006). However, book reading is not a common practice in Chile. This is most likely due to the fact that books are expensive and scarce in Chile –a new children's book can cost between 20 and 30 U.S. dollars– and there is no access to public libraries in most low-income neighborhoods (Fundación La Fuente/Adimark GFK, 2010). Because books are needed for shared reading practices, the limited access to books may constrain the implementation of this practice in many families. Rates of shared reading in Chile also suggest this: although the number of Chilean families that report weekly reading increased in the 2007-2017 period (Mendive et al., 2017; Susperreguy et al., 2007), nonetheless, approximately 40% of the studied families did not engage at all in weekly reading (Mendive et al., 2017). Moreover, in a study conducted by Strasser and Lissi (2009), only 3.7% of participating parents read daily to their children, implying that it is not a routine activity for most families. The fact that parents do not frequently read with their children can be explained by their beliefs around book reading. Chilean parents see book reading as an academic and not a recreational activity (Susperreguy et al., 2007). Child academic development is often considered the school's responsibility, while parents are expected to support children's socioemotional moral development (Rivadeneira, 2018).

On the other hand, storytelling and reminiscing are more common practices among Chilean families, likely because "oral traditions are an important part of the lives of Chilean families for social, personal, religious and moral reasons" (Leyva & Smith, 2016). Storytelling and reminiscing are two forms of non-present talk, that is, narratives about something outside the here-and-now, that existing research has linked with child vocabulary outcomes (Mendive et al., 2017). Examples include talking with the child about a special past event, sharing personal or family stories, and speaking about stories from when the child was a baby (Mendive et al., 2017). Storytelling has been less studied in other developed countries compared to book reading. Nevertheless, in studies with both White-middle class (Reese, 1995) and multi-ethnic low-income families (Sparks & Reese, 2012) in the U.S., it has been observed that maternal non-present talk is related to child semantic knowledge, and it has even been suggested that it is a stronger predictor than book reading (Reese, 1995). However, it is not clear if the effect of non-present talk is independent of the effect of storybook reading and if the relationship between parent practices and child outcomes is causal. Additional research is needed to solve these questions.

Research Overview

The objectives of this study are twofold: to examine how parent practices change as children age and to explore how changes in parent practices influence child language and cognitive outcomes. This research inquiry will be guided by the following research questions:

1. *How do parent practices change as their children grow older?*
2. *How do changes in parent activities impact the child's receptive language and cognitive development?*

For the first research question, I hypothesize that parent practices will increase with pre-kindergarten entry when the school and schoolwork will require a higher involvement in language, literacy, and cognitive activities (as observed in Son & Morrison, 2010). When children start first grade, parental practices are expected to decrease, given that children will spend more time in school and less time at home, thus limiting the time that parents spend with their children. Examining how parent practices change as children age can provide insight into parental beliefs about literacy socialization and child development. Results from this analysis can also be used for the development of targeted interventions to promote parent involvement in activities that support child development for the age ranges in which parent practices are lower. This study extends the existing research on changes in parent practice as children grow by looking at a different population (i.e., Chileans) for a more extended period of child development (i.e., from ages 0 to 12, and beyond the transition to kindergarten).

Second, it examines the effect of four parental practices on child language and cognitive outcomes. I hypothesize that book reading and storytelling will have a positive effect on child language outcomes, and book reading and recreational activities will have a positive effect on child cognitive outcomes. Mixed-effect models allow for the estimation of the differential effect of each parent practice on child development while controlling for factors that existing research identified as predictors of language development, like parent education (Vernon-Feagans et al., 2020), household socioeconomic status (Rowe, 2008), and access to learning resources (Payne et al., 1994). These results contribute to the existing literature as it supports making causal affirmations

on how parent-child book reading, storytelling, participation in recreational activities, and conversing affect child developmental outcomes.

Methods

Data Source

Data was taken from the Chilean Longitudinal Study results for Early Childhood (Encuesta Longitudinal de la Primera Infancia, ELPI), a nationally representative survey of children born between January 1, 2006, and August 31, 2009. The ELPI has three data waves, collected in the years 2010 (n=14,070), 2012 (n=14,279), and 2017 (n=5,015). The survey's main respondent is the child's primary caregiver, who provides information about sociodemographic characteristics and the child's achievement of developmental milestones.

Measures

The response variables will be the child receptive language and cognitive outcome measures obtained through standardized tests. Mother and father activities will be used as explanatory variables. Finally, demographic information, resources, and child socioemotional outcomes will be used as covariates.

Family practices. Categorical variables for whether the mother, father, or both reported conducting a particular activity with their child in the last week (0=None of the parents; 1=Mother or father; 2=Both parents)[3]. In this study, four activities examined in all three points of data collection were used: (1) read or look at books, (2) tell stories, (3) participating in recreational activities (going to the park, library, zoo, or museum), and (4) spend time conversing or drawing with the child.

Child outcome measures. As outcome measures, two child outcomes were used: the Peabody Picture Vocabulary Test (PPVT) and the Battelle tests. These measures were standardized with respect to the mean across age (a running variable), assuming normal distributions given age (Reynolds, 2019).

PPVT. The Spanish adaptation of the PPVT (Test de Vocabulario en Imágenes Peabody) was applied to children from 6 to 131 months and 30 days to evaluate receptive vocabulary. The PPVT has been found to be a valid and reliable measure of language in Chile (Strasser et al., 2010). PPVT scores have shown a high correlation with verbal ability scores on the Spanish versions of the Wechsler Intelligence Scale for Children (WISC–III; $r = .91$) and Kaufman Brief Intelligence Test (K-BIT) Vocabulary test ($r = .81$) (Narea, Toppelberg, et al., 2020).

BDI. The Battelle Developmental Inventory (BDI) was applied in 2010 to evaluate children from 6 months to 7 years and 11 months on their motor, communication, adaptation, socialization, and cognitive skills. In 2012 and 2017, the Battelle Developmental Inventory Screening Test (BDI-ST; Berls & McEwen, 1999) was applied. The BDI-ST uses a selection of the items that are more

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[3] For evidence that mother and father practices for this population are independent and, thus, can be added, see Zegers (2022).

correlated with the total score and does not support analysis by subscale (Centro de Microdatos, 2013a). Both assessments had been validated for the Chilean population. BDI's test-retest reliability ranges between .90 and .99 depending on the child's age and has high validity (Berls & McEwen, 1999).

Covariates. The following covariates were included in the regressions:

Parent education. Parent level of education will be grouped in the following variables: "never attended" (reference group), "daycare", "preschool", "prekindergarten and kindergarten", "primary school", "secondary school", "tertiary school incomplete", "tertiary school complete", "postgraduate education", and "special education". Parents still enrolled in school were included in the category corresponding to the higher level of education completed.

Parent school attendance. Dummy variables for mother and father school/college attendance (Not in school=0, In school=1) at the time of the assessment.

Parent employment. Dummy variables for mother and father employment state (Not employed=0, Employed=1) at the time of the assessment.

Household monthly income. Average household income in 2010 Chilean pesos (CLP)[4] during the last 12 months considering all sources of income, adjusted for inflation.

Child preschool/school attendance. Dummy variable (No=0, Yes=1) for child attendance in daycare, preschool, or school at the time of the assessment.

Mother and father coresidence. Dummy variables (No=0, Yes=1) for whether the biological mother and/or the biological father coreside with the target child at the time of the assessment.

Literacy resources. Literacy resources available at home were measured through an observation scale based on the Home Observation for the Measurement of the Environment (HOME) inventory (Bradley & Caldwell, 1984). Each item is coded dichotomously (Yes=resource observed; No=resource not observed). The items following items were used in this study: (1) at least 10 children's books are available at home, (2) there are age-appropriate learning equipment: mobiles, table and chair, playpen, etc., and (3) there is literary and musical material (books, records, musical instruments, etc.) available at home. The 2012 database had a considerable amount of missing data for these variables. To solve this issue, families that reported having the resources in 2010 and 2017 were coded has having this resource as well in 2012.

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[4] This means, income is adjusted for inflation using 2010 as base year.

Identification strategy

To analyze how parent literacy practices change by children's age, for each practice frequency y_i of child i's parent, the following regression will be conducted,

$$y_{i,t} = \alpha_t + \gamma_i + \beta\, X_{i,t} + \sum_{a=0}^{12} \delta_a\, D_{i,t}^a + \varepsilon_{i,t} \; ;$$

where α_t are time fixed effects and γ_i are individual random effects. X_i is a vector of controls (including the constant), D_i^a is a dummy variable taking value 1 if child i's age is equal to a (in years, for years 0-12), and ε_i is the residual. The difference $\delta_a - \delta_{a-1}$ tells us how practice y changes when the child's age changes from $a - 1$ to a (conditional on the controls).

To answer the second research question, an estimation of how changes in parent practices affect different outcomes for children ages 0 to 7[5] will obtained. For each language and cognitive outcome $y_{i,t}$ of individual i at time t, I estimate the equation,

$$y_{i,t} = \alpha_t + \gamma_i + \beta\, X_{i,t} + \delta\, P_{i,t} + \varepsilon_{i,t} \; ;$$

where α_t and α_i are time fixed effects and individual random effects, respectively. $X_{i,t}$ is a vector of characteristics of individual i at time t, and $P_{i,t}$ is a vector of parent practices of parents of child i at time t, respectively. Finally, $\varepsilon_{i,t}$ is the residual of the model. The presence of random effects at the child level allows accounting for any non-observable characteristic of the child that is constant over time (e.g., abilities due to innate characteristics as genetic information or education before the observations). The presence of time fixed effects allows controlling for every systematic change over time in the outcome variable (e.g., any change in how the scores are computed over time).

The parameter of interest is δ: the changes in score associated with changes in parent practices (that is, from not doing to doing the practice or viceversa). The presence of child random effects implies that the information obtained by these parameters came only from parents who change their practices over time and solves the problem of bias due to differential educational experiences. For example, if parents who perceive a higher language ability in their child choose to spend more time with them doing some of the practices examined, a systematic higher outcome associated with more intense practices would be observed, when the case is, in fact, that the higher outcome is due an unobserved variable (i.e., the child's ability) and not the practice itself. This is not a problem in this specification, as this effect will be absorbed in the child random effect instead of the parameters of interest.

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[5] This age range was selected for two reasons. First, because the BDI can only be used with children up to 7 years and 11 months of age. Second, while there was data available for children up to 12 years of age when using the PPVT as outcome variable, the decrease in parent practices when children were between 7 and 12 years of age (see Figures 4-7) resulted in negative estimated outcomes.

Random vs. Fixed Effects. Both random effect (RE) and fixed effects (FE) models generate a person-based constant. Assumptions associated with the RE model make it more efficient and precise, reducing the variance of the estimator. However, the person-specific random effects can be biased in RE models. Nevertheless, it can be argued that this is not a problem in this study because the person-specific parameter is not the variable of interest. In other words, because the variable of interest in this study is not the random effect itself but the change in the practices examined, it is less likely that the assumptions associated with the random effects model will bias the estimated coefficient associated with the practice (see Chetty et al., 2011 for a further discussion of this problem).

Sequential inclusion of covariates. To determine the possible impact that covariates might have on the dependent variable, covariates were included in a sequential manner. These covariates have often been cited as predictors of child development (Niklas & Schneider, 2017; Son & Morrison, 2010).

Five different regression models were conducted. The models are presented in Figure 3.

Figure 3

Regression Models Developed by Sequential Addition of Covariate Variables.
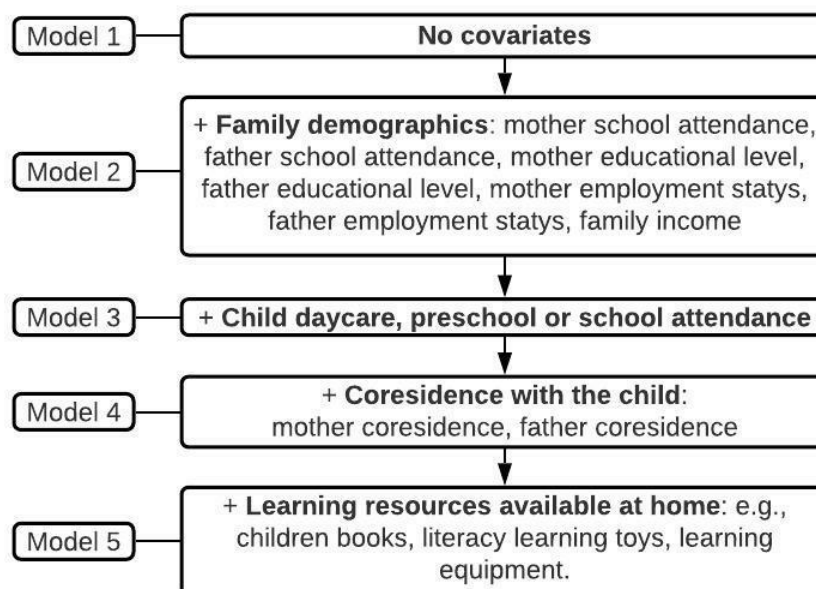
Principal Component Analysis. To differentiate the effect of the change in multiple mother and father practices on child language and cognitive outcomes, all the practices must be included simultaneously in the regression. Because it is likely that these variables of interest are correlated, including all of them simultaneously in the regression can increase model error and decrease its statistical power. To address this issue, Principal Component Analysis (PCA) was used for data reduction. PCA reduces dimensionality in a dataset by using linear combinations of

the uncorrelated components among the variables of interest, so the first few components retain most of the variation of the original variables (Jolliffe, 2002). Two Principal Component (PC) variables were developed in this study, separating the two practices that previous evidence (e.g., Mol & Bus, 2011; Reese, 1995) has indicated to be more predictive of child language outcomes, storytelling and book reading, from those we have less evidence –participating in recreational activities and drawing and/or conversing.

Results

Sample Descriptive Statistics

The sample used in this study is comprised of children between 0 and 12 years of age, 50.45% are male. Child school attendance, as expected, increased with age, from 43.5% in 2010 to 99.7% in 2017. Less than 1% of this sample were enrolled in special education.

Mother's mean age in 2010 was 29 years. Mother school attendance was 8.8% in this dataset, while employment was 45.7%. Mother's school attendance decreased with the passing years, and employment increased. In 2017, mother's school attendance was 5.7%, and employment was 63.1%. This increase in female employment was likely due to children attending school full day. Father's mean age in 2010 was 33 years old, with an employment rate of 94.3% and a school attendance rate of 2.6%. Like with mothers, school attendance decreased in 2017, although the employment rate does not change, as it was high to begin with, and fathers' employment is less likely to be constrained by childcare responsibilities among Chilean families. The participating families' mean income also increased with time, from an average of 468,538 CLP in 2010 to 566,744 CLP in 2017[6]. Additional information about family demographics is available in Table 8.

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[6] That is, from 563.18 USD in 2010 to 681.23 USD in 2017, based on 2010 CLP value.

Table 8

Sample Descriptive Statistics.

	2010	2012	2017
Child characteristics			
Sex (1=Female)	49.55%	49.40%	48.98%
Age			
0	7.56%	1.69%	-
1	28.01%	5.67%	-
2	27.44%	8.20%	-
3	26.68%	24.36%	-
4	10.31%	24.17%	-
5	-	23.19%	0.14%
6	-	12.73%	5.29%
7	-	-	6.71%
8	-	-	14.69%
9	-	-	23.41%
10	-	-	23.14%
11	-	-	22.31%
12	-	-	4.32%
Currently attending school (1=Yes)	43.51%	76.51%	99.70%
Education level			
No school attendance	55.87%	21.71%	0.04%
Daycare	7.37%	1.51%	N/I
Preschool	27.54%	21.98%	0.01%
PK and K	8.56%	45.72%	2.43%
Primary	N/I	8.75%	96.93%
Special education	0.65%	0.33%	0.59%
Mother characteristics			
Age	29.3 (7.14)	31.2 (7.21)	36.3 (7.22)
Education level			
Less than primary	0.38%	0.30%	0.30%
Primary	17.48%	16.58%	15.32%
Secondary	59.42%	63.07%	55.39%
Tertiary incomplete	10.57%	8.63%	8.79%
Tertiary complete	11.32%	10.64%	19.07%
Postgraduate	0.67%	0.65%	1.04%
Special education	0.15%	0.12%	0.09%
Employed (1=Yes)	45.74%	49.59%	63.07%

Attending school (1=Yes)	8.76%	7.22%	5.69%
Father characteristics			
Age	33.5 (7.7)	35.1 (7.8)	39.9 (8.0)
Education level			
Less than primary	0.47%	0.48%	0.39%
Primary	19.84%	19.32%	18.65%
Secondary	57.58%	62.13%	55.43%
Tertiary incomplete	8.25%	6.16%	6.81%
Tertiary complete	13.03%	10.96%	17.14%
Postgraduate	0.73%	0.80%	1.55%
Special education	0.10%	0.14%	0.03%
Employed (1=Yes)	94.34%	95.86%	94.66%
Attending school (1=Yes)	2.55%	2.55%	1.81%
Household characteristics			
Family income (mean in CLP)	468,538.9	473,583.1	566,744.7
Family income (SD in CLP)	(806,400)	(459,041)	(668,342)
N	14,070	14,279	5,015

Table 9

Percentage of Families in Which One or Both of the Parents Conducted the Practice in the Last Week.

	2010	**2012**	**2017**
Book reading	68.72%	77.55%	76.23%
Storytelling	68.9%	79.04%	66.57%
Recreational activities	77.83%	70.28%	80.58%
Drawing/Conversing	91.86%	94.82%	80.81%

Changes in Parent Practices by Child's Age

The first goal of this study was to explore how parent practices change by child's age, estimating the change in coefficient from ages a-1 to a, conditional on the covariates. Analyzing changes in practice by age can contribute to better understand the estimated coefficients for each parent practice, obtained in the second part of this study.

Regression results presented in Table 10 indicate that, while each practice follows its own trajectory, book reading, storytelling, and conversing/drawing practices tend to increase with age up to age 5, when there is a slight decrease in practice, although only book reading has a significant negative coefficient in Model 5. Between ages 5 and 6, parent practices increase before starting to consistently fall at age 7, as indicated by the significant negative coefficients (see Figures 4-7).

Decreases in practices at ages 5 and 7 can be partially explained by changes in the time parents spend with the child. By age 5, children start attending pre-kindergarten, spending between 4 to 5 hours in the educational center. At age 7, children start first grade, where they usually have a full-day schedule (on average, 8 hours). The increase in school hours means less time parents spend with their children.

Table 10

Estimated Coefficient of Effect Compared to Previous Age Point

	Book reading	Storytelling	Recreational	Conversing
Age 1	0.123***	0.0938***	0.0403	0.0757**
	(0.0364)	(0.0359)	(0.0369)	(0.0330)
Age 2	0.0434*	0.0946***	-0.00725	0.0423**
	(0.0244)	(0.0241)	(0.0249)	(0.0198)
Age 3	0.0189	0.0662***	-0.0458*	-0.0417**
	(0.0231)	(0.0227)	(0.0243)	(0.0186)
Age 4	0.0516	0.00545	0.00917	0.0372
	(0.0467)	(0.0463)	(0.0511)	(0.0385)
Age 5	-0.118**	-0.0549	-0.0695	0.00781
	(0.0528)	(0.0518)	(0.0595)	(0.0365)
Age 6	0.110	-0.00627	0.0736	0.0443
	(0.0835)	(0.0863)	(0.0894)	(0.0613)
Age 7	-0.104*	-0.163***	0.0726	-0.106**
	(0.0558)	(0.0590)	(0.0563)	(0.0541)
Age 8	-0.142***	-0.145***	0.00397	-0.117***
	(0.0442)	(0.0458)	(0.0419)	(0.0430)
Age 9	-0.103***	-0.124***	-0.0726**	-0.148***
	(0.0305)	(0.0309)	(0.0294)	(0.0308)
Age 10	-0.190***	-0.162***	-0.0587**	-0.113***
	(0.0267)	(0.0259)	(0.0264)	(0.0277)
Age 11	-0.0550**	-0.0541**	-0.0903***	-0.0844***
	(0.0268)	(0.0248)	(0.0278)	(0.0280)
Age 12	-0.0300	-0.0500	-0.0853*	-0.0973**
	(0.0448)	(0.0383)	(0.0484)	(0.0454)
Observat.	15,723	15,723	15,723	15,723

Note. Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Book reading (Figure 4) and storytelling (Figure 5) practices have a steeper curve compared with conversing/drawing (Figure 7), indicating a bigger change in the estimated coefficients. Recreational activities (Figure 6) have a different trajectory. Parent practices tend to

decrease with age until 5, when they increase until the child is seven years of age. At age 9, like the rest of the practices examined, the estimated coefficients significantly decline. The trajectory of recreational practices is likely different because parents tend to do recreational activities like going to museums, zoos, and libraries when children are older, when they can engage actively with the content presented.

Figure 4

Changes in Estimated Coefficient of Parent Book Reading by Child's Age

Changes in Parents Book Reading Practices by Child's Age
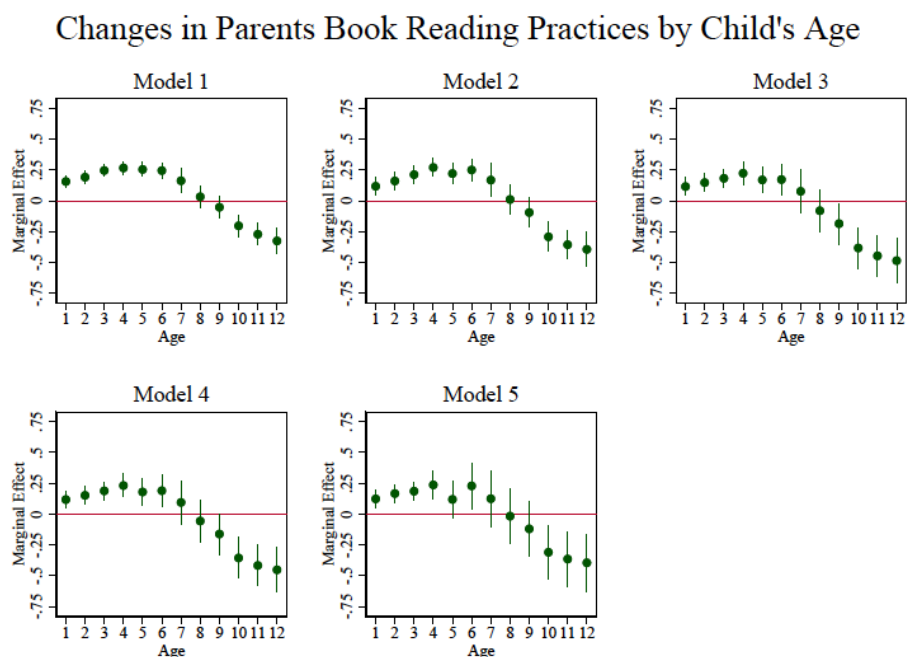
Figure 5

Changes in Estimated Coefficient of Parent Storytelling by Child's Age

Changes in Parents Storytelling Practices by Child's Age
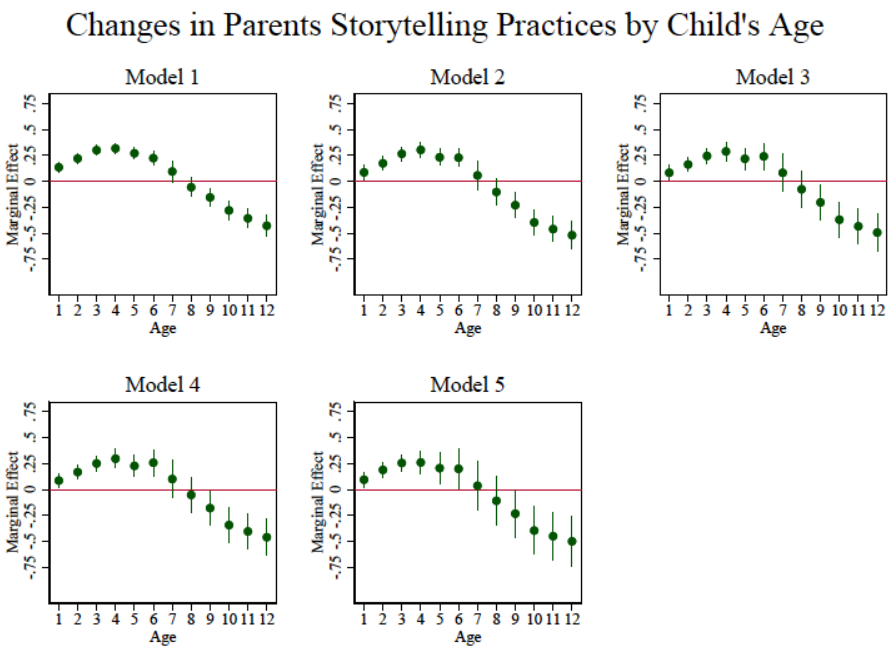
Figure 6

Changes in Estimated Coefficient of Parent Recreational Activities by Child's Age

Changes in Parents Recreational Practices by Child's Age
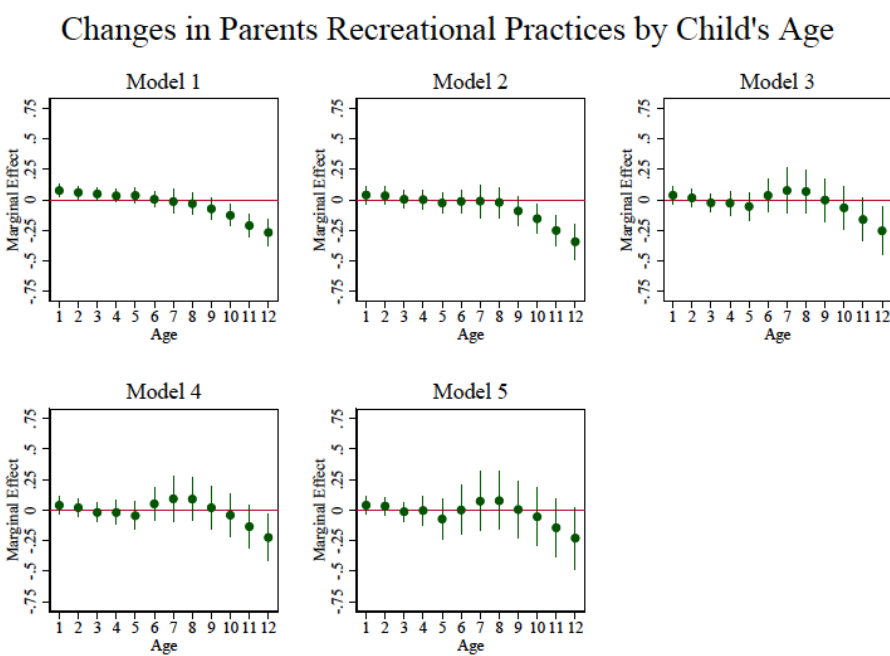
Figure 7

Changes in Estimated Coefficient of Parent Conversing/Drawing by Child's Age

Changes in Parents Drawing and Conversing Practices by Child's Age
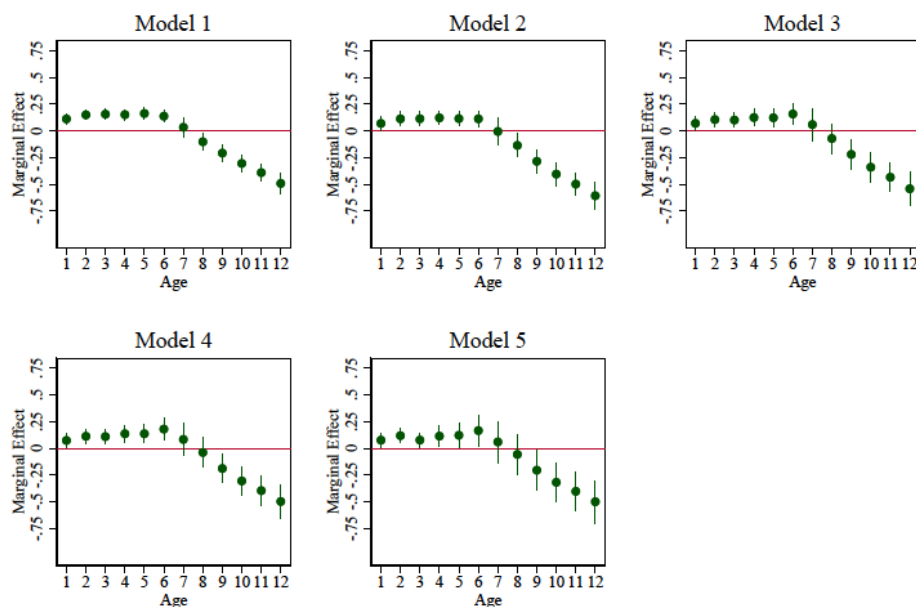
Impact of Parent Practices in Child Development

The second goal of this study is to explore how changes in parent practices impact child receptive language and cognitive outcomes. Three different types of regression were conducted to address different estimation issues. First, four regressions were run, using one practice at a time as independent variable. Second, all practices were included in the same regression, to solve for possible omitted variable bias that can emerge when looking at one practice at a time. Third, two PC variables were used to reduce noise in the estimation that likely resulted from the existing correlation among some of the parent practices examined.

Estimated effect of each practice. Regressions using a mixed-effects model were conducted using each practice as independent variables in separate models to identify the effect of changes in practices on child language and cognitive outcomes. When using the PPVT as the outcome variable, book reading and storytelling had a significant positive effect on children's receptive vocabulary (see Appendix B.1.). The estimated coefficient for both practices was 0.046. When using the BDI as the outcome variable, book reading, storytelling, and recreational activities had a significant positive effect. The estimated coefficients were higher than for the PPVT, ranging from 0.064 for recreational activities to 0.092 for book reading (see Appendix B.2.).

However, correlation results (see Appendix B.3.) indicate that book reading and storytelling practices have a moderate to strong correlation ($r=0.63$), book reading and conversing activities have a moderate correlation ($r=0.40$), and storytelling and conversing activities also have a moderate correlation ($r=0.42$). Under these circumstances, looking at each practice

independently can lead to omitted variable bias, and the resulting coefficients might be overestimating the effect of each parent practice. To address this potential bias, a new mixed-effect model was run including all the practices in the regression, estimating the effect of each practice while also accounting for the effect of other practices.

Estimated effect of all practices. When accounting for the effect of other practices, only storytelling practices has a significant positive effect on children's receptive vocabulary outcomes. The change in practice from not telling stories in the last week to telling stories in the last week generated an estimated increase of 0.037 S.D. (p<0.1) in the child's mean receptive vocabulary scores. On the other hand, book reading stops being significant after controlling for demographic variables, with statistically significant variables like income, mother employment, and parent's educational level likely accounting for the child language scores.

Interestingly, the estimated coefficient for storytelling is reduced by almost half when resources (e.g., having at least ten child books at home, having literacy and music resources) are introduced as covariates. This change can partially be explained by the data reduction caused by the inclusion of these covariates (as the number of observations is reduced by half). Nevertheless, it is possible that this result indicates a behavior change, with parents that increase their practices also increase their investment in literacy resources. Regression results reveal that each of the resources have a significant effect on the child's receptive vocabulary outcomes (tables available upon request).

Table 11

Regression of Parent Practices on Child Receptive Vocabulary.

	Model 1	Model 2	Model 3	Model 4	Model 5
Book reading	0.0575***	0.0182	0.0164	0.0153	0.0335
	(0.0121)	(0.0154)	(0.0154)	(0.0154)	(0.0211)
Storytelling	0.0653***	0.0669***	0.0674***	0.0667***	0.0365*
	(0.0127)	(0.0161)	(0.0160)	(0.0161)	(0.0218)
Recreational activities	0.0356***	0.0123	0.0119	0.0116	-0.000760
	(0.00933)	(0.0114)	(0.0114)	(0.0114)	(0.0170)
Drawing and Conversing	-0.000836	-0.0328*	-0.0323*	-0.0371**	-0.0312
	(0.0136)	(0.0170)	(0.0170)	(0.0171)	(0.0227)
Observations	19,216	10,627	10,626	10,626	5,591

Note. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

When using the BDI as outcome variable, book reading and recreational activities were significant. Interestingly, the addition of the estimated effects of any two practices always resulted in outcomes significantly different from zero, except when one of the practices was drawing/conversing (see Appendix B.5.). In other words, when any practice was added to conversing, the estimated effects added up to zero. This result might be explained by the fact that

conversing had a negative estimated effect under every model, even though the effect was small and non-significant.

For storytelling, the significant effect of this practice on cognitive outcomes disappears when resources are included in the regression. This result is similar to the one obtained when using the PPVT as outcome variable. In the previous regression (see Table 12), while the practice still has a significant effect, the estimated coefficient was reduced from 0.067 (p<0.01) to 0.037 s.d. (p<0.1) when resources were included as covariates. While it is possible that the reduction in the estimated effect was caused by a decrease in sample size (as it decreased by almost half when resources were included in the regression), for BDI outcomes, book reading and recreational activities were still significant, which suggests that data reduction is not the problem. Three alternative explanations to this result are that (1) resource availability might be more predictive of the child outcome than the storytelling practice, or (2) parents who invest in literacy resources might also value and support literacy development with activities not assessed in this study.

Table 12

Regression of Parent Practices on Child Cognitive Outcomes.

	Model 1	Model 2	Model 3	Model 4	Model 5
Book reading	0.0772***	0.0578***	0.0559***	0.0557***	0.0667***
	(0.0128)	(0.0163)	(0.0163)	(0.0163)	(0.0226)
Storytelling	0.0606***	0.0535***	0.0531***	0.0531***	0.0315
	(0.0132)	(0.0169)	(0.0169)	(0.0169)	(0.0234)
Recreational activities	0.0510***	0.0337***	0.0323***	0.0321***	0.0452**
	(0.00974)	(0.0121)	(0.0120)	(0.0120)	(0.0184)
Drawing and Conversing	-0.0108	-0.0128	-0.0104	-0.0106	-0.0138
	(0.0145)	(0.0195)	(0.0195)	(0.0196)	(0.0256)
Observations	17,405	9,567	9,567	9,567	4,587

Note. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

It is important to note that, while book reading is non-significant and storytelling is significant at 10%, the added effect of both practices is significant at 1%. This result can indicate that these practices are adding noise to the estimation when included together. A possible solution to this problem is to create a Principal Component (PC) variable for both practices. The use of PC variables is also justified because book reading and storytelling practices have a moderate to strong correlation; therefore, including both of them simultaneously in the regression can increase model error and decrease its statistical power.

PCA of Parent Practices and Child Language and Cognitive Outcomes

Two PC variables were developed: one for book-reading and storytelling practices and another for recreational and conversing practices. Regression results show that book reading-storytelling practices significantly increase child vocabulary outcomes by 0.047 standard deviations, while recreational and conversational activities have a non-significant but negative estimated coefficient.

Table 13

Regression of Book Reading-Storytelling and Recreational-Conversational Activities on Child Receptive Vocabulary.

	Model 1	Model 2	Model 3	Model 4	Model 5
PC Book-Storytelling	0.0835***	0.0562***	0.0553***	0.0539***	0.0472***
	(0.00824)	(0.0101)	(0.0101)	(0.0101)	(0.0145)
PC Recreation-Conversing	0.0278***	-0.00329	-0.00339	-0.00555	-0.0155
	(0.00847)	(0.0107)	(0.0107)	(0.0107)	(0.0150)
Observations	19,216	10,627	10,626	10,626	5,591

Note. Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Similarly, for cognitive outcomes, engaging in book reading and storytelling practices increased children's cognitive outcomes in 0.067 standard deviations, while the outcomes for recreational and conversing practices were non-significant. The non-significant effect for recreational and conversational practices is likely to be a consequence of the negative estimated effect of conversing (see Table 14), as recreational activities had a significant positive effect on cognitive outcomes. Therefore, a new regression was conducting using a PC variable for book reading, storytelling, and recreational practices. This new regression revealed that these practices increase children's cognitive outcomes in 0.084 standard deviations (see Appendix B.6.).

Table 14

Regression of Book Reading-Storytelling and Recreational-Conversational Activities on Child Cognitive Outcomes.

	Model 1	Model 2	Model 3	Model 4	Model 5
PC Book-Storytelling	0.0930***	0.0757***	0.0742***	0.0742***	0.0669***
	(0.00849)	(0.0107)	(0.0107)	(0.0107)	(0.0155)
PC Recreation-Conversing	0.0346***	0.0224*	0.0222*	0.0222*	0.0274
	(0.00891)	(0.0115)	(0.0115)	(0.0116)	(0.0168)
Observations	17,405	9,567	9,567	9,567	4,587

Note. Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Resources

  While the focus of this study was parental practices, it was observed that all the resources included as covariates had a significant positive effect on child receptive language and cognitive outcomes. The estimated effects were higher for language than cognitive outcomes, ranging from 0.122 to 0.176 when using the PPVT as the outcome measure. For the BDI, the estimated effects ranged from 0.087 to 0.111 (tables available upon request).

<div align="center">Discussion</div>

Changes in parent practices by age

  The first goal of this study was to examine how parent practices change as children age. With this sample of Chilean parents, some general patterns emerged. First, parents tend to increase their practices between 0 and 4 years of age and decrease them when their children are between ages 7 and 12, as children spend more hours in school and do more activities by themselves. These results are inconsistent from those obtained by Hayes and colleagues (2018), who reported a parental decrease in activities as their children grew (from ages 2 to 6) and with those to Powell et al. (2012), who also observed a decrease in parental cognitive stimulation for children ages 4 to 6. Results from this study coincide with the ones obtained by Powell and colleagues, however, in that in both studies parent recreational activities (e.g., going to the library, zoo, park or playground) increase from kindergarten (age 6) to first grade (age 7). They also coincide with Son and Morrison's (2010) in that parental linguistic stimulation improved between ages 3 and 4.

  It is difficult to offer hypothesis for the discrepancies in the results with some studies and the similarities with others, as the methods used in this study are different, as it is the population studied. However, it is possible that these differences rely on (1) parental beliefs and customs regarding their role to support their children's cognitive development and their ability to respond to parent stimulation, (2) the parents expectations related to the required abilities that children need to gain for school, (3) the age of preschool and school entry and the time spent as school, and (4) the requests from school for parental involvement in promoting cognitive development. Future research pursuing these hypotheses is needed.

Impact of parent practices on child development

  The second goal of this study was to examine the individual effect of four parent practices on child receptive language and cognitive development. This goal was motivated by the converging evidence that socio-cultural traditions, beliefs, and experiences permeate and influence how parent practices are implemented and, consequently, how they impact child development. This variability in how parent practices are implemented, in turn, can result in different patterns of child development from those traditionally observed in other cultures. For example, in this study it was observed that storytelling significantly predicts child receptive language. This result was not surprising, as there is existing evidence that non-present talk, like reminiscing, predicted child vocabulary in Chilean (Mendive et al., 2017) and American (Reese, 1995; Rowe, 2012; Tabors et al., 2001) children. Reese (1995) posited that maternal elaborations and associations provided

while narrating about a past event can provide personally significant information, facilitating the acquisition of semantic understanding.

What was surprising was the result that the effect of book reading on language development was non-significant. This outcome was unanticipated as there is substantial evidence that book reading contributes to language development (Farrant & Zubrick, 2012; Sénéchal & Cornell, 1993; Sénéchal & LeFevre, 2002, 2014), likely because book reading exposes to the child to new words not commonly used in oral language (Cunningham & Stanovich, 1998). Nevertheless, the explanations for this result are manifold. Firstly, book reading is less common in Chile than in other developed countries where the studies mentioned above were conducted. In the 2017 cohort of the ELPI database, 35% of the primary caregivers reported not reading to their children in the last week, 34% reported reading 1-3 times, 14% 4-6 times, and 14% reported reading every day. While the rate of book reading seems to be increasing among Chileans, it is arguable that it is still not part of their routine in many households.

Furthermore, it could be asserted that Chilean parents might not have the necessary literacy skills to understand the story and share it in a comprehensible way with their children (Leyva & Smith, 2016). The second study of Basic Competencies of the Adult Population (Centro de Microdatos, 2013b) revealed that 44% of the adult population were categorized as functional illiterates, having severe difficulties in comprehending what they read. These difficulties can not only hinder parents' perceived self-efficacy in sharing books (Bandura, 1989), but also their ability to present the book in a way that it is interesting and enjoyable for the children (Bus et al., 1995; Janes & Kermani, 2001). However, book reading had a significant positive association (p<0.01) with children's cognitive development. Existing research suggests differences in the way books are shared (Anderson et al., 2010): some parents might prioritize vocabulary teaching, while others might focus on decoding or on the development of the child's personal narrative. While Chilean parents might not be proficient in (or even used to) promoting vocabulary development through reading (as some scaffolding and questioning are necessary to achieve word learning; Mol et al., 2008), they are likely promoting other abilities through book reading. The evidence that book reading can positively affect child cognitive development is not unique to the Chilean population. For example, Raikes and colleagues (2006) observed that mother's routine of reading every day with their children had a positive correlation with children's cognitive skills at ages 24 and 36 months. This study contributes to the existing research by exploring the effects at a wider age range.

Another alternative explanation for the different results between storytelling and book reading for this sample is that most existing studies consider either both practices under the same construct (e.g., Home Learning/Literacy Environment) or only one of the practices and not the other. It has been posited that book reading and storytelling share some characteristics, like requiring listening comprehension to be able to learn new words and offering the child the opportunity to interact with the narrator (Lenhart et al., 2018). Not including both practices as predictors of child outcomes can lead to omitted variable bias, obtaining coefficients that are higher than those obtained when accounting for the effect of other practices. In this study, it was observed that book reading was significant when it was included as the only predictor of child language outcomes; however, its effect disappeared when both book reading and storytelling were included in the regression. This result in addition to the moderate to high correlation index between these

two practices might signal an overestimation of the effect of book reading on child language outcomes in existing studies.

Having conversations and/or drawing with the child had a negative –although non-significant– effect on child language and cognitive outcomes. This practice might not be a good predictor of how the outcome varies because of low between-family and within-family variability, as it is the most common practice reported by parents. Additionally, parent-child daily conversations might lack the elements that evidence suggests increase child development, like open-ended and elaborative questions and explanatory talk (Reese et al., 2010). Lastly, it is important to consider that the question was formulated in a way that might confound the results, as parents were asked whether they talked and/or draw at least once with their child in the last seven days.

Conclusion

Contributions

This study contributes to existing research by examining changes in parental practices by child's age in a more extended time frame on child development and while using a culturally different population. Additionally, it offers causal relations between changes (that is, from not doing a practice to doing it and vice versa) in four parent practices (book reading, storytelling, participating in recreational activities and conversing) and their effect in child receptive vocabulary and cognitive development, while addressing methodological issues of omitted variable bias and loss of statistical power.

Limitations

The results from this study are limited by the data available and the method being used. The mixed-model method used required the same data to be available at the three data points. However, only four parent practices were examined in the three data sets, and in one of the datasets parental practices were reported as dummy variables, forcing the dichotomization of frequency reports in the other datasets. Furthermore, there was considerable missing data related to household resources in the 2012 dataset, which generate considerable data reduction when resources were included as covariates in Model 5. Finally, because the estimation of the effect of changing parent practices on child outcomes focused on children ages 0-7, only a small number of participants have data available on the three data points.

Future Research

In the future, research on parental practices should include assessment for other culturally situated practices, including storytelling, to determine how these practices impact child development. Results from this study also highlight the need of conducting qualitative research on shared reading and storytelling practices with Chilean families, to further understand the abilities being promoted through these practices. This line of research is critical for developing targeted interventions, especially family literacy programs for low-income families. Like in the U.S., there is a considerable gap in language and literacy development in children from low- and high-SES

(Contreras & Puentes, 2017), a gap that can later impact literacy (Espinoza & Rosas, 2019). Socioculturally-based, effective interventions to support families in the promotion of child linguistic and literary development are critical to reduce this gap.

Study 3

Affective, Physical, and Linguistic Behaviors of Chilean Parents
During Shared-Reading Events with their Toddlers.

Author Note:

Abstract

Purpose: This study explores the behaviors shown by Chilean mothers when sharing a book with their young children (11-16 months of age) and how these behaviors correlate with child receptive language, expressive language, and cognitive outcomes.

Methods: A total of 117 videos of mothers using a wordless book with their young children were transcribed and coded. The coded segments focused mostly in three types of behavior: affective, physical, and linguistic. The coded behaviors were used as independent variables to estimate how they predict child language and cognitive outcomes.

Results: Descriptive statistics reveal that mothers used a wide range of literacy behaviors, but they prioritize labeling as narrative utterances and imperative sentences ("look") and onomatopoeia as non-narrative strategies to guide the child's attention to the task. Regression results suggest that mother requests of information and use of some engagement strategies predict child language development.

Implications: Even though they might not be used to sharing books with their toddlers, Chilean mothers are often are responsive to their child's developmental needs, using different engagement strategies and prioritizing linguistic utterances that are comprehensible. Future lines of research are suggested.

Keywords: shared reading, toddlers, wordless book, engagement.

Affective, Physical, and Linguistic Behaviors of Chilean Parents During Shared-Reading Events with their Toddlers.

Shared reading, that is, the practice of joint picture-book reading between a child and an adult, is a practice widely studied and described in the literature due to the benefits observed in child's language and literacy development (Mol & Bus, 2011; National Institute for Literacy, 2008). However, although it is an extended practice among Caucasian, middle-class families, shared reading is not a universal phenomenon, nor a monolithic practice, since there is considerable variability in the frequency and processes with which mothers share books with children (Anderson et al., 2010; Jung, 2019).

Studies on shared reading among Latino families have revealed variability in the reading styles and the type of linguistic utterances used (Hammer et al., 2005; Melzi & Caspe, 2005; Melzi et al., 2011). Nevertheless, most research has been focused on US-based Latino preschoolers and their families (Caspe, 2009; Cline & Edwards, 2017; Jung, 2019; Schick & Melzi, 2015). As posited by Muhinyi and Rowe (2019), research is required regarding the specific features of early book reading and how it relates to language development. Arguably, we also need to examine shared reading practices of Latino families outside the U.S., as the cultural context, resource access, and social influences of these families differ from their U.S. counterparts, possibly influencing the exercise of shared reading (Bronfenbrenner & Morris, 1998; Heath, 1980; Rogoff, 2003) and, consequently, child developmental outcomes.

The purpose of this study, then, is to examine and describe the behaviors shown by Chilean mothers when sharing a wordless book with their young children, intending to gain a deeper understanding of the socio-cultural literacy practices of this population. In particular, this study provides a quantitative and qualitative analysis of the caregivers' affective, physical, and linguistic behaviors during the shared reading event and how these behaviors predict children's language and cognitive outcomes.

Research Context

Shared Book Reading among Latino Families in the U.S.

Research on shared reading in Latino communities in the U.S. has shown that this is not a common practice (Yarosz & Barnett, 2001). Nevertheless, research conducted with U.S.-based Latino mothers reveals that they are as elaborative as Euro-American mothers when sharing a book with their preschool or school-age children (Jung, 2019). The difference is that Latino mothers stress the importance of building their children's interpersonal relations and social skills (Melzi et al., 2011) and can favor a more didactic and moralistic approach (Janes & Kermani, 2001). Euro-American mothers, on the other hand, prefer a more co-constructive approach (Melzi et al., 2011).

Latino mothers tend to produce more utterances in discussing the text and the story context while Euro-American mothers might prioritize the use of decontextualized language to talk about events occurring in the real world (Jung, 2019). Additionally, research on caregiver narrative styles has revealed high variability among U.S.-based Latino mothers. For example, Hammer and colleagues (2005) observed that Puerto Rican mothers displayed either a combinational style

(reading the text to the child and stopping periodically to make comments or ask questions to the child) or a child-centered style (speaking less than their child and focusing on labeling or commenting) when sharing books with their children. Caspe (2009) later identified three book reading styles from Latino families: storybuilder-labeler (co-constructors with the child), storyteller (narrators of rich storytelling), and abridged-storyteller (narrators of concise stories). These differences in narrative styles highlight the risk of encompassing all Latino subjects under one homogenizing category and the importance of identifying the factors that might explain the variability in book sharing.

Shared Reading with Infants

Existing research suggests that children who are read to from earlier ages benefit in their general (DeBaryshe, 1993) and situation-specific (Snow & Goldfield, 1982) language development. Being read to also facilitates children's literacy engagement, even though most of the interaction during shared reading can be focused on getting and maintaining the child's attention (van Kleeck et al., 1996). Shared reading with young children, however, is unlikely to be focused on the narrative exclusively but might involve other communicative means, such as physical behaviors and demonstrations of affect. For children in the early stages of language acquisition, nonverbal gestures are essential for productive and receptive communication (Namy et al., 2000). Moreover, the affective quality of the mother-child interactions has been found to be related to child engagement in book reading practice (Jung, 2019).

Shared Reading of Wordless Books

Wordless books are texts where the illustration or picture carries the meaning of the story and where the absence of print contributes to the meaning of the narrative (Arizpe, 2013). As stated by Jalongo and colleagues (2002), "Wordless picture books connect visual literacy (learning to interpret images), cultural literacy (learning the characteristics and expectations of social groups) and literacy with print (learning to read and write language)." (p. 168). It supports the emergence of successful narratives of participants from different socio-cultural and linguistic contexts and ensures that everyone can narrate a story, regardless of their literacy level (Melzi et al., 2011). The use of wordless books, then, promotes the use of varied narrative styles based on the users' socio-cultural preferences while, at the same time, aiding the child's literacy development by encouraging book handling, image observation and interpretation, and narrative understanding.

Research overview

This study aims to examine the behaviors used by Chilean mothers with their young children when sharing a book. It is compelling to study this population because of the unique constellation of factors that characterize Chilean families. For example, shared reading is uncommon both within Chilean households (Mendive et al., 2020) and in school settings (Strasser & Lissi, 2009). Books are exorbitantly expensive and scarce in Chile (Fundación La Fuente/Adimark GFK, 2010), and Chilean parents often believe that young children cannot understand the content of books (Susperreguy et al., 2007). Furthermore, the extant literature on shared reading practices of Latino families has mostly focused on U.S.-based families with

preschoolers, while the research about other Latino communities and infants and young toddlers is scarce.

Because this study focuses on young children, three dimensions will be analyzed: linguistic narrative, as well as affective and physical behaviors. Given the central role of these behaviors at this developmental stage, it is important to consider all three factors in tandem. Caregiver linguistic behaviors will be analyzed using coding systems previously tested with Latino populations (Caspe, 2009; Jung, 2019; Melzi et al., 2011), but this study will use qualitative analysis to explore possible thematic patterns in the caregiver literacy utterances.

The following research questions will guide the inquiry procedure:

(1) What kinds of affective, physical, and linguistic behaviors are involved in the book-sharing practices of Chilean mothers with their young children?
    a. What is the frequency of each type of behavior?
    b. What thematic patterns emerge from the linguistic utterances?
    c. Are the physical, physical, and linguistic behavior correlated?

(2) Do mother book sharing behaviors predict child language (expressive and receptive) and cognitive outcomes?

It is expected that high between-cases variability in behaviors will be observed. Mothers who show more positive affect and supportive physical behaviors are also envisioned to provide more elaborated narrative (including a description of the illustrations and the use of decontextualized language). Given the age of the participating children, it is likely that mothers will prioritize labeling while also using imperative sentences ("Look here"), onomatopoeia, and pointing to guide the child's attention to the task. It is hypothesized that children whose mothers are more effective in engaging them with the book while providing a higher rate of narrative utterances will have higher scores in the expressive and receptive language outcomes.

Methods

The current study is part of a larger longitudinal project (Mil Primeros Días; Thousand First Days) seeking to characterize the caregiving experiences of Chilean infants, contrasting exclusive maternal caregiving, daycare/preschool attendance, kinship care, and non-kinship care, and exploring possible associations between quality of care and child developmental outcomes. For the Mil Primeros Días project, children born between April and July of 2018 in the Great Santiago area (Chile) and who attended public daycare or preschool centers from the JUNJI (Junta Nacional de Jardines Infantiles) and INTEGRA network were invited to participate. Families who agreed to participate were visited in their homes between May, 2019 and January, 2020, when home and parent data was collected. The current study involves a secondary coding of the video recordings of the caregiver (mother, father, grandparents) and child interactions while completing the Three Bags Task, which is described in detail below. In particular, this study will examine the dyad interactions during the use of the book. Additionally, children's cognitive, receptive language, and expressive language scores were used as dependent variables, and demographic information was used as covariates.

Participants

Of the 1,200 families participating in the Thousand First Days project, 900 were video recorded while completing the Three Bags Task with their 11 to 16-month-old children. A random subsample of 120 videos, or 10% of the overall sample, was selected for this study from this sample. Of the 120 videos, three were excluded: one because the caregiver skipped the bag with the book (therefore, there was no shared reading event to code), and two because the audio quality was deficient, preventing researchers from coding the linguistic utterances.

Measures

Independent variable: Three bags task. One of the assessments used during the home visits was the Three Bags Task. For this task, the caregiver-child dyads were given three numbered bags and instructed to play with the bags' content for ten minutes, which should be opened in order. Participants were not instructed how long they ought to play with the content of each bag. The first bag contained the wordless book "Good Dog, Carl" (Day, 1986), a hardcover wordless book that is easy to handle for an infant and depicts a familiar routine, like getting out of the crib, dancing while listening to music, getting a snack, and taking a bath (Jalongo et al., 2002)[7]. The two additional bags had infant toys: the second bag contained a small kitchen with cooking utensils and plastic food, and the third bag contained an arc with animal and human figures. The dyads were requested to sit on a mat while playing; if the child moved outside the mat, the evaluator reminded the caregiver that the child should be within the mat perimeter at all times. Participating families were video recorded while completing this task.

Dependent variable: Bayley Scales for Infant and Toddler Development. This instrument assesses the developmental functioning of infants and young children between 1 and 42 months of age to detect developmental delays. For Mil Primeros Días, the cognitive and language (receptive and expressive) scales were used (Narea, Abufhele, et al., 2020). Item Response Theory was used to test the instrument's validity and generate scores for each respondent. Scores were later standardized with a mean of zero and a standard deviation of 1 to ease interpretability.

Covariates.

Parent demographic questionnaire. Parent demographic questionnaire included questions about parental educational level, per capita income, housing density, and coresidence with the child's father (see Table 15).

HOME measure. The Home Observation for the Measurement of the Environment (HOME) inventory (Bradley & Caldwell, 1984) was used to measure household quality. This instrument has been validated for the Chilean context (Bustos et al., 2001). In this study, only the scale on literacy resources available at home was used. These items evaluated the presence of age-

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[7] While the book has a few sentences at the beginning and the end of the story, these sentences were covered in the book used for this study.

appropriate toys and other resources that support child motor, cognitive, and language development.

Coding

Video recordings were coded using the software MaxQDA. A First Cycle coding (Saldaña, 2013) was conducted using a provisional (Miles et al., 2014) set of codes. This codebook was developed based on existing shared reading measures for infants (Resnick et al., 1987; van Kleeck et al., 1996), caregiver language use in narrative and non-narrative events (Caspe, 2009; Melzi & Caspe, 2005), and caregiver affective regard (Ware et al., 2000). The codes were thematically grouped in three dimensions that were considered to be critical in the caregiver-child interaction during shared reading: (1) affective: positive and negative, (2) physical: supportive and constraining, and (3) linguistic: narrative and non-narrative.

The author and one research assistant completed the First Cycle of coding with 25 videos. During this coding stage, new thematic patterns were used to revise and update the codebook (Appendix C.1.). Then, three clinical psychologists from Chile were hired as research assistants to code all the videos selected for this study, using the revised codebook in the Second Cycle of coding. The research assistants also transcribed verbatim the participants' utterances for thematic analysis. An utterance was defined as a verbalization that carried social meaning delimited by silence, breaths, or pauses (Aronoff & Rees-Miller, 2001) directed towards the child. Maternal utterances for themselves (e.g., "parece que está con sueño"; "it seems that she is sleepy") and directed to the researcher were not coded.

Reliability. To ensure consistency in the use of codes and the transcription, the research team first participated in weekly meetings to use the codebook and discuss the coding criteria. A random sample of 14 videos (11.6% of the total) was assigned to all team members to check for intercoder reliability. The mean agreement between coders was 89%. Finally, after completing the coding and transcription, the author reviewed all the videos to check the coded segments and the transcriptions.

Analytical Strategy

Four analytical strategies were used in this study. First, using MaxQDA and Stata, descriptive statistics were calculated for all coded segments (mean, standard deviation, range, and percentages) to determine the frequency of behaviors shown by the mothers. Then, coded segments in each category were analyzed thematically using inductive coding (Saldaña, 2013) to determine if any culturally based patterns emerged from the qualitative data. Second, a Pearson correlation matrix was calculated to determine the direction, strength, and significance of the relationships among all linguistic variables and the dimensions (affective, physical, and linguistic) examined in this study. Finally, multiple linear regressions were conducted to determine how caregiver behaviors predict child language and cognitive outcomes, controlling for family demographics (child's age, mother educational level, family income per capita, home overcrowding, and home learning resources).

Results

Descriptive Statistics of the Shared Reading Event

Participants. Participating children were, on average, 13.2 months of age (s.d.=1.17). Participating mothers were mothers between 18 and 44 years of age (mean=29.43; s.d.=5.77) and had completed high school (46.15%). The income per capita was, on average, 195 USD (s.d.=145)[8]. The score on the HOME-materials scale was, on average, 6.51 (s.d.=1.98, range=0-9). Additional demographic information is presented below (Table 15).

Table 15

Participants demographic information

	Freq.	Percent
Single parent household		
No	89	76.07%
Yes	28	23.93%
Mother Educational Level		
Grade School	10	8.55%
High School	54	46.15%
Tertiary education (incomplete)	26	22.22%
Tertiary education (complete)	25	21.37%
Graduate School	2	1.71%
Overcrowding		
No overcrowding	96	82.05%
Medium overcrowding	14	11.97%
High overcrowding	5	4.27%
Critical overcrowding	2	1.71%
Observations	117	

Duration of reading events. The shared reading event started when the caregiver picked up the book "Good Dog Carl" to share it with the child and ended when the caregiver guided the attention of the child to another toy. The average length of these events was 2 minutes and 9 seconds, ranging from 12 seconds to 10 minutes and 13 seconds. In 85% of the videos, there was one shared reading event; in 9%, there were two, in 3%, there were 3, and in 2%, there were 4 reading events.

Affective behaviors. None of the mothers showed verbal or physical displays of negative behavior, like disapproval, rejection, and anger towards the child (Ware et al., 2000). This result

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[8] In Chilean Pesos, the average income per capita was 160,129.7 (s.d.=118,905.1). The value in U.S. dollars was calculated based on the CLP market rate on 04-21-2022.

was expected, as mothers knew they were recorded and assessed, and the codes used to evaluate negative behavior required explicit disapproving or punitive actions (see Appendix C.1.). Mothers did show positive affect behaviors. The display of positive affect tended to be more physical (61.49%) than verbal (38.51%; for the full table with the percentages of coded behaviors, see Appendix C.2.). On average, mothers showed 0.77 (s.d.=1.32) physical affective behaviors, like smiling at the child while locking eyes, caressing, or kissing them, and 0.48 (s.d.=1.11) verbal affective behaviors, like regarding the child with terms like "mi amor" (my love), or "princesa" (princess).

Table 16

Caregiver's Affective Behaviors.

Positive Affect		Mean	S.D.	Min	Max
	Physical	0.77	1.32	0	9
	Verbal	0.48	1.11	0	7

Physical behaviors. Like affective behaviors, negative or constraining physical behaviors were rare, occurring in less than 1% of the total coded physical behaviors (see Table 3). The most recurrent constraining behavior was the restriction of the child's movements. Mothers restrained their toddler's movement to either engage the child in the task or keeping the child on the play mat, as required by the evaluator. Of the four videos in which there was more than one restrictive event, two the children seemed distracted and wanted to explore outside the reading task. In one, the child was upset and crying, and in another, the mother showed invasive behaviors, interrupting the child independent exploration of the book.

For the remainder 99%, physical behaviors encouraged the child's exploration and engagement with the book. The most common supportive behavior was to turn the book pages for the child (32.35%), followed by letting the child turn the pages (27.90%). Mothers also held the book in front of the child and let the child hold the book at the same rate (9.67% each). The similarities in the adult-centered (i.e., turning pages for the child and holding the book in front of the child) and child-centered (i.e., letting the child turn pages and hold the book) supportive behaviors seem to indicate that there is a similar control of the book by the child and the caregiver. In other words, it is not the adult who controls the book, but the book's exploration is shared between the adult and the child.

Pointing was another recurrent supportive behavior, representing 20.41% of the total supportive behaviors. Mothers often pointed to the book while labeling or describing an image or while trying to engage the child with the book.

Table 17

Caregiver's Physical Behaviors.

Constraining Physical Behavior	Mean	S.D.	Min	Max
Strongly resists child turning pages	0.02	0.27	0	3
Pinches, pulls, or pushes child	0.00	0.09	0	1
Restricts child's movement	0.23	0.92	0	6
Forcefully takes the book away from the child	0.01	0.13	0	1
Supportive Physical Behavior	**Mean**	**S.D.**	**Min**	**Max**
Let the child turn the pages	7.86	10.51	0	92
Lets the child hold the book	2.72	2.51	0	13
Turn the pages for the child	9.11	7.18	0	51
Points	5.75	6.76	0	39
Holds the book in front of the child	2.72	2.03	0	13

Linguistic statements. Linguistic statements consist of all verbal utterances emitted by the caregiver when the caregiver opens the book bag and the time they open the next bag. The verbal utterances related to the book story are coded as narrative utterances; utterances that were not related to the book story are coded as non-narrative utterances.

Narrative. Among the narrative utterances, labeling was the most predominant (46.38%) and the second most common among all utterances (19.65%). This linguistic behavior consists of naming the content of the illustrations. In this study, participants labeled an item, on average, 7.34 times per video (s.d.=6.79). The items more frequently named across and within videos were the characters: dog, baby, and mother. Only on a few occasions were other items labeled, like food and toys. From the total labeling utterances, 28.7% were labeling the dog using the words "perro" (dog), "perrito" (doggy), or "perroto" (dogo). An additional 15.8% were labeling the dog using the onomatopoeia that represents the barking sound in Spanish ("guau"). While existing studies tend to consider the use of onomatopoeias as an engagement strategy, in this case, the participants were clearly labeling the animal by the sound by saying, for example, "un guau-guau" ("a woof-woof") or "un niño con el guau-guau" ("a kid with the woof-woof").

The second most used type of narrative utterance is description (23.11% for narrative; 9.79% overall), that is, utterances that characterize and elaborate plot information available in the illustration (Caspe, 2009). On average, participants described an illustration 3.65 times per video (s.d.=6.53). The utterances during descriptions were longer than for evaluations, labeling, or events and included more novel words, like "maquillando" (putting on makeup), "pecera" (fishbowl), and "joyas" (jewels). An example of a descriptive utterance would be: "Le da de comer al bebé, el perro: le da leche, uvas" (The dog feeds the baby: it gives [it] milk, grapes). Similar to descriptions in structure and complexity, and often interspersed with them, were event utterances. Events are narrative utterances in past tense about actions that move the story forward (Caspe, 2009). However, although description and event utterances were strongly correlated (r=0.657; see

Appendix C.3.), mothers used events much less frequently. Only 12% of the mothers used event utterances, and events represent 2.16% of all narrative utterances (0.91% overall). These results indicate that mothers rarely narrated a story, using the book as a prompt to label and describe the dog and the protagonist child actions. Examples of event utterances are "el niño se quedó en una pieza solo, ahí" ("the child was left alone in a room, there") and "se cayó al agua el bebé" ("the baby fell into the water").

Mothers frequently asked questions (mean= 2.48; s.d.=3.55) requesting the child to provide information. Requests of information represent 15.77% of all narrative utterances and 6.69% of all linguistic utterances. The information requested frequently consisted of content parents were aware their children can provide. For example, "¿Cómo se llama este animal?" ("What is the name of this animal?"), "¿Cómo hace el perro?" ("What [sound] does the dog make?") or "Qué es eso?" ("What is this?" while asking the child to label items in the illustration, like water, baby, etc.). Sometimes, questions were used as a game, where mothers asked "Where is…?" with the expectation that the child would point to the item.

Parents also asked questions requesting the child's opinion about the book, with a mean of 0.55 times per video (s.d.=1.04). Request of opinion represents 3.52% of all narrative utterances and 1.49% overall. However, request of opinion seems to be used more as an engagement strategy as, arguably, parents rarely seek an actual response from the child when asking this question. Unlike with requests of information, parents did not repeat the question until the child responded, and they frequently used a higher-pitch intonation when asking request of opinion questions. The most frequently asked questions were: "¿Te gusta?" ("Do you like it?") and "¿Te gustó?" ("Did you like it"). On occasions, they specified the subject of the evaluation: "¿Te gustó el libro? ("Did you like the book?") or "¿Te gustó el perro?" ("Did you like the dog?").

Like with request of opinion, parents also frequently used evaluation utterance (mean=1.39, s.d.=2.30) as an engagement strategy. When providing evaluations, that is, "utterances that provided or requested judgment or subjective information" (Caspe, 2009, p. 311), mothers frequently used a high-pitched tone and often did not indicate the subject of the evaluation (e.g., "mira que liiiiindo"; "look how preeeeety"). The word "pretty" was by far the most used adjective when providing evaluations (i.e., "how pretty is the book," "how pretty is the dog"). Evaluations represent 8.80% of the narrative utterances (3.73% overall).

Non-narrative. Non-narrative utterances are caregiver utterances that are unrelated to the narration of the story. This study's most common non-narrative utterances were "unrelated" to the narrative. Unrelated utterances represent 66.75% of the non-narrative utterances and 38.47% overall, making it the most common type of linguistic verbalization (mean=14.37; s.d.=11.74). The main purpose of these utterances was to engage the child with the book, and frequently were presented in the form of short instructions, like "mira" ("look"), "toma" ("take"), "ve" ("look") and "ábrelo" ("open it"). Another strategy used by mothers to grab the child's attention and engage them with the task at hand was to utter onomatopoeias like "oooohhhh", "iiihhhh", and "owww". These utterances, classified as "other" (mean=1.76; s.d.=2.15), represented 8.23% of the non-narrative utterances and 4.74% overall. Onomatopoeias were produced in high-pitched tones and usually were followed by either unrelated utterances (if the caregiver the child was still not focused on the book) or by narrative utterances, like labeling and evaluations.

Another frequent non-narrative utterance was conversational (non-narrative: 16.24%; overall: 9.41%), that is, responses, confirmations, corrections, or clarifications the caregiver provided to the child's verbalization. On average, mothers provided a conversational utterance to their child 3.49 times during the shared reading event (s.d.=5.69) responded. The majority of the conversational utterances were confirmations to child utterances like "siii" ("yeees"), "esoooo" ("that's it") and "ahá". Occasionally, the adult would also repeat the child's statement. On rare occasions, the mother introduced new information as well, either by reflecting on the child's behavior (e.g., "ahhhh, te gusto el juguete"; "ahhhh, you liked the toy) or by adding a question (e.g., "sí, ¿qué está haciendo el perro ahí?"; "yes, what is the dog doing there?").

Less frequently, mothers provided additional information or explanations outside the narrative of the story (coded as "general knowledge") or established connections between the book story and the child's experiences (coded as "personal experience"). Nevertheless, these linguistic utterances provide insightful information on socio-cultural traits in shared reading. General knowledge utterances (mean=1.05; s.d.=1.56) represented 4.92% of non-narrative utterances (2.84% of all linguistic utterances), and the majority of them were focused on teaching the child how to use the book. While the verbalizations were short (e.g., "ábrelo, ábrelo así"; "open it, open it like this"), they were usually accompanied by physical modeling of the behavior. In a few other cases, mothers taught basic academic skills, like counting (e.g., "ese es uno un perrito y ese son dos"; "that is one a puppy and that is two") or literacy (e.g., "ahí 'ta la 'u'"; "there's the 'u'"). Personal experience utterances (mean=0.82; s.d=1.64) represented 3.85% of non-narrative utterances (2.22% overall) and focused on two topics. The first topic was relating the child to the baby in the book: for example, "hace lo mismo que hacís tú" or "lo que haces tú cuando te vas a bañar". Six mothers went even further by affirming that the baby in the book was, in fact, their own baby by sharing statements like "mira, esa eres tú" ("look, that's you") or by calling the book baby by the child's name. The second topic was the dog. Mothers paralleled the book's dog with their own pet, by making statements like "Se parece a la Lucy, pero en negra" ("It looks like Lucy, but in black") or "como la Dakota" ("like Dakota").

Table 18

Caregiver Linguistic Utterances.

Narrative Utterances	Mean	S.D.	Min	Max
Labeling	7.34	6.79	0	39
Evaluations	1.39	2.30	0	15
Descriptions	3.65	6.53	0	36
Events	0.34	1.26	0	11
Request of Opinion	0.58	1.09	0	5
Request of Information	2.50	3.54	0	20
Non-Narrative Utterances	**Mean**	**S.D.**	**Min**	**Max**
Personal Experience	0.82	1.64	0	9
General Knowledge	1.05	1.56	0	9
Conversational	3.50	5.69	0	40
Unrelated	14.37	11.74	0	54
Other	1.76	2.15	0	11

Relationships among Behavioral Dimensions

Little is known about how physical and affective behaviors in shared reading relate to linguistic behaviors. To explore the relationship among these variables, a matrix of Pearson Correlation Coefficients was estimated. Results, presented in Table 19, reveal that positive affect has moderate to strong significant correlations with supportive behavior and linguistic (narrative and non-narrative) behaviors. Supportive physical behaviors also have significant positive correlations with linguistic behaviors; constraining physical behaviors, on the other hand, do not have significant correlations except with unrelated behaviors. While the correlation is small, it suggests that mothers who physically limit the child's exploration also tend to use non-narrative utterances, including unrelated utterances to engage the child with the task and personal experience utterances to relate the child's experience with the content of the book (see Appendix C.4.).

Table 19

Correlations among Coded Shared Reading Behaviors

	1	2	3	4	5
1. Positive affect	1.000				
2. Constraining (physical)	0.1565	1.000			
3. Supportive (physical)	0.4882*	0.0622	1.000		
4. Narrative (linguistic)	0.5701*	-0.0564	0.6970*	1.000	
5. Non-narrative (linguistic)	0.6022*	0.2419*	0.6638*	0.7566*	1.000

* $p<0.01$

A strong correlation ($r=0.756$) was observed between narrative and non-narrative linguistic utterances. A new correlation matrix was estimated to further explore the correlations among the types of linguistic utterances (see Appendix C.3.). Positive significant correlations were observed among most of the variables, although the strength of the correlation was small to moderate. Strong correlations were observed between description and event linguistic utterances ($r=0.657$). This correlation can be explained by the fact that descriptions and events were quite similar in structure, length, and vocabulary complexity, and caregivers often used descriptions and events throughout. A strong correlation ($r=0.675$) was observed between labeling and conversational utterances as well.

Behavior Predictiveness of Child Language Outcomes

Multiple regressions were conducted to test the relationship between the behaviors showed by the mothers during the shared reading event and the child's outcomes in cognitive, expressive, and receptive language assessments (as measured by the Bayley test), while controlling for the effect of mothers' education, the income per capita, the house level of overcrowding, and the learning materials available at home. For the first set of regressions, compound variables were created by adding the coded segments for each dimension (e.g., for the positive affect dimension, physical and verbal affective behaviors were summed) and used as independent variables to predict child outcomes. Results (presented in Table 20) reveal that only supportive physical behaviors predicted child cognitive outcomes.

Table 20

Regression Results of Mother Behaviors Over Child Cognitive and Language Outcomes.

	Cognitive	**Expressive Language**	**Receptive language**
Positive affect	0.0537	0.0338	-0.0698
	(0.0564)	(0.0684)	(0.0675)
Supportive physical behaviors	0.00706*	0.00169	0.00703
	(0.00458)	(0.00545)	(0.00548)
Constraining physical behaviors	-0.00982	0.00703	-0.00165
	(0.0752)	(0.0896)	(0.0900)
Narrative	0.00537	0.00480	0.0128
	(0.00818)	(0.00974)	(0.00978)
Non narrative	-0.00609	-0.00214	-0.00981
	(0.00789)	(0.00945)	(0.00945)
Observations	101	100	102
R-squared	0.488	0.253	0.330

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

To determine if any specific narrative, non-narrative, physical, and affective behaviors had a significant effect on the child outcomes, a new set of regressions was run. Including all the behaviors simultaneously resulted in a loss of statistical power. To solve this problem, regression analysis was conducted with the all the variables in each dimension of behaviors (e.g., constraining physical behavior, narrative linguistic behavior), in addition to the covariates mentioned above. Table 21 shows the regression results. Positive physical affective behaviors significantly predicted child cognitive outcomes. For physical supportive behaviors, only letting the child hold the book while reading had a small significant effect on expressive language outcomes. None of the constraining behaviors were significant, so they were excluded from the summary table. Finally, for linguistic utterances, narrative practices were more predictive of child outcomes than non-narrative. In particular, labeling had a significant effect ($p<0.05$) on cognitive outcomes and evaluations ($p<0.05$) on expressive language. A request for information (that is, asking the child questions) had a significant effect both on expressive ($p<0.05$) and receptive ($p<0.1$) language outcomes. For non-narrative utterances, only "other" (mostly, engagement onomatopoeia) was predictive of children's expressive language outcomes.

Table 21

Regression Results of Mother Behaviors During Shared Reading Event Over Child Cognitive and Language Outcomes.

	Cognitive		Expressive Language		Receptive language	
	β	β SE	β	β SE	β	β SE
Affective physical behavior	0.140**	(0.0565)	0.0818	(0.0663)	-0.0379	(0.0685)
Affective verbal behavior	0.0287	(0.0677)	0.0286	(0.0793)	0.0250	(0.0822)
R-squared Affective	0.468		0.249		0.283	
Let the child turn the pages	0.00842	(0.0089)	0.00369	(0.0105)	-0.0002	(0.0108)
Lets the child hold the book	0.0594	(0.0454)	0.0987*	(0.0533)	0.0871	(0.0544)
Turn the pages for the child	0.00545	(0.0154)	0.00471	(0.0179)	0.0113	(0.0184)
Holds the book in front of the child	-0.0242	(0.0594)	-0.0943	(0.0695)	-0.0993	(0.0706)
Points	0.00471	(0.0156)	-0.0031	(0.0182)	0.0076	(0.0187)
R-squared Supportive	0.486		0.277		0.322	
Labeling	0.0268**	(0.0134)	0.000457	(0.0157)	0.0177	(0.0163)
Evaluation	0.0501	(0.0433)	0.106**	(0.0503)	-0.0149	(0.0527)
Description	-0.0297	(0.0185)	-0.0237	(0.0214)	-0.0139	(0.0223)
Events	0.0462	(0.0831)	-0.0295	(0.0941)	-0.0053	(0.0989)
Request of opinion	0.00276	(0.0772)	-0.0746	(0.0911)	0.0316	(0.0938)
Request of information	0.0289	(0.0267)	0.0677**	(0.0312)	0.0630*	(0.0325)
R-squared Narrative	0.506		0.318		0.330	
Personal experience	-0.0191	(0.0483)	0.0296	(0.0552)	-0.0688	(0.0577)
General knowledge	-0.0211	(0.0497)	0.0163	(0.0569)	0.00862	(0.0594)
Conversational	0.0201	(0.0142)	0.00309	(0.0163)	-0.0057	(0.0170)
Unrelated	0.00311	(0.0078)	-0.0053	(0.0090)	0.0097	(0.0094)
Other	0.0465	(0.0398)	0.0848*	(0.0458)	-0.0172	(0.0477)
R-squared Non-narrative	0.463		0.276		0.299	
Observations	101		100		102	

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Note. Constraining physical behaviors did not yield significant results and were excluded from this table.

Discussion

This study explores Chilean mothers shared reading styles with their young children. More specifically, it examines the adult affective, physical, and linguistic behaviors while sharing a wordless book with their 11- to 16-month-old children. Three analytical strategies were used in this study. First, descriptive statistics and qualitative analyses were conducted for the coded segments. Second, correlational matrices were estimated to determine the direction, strength, and significance of the relationships between the three dimensions (affective, physical, and linguistic) examined. Third, linear regressions were conducted to determine if caregiver shared reading behaviors predict child language and cognitive outcomes, controlling for demographic characteristics.

As hypothesized, participating mothers showed a wide range of literacy behaviors and high between-cases variability in the exercise of said behaviors. Additionally, mothers prioritize labeling as narrative utterances and imperative sentences ("look") and onomatopoeia as non-narrative strategies to guide the child's attention to the task. Results reveal that mothers spend much of the time trying to engage their toddlers with the book by using onomatopoeia like "iiihh" and "ohhh," short instructions like "look," "take it," and "open it," and evaluation statements like "how preeeety!" to catch their child's attention. These strategies are responsive to children's short attention span at this age.

Studies conducted in other socio-cultural contexts with children at this similar age range consistently show that mothers spend a considerable amount of time keeping the child attentive and participating in the reading task (Martin, 1997; van Kleeck et al., 1996). Furthermore, a study conducted by Cline and Edwards (2017) with Spanish-speaking mothers in the U.S. also indicated that mothers frequently used the word "mira" to engage the child with the book. Interestingly, some of these engagement strategies –using onomatopoeia and evaluation utterances– significantly predicted child expressive language development. One possible explanation for this result is that the mother's ability to engage the child in the literacy event is critical for the transmission of literacy knowledge to occur (Baker et al., 1997). In other words, if the mother is not effective in involving the child in the reading event, it is unlikely that the child will learn the content the mother is trying to teach. A complementary explanation is that these engagement utterances are usually verbalized in a high-pitched tone and exaggerated intonation, two characteristics of "motherese" or "parentese" language. Existing research has shown that infants prefer the parentese speech register (Fernald, 1985; Trainor & Desjardins, 2002), which, in turn, is related to language acquisition (Liu et al., 2003). Then, children may be responding at a higher rate to the content being taught when using (or right after using) parentese speech.

Of the linguistic utterances, asking questions (request of information) is the only one predictive of children's receptive and expressive language. This result was expected, as similar findings were obtained by Muhinyi and Rowe (2019). They observed that mother's questions during a book reading at 10-months of age positively predicted children's expressive and receptive language at 18-months. The authors argue that maternal questions might support the child's attention to the book and increase child vocalizations during the book reading. Thus, questions promote the development of critical literacy skills, like labeling and turn-taking.

On the other hand, an unexpected outcome was that descriptions resulted in non-significant negative estimated coefficients for all three outcome measures. This outcome was surprising as the vocabulary used in the descriptions was more sophisticated than the one used in other narrative utterances. The sentences were also longer and more complex, stimuli frequently related to language acquisition (Hurtado et al., 2008; Huttenlocher et al., 2010). However, it is possible that these sentences were too complex for children within this age range. Mothers often simplify the book text when sharing it with their younger children to ensure comprehension and attention (Martin & Reutzel, 1999). In the early stages of language acquisition, children also benefit from repeated exposure to words (Schwab & Lew-Williams, 2016), an event that is less likely to happen in longer utterances. Nevertheless, it is possible that if parents continue to have an elaborative sharing style with more complex vocabulary, this will support the child's language development in the future.

Finally, it is essential to note that the action of labeling the animals by their sounds (e.g., cocó for bird, mooo for cow) when interacting with young children is likely a common baby talk phenomenon among Spanish-speaking families (Ferguson, 1964). While the use of onomatopoeia has often been regarded as an engagement strategy (non-narrative), among Chilean families, it is a way of labeling (narrative) items in the book. When assessing children's progress in language development, these types of onomatopoeia could be considered a word representing the concept of the animal instead of being considered a non-narrative utterance with the underlying pragmatic intent of engaging the child in the task.

Conclusion

Contributions

This study contributes to the existing research by examining the shared reading behaviors of Chilean mothers and their young children, extending the existing research on narratives of Latino parents by considering the affective and physical behaviors in addition to the linguistic utterances. Results from this study reveal that mother requests for information and the use of some engagement strategies predict child language development. This study also provides qualitative information on socio-cultural thematic patterns in the narratives developed by these caregivers. Some of the novel patterns that emerged from this study are the use of onomatopoetic animal sounds as a labeling utterance for the animal and of high-pitched positive evaluation utterances as a strategy for child engagement with the task.

Limitations

This study has several limitations. First, the video data available came from the Three Bags Task, an evaluation that might have constrained the variability of the mother's behaviors. While a high variability in the duration of the shared reading event was observed, some participants might have cut the reading short because they felt forced to use the other bags' content. Additionally, the fact the book "Good dog Carl" is a wordless book supported the use of varied narrative styles based on the participants' preferences while ensuring that everyone could share the book regardless of their literacy level. Nevertheless, the lack of written text does not allow to evaluate how caregivers read and adapt it to scaffold the content of the book to the child's level of proximal

knowledge (Vygotsky, 1978), nor does it allows to compare and contrast the level of elaboration provided by the mother when reading the written text versus when developing their own narrative. Finally, a third limitation of this study resides in its small sample size, as there is evidence that regression analysis with small samples can be more influenced by outliers (Bollen & Jackman, 1985).

Future research

To further understand how parental behaviors during early childhood predict later child language development, it is critical to examine (1) the child's language outcomes in later developmental stages and (2) the evolution of shared reading behaviors of these caregivers. It is recommended to continue to analyze the shared reading patterns of the same sample to determine how culturally influenced narratives change in time and impact child language and literacy development. Thematic analysis of the narratives can provide insight into this population's beliefs and values being transmitted throughout the mother's storytelling. Following up on the child's language development trajectory can help disentangle the effect of the child's previous language level from the effect of parental influence.

Dissertation Conclusion

This dissertation aimed to contribute to the development of research about family literacy socialization in Chile by examining the particular socio-cultural dynamics of this community, as it encompasses its customs, values, beliefs, and resources. Using a nationally representative longitudinal database, I explored the differential effect that changes in mother and father practices have on child language and cognitive development (Study I) and the effect that their combined practices vis-a-vis other components of the home literacy environment (e.g., literacy toys) have on child outcomes (Study II). I also analyzed how parents changed their practices as children age, as these changes might reflect parental beliefs about child capabilities and time availability for shared activities (Study II). Finally, I examined mothers' physical, affective, and linguistic behaviors when sharing a book with their infants and toddlers.

Results from this dissertation contribute to further understanding the literacy dynamics of Chilean families and support the argument about the need to complexify our study of family literacy, regardless of the population being researched. While qualitative research has uncovered varied roles in the use and functions of literacy from members of different socio-cultural communities, quantitative measures often focus only on a select number of practices and resources. Results from Study I make a case for including the fathers (and likely, other family members) when studying the family literacy practices, as they have a significant effect on child developmental outcomes that are independent and different from the mother's effect. Results from Study II support the need to include other socioculturally-valued literacy practices (e.g., storytelling) and resources (e.g., literacy toys) when examining the HLE, as they make a unique contribution to child outcomes. Finally, Study III suggests that even topics that have been extensively studied, like the shared reading dynamics between a mother and a child, can yield novel information when a new population is researched. For this sample, for example, using onomatopoeias to represent animal sounds was not an engagement strategy but a way to label the animal in a fashion that is easier for the child to imitate.

Complexifying the study of the HLE can also be a course of action to counter deficit perspectives and celebrate cultural differences. If we only consider certain practices or resources when examining the HLE, we can commit omitted variable bias or favor the performance of specific communities over others. Qualitative studies on family literacy should inform the design of quantitative studies to tackle the challenge of developing measures that support equitable evaluation of members of different communities. These measures will allow us to further differentiate between universal child developmental trajectories versus child outcomes that result from exposure to particular environments.

The results from this dissertation can be used to inform the design and implementation of family literacy intervention for Chilean families. For example, evidence about the value of storytelling could be used to impulse the recovery of myths, legends, and other narratives of oral tradition to promote child language development and oral comprehension and celebrate cultural identity. Since books are not readily available for these families, other literacy artifacts that are more easily accessible, like the Bible or complimentary newspapers, could be used for literacy activities. Alternatively, mothers, fathers, and children could be invited to write their own books, where they recount family stories.

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Appendices for Study I

Appendix A.1.

Regression of Each Mother and Father Practices on Child Receptive Vocabulary.

	Model 1	Model 2	Model 3	Model 4
Book reading				
Mother	0.103***	0.0692***	0.0664***	0.0691***
	(0.0164)	(0.0223)	(0.0223)	(0.0224)
Father	0.112***	0.0398**	0.0395*	0.0321
	(0.0157)	(0.0202)	(0.0202)	(0.0204)
Mother=Father	0.7313	0.4065	0.4456	0.2986
Mother+Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Mother=Father=0	0.0000***	0.0000***	0.0000***	0.0001***
Storytelling				
Mother	0.107***	0.0944***	0.0951***	0.0977***
	(0.0162)	(0.0220)	(0.0220)	(0.0220)
Father	0.117***	0.0542***	0.0524***	0.0453**
	(0.0152)	(0.0196)	(0.0196)	(0.0198)
Mother=Father	0.6855	0.2326	0.2049	0.1234
Mother+Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Mother=Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Taking the child to the park, library, zoo, or museum				
Mother	0.0446***	0.0389*	0.0381*	0.0445**
	(0.0161)	(0.0225)	(0.0224)	(0.0226)
Father	0.0875***	0.0127	0.0123	0.00322
	(0.0154)	(0.0210)	(0.0210)	(0.0213)
Mother=Father	0.1035	0.4872	0.4940	0.2780
Mother+Father=0	0.0000***	0.0173**	0.0200**	0.0277**
Mother=Father=0	0.0000***	0.0516*	0.0588*	0.0572*
Drawing and/or conversing				
Mother	0.0302	0.00148	0.00155	0.00609
	(0.0267)	(0.0354)	(0.0354)	(0.0354)
Father	0.0909***	0.0138	0.0134	0.00310
	(0.0146)	(0.0202)	(0.0201)	(0.0206)
Mother=Father	0.0584**	0.7839	0.7908	0.9473
Mother+Father=0	0.0000***	0.6730	0.6783	0.7995
Mother=Father=0	0.0000***	0.7731	0.7818	0.9657
Observations	19,216	10,627	10,626	10,626

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix A.2.

Regression of Each Mother and Father Practices on Child Cognitive Outcomes.

	Model 1	Model 2	Model 3	Model 4
Book reading				
Mother	0.146***	0.119***	0.115***	0.115***
	(0.0185)	(0.0253)	(0.0253)	(0.0254)
Father	0.108***	0.0745***	0.0743***	0.0731***
	(0.0168)	(0.0223)	(0.0223)	(0.0226)
Mother=Father	0.1897	0.2699	0.3147	0.3013
Mother+Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Mother=Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Storytelling				
Mother	0.133***	0.107***	0.103***	0.103***
	(0.0182)	(0.0246)	(0.0246)	(0.0247)
Father	0.112***	0.0844***	0.0847***	0.0837***
	(0.0167)	(0.0221)	(0.0221)	(0.0224)
Mother=Father	0.4631	0.5623	0.6294	0.6150
Mother+Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Mother=Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Taking the child to the park, library, zoo, or museum				
Mother	0.0791***	0.100***	0.0972***	0.0998***
	(0.0184)	(0.0260)	(0.0259)	(0.0262)
Father	0.0878***	0.0121	0.0118	0.00801
	(0.0170)	(0.0240)	(0.0240)	(0.0245)
Mother=Father	0.7748	0.0472**	0.0541*	0.0422**
Mother+Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Mother=Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Drawing and/or conversing				
Mother	0.0791**	0.0795*	0.0790*	0.0801*
	(0.0320)	(0.0436)	(0.0436)	(0.0437)
Father	0.0738***	0.0276	0.0293	0.0265
	(0.0157)	(0.0230)	(0.0229)	(0.0235)
Mother=Father	0.8904	0.3374	0.3572	0.3283
Mother+Father=0	0.0000***	0.0147**	0.0136**	0.0151**
Mother=Father=0	0.0000***	0.0438**	0.0391**	0.0466**
Observations	17,405	9,567	9,567	9,567

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix A.3.

Correlation Matrix of Parent Practices.

		Mother				Father			
		Book reading	Story telling	Rec.	Draw & Conv.	Book reading	Story telling	Rec.	Draw & Conv.
Mother	Book reading	1.0000							
	Storytelling	0.3413	1.0000						
	Recreational	0.5137	0.2202	1.0000					
	Draw & Conv.	0.2309	0.7063	0.3059	1.0000				
Father	Book reading	0.1458	0.0612	0.1471	0.0660	1.0000			
	Storytelling	0.0858	0.4252	0.0811	0.4450	0.3648	1.0000		
	Recreational	0.1674	0.0933	0.1984	0.1086	0.0447	0.1611	1.0000	
	Draw & Conv.	0.0894	0.5315	0.0721	0.5535	0.0267	0.5135	0.1841	1.0000

Appendix A.4.

Chi-square Tests for Mother and Father Practices (PPVT)

	Model 1	**Model 2**	**Model 3**	**Model 4**
Book reading				
Mother=Father	0.4742	0.5602	0.6356	0.5796
Mother+Father=0	0.0000***	0.2140	0.2566	0.2811
Mother=Father=0	0.0000***	0.3754	0.4568	0.4650
Storytelling				
Mother=Father	0.4773	0.5935	0.5172	0.4802
Mother+Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Mother=Father=0	0.0000***	0.0001***	0.0001***	0.0001***
Taking the child to the park, library, zoo, or museum				
Mother=Father	0.6874	0.3908	0.4008	0.3070
Mother+Father=0	0.0002***	0.2587	0.2725	0.2721
Mother=Father=0	0.0006***	0.3429	0.3616	0.3011
Drawing and/or conversing				
Mother=Father	0.1569	0.5995	0.6001	0.7348
Mother+Father=0	0.7506	0.1109	0.1168	0.0955*
Mother=Father=0	0.3605	0.2784	0.2904	0.2343
Other				
Mom_Book=Mom_Story=0	0.0000***	0.0001***	0.0001***	0.0001***
Mom_Park=Mom_Draw=0	0.0337**	0.2508	0.2633	0.2297
Dad_Book=Dad_Story=0	0.0000***	0.0328**	0.0396**	0.0572*
Dad_Park=Dad_Draw=0	0.0616*	0.6966	0.7086	0.4967
Observations	19,216	10,627	10,626	10,626

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix A.5.

Chi-square Tests for Mother and Father Practices (BDI)

	Model 1	**Model 2**	**Model 3**	**Model 4**
Book reading				
Mother=Father	0.1584	0.4630	0.4905	0.4778
Mother+Father=0	0.0000***	0.0002***	0.0004***	0.0004***
Mother=Father=0	0.0000***	0.0008***	0.0014***	0.0015***
Storytelling				
Mother=Father	0.4652	0.9135	0.8781	0.8798
Mother+Father=0	0.0000***	0.0010***	0.0011***	0.0011***
Mother=Father=0	0.0000***	0.0046***	0.0049***	0.0050***
Taking the child to the park, library, zoo, or museum				
Mother=Father	0.4957	0.0194**	0.0202**	0.0185**
Mother+Father=0	0.0000***	0.0032***	0.0047***	0.0049***
Mother=Father=0	0.0000***	0.0008***	0.0011***	0.0011***
Drawing and/or conversing				
Mother=Father	0.6721	0.4688	0.4818	0.4615
Mother+Father=0	0.7535	0.7872	0.7320	0.7482
Mother=Father=0	0.9060	0.7654	0.7809	0.7618
Other				
Mom_Book=Mom_Story=0	0.0000***	0.0001***	0.0001***	0.0001***
Mom_Song=Mom_Draw=0	0.0022***	0.0013***	0.0016***	0.0015***
Dad_Book=Dad_Story=0	0.0001***	0.0020***	0.0020***	0.0023***
Dad_Song=Dad_Draw=0	0.1236	0.4949	0.5104	0.4705
Observations	17,405	9,567	9,567	9,567

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix A.6.

Principal Components (Eigenvectors) for Mother and Father Practices.

Mother	Comp. 1	Comp. 2	Comp. 3	Comp. 4
Book reading	0.5562	-0.2691	-0.4408	0.6511
Storytelling	0.5773	-0.2493	-0.2206	-0.7456
Recreational	0.3218	0.9302	-0.1763	-0.0097
Draw & Conv.	0.5038	-0.0113	0.8520	0.1418

Father	Comp. 1	Comp. 2	Comp. 3	Comp. 4
Book reading	0.5153	-0.4542	0.2521	0.6816
Storytelling	0.5207	-0.4276	0.1314	-0.7272
Recreational	0.4574	0.7477	0.4807	-0.0254
Draw & Conv.	0.5042	0.2275	-0.8295	0.0773

Appendix A.7.

Regression of PC Variables of Mother and Father Practices on Child Receptive Vocabulary.

	Model 1	**Model 2**	**Model 3**	**Model 4**
PC Mother Practices	0.0691***	0.0514***	0.0507***	0.0530***
	(0.00874)	(0.0121)	(0.0121)	(0.0121)
PC Father Practices	0.0589***	0.0186*	0.0181*	0.0128
	(0.00725)	(0.0101)	(0.0101)	(0.0103)
Mother=Father	0.4205	0.0720*	0.0734*	0.0298**
Mother+Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Observations	19,216	10,627	10,626	10,626

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Appendix A.8.

Effect of PC Variable of Mother and Father Practices on Child Cognitive Outcomes.

	Model 1	**Model 2**	**Model 3**	**Model 4**
PC Mother Practices	0.0999***	0.0889***	0.0864***	0.0865***
	(0.0102)	(0.0138)	(0.0138)	(0.0139)
PC Father Practices	0.0532***	0.0321***	0.0324***	0.0316***
	(0.00791)	(0.0115)	(0.0115)	(0.0118)
Mother=Father	0.0015***	0.0073***	0.0107**	0.0111**
Mother+Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Observations	17,405	9,567	9,567	9,567

Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix A.9.

Principal Components (Eigenvectors) for Mother and Father Book Reading-Storytelling and Recreational-Conversing Practices.

Mother	Comp. 1	Comp. 2
Book reading	0.7071	
Storytelling	0.7071	-0.7071

Mother	Comp. 1	Comp. 2
Recreational	0.7071	
Draw & Conv.	0.7071	-0.7071

Father	Comp. 1	Comp. 2
Book reading	0.7071	
Storytelling	0.7071	-0.7071

Father	Comp. 1	Comp. 2
Recreational	0.7071	
Draw & Conv.	0.7071	-0.7071

Appendix A.10.

Chi-square Tests for PC Subtype Variables of Mother and Father Practices (PPVT)

	Model 1	**Model 2**	**Model 3**	**Model 4**
Story-Book: Mother=Father	0.1813	0.3073	0.3049	0.2487
Story-Book: Mother+Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Recreation-Draw: Mother=Father	0.5164	0.4438	0.4552	0.2810
Recreation-Draw: Mother+Father=0	0.0005***	0.9486	0.9572	0.9426
Observations	19,216	10,627	10,626	10,626

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix A.11.

Chi-square Tests for PC Subtype Variables of Mother and Father Practices (BDI)

	Model 1	Model 2	Model 3	Model 4
Story-Book: Mother=Father	0.0280	0.5479	0.6089	0.5951
Story-Book: Mother+Father=0	0.0000***	0.0000***	0.0000***	0.0000***
Recreation-Draw: Mother=Father	0.2442	0.0065***	0.0078***	0.0072***
Recreation-Draw: Mother+Father=0	0.0000***	0.0145**	0.0161**	0.0180**
Observations	17,405	9,567	9,567	9,567

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix A.12.

Regression of Mother, Father, and Mother-Father Interaction Practices on Child Receptive Vocabulary Outcomes.

	Model 1	Model 2	Model 3	Model 4
Book reading				
Mother	0.0777***	0.0348	0.0309	0.0318
	(0.0206)	(0.0282)	(0.0281)	(0.0281)
Father	0.0941*	0.00511	0.00529	0.00366
	(0.0520)	(0.0612)	(0.0613)	(0.0614)
Mother#Father	-0.0575	-0.00195	-0.00184	-0.00261
	(0.0552)	(0.0652)	(0.0653)	(0.0654)
Storytelling				
Mother	0.0765***	0.0669**	0.0686**	0.0698**
	(0.0213)	(0.0298)	(0.0297)	(0.0297)
Father	0.0521	0.0235	0.0185	0.0183
	(0.0405)	(0.0488)	(0.0487)	(0.0487)
Mother#Father	0.00163	0.0433	0.0470	0.0450
	(0.0451)	(0.0549)	(0.0548)	(0.0548)
Taking the child to the park, library, zoo, or museum				
Mother	0.0451**	0.0421	0.0396	0.0442
	(0.0191)	(0.0271)	(0.0271)	(0.0272)
Father	0.0404	0.0265	0.0208	0.0197
	(0.0385)	(0.0498)	(0.0496)	(0.0496)
Mother#Father	-0.0149	-0.0433	-0.0361	-0.0394
	(0.0427)	(0.0566)	(0.0564)	(0.0564)
Drawing and/or conversing				
Mother	-0.0508	-0.0755*	-0.0749*	-0.0712*
	(0.0316)	(0.0422)	(0.0421)	(0.0421)
Father	-0.0633	-0.139	-0.139	-0.142
	(0.0679)	(0.0893)	(0.0894)	(0.0894)
Mother#Father	0.0927	0.131	0.132	0.128
	(0.0697)	(0.0922)	(0.0922)	(0.0923)
Observations	19,216	10,627	10,626	10,626

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix A.13.

Regression of Mother, Father, and Mother-Father Interaction Practices on Child Cognitive Outcomes.

	Model 1	**Model 2**	**Model 3**	**Model 4**
Book reading				
Mother	0.0970***	0.0717**	0.0700**	0.0704**
	(0.0234)	(0.0330)	(0.0330)	(0.0330)
Father	0.0137	0.0186	0.0235	0.0235
	(0.0557)	(0.0684)	(0.0685)	(0.0685)
Mother#Father	0.0455	0.0322	0.0250	0.0240
	(0.0589)	(0.0729)	(0.0730)	(0.0731)
Storytelling				
Mother	0.0823***	0.0600*	0.0572*	0.0573*
	(0.0235)	(0.0334)	(0.0335)	(0.0335)
Father	0.0787*	0.0852	0.0818	0.0819
	(0.0475)	(0.0588)	(0.0588)	(0.0588)
Mother#Father	-0.0385	-0.0332	-0.0280	-0.0283
	(0.0518)	(0.0645)	(0.0645)	(0.0645)
Taking the child to the park, library, zoo, or museum				
Mother	0.0727***	0.126***	0.124***	0.125***
	(0.0218)	(0.0313)	(0.0313)	(0.0314)
Father	0.0761	0.0995	0.0987	0.0971
	(0.0463)	(0.0609)	(0.0607)	(0.0608)
Mother#Father	-0.0419	-0.152**	-0.152**	-0.152**
	(0.0511)	(0.0689)	(0.0688)	(0.0689)
Drawing and/or conversing				
Mother	0.0174	0.0279	0.0277	0.0286
	(0.0366)	(0.0520)	(0.0519)	(0.0520)
Father	0.0167	0.00414	0.000107	-0.000747
	(0.0864)	(0.105)	(0.105)	(0.105)
Mother#Father	-0.0196	-0.0122	-0.00538	-0.00637
	(0.0886)	(0.109)	(0.109)	(0.109)
Observations	17,405	9,567	9,567	9,567

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix A.14.

Regression of PC Variables and Interaction Practices on Child Receptive Language Outcomes.

	Model 1	Model 2	Model 3	Model 4
PC Mother	0.0681***	0.0516***	0.0509***	0.0532***
	(0.00889)	(0.0121)	(0.0121)	(0.0121)
PC Father	0.0620***	0.0135	0.0125	0.00723
	(0.00883)	(0.0119)	(0.0119)	(0.0121)
PC Mother#Father	-0.00574	0.00951	0.0105	0.0105
	(0.00964)	(0.0128)	(0.0128)	(0.0128)
Observations	19,216	10,627	10,626	10,626

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix A.15.

Regression of PC Variables and Interaction Practices on Child Cognitive Outcomes.

	Model 1	**Model 2**	**Model 3**	**Model 4**
PC Mother	0.0995***	0.0889***	0.0863***	0.0865***
	(0.0104)	(0.0138)	(0.0138)	(0.0139)
PC Father	0.0545***	0.0346**	0.0347**	0.0339**
	(0.0103)	(0.0141)	(0.0141)	(0.0144)
PC Mother#Father	-0.00232	-0.00470	-0.00439	-0.00436
	(0.0117)	(0.0150)	(0.0149)	(0.0149)
Observations	17,405	9,567	9,567	9,567

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendices for Study II

Appendix B.1.

Effect of Each Parent Practice on Child Receptive Vocabulary Outcomes.

	Model 1	Model 2	Model 3	Model 4	Model 5
Book reading	0.107***	0.0533***	0.0518***	0.0492***	0.0455***
	(0.00937)	(0.0118)	(0.0118)	(0.0118)	(0.0165)
Storytelling	0.112***	0.0727***	0.0721***	0.0696***	0.0462***
	(0.00963)	(0.0121)	(0.0121)	(0.0121)	(0.0168)
Recreational activities	0.0669***	0.0252**	0.0246**	0.0230**	0.00978
	(0.00868)	(0.0108)	(0.0108)	(0.0108)	(0.0158)
Drawing and Conversing	0.0752***	0.0103	0.0101	0.00395	6.74e-05
	(0.0120)	(0.0154)	(0.0154)	(0.0156)	(0.0201)
Observations	19,216	10,627	10,626	10,626	5,591

Note. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Appendix B.2.

Effect of Parent Practices on Child Cognitive Outcomes.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Book reading	0.126***	0.0953***	0.0932***	0.0928***	0.0923***
	(0.00985)	(0.0126)	(0.0126)	(0.0126)	(0.0180)
Storytelling	0.122***	0.0950***	0.0935***	0.0931***	0.0790***
	(0.0102)	(0.0130)	(0.0130)	(0.0130)	(0.0183)
Recreational activities	0.0836***	0.0544***	0.0528***	0.0522***	0.0638***
	(0.00918)	(0.0115)	(0.0114)	(0.0115)	(0.0173)
Drawing and Conversing	0.0753***	0.0431**	0.0441**	0.0429**	0.0344
	(0.0130)	(0.0180)	(0.0180)	(0.0182)	(0.0238)
Observations	17,405	9,567	9,567	9,567	4,587

Note. Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix B.3.

Correlation Matrix of Parent Practices.

	Book reading	Storytelling	Recreational	Draw & Conv.
Book reading	1.000			
Storytelling	0.6342	1.000		
Recreational	0.2840	0.2967	1.000	
Draw & Conv.	0.4026	0.4201	0.3457	1.000

Appendix B.4.

Chi-square Tests for Parent Practices (PPVT)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Book reading=Storytelling	0.7203	0.0799*	0.0669*	0.0650*	0.9375
Book reading+Storytelling=0	0.0000***	0.0000***	0.0000***	0.0000***	0.0008***
Book reading=Storytelling=0	0.0000***	0.0000***	0.0000***	0.0000***	0.0035***
Book reading=Recreational	0.1620	0.7636	0.8186	0.8487	0.2174
Book reading+Recreational=0	0.0000***	0.1059	0.1337	0.1540	0.2132
Book reading=Recreational=0	0.0000***	0.2666	0.3176	0.3523	0.2809
Book reading=Conversing	0.0027***	0.0368**	0.0461**	0.0323**	0.0520*
Book reading+Conversing=0	0.0007***	0.4900	0.4518	0.3082	0.9341
Book reading=Conversing=0	0.0000***	0.1008	0.1175	0.0738*	0.1475
Storytelling=Recreational	0.0738*	0.0092***	0.0081***	0.0085***	0.2071
Storytelling+Recreational=0	0.0000***	0.0000***	0.0000***	0.0000***	0.1647
Storytelling=Recreational=0	0.0000***	0.0000***	0.0000***	0.0000***	0.2427
Storytelling=Conversing	0.0012***	0.0001***	0.0001***	0.0000***	0.0475**
Storytelling+Conversing=0	0.0001***	0.1098	0.1002	0.1672	0.8530
Storytelling=Conversing=0	0.0000***	0.0001***	0.0001***	0.0001***	0.1356
Recreational=Conversing	0.0450**	0.0421**	0.0463**	0.0288**	0.3308
Recreational+Conversing=0	0.0174*	0.2688	0.2702	0.1720	0.2024
Recreational=Conversing=0	0.0005***	0.1192	0.1284	0.0784*	0.3627
Observations	19,216	10,627	10,626	10,626	5,591

Note. Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix B.5.

Chi-square Tests for Parent Practices (BDI)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Book reading =Storytelling	0.4718	0.8839	0.9255	0.9300	0.3820
Book reading+Storytelling=0	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
Book reading=Storytelling=0	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
Book reading=Recreational	0.1180	0.2518	0.2617	0.2622	0.4782
Book reading+Recreational=0	0.0000***	0.0000***	0.0000***	0.0000***	0.0001***
Book reading=Recreational=0	0.0000***	0.0000***	0.0000***	0.0000***	0.0003***
Book reading=Conversing	0.0000***	0.0084***	0.0133**	0.0136**	0.0237**
Book reading+Conversing=0	0.0002***	0.0594*	0.0571*	0.0607*	0.1042
Book reading=Conversing=0	0.0000***	0.0017***	0.0027***	0.0028***	0.0122**
Storytelling=Recreational	0.5712	0.3553	0.3305	0.3270	0.6642
Storytelling+Recreational=0	0.0000***	0.0000***	0.0000***	0.0000***	0.0056***
Storytelling=Recreational=0	0.0000***	0.0001***	0.0001***	0.0001***	0.0115**
Storytelling=Conversing	0.0008***	0.0163**	0.0212**	0.0214**	0.2252
Storytelling+Conversing=0	0.0053***	0.0874*	0.0729*	0.0756*	0.5777
Storytelling=Conversing=0	0.0000***	0.0064***	0.0070***	0.0070***	0.3829
Recreational=Conversing	0.0014***	0.0630*	0.0872*	0.0887*	0.0842*
Recreational+Conversing=0	0.0092***	0.3105	0.2892	0.2994	0.2718
Recreational=Conversing=0	0.0000***	0.0200**	0.0272**	0.0283**	0.0488**
Observations	17,405	9,567	9,567	9,567	4,587

Note. Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix B.6.

Regression of PC Variable for Book Reading, Storytelling, and Recreational Parent Practices on Child Cognitive Outcomes.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
PC Practices	0.114***	0.0879***	0.0861***	0.0859***	0.0843***
	(0.00782)	(0.0100)	(0.0100)	(0.0101)	(0.0143)
Observations	17,405	9,567	9,567	9,567	4,587

Note. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Appendices for Study III

Appendix C.1.

Codebook

Reading event times: Coded with a green star or green memo

- Beginning of coding event: Caregiver takes the book out of the bag.
- End of reading event: Caregiver picks up the second bag or guides the attention to the child to another bag. Exception: If the child continues to use the book even after the efforts of the caregiver to center the attention to the child to another bag and the caregiver recenters the attention to the book, the end of the reading event is postponed.

1. **Affective**
   1.1. **Positive affect:** "This [code] taps the parent's expression of love, respect and/or admiration for the child. Positive regard is evident in the way(s) in which the parent listens, watches attentively and looks into the child's face when talking to him/her."
      1.1.1. **Physical signs of positive affect:** e.g., caressing, kissing
         - Caressing the child
         - Kissing the child
         - Hugging the child
         - Laughing with the child
         - Smiling to the child while looking at each other
         - Facial signs of concern and/or empathy for the child's distress
      1.1.2. **Verbal signs of positive affect:**
         - Verbal utterances of enthusiasm about the child
         - Praising and/or complimenting the child
         - Verbal utterances of concern and/or empathy for the child's distress
   1.2. **Negative affect:** "This [code] reflects the parent's expression of discontent with, anger toward, disapproval of, and/or rejection of the child."
      1.2.1. **Physical signs of negative affect:**
         - Signs of frustration (e.g., sighs, rolling eyes)
         - Physical roughness with the child (e.g., yanking the child's arm; slapping or hitting the child)
         - Cold looks towards the child
         - Tense body, facial muscles, or strained expression
         - Threatening posture (e.g., looming over the child in a menacing way)
      1.2.2. **Verbal signs of negative affect:**
         - Disapproving and/or negative voice
         - Snappish responses to the child's bids
         - Punitive behavior (e.g., "If you don't get over here right now, I'm going to get you.")

- Threatening the child (verbally) for failing at a task or for not interacting with the toys in the way the parent desires (e.g., "If you don't start trying harder, I'm going to put all of the toys away)
- Harsh vocalizations and/or verbalizations (e.g., "Shut up!" "Get back on the mat right now!")
- Abruptness with the child (e.g., curt, business-like comments without eye contact)
- Calling the child unflattering names or belittling the child's efforts

2. **Physical**
   2.1. **Supportive behavior:** Parent's range of physical actions that seek to support the child's exploration and engagement with the book (e.g., allowing non-standard book manipulation like mouthing, banging, or closing book, changing position to support the child's viewing of the book, assisting child's action.
   - 2.1.1. **Holds the book in front of the child:** Moves the book to keep it in child's sight line.
   - 2.1.2. **Passes the pages for the child:** The caregiver passes the pages to the book, for the child to see new illustrations.
   - 2.1.3. **Lets the child hold the book:** Coded even when the child is holding the book with one hand.
   - 2.1.4. **Lets the child pass the pages of the book:** The caregiver allows the child to pass the pages independently, that is, the caregiver does not help the child pass the pages.
        NOTE: If the researcher assistant has doubts about if is the caregiver or the child which turns around the page, code both (sometimes both pass the page).
        NOTE: It will only be coded *"Lets the child pass the pages"* or *"Pass the pages for the child"* if it is an <u>intention</u> of the subject to pass the page
        NOTE: It will only be coded "*Lets the child pass the pages"* or *"Pass the pages for the child"* if it the page is completely passed.
   - 2.1.5. **Points:** with a finger or the hand to the illustrations in the book. May be accompanied of labeling.

   2.2. **Constraining behavior:** Parent's range of physical actions that limit or inhibit the child's physical movement and book use. The caregiver's consistent physical constraining clearly restricts the child's physical growth and independent exploration (e.g., Pinches, pulls, or pushes child, restricts child's movements, impedes child to have alternative focus of attention).
   - 2.2.1. **Pinches, pulls, or pushes child** (Resnick et al., 1987)
   - 2.2.2. **Restricts child's movements** (Resnick et al., 1987)
   - 2.2.3. **Forcefully takes the book away from the child**
   - 2.2.4. **Strongly resists the child turning pages** (Resnick et al., 1987)
     - <u>NOTE</u>: Mother (softly) taking the book from the child's hand to reengage the child into the reading event is not considered a constraining behavior.

3. **Linguistic**
   3.1. **Narrative**

3.1.1. Labeling: "Labels were coded as utterances that provided or requested name of objects and pictures in the book (e.g., Éste es un perro [this is a dog])." (p. 331). If the caregiver describes or evaluates an event, then there is no labeling, unless the labeling is clearly separated from the description or evaluation (e.g., La mamá… la mamá está peinando al niño).

- Label action (e.g., verb) (Melzi et al., 2011)
- Label event (e.g., picnic) (Melzi et al., 2011)
- Label pictures (e.g., object, person, animal) (Melzi et al., 2011)
  NOTE: If the labeling occurs within a description, evaluation, or event, it should not be coded as labeling, but as description, evaluation, or event.

3.1.2. Evaluations: "Evaluations were identified as utterances that provided or requested judgment or subjective information (e.g., Ojalá que el niñito encuentre a su rana [let's hope that the little boy finds his frog])" (p. 331)

3.1.3. Descriptions: "Descriptions were coded as utterances that provided or requested explanations or elaborations of plot information provided in the pictures (e.g., El niño está sentado en la cama [the boy is sitting on the bed]). Descriptions were identified as occurring in the present or nearpresent tense and characterizing an immediate activity." (p. 331)

- Describe action (e.g., adverb)
- Describe picture (e.g., parts or attributes)

3.1.4. Events: "Events included utterances that provided or requested actions that moved the story forward and therefore were told in the past tense (e.g., El niño y sus amigos caminaron al agua [the boy and his friends walked towards the water])" (p. 331)

3.1.5. Request of opinion: Caregiver questions that seek for the child to provide an opinion related to the shared reading event. For example: "Te gusta el perro? [Do you like the dog?]" or "Te gustó el libro? [Did you like the book?]".

3.1.6. Request of information: Caregiver questions that seek for the child to provide information related to shared reading event. For example: "Where is the baby?" or "What sound does the dog make?"

3.2. Non-narrative

3.2.1.   Conversational: "Conversational utterances were identified as provisions or requests for confirmations, corrections, clarifications or responses to a partner's previous utterance (e.g., Muy bien, tú sabes mucho [very good, you know a lot])." (p. 331)

- Confirmations
- Corrections
- Clarifications
- Backchanneling (e.g., mmhm)
- Full repetition of interlocutor's prior utterance
- Partial repetition of interlocutor's prior utterance

3.2.2.   General knowledge: "General knowledge codes include utterances which provided or requested definitions [or explanations] (e.g., Las Abejas pican [bees sting]), counting, or talk about the process of booksharing." (p. 331)

- Naming letters or producing letter sounds

- Counting
- Teaching how to use the book (e.g., pass the pages from left to right, positioning the book in the correct way, etc.)

3.2.3.   Personal experience: "Personal experience was used to identify utterances that requested or provided connections between the child's experiences and the story." (p. 332)

- Text to life child (relate book to child's life)

3.2.4.   Unrelated: "Any utterance that was entirely unrelated to the narrative." (Melzi et al., p. 1287).

- Conversation about the present (e.g., child behaviors)
- "Cálmate": unrelated + instruction
- "Llama a la Lucy": unrelated + instruction
- "Vamos a sentarnos aquí"
- "Qué pasó?" (in response to the child opening their mouth": unrelated + interactive

3.2.5.   Other:

4. **Pragmatic intent**
   4.1. **Informative:** Utterances in which the caregiver provides informative statements to the child (e.g., "This is a dog", "The baby is sitting in the crib", etc.)
   4.2. **Interactive: "**Utterances that engaged the interlocutor, including requests for information (e.g., questions, fill-in the blank statements), answers to requests made by the interlocutor, statements that directed the behavior of the interlocutor (e.g., directing attention to the book), and utterances with a single interactional marker." (p. 110)
   4.3. **Instructions:** Caregiver provides an instruction to the baby such as "deja el libro ahí" "párate", "tómalo tú", etc.
   - Coded by itself if is related to shared reading task (e.g., "grab the book", "abre el libro aquí")
   - Coded with unrelated if the instruction refers to out-of-tasks behavior (e.g., "llama a la Lucy" (the dog)).
   4.4. **Responsiveness (child oriented):** Appropriate and consistent parent behaviors in response to the child's social, emotional, and physical needs (e.g., Interpret, imitate, repeats, or responds to child's sound, talk, or action; gives words to child's vocalization)
   - Describe child's action (van Kleeck et al., 1996)
   - Interpret child's sound or action (van Kleeck et al., 1996)
   - Imitate child's sound or action (van Kleeck et al., 1996)
   - Repeats child's sound or action (Resnick et al., 1987)
   - Respond to child's action (van Kleeck et al., 1996)
   - Respond to child's talk (van Kleeck et al., 1996)
   - Corrects child's vocalization (Resnick et al., 1987)
   - Elaborates child's vocalization (Resnick et al., 1987)
   - Gives words to child's vocalization (Resnick et al., 1987)
   4.5. **Engagement (task oriented):** Parent behaviors that seek to interest the child with the reading event (e.g., Verbal attention getter like saying "Look," "Come here" or child's

name; using vocal attention getter (non-semantic sound effects); acting out something in the book; enacting while playing with the book (Barking while using the book to simulate the barking).

- Verbal attention getter ("Look," "Come here" or child's name)
- Sound effects (Animals or machine noises, semantic sounds)
- Sing-song cadence
- Vocal attention getter (non-semantic sound effects)
- Act out something in the book
- Make eye contact with child
- Games with book (use book as toy or other object)
- Limit available visual and tactile material
- Require joint attention before going on
- Visually check the child to monitor child's attention

Appendix C.2.

Percentages of Coded Shared Reading Behaviors.

		Coded segments	Percentage by area	Percentage by dimension
Linguistic	Non-Narrative Utterances			
	Personal Experience	97	3,85%	2,22%
	General Knowledge	124	4,92%	2,84%
	Conversational	410	16,27%	9,38%
	Unrelated	1682	66,75%	38,47%
	Other	207	8,21%	4,73%
	Total	2520	100%	
	Narrative Utterances			
	Labeling	859	46,38%	19,65%
	Evaluations	163	8,80%	3,73%
	Descriptions	428	23,11%	9,79%
	Events	40	2,16%	0,91%
	Request of Opinion	69	3,73%	1,58%
	Request of Information	293	15,82%	6,70%
	Total	1852	100%	
	Dimension Total	4372		100%
Pragmatic Intent	Pragmatic Intent of Utterances			
	Interactive	668		10,88%
	Instruction	1277		20,79%
	Informative	1513		24,64%
	Engagement	2019		32,88%
	Responsiveness	664		10,81%
	Total	6141		100%
Physical	Constraining Physical Behavior			
	Strongly resists child turning pages	3	9,38%	0,09%
	Pinches. pulls. or pushes child	1	3,13%	0,03%
	Restricts child's movement	27	84,38%	0,81%
	Forcefully takes the book away from the child	1	3,13%	0,03%
	Total	32		
	Supportive Physical Behavior			
	Let the child pass the pages	920	27,90%	27,63%

	Lets the child hold the book	319	9,67%	9,58%
	Pass the pages for the child	1067	32,35%	32,04%
	Points	673	20,41%	20,21%
	Holds the book in front of the child	319	9,67%	9,58%
	Total	3298	100%	
	Dimension Total	3330		100%
	Possitive Affect			
	Physical	91	61,49%	61,49%
	Verbal	57	38,51%	38,51%
Affect	**Total**	148	100%	100%
	Negative Affect			
	Physical	0	0%	0%
	Verbal	0	0%	0%
	Total	0	0%	0%

Appendix C.3.

Correlations among Coded Linguistic (Narrative and Non-narrative) Utterances.

	1	2	3	4	5	6	7	8	9	10	11
1. Labeling	1.00										
2. Evaluation	0.519*	1.000									
3. Description	0.440*	0.453*	1.000								
4. Event	0.388*	0.541*	0.657*	1.000							
5. Req. of Opinion	0.359*	0.499*	0.226	0.259*	1.000						
6. Req. of Info.	0.319*	0.192	0.454*	0.215	0.118	1.000					
7. Pers. Experience	0.211	-0.018	0.218	-0.017	-0.010	0.075	1.000				
8. Gral. Knowledge	0.366*	0.280*	0.306*	0.260*	0.165	0.207	0.107	1.000			
9. Conversat.	0.675*	0.397*	0.570*	0.374*	0.229	0.381*	0.083	0.266*	1.000		
10. Unrelated	0.429*	0.389*	0.466*	0.280*	0.309*	0.344*	0.290*	0.315*	0.277*	1.000	
11. Other	0.477*	0.434*	0.371*	0.261*	0.157	0.463*	0.251*	0.211	0.345*	0.417*	1.00

* $p < 0.01$

Appendix C.4.

Correlations among Coded Constraining Behaviors and Non-Narrative Linguistic Utterances.

	1	2	3	4	5	6	7	8	9
1. Resists the child turning pages	1.000								
2. Restricts child movement	0.077	1.000							
3. Forcefully takes the book	-0.012	0.397*	1.000						
4. Pinches, pulls, or pushes child	-0.008	0.583*	0.704*	1.000					
5. Pers. Experience	-0.046	0.111	-0.066	-0.046	1.000				
6. Gral. Knowledge	-0.003	0.246*	0.290*	0.472*	0.107	1.000			
7. Conversational	-0.057	-0.038	-0.023	-0.024	0.083	0.266*	1.000		
8. Unrelated	-0.058	0.342*	0.159	0.235	0.290*	0.315*	0.277*	1.000	
9. Other	-0.033	0.057	0.106	0.053	0.251*	0.211	0.345*	0.417*	1.000

* $p < 0.01$