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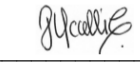
Signature 

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Parenting and Early Language Development of Young Children in South Korea

A Dissertation

presented by

So Yeon Shin

to

The Committee on Higher Degrees in Education

in partial fulfillment of the

requirements for the degree of

Doctor of Philosophy in

the subject of

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Harvard University

Cambridge, Massachusetts

May 2021

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Dissertation Advisor: Professor Meredith L. Rowe So Yeon Shin

Parenting and Early Language Development of Young Children in South Korea

Abstract

Following the social interactionist and language socialization theories, language development research points to the importance of parents' role in shaping children's early experiences and their development. Although there is an established body of research examining early language development in Western cultures, the need for a more nuanced understanding of variations across different cultures and languages remains. In my dissertation, I add to this growing effort to expand our knowledge about child development by conducting three studies that examine early experiences and development of children growing up in South Korea.

In Study 1, I take a broad look at the early experiences of Korean children and examine the longitudinal relations between maternal characteristics, early home experiences, and children's later language outcomes by analyzing a longitudinal dataset drawn from a national sample of 1,894 Korean families. In Study 2, I take a closer look at children's daily experiences by examining parent-child interactions and investigating whether, in a sample of 31 Korean families, mothers' and their 1-year-olds' use of gesture is related to children's vocabulary skills at age 3. In Study 3, I highlight variations within Korea by exploring how variations in parental cultural and linguistic backgrounds shape their language use during interactions with their preschool-aged children by examining data from 36 monolingual Korean families and 33 multilingual Korean families. Together, findings from these studies add to the emerging body of cross-cultural and international research and knowledge on parent-child interaction and early language development.

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Acknowledgements

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I would also like to thank many friends and colleagues in Cambridge and elsewhere—Liu Jiang, Gladys Aguilar, April Boin Choi, Jaein Lee and many others too numerous to mention—who made this journey more meaningful and doable. In addition, I would like to extend my gratitude to my research teammates without whom the work (quite literally) could not have been done: Lena Jeong, Soobin Lee, Michelle Chung, Joohee Baik, Sueyoon Lee, Hong Beom Choi, Ah-reum Kim, Eunyoung Chung, and Eun-ah Hwang. I also gratefully acknowledge the Korea Institute Graduate Summer Research Grant and the Graduate School of Arts and Sciences Frederick Sheldon Traveling Fellowship that supported my research training and made my international field work possible.

Last but not least, I am forever grateful for my parents, my brother, and Nicholas, who have played an indispensable role of supporting me all these years, keeping me on track, and

always being there for me. Their love and support have been and will be the foundation of what I do… always.

General Introduction

The social interactionist theory of language development posits that young children acquire their language skills by interacting with adults—most often, their parents (Bates, 1979a; Vygotsky, 1978). Indeed, researchers have shown that day-to-day interactions with parents serve as a helpful source of language input and a useful platform for children to practice their language skills (Beals, 2001; De Temple, 2001; Hoff, 2003; Huttenlocher et al., 1991; Pan et al., 2005; Snow et al., 2001). Yet, most of our knowledge about early language development comes from studies that have examined only the relatively small portion of the world's population residing in Western countries. The limitation constrains our ability to develop a more generalized understanding of child development (Arnett, 2008; Henrich, Heine, & Norenzayan, 2010), especially, as language socialization theory posits, given that early language experiences and development are shaped by cultural context where children grow up (Fogle & King, 2017; Ochs & Schieffelin, 1984; 2017).

Extending existing research efforts in Western contexts to further understand and promote all children's development, LeVine (2004) urges researchers to broaden their research focus and consider the role of specific cultural contexts, as it is "impossible to generalize validly about human child development on the basis of observations restricted to one population or closely related ones" (p. 151). Considering parenting and child development as culturally constructed phenomenon (Harkness & Super, 2002), the emphasis on considering the broader cultural context for children's early socialization not only challenges claims of the universality of language acquisition (Fogle & King, 2017; LeVine, 2004; Ochs & Schieffelin, 2017), but also highlights the need to situate it at the intersection of multiple experiences and backgrounds both within and across cultural contexts (Garrett & Baquedano-López, 2002).

Although there is a general consensus in the cross-cultural and international research on early childhood and language development that parents play an important role in shaping children's early experiences, such research also suggests that how parents do so (e.g., quantity and quality of verbal and non-verbal input; types of activities in which they engage with children) can vary widely both within and across cultural contexts (e.g., Kita, 2009; Kishimoto, 2017; Ochs & Schieffelin, 1984; Salomo & Liszkowski, 2013). My dissertation aims to add to the research focused on expanding our knowledge about child development across different cultural settings by examining children's early experiences and language development as situated in the rarely examined cultural context of South Korea. While the existing Korean literature[1] similarly points to the importance of parents' support in children's early language development (e.g., Lee & Kwak, 2008; Min & Moon, 2013; Song, 2016), there are still gaps in our understanding of the specific roles that Korean parents play during children's early years. Especially given research findings that point to increasing SES-based achievement gaps in South Korea over the last few decades (Byun & Kim, 2010), further research that can help all Korean parents promote their children's development is needed.

In this dissertation, I present three studies that examine different aspects of the role that parents play in Korean children's language development. In Study 1, I take a broad look at the early experiences of children growing up in Korea and their role in shaping children's language outcomes. Using longitudinal data from the Panel Study of Korean Children, I conduct a partially latent structural regression model with a sample of 1,894 Korean families to test the generalizability and applicability of two widely studied theories of how different family and parent

[1] For the purposes of the dissertation, I refer to scholarly work that has been conducted with Korean families and published in the Korean language as "Korean literature."

factors, such as family socioeconomic status (SES), shape family processes and child outcomes: the Family Stress Model and the Family Investment Model. In the study, I examine whether and how parental characteristics and early home experiences mediate the relations between family SES and children's language outcomes. This study provides evidence for an integrated model that combines the two Models to understand the multifaceted nature of children's early experiences and language development in the South Korean context.

Taking a developmental approach across the second and third studies, I look more closely at children's daily experiences by examining parent-child interactions in Korean families, as parents' and children's everyday interactions serve as one of many platforms of early socialization. Such platforms are shaped by the broader cultural contexts and in turn, shape children's development (Trommsdorff & Kornadt, 2003). In Study 2, I describe the early gesture use of 31 Korean mothers and children and explore how early gesture use around children's first birthday predicts children's language outcomes two years later. In addition to using gestures observed in other cultural contexts, Korean mothers and children in the sample used gestures that are not commonly observed in other cultures, providing initial evidence for culturally specific socialization that starts with preverbal children. The findings from this study add to the growing body of international research on the role of gesture use in children's early social interaction, as well as shed light on additional features of parent-child interactions that can promote children's language development in Korea.

Lastly, in Study 3, I investigate linguistic features of parent-child interactions when children are between three and five years of age. Drawing from a sample of 33 multilingual families (i.e., families where the mothers are immigrants to Korea) and 36 monolingual families (i.e., families where both fathers and mothers are native-born Koreans, who were raised in Korea),

I characterize mothers' and children's language use during conversations, and explore whether mothers' language use is similarly associated with children's language use. Highlighting potential similarities and differences of language use between multilingual and monolingual families, the study adds to the line of international and cross-cultural research on the role of parents' language input and children's language production practice in child language development in different populations. In addition, the findings add to the efforts to better understand diversity in language use within Korea, given the recent rise in the number of multilingual families in Korea (Kang, 2010).

Taken together, findings from these studies contribute to the field of child development research by exploring variations in parenting that shape children's language development in the context of South Korea. In addition to responding to the call to expand our research focus to parenting across diverse cultural contexts, the findings also will have educational implications for identifying factors and strengthening strategies that support children's language development in South Korea.

Study 1

Pathways between family SES, parent characteristics, early experiences and child language outcomes in South Korea: A combined analysis of the Family Stress Model and the Family Investment Model

Background

Both theoretical and empirical evidence have pointed to the important role that parents play in shaping children's early experiences and language outcomes (e.g., Hoff, 2013; Noel et al., 2008; Pan et al., 2005). For example, research in the U.S. shows that parents' education levels and household income, two primary components of family socioeconomic status (SES), are predictive of children's early home experiences (e.g., quality of parent-child interactions, diversity of resources in home learning environment) and their language development (e.g., Hoff, 2013; Rowe, 2008). To understand the relation between family SES and child outcomes, researchers commonly use two explanatory models: the Family Stress Model (FSM) and the Family Investment Model (FIM), which posit parents' psychological well-being and the quality of children's learning experiences, respectively, as the main mechanisms explaining the predictive power of SES for shaping child development (e.g., Bradley & Corwyn, 2002; Conger & Conger, 2002).

Although there is a growing body of research that tests these two models outside the U.S. (e.g., Coddington et al., 2014; Hosokawa & Katsura, 2018), evidence on how the processes proposed by the two models operate in diverse cultural contexts is still limited. In this study, we examine the applicability of these two widely studied models using longitudinal data from 1,894 families in South Korea, a context rarely examined in the literature. More specifically, we test the applicability of an integrated model of the FSM and the FIM to the South Korean context by examining the direct and indirect relations between family SES during child's first year, maternal

characteristics during child's first year, home experiences at preschool, and child language outcomes at preschool and kindergarten. In doing so, we also expand the basic models to consider whether additional maternal characteristics (i.e., maternal self-efficacy and knowledge of child development) may enhance the applicability of our overall model to this understudied context. This study adds to the growing effort to extend theories of early language development and socioeconomic disparities beyond the U.S., and to further our understanding of the role of family and parenting in child development in diverse cultural contexts.

Context of South Korea

As it undergoes rapid urbanization and globalization, South Korea faces increasing emphasis on academic achievement (Kim & Lee, 2010; Sorensen, 1994). At the same time, there is growing evidence of widening income inequality and SES-based differences in academic achievement for school-aged children (Byun & Kim, 2010; Chang, 2016). As the need for their children to take part in academic competition increases, Korean parents (most often mothers) face the task of preparing their children for academic competition from an early age (Sorensen, 1994), with such pressure shaping how they invest in their children's early learning environment (Kim & Lee, 2010). With this pressure comes an increase in the financial burden to families (Han, 2010). Korean parents report that educational expenses for children are one of their main financial concerns (Kim, 2004). For example, a national study shows that in addition to everyday expenses, an average family with a monthly income of 4,500,000 Korean won (approximately 4,000 U.S. dollars), spends about 300,000 Korean won (approximately 270 U.S. dollars) per child on private education (e.g., private tutoring, intensive test prep courses), with the average expenditure continuing to increase (Statistics Korea, 2020a). This burden is most salient for parents from lower SES backgrounds, who need to balance multiple needs of family and children with fewer financial

resources (Han, 2010; Park & Kim, 2013). This social context of South Korea, along with increasing SES-based differences in academic achievement (Byun & Kim, 2010; Chang, 2016), calls for a more comprehensive understanding of how these differences may arise early on—even before the formal schooling begins.

Family Stress Model

One theoretical approach for explaining the relations between early parental and family characteristics and children's development in the literature more broadly is the Family Stress Model (FSM; Conger et al., 1994; Conger & Conger, 2002). According to the FSM, family SES and related "economic hardship primarily influence the development of children through the lives of parents" (Conger et al., 2010, p. 692). In particular, the model predicts that parents' SES, often measured based on family income, would have an impact on parents' psychological state (namely, depression, emotional distress, and parenting stress), which in turn would affect their parenting style and behavior (e.g., responsiveness). The model further posits that these variations in how parents interact with their children would lead to differences in children's cognitive and socioemotional outcomes.

Indeed, there is a strong body of empirical evidence in the U.S. that supports the FSM (e.g., Conger et al., 1994, 2002; Gutman et al., 2005; Neppl et al., 2016; Simons & Steele, 2020). For example, Yeung and colleagues (2002), in examining a nationally representative sample of 753 preschool-aged children, found that maternal emotional distress and childrearing practices partially mediated the relation between family SES and children's behavioral and cognitive outcomes. Furthermore, American mothers who report more depressive symptoms (Campbell et al., 2007) and higher levels of parenting stress, i.e., stress they experience regarding their role as parents

(Noel et al., 2008), tend to be less responsive to their toddlers and preschoolers, and consequently, less likely to provide a home learning environment that promotes their children's development.

In addition to the work examining different populations in the U.S., there is evidence that the FSM may be applicable in other countries and cultural contexts (e.g., Aytaç & Rankin, 2009; Emmen et al., 2013; Solantaus et al., 2004). For example, in examining a longitudinal dataset of Chinese preschoolers, Wu and colleagues (2020) found that maternal depressive symptoms predicted mothers' responsiveness, which in turn was associated with children's socioemotional skills. Furthermore, in examining a sample of British children, Kiernan and Huerta (2008) found that maternal depression, along with family SES—and more specifically, families' economic hardship—negatively predicted preschool-aged children's cognitive outcomes.

Although research in Korea has not yet explored the FSM in full, several studies provide at least partial support for the FSM (e.g., Kwak et al., 2007; Park & Park, 2016). For example, Moon (2012) showed that Korean mothers with higher levels of parenting stress tend to be less responsive and less emotionally supportive, which was suggested to be less conducive to their infants' development. Building on this body of empirical evidence, the current study aims to add to this growing body of research by examining whether the full FSM applies to the cultural context of South Korea, where mothers seem to experience heightened pressure and stress related to the need to provide early support for their children's development (Sorensen, 1994).

Self-efficacy, Maternal Psychological Stress, and Parenting Practices

Another aim of this study is to extend the FSM by including another element of maternal psychological well-being beyond parenting stress and depression: maternal self-efficacy. Research indicates that the level of mothers' self-efficacy, or their belief that they can control different aspects of their lives, is another maternal psychological factor related to children's developmental

outcomes (see Jones & Prinz, 2005 for a review). Although self-efficacy is not often discussed as a component of parental or maternal psychological well-being/stress in the FSM, we argue that mothers' self-efficacy is an important element to consider because of its potential influence on general psychological well-being and also on how parents interact with their children. More specifically, mothers who generally do not feel like they have control over events around them (i.e., low self-efficacy), may also feel less confident about their ability to influence their children's development, and thus may be less likely to engage in behaviors that promote learning, such as providing high-quality home learning environment for their children. Indeed, research suggests that mothers with higher depressive symptoms tend to show low self-efficacy (Haslam et al., 2006), and that self-efficacy explains the relation between maternal depressive symptoms and maternal parenting behaviors (Teti & Gelfand, 1991). Research further shows that American mothers with higher levels of self-efficacy tend to show more positive childrearing behaviors, and consequently, to promote children's development more fully (Peacock-Chambers et al, 2016).

Previous research with Korean families suggests that maternal self-efficacy may be particularly important to include in the FSM (e.g., Park & Kim, 2013; Shin & Ahn, 2014). Indeed, Holloway and colleagues (2016) found that Korean mothers' self-efficacy partially mediated the relation between family SES and child cognitive outcomes at age seven, suggesting that how mothers felt about their ability to control the world around them may predict how they interact with their children and influence their development. Other studies further highlight the close relation between stress and self-efficacy for Korean parents (Kim & Doh, 2004; Kim et al., 2012). Therefore, in the model tested in the current study, we include mothers' self-efficacy as an additional factor that may reflect mothers' overall levels of psychological stress.

Family Investment Model

The Family Investment Model (FIM) is another model of the mechanisms relating family SES and parental characteristics to child outcomes. The FIM posits that parents from higher SES backgrounds are able to invest more in the resources and experiences that promote children's development (Bradley & Corwyn, 2002; 2004; Conger et al., 2010). In particular, parents that have more resources would provide higher quality home learning environment, including greater exposure to more responsive care, "stimulation" (e.g., language input, varied educational activities), and material resources for their children. There is a strong body of empirical evidence in the U.S. that supports this theoretical approach (Bradley et al., 2001; Hoff, 2003; Raikes et al., 2006; Sohr-Preston et al., 2013). For example, American families of greater means are more likely to provide their children with more access to reading materials, technology, and cultural resources (e.g., museum visits) than families of lesser means, and that differences in material investment predict variations in children's cognitive and academic outcomes (Bradley & Corywn, 2002; Guo & Harris, 2000).

While the FIM has focused primarily on understanding the role of families' financial resources (e.g., family income), researchers have also pointed to parents' education level as another important predictor of investments made for children (Conger & Donnellan, 2007). That is, parental education would increase their skills (e.g., increased language skills and cognitive flexibility), which will help inform their parenting behaviors and home learning environment (e.g., higher quality language use), which in turn, will benefit children's development (Harding et al., 2015). Indeed, research on early language development in the U.S. shows that more educated parents (in this case, mothers) tend to have children with more advanced language skills from early on (e.g., Hart & Risley, 1995; Hoff, 2003; Magnuson et al., 2009; Rowe, 2008). Researchers

propose that this positive relation between maternal education and child language outcome can be explained by variations in how mothers engage their children in everyday activities and conversations: more educated mothers tend to be responsive to their children by conversing with them more, and engage more often in "cognitively stimulating parenting practices" (e.g., shared book reading), which may help children's language development (Harding et al., 2015, p. 63).

In addition to an established body of research in the U.S., there also has been an increasing effort to understand the generalizability of the FIM to diverse parts of the world (e.g., Coddington et al., 2014; Jeong et al., 2017; Lohndorf et al., 2018; McCoy et al., 2015). For example, Vasilyeva and colleagues (2018) found that both family income and maternal education level were positively associated with home learning activities and access to resources, respectively, which together predicted school-aged children's reading scores in Russia. Similarly, Jeong and colleagues (2017) found that both mothers' and fathers' education levels were positively associated with the quality of home learning environment and children's developmental outcomes across 44 low- and middle-income countries.

Similar to the findings in the U.S. and other countries, there is also empirical evidence that support different aspects of the FIM in Korea. For example, Lee and Kwak (2008) found a positive association between family SES and Korean children's early language development, where children from families with higher income showed more advanced language skills than their peers. Beyond such empirical evidence, societal expectations of early academic preparation also suggest that Korean mothers of young children may be driven to invest in their children's early experiences to subsequently promote early learning and development. Therefore, in this current study, we examine the generalizability of the FIM in the context of Korea.

Maternal Knowledge of Child Development, Education Attainment Levels, and Parenting Practices

In addition to testing the applicability of the FIM in Korea, the current study also aims to extend the FIM to include an additional maternal factor**:** maternal knowledge of child development. As Harding and colleagues (2015) note in their theoretical framework, maternal education is projected to increase not only mothers' skillsets (e.g., language skills, cognitive flexibility), but also their knowledge and beliefs, such as knowledge about typical patterns of child development and about parenting practices that promote children's early development. This proposed association is supported by a body of literature both in the U.S. and beyond, which shows that what mothers know and believe vary by maternal education and influence how they interact with their children (Bornstein et al., 2018; Davis-Kean, 2005; Heath, 1983; LeVine, 2004; Ochs & Schieffelin, 1984). In particular, maternal knowledge of child development has been suggested as a mediating factor that explains the relation between mothers' education level, children's early experiences, and children's developmental outcomes (Cuartas et al., 2020; Rowe, 2008; Vernon-Feagans et al., 2008; Zajicek-Farber, 2010). For example, Rowe and colleagues (2016) showed that while the magnitude of the relations varied across racial/ethnic groups, maternal knowledge of child development consistently predicted children's language outcomes across Black, Latino, and White families in the U.S.

A few studies with Korean families have also examined the role of maternal knowledge of child development in children's early experiences (Min & Moon, 2013; Seo & Lee, 2013). For example, Yoon and Cho (2004) showed that maternal knowledge of child development predicted the quality of home learning environment and in particular, children's access to reading materials. Furthermore, Min and Moon (2013) found that Korean mothers' knowledge of child development

positively predicted their responsiveness to their children, as well as children's developmental outcomes. Building on these previous findings in Korea, the current study extends the FIM by observing the potential mediating role of maternal knowledge of child development between family SES and child outcomes.

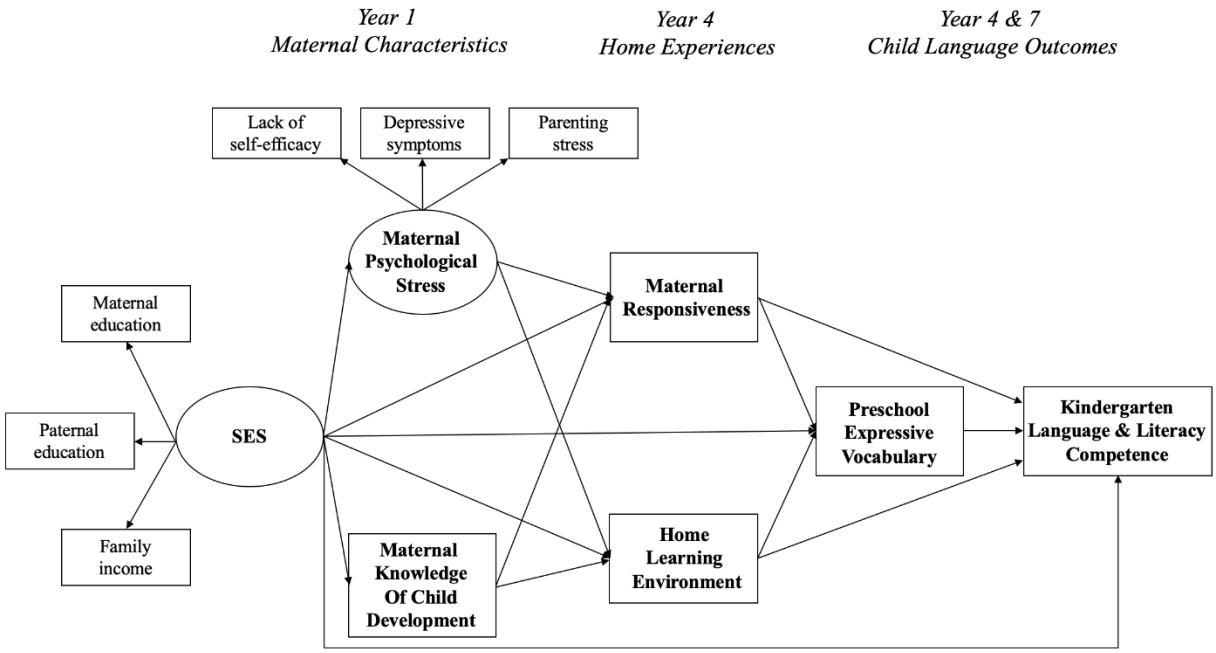

Figure 1.1.
Proposed theoretical model of the relations among family SES, maternal characteristics, home experiences, and child language outcomes.

Current Study

In this study, we build on these findings to adapt and test the FSM and the FIM as means of explaining the mechanisms that may link family SES and children's language development in South Korea (see Figure 1.1 for the proposed theoretical model). More specifically, this study tests an integrated model of SES to simultaneously examine relations among family SES, maternal characteristics (maternal psychological stress and maternal knowledge of child development), children's home experiences, and children's language outcomes in preschool and kindergarten. In Figure 1.1, the top row from SES to language outcomes through maternal psychological stress and

home experiences depicts the processes typically posited by the FSM, whereas the bottom row from SES to language outcomes through maternal knowledge and home experiences shows the processes aligned with the FIM. In this study, we investigate these various pathways—as well as the extent to which they may contribute to one another—using a longitudinal dataset of South Korean families that span over a period of seven years, from children's birth to kindergarten. Specifically, we ask the following research questions (RQs):

RQ1) To what extent does family SES at child's age 1 directly predict Korean mothers' psychological stress and knowledge of child development at age 1, children's home experiences at age 3, or children's language outcomes at ages 3 and 6?

RQ2) Is the relation between family SES and children's later language outcomes explained by maternal characteristics and/or home experiences? If so, are these indirect pathways more aligned with the Family Stress Model, the Family Investment Model, aligned with both or neither?

This study extends previous work on SES-based disparities in young children's developmental opportunities in the following ways. First, we integrate two canonical theoretical approaches for understanding SES gaps—the Family Stress Model and the Family Investment Model—to test a more comprehensive set of mediating pathways between family SES and child language outcomes. Most studies examining associations between family SES, parental characteristics, and children's outcomes have studied different parental characteristics in separate analyses (e.g., Hoff, 2013; Huttenlocher et al., 2010). Furthermore, while many studies have tested the replicability of the FSM and the FIM, few have examined these models simultaneously in a single, integrated model (Conger et al., 2010).

Second, we extend the FSM and FIM by exploring the potential role of additional mediating factors that may have broad relevance in different contexts, including Korea. More specifically, based on prior findings that suggest the contribution of maternal self-efficacy to children's early experiences and developmental outcomes (e.g., Jones & Prinz, 2005), including consistent research in South Korea (Holloway et al., 2016), we expand the conceptualization of maternal psychological stress to include maternal self-efficacy. Furthermore, based on work finding links between maternal knowledge about child development and children's outcomes (e.g., Cuartas et al., 2020), including research findings in Korea (e.g., Min & Moon, 2013), we extend the FIM by exploring the additional role of maternal knowledge about child development as a predictor of home experiences and, in turn, child outcomes. As far as we are aware, this is the first study that explores an integrated model of the FSM and FIM in the context of children's early language development in South Korea.

Methods

Procedure

Conducted by the Korea Institute of Child Care and Education, the Panel Study of Korean Children (PSKC) is a national study that monitors the early experiences and development of a cohort of typically developing Korean children (Chang, Shin, & Park, 2006). The Panel Study aims to provide a national level database that allows researchers to examine the relations between various environmental factors and children's development longitudinally. The annual data collection for the study started in 2008, the year when the cohort of participating children was born, and will be completed in 2027. The participants for the study were recruited as the representative sample of families in six districts across the nation. To recruit participants, the research team conducted a stratified two-stage sampling method. First, they compiled a list of medical institutes

with an established maternity ward from each district that delivered more than 500 children in 2006. Using a systematic sampling method based on the location of the institutes within each district, the research team then selected the final set of thirty institutes to invite and participate in the next round of the sampling process. During the second stage of sampling, the research team contacted families with newly born children in 2008 at each of the participating institutes across all six districts, and invited families that consented to participate. Each year, primary caregivers (mostly parents) of the children filled out either a paper-based or a computer-based survey on various aspects of their children's and their own experiences. In addition, trained researchers visited their homes to observe their home environment and assess their children's development.

The data for the current study come from Year 1 (2008), Year 4 (2011), and Year 7 (2014) of the larger study. At the times of data collection for each year, children were between 3 and 8 months old in Year 1, 35–43 months in Year 4, and 72–79 months in Year 7. Information on maternal psychological stress and maternal knowledge of child development, as well as on basic family demographics, was obtained from the Year 1 survey. Information on children's home learning environment and interaction with parents was obtained from the Year 4 home visit and survey. Children's language outcomes were obtained from the Year 4 home visit and Year 7 survey.

Participants

The initial sample in Year 1 included 2,150 families, with 1,754 families participating in Year 4 and 1,620 families in Year 7. Children in the families that remained in the study in Year 7 tended to be from families with slightly lower average monthly income and paternal education levels than those who discontinued their participation in the study (see Appendix 1.A.1). The sample for the current study includes families from the initial sample of 2,150 that fulfill two inclusion criteria: families that 1) reported having both parents live with their children in Year 1,

and 2) did not report any diagnosis for disorders for children at any of the three time points. A total of 1,894 children and their families were included in the final analytic sample (see Table 1.1). Approximately half (n = 921, 48.6%) of the children in the analytic sample were girls. Of the parents who reported their immigration status, most (99.3% for mothers and 99.8% for fathers) reported being native-born Korean citizens. At the start of data collection (Year 1), the average age of participating mothers was 31.39 years old (SD = 3.7 years, Range = 19 – 46).

Measures

Family Socioeconomic Status

Families' baseline socioeconomic status was measured as a latent composite of three continuous measures of their average monthly income and parental education attainment levels. Mothers reported families' average monthly income during the Year 1 visit by selecting from a list of possible income ranges (e.g., 0 ~ 1,000,000 Korean won, 1,000,001 ~ 2,000,000 Korean won, etc.). A reported monthly income of less than 1,000,000 Korean won (approximately $883) was coded as 1, and an income more than 10,000,000 won (approximately $8,883) was coded as 11, with each 100,000 won interval in between receiving a corresponding code (e.g., an income between 1,000,001 won and 2,000,000 won was coded as 2). Mothers also reported their spouses' and their highest education levels during the Year 1 visit. For each parent, no formal schooling was coded as 1, completed grade school as 2, completed middle school as 3, completed high school as 4, completed 2-year college as 5, 4-year university degree as 6, masters' degree as 7, and doctoral degree as 8.

Maternal Knowledge of Child Development

During the Year 1 visit, mothers also responded to a short version of the Knowledge of Infant Development Inventory (KIDI; MacPhee, 2002), a survey of questions that measures their

knowledge of child development. This measure has been used in developmental research in the U.S. (e.g., Bornstein et al., 2018; Rowe, 2008), as well as in South Korea (e.g., Min & Moon, 2013). Mothers were asked to respond to 13 items on the principles of development by marking whether they agree with each of the statements. Example items include "Infants understand only words they can say" and "The way a child is brought up has little effect on how smart he/she will be." For each item, a correct response was coded 1, and an incorrect response (including responses that was marked as "unsure") was coded 0. For mothers who responded to more than 75% of the total number of items (i.e., 10 or more), the proportion of their accuracy was measured as the total number of correct responses over the total number of questions responded, with a Cronbach's alpha of .52. While lower than the reliability of the complete KIDI scale (MacPhee, 1981), this reliability is similar to the internal consistency of similar short versions used in prior research (e.g., Rowe et al., 2016; α= .60).

Maternal Psychological Stress

Mothers' psychological stress was measured as a latent variable with three scales capturing maternal parenting stress, maternal sense of self-efficacy, and maternal depressive symptoms, respectively. During the Year 1 visit, mothers responded to 10 items from the Korean Parenting Stress Scale that measures the level of stress related to parenting (Kim & Kang, 1997). Example items include "I'm not as happy as I was before my child's birth" and "I'm not sure if I can be a good parent." In addition, mothers responded to four items on their general sense of self-efficacy from the Pearlin Self-Efficacy Scale (Pearlin et al., 1981), which has been used in research in the U.S. (e.g., Hofferth et al., 1998) and was shown to have an adequate level of reliability (α= .82) in a pilot sample of Korean mothers (Shin et al., 2007). Example items included "I do not have control over what happens around me," and "Some of the problems I have in my life are things that I will

never be able to resolve." Mothers also reported on their depressive symptoms by answering six items on the Kessler depression measure (Kessler et al., 2002), a measure previously used in the U.S. (e.g., Kessler et al., 2006; 2007) that showed an adequate level of internal consistency (α= .89) in the Korean pilot (Shin et al., 2007). Example items include "Were you anxious in the last 30 days?" and "Were you lethargic in the last 30 days?" For each item on the three scales, mothers' responses were on a 5-point Likert scale, ranging from 'not at all' (coded 1) to 'strongly agree' (coded 5). For each scale, responses from mothers who responded to more than 75% of the questions were included in the analysis. The average scores for each of the three scales were used as continuous measures of maternal psychological stress in the analysis, with a higher average representing higher levels of depressive symptoms and parenting stress, and a lower sense of self-efficacy. The items for maternal psychological stress variables showed acceptable to high internal reliability with Cronbach's alpha values of .84 for parenting stress, .81 for self-efficacy, and .91 for depression.

Home Learning Environment

During the Year 4 visit, when children were three years old, the Early Childhood Home Observation of the Measurement of the Environment (EC-HOME; Caldwell & Bradley, 2003) was used to capture the quality of children's home learning environment. The measure is widely used in developmental research in the U.S. (e.g., Pachter et al., 2006; Totsika & Sylva, 2004), and also has been validated and used with Korean families (Chang, 2017; Kim & Kwak, 2007). As in prior research, the sum of scores was used in the analyses. More specifically, scores for four subscales (32 items) that directly address stimulation for children's learning and development—learning materials, language stimulation, academic stimulation, and variety—were used to capture the quality of home learning environment. The subscale for learning materials includes 11 items that

measure children's access to materials, such as books and toys that stimulate their learning (e.g., "Ten or more books are available" and "Child is encouraged to learn shapes"). Seven items on language stimulation indicate parents' verbal interaction with children that promote language learning (e.g., "Child is encouraged to learn the alphabet" and "Caregiver encourages child to talk and takes time to listen"). Five items on academic stimulation indicate the level of support that parents provide for knowledge acquisition (e.g., "Child is encouraged to learn numbers" and "Child is encouraged to learn colors"). Lastly, nine items on variety capture variations and richness of children's experiences (e.g., "Caregiver encourages child to put away toys without help" and "Child is taken outside for play every day the child is in care (except in bad weather)"). The items were answered via parent interview (n = 18) and researcher observation (n = 14) of parent-child interactions and coded as yes (1) or no (0). The Cronbach's alpha for the four subscales was .69.

Maternal Responsiveness

During the fourth visit, mothers also completed the Parenting Style Questionnaire (PSQ) (Bornstein et al., 1996), a tool developed in the U.S. that has also been used with Korean families (e.g., Lee et al., 2008). Nine items from the section on parents' interaction style with their children were used in the analysis. Example items include "I know what my child wants or feels" and "I respond immediately to my child, if he or she shows signs of difficulty or discomfort." The responses were on a 5-point Likert scale, which ranged from 'not at all' (coded 1) to 'strongly agree' (coded 5). The average scores of the nine items were used for the analysis, with a higher score representing more responsive parenting. The internal reliability for these items was .88.

Child Language Outcomes

Children's expressive vocabulary was measured in Year 4 (child age 3) using the Receptive and Expressive Vocabulary Test (REVT; Kim et al., 2009a). The REVT is a standardized test of

Korean vocabulary, normed with typically developing, monolingual Korean speakers in South Korea (Kim et al., 2009b). The decile scores based on the monolingual norm were reported in the dataset and used in the analysis. The codes for the decile categories ranged from 1 to 11, where children below the lowest 10% of the age norm were coded 1, and children above 100% of the age norm were coded 11.

Table 1.1.
Descriptive Statistics for the Final Sample (N = 1,894).

Variables	*n*	*M* or % (*SD*)	Range	% missing	Year Reported
Female	915	48.35%		0	1
Birth order	1,888	1.65 (0.72)	1 – 5	0.30	1
Maternal age	1,894	31.39 (3.70)	19 – 46	0	1
Family SES					
Monthly income	1,882	3.43 (1.46)	0 – 11	0.63	1
Maternal education	1,882	5.15 (0.96)	1 – 8	0.63	1
Paternal education	1,876	5.31 (1.03)	2 – 8	0.95	1
Maternal knowledge	1,689	0.68 (0.16)	0 – 1	10.82	1
Maternal psychological stress					
Parenting stress	1,691	2.74 (0.61)	1 – 4.7	10.72	1
Lack of self-efficacy	1,688	2.22 (0.69)	1 – 5	10.88	1
Depressive symptoms	1,684	1.95 (0.70)	1 – 5	11.09	1
Home learning environment	1,551	27.56 (3.14)	4 – 32	18.11	4
Maternal responsiveness	1,506	3.80 (0.49)	1.89 – 5	20.49	4
Expressive vocabulary	1,534	4.82 (3.22)	1 – 11	19.01	4
Language & literacy skills	1,419	3.78 (0.81)	1 – 5	25.08	7

Additionally, parents reported on children's language and literacy skills during Year 7 (child age 6) using the Korean version of the Parent-Teacher Report of child academic skills (NICHD, 2018). The current analysis used the 14 items on children's perceived language and literacy skills from the original measure. Example questions include "My child uses complex sentence structures" and "My child reads simple books independently." The responses were on a 5-point scale, which ranged from 'not yet' (coded 1) to 'proficient' (coded 5). The average scores

of perceived language skills in Year 7 were used as a measure of children's perceived language and literacy skills in kindergarten. The Cronbach's alpha for the items was .93.

Covariates

Children's gender, birth order, and mothers' age in Year 1 were included as covariates in all models. Children's ages, measured in months, in Years 4 and 7 were also included to control for age-related variations in children's language outcomes. In reporting children's birth order, first-borns received a code of 1, and any child who had four or more older siblings (i.e., fifth born or later) received a code of 5. Table 1.1 shows descriptive statistics of all relevant variables for the final sample.

Analytic plan

First, we conducted confirmatory factor analysis with the total sample using the three relevant variables (family income, paternal education, and maternal education) for 'family socioeconomic status (SES),' as income and parental education are two primary components of family SES examined in the literature (Conger & Donnellan, 2007). Additionally, we conducted confirmatory factor analysis with the total sample for the construct of 'maternal psychological stress' using the three relevant variables (parenting stress, depressive symptoms, and self-efficacy), given findings that support relations between the three variables (e.g., Teti & Gelfand, 1991).

We then employed a partially latent structural regression model (Figure 1.2) with the total sample to examine direct and indirect relations among family SES, maternal characteristics, children's home experiences, and children's language outcomes, allowing us to answer our two primary RQs. We tested three potential alternative models to determine the model that best fits the data. Model 1 was a fully mediated model, including only direct paths from the latent variable of family SES to maternal characteristics, direct paths from maternal characteristics to home

experiences, and direct paths from home experiences to language outcomes. Model 2 tested the hypothesis that family SES both directly and indirectly predicts different aspects of child experiences and outcomes by maintaining all the paths represented in Model 1 and also including additional direct paths from SES to two home experience variables and two child language outcome variables. Model 3, the most complex model, built on Model 2 and included additional paths from maternal characteristics to child language outcomes to examine whether the model where maternal characteristics had a direct effect on child language outcomes fit the data better. The Satorra-Bentler Scaled Chi-Square difference tests were used to determine the model with the best fit.

Covariates (i.e., child gender, birth order, child age, maternal age) were included in all models. More specifically, direct paths were added from child gender to parenting style, home learning environment, and later language outcomes, as research suggests potential gender-based differences in how parents interact with their young children and children's language development (e.g., Kaushanskaya et al., 2013; Kerig et al., 1993; Starrels, 1994). Additionally, paths from birth order to maternal characteristics, home experiences, and child outcome variables were added to account for potential source of confounding relations (Someya et al., 2000; Sputa, & Paulson, 1995). Paths from children's ages in Year 4 and Year 7 to the year's language outcomes were added to account for the varying ages in months of the children at each time point. Paths from mothers' ages to maternal characteristics, home experiences, and child outcome variables were also added to account for the varying ages of the participating mothers (Bornstein et al., 2006; Mirowsky & Ross, 1992; Ragozin et al., 1982). Covariates were allowed to co-vary with the latent construct of SES. Residuals for maternal characteristics in Year 1 and home experiences in Year

4 were allowed to co-vary within the same visit to account for any shared source of measurement error.

All analyses were conducted using MPlus 8.2 (Muthén & Muthén, 2012). The maximum likelihood with robust standard errors estimator (MLR) was used in all structural equation models to account for potential non-normality of residuals. Full information maximum likelihood (FIML) was also used to account for the missing data (see Table 1.1 for more details on missingness). The use of the estimator assumes that the data are missing at random. For the current study, the following criteria of adequate model fit were used: a Bentler Comparative Fit Index (CFI) > .90, root mean squared error of approximation (RMSEA) < .08, and standardized root mean square residual (SRMR) < .08 (Hu & Bentler, 1999). The goodness-of-fit criterion of a non-significant chi-square was not included in the present study, as its value is often influenced heavily by a large sample size (Cheung & Rensvold, 2002).

Once the final model was decided, we examined the direct paths from family SES in Figure 1.2 to examine the direct relations between family SES and other variables (RQ1). We further examined the indirect paths in Figure 1.2 to understand the indirect paths from family SES to language outcomes, including whether the processes posited by the FSM and/or the FIM are applicable to the Korean context (RQ2). The structural equation modeling approach allowed us to examine relations between predictors and multiple outcomes simultaneously, taking into account multiple variables and testing the overall model fit.

Table 1.2. Correlation Matrix for Family SES, Maternal Characteristics, Home Experiences, Language Outcomes, and Covariates.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Covariates												
1. Birth order												
2. Female	.024											
3. Maternal age	**.373**	.044										
Year 1 Parental characteristics												
4. Mother ed.	**-.104**	.012	**.090**									
5. Father ed.	-.024	.005	**.129**	**.545**								
6. Income	.013	.038	**.172**	**.321**	**.305**							
7. Maternal knowledge	**.125**	.009	**.097**	**.252**	**.183**	**.161**						
8. Parenting stress	**.106**	-.041	-.047	**-.088**	**-.070**	**-.079**	**-.070**					
9. Self-efficacy	.033	-.007	-.037	-.012	-.032	**-.082**	**-.077**	**.533**				
10. Depression	-.035	-.026	**-.060**	**-.057**	-.040	**-.072**	**-.087**	**.513**	**.556**			
Year 4 Home experiences												
11. Maternal responsiveness	**-.068**	.029	**.052**	**.099**	**.092**	**.115**	**.073**	**-.350**	**-.262**	**-.267**		
Year 4 & 7 Language outcomes												
12. Preschool vocab.	**-.171**	**.075**	.021	**.157**	**.131**	.040	**.089**	-.037	-.004	-.005	**.103**	
13. K. language	**-.154**	**.227**	-.027	**.159**	**.129**	**.071**	**.105**	**-.077**	**-.057**	-.038	**.208**	**.296**

Notes: Values significant at $p < .05$ in bold; Mother ed. = Maternal education level; Father ed. = Paternal education level; Preschool vocab. = Preschool expressive vocabulary score; K. language = Kindergarten language and literacy skills.

Results

Descriptive Statistics

As shown in Table 1.1, fathers (M = 5.31, SD = 1.03) and mothers (M = 5.15, SD = 0.96) had similar educational levels, with 68.58% of mothers and 70.49% of fathers reporting having attended at least community college. These rates are higher than the national average of 50% of adults (between ages 25 and 64) with education beyond high school (OECD, 2020). In the final sample, families reported earning between 3,000,000 won and 4,000,000 won per month (e.g., between $2,649 and $3,532), which approximates a national average of monthly income of 3,401,000 won ($2,996) (Statistics Korea, 2020b). Mothers' average accuracy on the knowledge of child development measure was 68% (SD = 16%), a value similar to previous findings in the U.S. (MacPhee, 2002). The results of the psychological stress measures from Year 1, which were on a 5-point Likert scale, showed that on average, mothers reported low to moderate levels of depressive symptoms (M = 1.95, SD = 0.70), parenting stress (M = 2.75, SD = 0.61), and lack of self-efficacy (M = 2.22, SD = 0.69). The quality of home learning environment, on average, was relatively high (M =27.56, SD = 3.14). Mothers' reported responsiveness showed a relatively responsive parenting style with an average score of 3.80 (SD = 0.49) on a scale of 1 to 5. Children's average expressive vocabulary decile score in Year 4 was 4.82 (SD = 3.22), similar to the average for the norming population of the assessment of 5.00. Maternal reports of children's kindergarten average language and literacy skill in Year 7 was 3.78 (SD = 0.82), indicating that mothers reported

that children were on average "overall proficient." Most of the children were either first (47.67%) or second (41.53%) born. Table 1.2 shows correlations among all variables, including covariates.

Table 1.3.
Factor Loadings of SES and Maternal Psychological Stress.

Variable	Standardized loading	Unstandardized loading (SE)
SES		
Maternal education	.754	1.000
Paternal education	.724	1.037* (0.071)
Family income	.427	0.869* (0.063)
Maternal Psychological Stress		
Parenting stress	.704	1.000
Self-efficacy	.757	1.202* (0.053)
Depression	.732	1.190* (0.053)

Notes: * $p < .001$; Standard errors of unstandardized estimates in parentheses. Model fit: $\chi^2(8) = 21.82$, RMSEA = .03, CFI = .99, SRMR = .02.

Confirmatory Factor Analyses

Table 1.3 shows the results from confirmatory factor analyses for family SES and maternal psychological stress. The results showed adequate factor loadings onto respective factors. Since these models were perfectly identified on their own, we also tested a measurement model with both family SES and maternal psychological stress factors, with a correlation between the two. The model showed adequate model fit, $\chi^2(8) = 21.82$, RMSEA = .03, CFI = .99, SRMR = .02.

Model Fit Comparisons

Overall, all three models that we tested showed adequate model fit (Table 1.4). A Satorra-Bentler Scaled Chi-Square difference test that compared the fit of Models 1 and 2 showed that Model 2 had better fit: $\chi^2\Delta(4) = 76.16$, $p < .001$. A similar Chi-Square difference test between Models 2 and 3 showed a better fit for Model 3 than for Model 2, $\chi^2\Delta(4) = 12.66$, $p < .05$. Therefore, Model 3 (Figure 1.2) with all direct paths from family SES to home experiences and

language outcomes, as well as direct paths from maternal characteristics to child outcomes, was selected as the final model for the data.

Table 1.4.
Model Fit Statistics for Structural Models.

Model	χ^2(df)	CFI	RMSEA (90% CI)	SRMR
Model 1. Model with direct paths from SES only to maternal characteristics	259.448 (68)	.941	.039 (.034 – .044)	.036
Model 2. Model 1 with direct paths from SES to home experiences & child language outcomes	184.313 (64)	.963	.032 (.026 – .037)	.023
Model 3. Model 2 with direct paths from maternal characteristics to child language outcomes	171.701 (60)	.966	.031 (.026 – .037)	.022

Notes: CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

SES as a Predictor of Maternal Characteristics, Home Experiences, and Child Language Outcomes

Figure 1.2 shows the direct paths from family SES to early maternal characteristics (i.e., maternal psychological stress, and maternal knowledge of child development), children's home experiences in preschool, and language outcomes in preschool and kindergarten in the final model (Model 3). Family SES and maternal psychological stress were negatively related, b = -0.05, SE = 0.02, $p < .05$, β = -0.08, while SES and maternal knowledge of child development were positively related, b = 0.07, SE = 0.006, $p < .001$, β = 0.33. In addition, family SES showed a positive association with maternal responsiveness, b = 0.07, SE = 0.02, $p < .01$, β = 0.10, and the quality of home learning environment, b = 0.80, SE = 0.15, $p < .001$, β = 0.19, respectively. Family SES was also a positive, statistically significant predictor of preschool expressive vocabulary, b = 0.52, SE = 0.15, $p < .001$, β = 0.12, and kindergarten language and literacy skills, b = 0.11, SE = 0.04, $p < .01$, β = 0.10. In sum, the results of the final model showed that after controlling for child

gender, child age, birth order, and maternal age, there were significant SES-based disparities in early maternal characteristics, children's preschool home experiences, and children's preschool and kindergarten language outcomes in this sample.

Relations between Family SES and Child Language Outcomes via Maternal Characteristics and Home Experiences

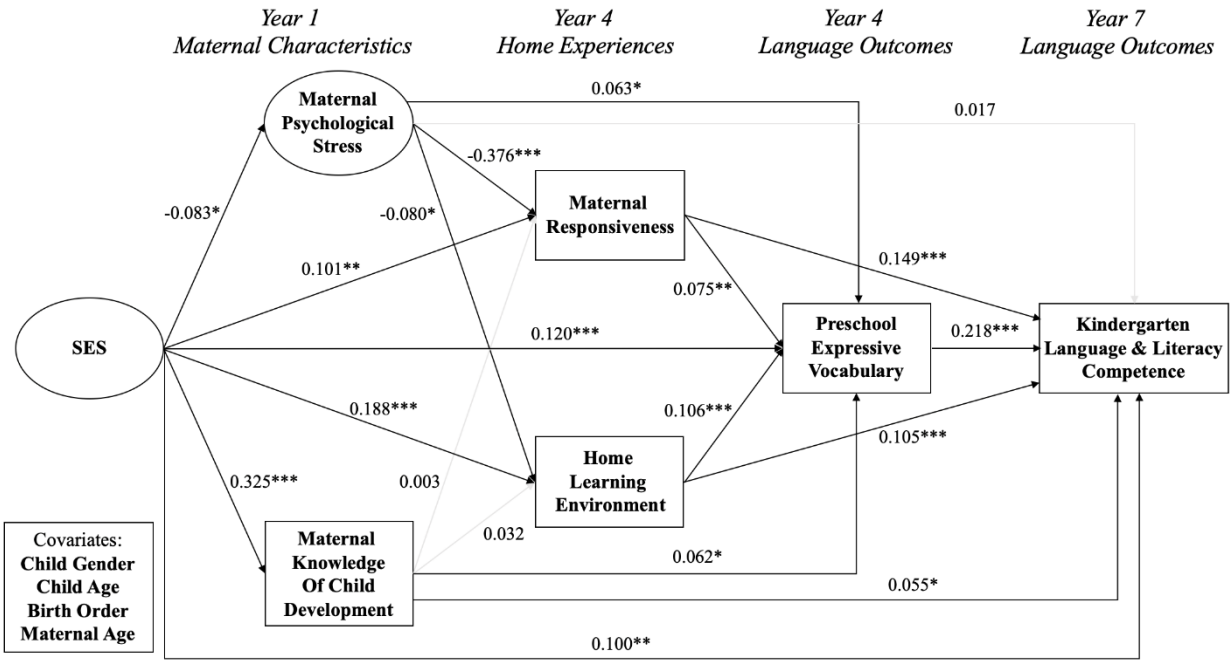

Figure 1.2.
Results of the final analytic model (Model 3).
Notes: All coefficients are standardized, and the *p*-values represent the statistical significance of unstandardized coefficients. The statistically nonsignificant paths are represented in grey. The undirected paths between exogenous variables are not shown in the figure. The measurement errors for indicator variables for "SES," and "maternal psychological stress," and the variances on the exogenous variables are also not shown in the figure. The disturbance terms and variances on the disturbance terms, as well as undirected paths between disturbance terms between maternal characteristics variables and between home experience variables, also do not appear in the figure. The direct paths from the disturbance terms to the endogenous variables are scaled at 1. * $p < .05$; ** $p < .01$; *** $p < .001$. Model fit: $\chi^2(60) = 171.70$, $p < .001$; CFI = 0.97; RMSEA = 0.03; SRMR = .02.

Mothers' psychological stress was negatively associated with their responsiveness, b = -0.42, SE = 0.03, $p < .001$, β = -0.38, and with the quality of home learning environment, b = -0.56,

SE = 0.22, $p < .05$, β = -0.08. The path from maternal psychological stress to children's preschool expressive vocabulary was also positive and statistically significant, *b* = 0.46, *SE* = 0.22, $p < .05$, β = 0.06, whereas the path from maternal psychological stress to language and literacy skills in kindergarten was not statistically significant. On the other hand, as shown by the paths in grey, the associations between maternal knowledge of child development and the two preschool home experience variables (i.e., maternal responsiveness, and home learning environment) were not statistically significant. However, the direct paths from maternal knowledge to children's preschool expressive vocabulary, *b* = 1.25, *SE* = 0.56, $p < .05$, β = 0.06, and from maternal knowledge to children's kindergarten language skills, *b* = 0.28, *SE* = 0.14, $p < .05$, β = 0.06, were both positive and statistically significant. These results suggest that mothers' psychological stress has the strongest direct association with their later responsiveness, whereas mothers' knowledge of child development has a direct association with children's language outcomes.

Furthermore, the results of the final model showed that the direct paths from preschool home experience variables to language outcome variables were all positive and statistically significant, as well. More specifically, maternal responsiveness was associated with preschool expressive vocabulary, *b* = 0.49, *SE* = 0.18, $p < .01$, β = 0.08, and kindergarten language skills, *b* = 0.25, *SE* = 0.05, $p < .001$, β = 0.15. Similarly, home learning environment was positively predictive of both preschool expressive vocabulary, *b* = 0.11, *SE* = 0.03, $p < .001$, β = 0.11, and kindergarten language and literacy skills, *b* = 0.03, *SE* = 0.01, $p < .001$, β = 0.11. These indicate that children who had more responsive mothers and had higher quality home learning experiences

Table 1.5.
Standardized and Unstandardized Coefficients of Indirect Paths from Family SES to Child Language Outcomes.

Indirect Paths	Standardized Coefficient	Unstandardized Coefficient	SE
SES → Pre. vocab.	**0.047**	**0.203*** **	**0.051**
SES → M. stress → Pre. vocab.	-0.005	-0.023	0.015
SES → M. stress → M. resp. → Pre. vocab.	0.002	0.010~	0.006
SES → M. stress → HLE → Pre. vocab.	0.001	0.003	0.002
SES → M. knowledge → Pre. vocab.	0.020	0.088*	0.040
SES → M. knowledge → M. resp. → Pre. vocab.	0.000	0.000	0.003
SES → M. knowledge → HLE → Pre. vocab.	0.001	0.005	0.004
SES → M. resp. → Pre. vocab.	0.008	0.033*	0.017
SES → HLE → Pre. vocab.	0.020	0.087**	0.026
SES → K. language	**0.094**	**0.103*** **	**0.017**
SES → M. stress → K. language	-0.001	-0.002	0.003
SES → M. stress → M. resp. → K. language	0.005	0.005*	0.002
SES → M. stress → M. resp. → Pre. vocab. → K. language	0.001	0.001~	0.000
SES → M. stress → HLE → K. language	0.001	0.001	0.000
SES → M. stress → HLE → Pre. vocab. → K. language	0.000	0.000	0.000
SES → M. stress → Pre. vocab. →K. language	-0.001	-0.001	0.001
SES → M. knowledge → K. language	0.018	0.019*	0.010
SES → M. knowledge → M. resp. → K. language	0.000	0.000	0.001
SES → M. knowledge → M. resp. → Pre. vocab. → K. language	0.000	0.000	0.000
SES → M. knowledge → HLE → K. language	0.001	0.001	0.001
SES → M. knowledge → HLE → Pre. vocab. → K. language	0.000	0.000	0.000
SES → M. knowledge → Pre. vocab. → K. language	0.004	0.005*	0.002
SES → M. resp. →K. language	0.015	0.016**	0.006
SES → M. resp. → Pre. vocab. → K. language	0.002	0.002~	0.001
SES → HLE → K. language	0.020	0.022**	0.007
SES → HLE → Pre. vocab. → K. language	0.004	0.005**	0.002
SES → Pre. vocab. → K. language	0.026	0.029**	0.009

Notes: *$p < .05$; **$p < .01$; ***$p < .001$; ~ $p < .10$. Bolded show total indirect path. Pre. vocab. = Preschool expressive vocabulary; HLE = Home learning environment; K. language = Kindergarten language and literacy skill; M. knowledge = Maternal Knowledge of Infant Development Index; M. stress = Maternal psychological stress; M. resp. = Maternal responsiveness.

in preschool tended to have larger expressive vocabulary in preschool and higher language and literacy skills in kindergarten.

As shown in Table 1.5, each of the indirect paths from family SES to preschool expressive vocabulary and kindergarten language and literacy skills was positive and statistically significant. The total indirect path from family SES to preschool expressive vocabulary via maternal characteristics and preschool home experiences, $b = 0.20$, $SE = 0.05$, $p < .001$, $\beta = 0.05$, accounted for 27.92% of the association between family SES and preschool expressive vocabulary. Similarly, the total indirect path from family SES to kindergarten language and literacy skills via maternal characteristics, home experiences, and preschool expressive vocabulary was positive and statistically significant, $b = 0.10$, $SE = 0.02$, $p < .001$, $\beta = 0.09$, explaining 48.36% of the total association between family SES and kindergarten language and literacy skills.

The results showed that the indirect paths posited by the FSM explained part of the association between family SES and children's later outcomes. More specifically, the indirect path from family SES to preschool expressive vocabulary via maternal psychological stress and preschool maternal responsiveness was positive, but only marginally significant, $b = 0.10$, $SE = 0.01$, $p = .069$, $\beta = 0.002$. The indirect path from family SES to kindergarten language and literacy skills via maternal psychological stress and maternal responsiveness was positive and statistically significant, $b = 0.01$, $SE = 0.002$, $p < .05$, $\beta = 0.005$, whereas the indirect path via maternal psychological stress, maternal responsiveness, and preschool expressive vocabulary skills was positive, but statistically nonsignificant, $b = 0.001$, $SE = 0.00$, $p = .075$, $\beta = 0.001$. On the other hand, the indirect paths from family SES to later language outcomes via only maternal psychological stress were statistically nonsignificant.

The results on the processes posited by the FIM showed a different pattern. As expected, given the nonsignificant direct paths from maternal knowledge to home experiences variables, neither the indirect path from family SES to children's preschool expressive vocabulary via maternal knowledge and maternal responsiveness nor the indirect path via maternal knowledge and home learning environment was statistically significant. Similarly, the indirect paths from family SES to kindergarten language and literacy skills via maternal knowledge and home experience variables were nonsignificant. However, the indirect path from family SES to preschool expressive vocabulary via *only* maternal knowledge was positive and statistically significant, b = 0.09, SE = 0.40, $p < .05$, β = 0.02, which accounted for 43.35% of the total indirect effect between family SES and preschool expressive vocabulary. Likewise, the indirect path via only maternal knowledge accounted for 18.45% of the total indirect path from family SES to kindergarten language and literacy skills, with the indirect paths via maternal knowledge, b = 0.02, SE = 0.01, $p < .05$, β = 0.02, and via maternal knowledge and preschool expressive vocabulary skills, b = 0.01, SE = 0.002, $p < .05$, β = 0.004, both positive and statistically significant. Together with the results on the direct paths, the results suggest that while maternal characteristics and home experiences do have a direct association with children's language outcomes, the association between family SES and language outcomes may not be fully explained by the indirect paths via both maternal knowledge and home experiences.

Discussion

The current study aims to test the generalizability and compatibility of two prominent models—the Family Stress Model and the Family Investment Model—for examining the direct and indirect relations between family SES and children's developmental outcomes in the South Korean context in an integrated model. In particular, we explore both maternal characteristics and

home experiences as mechanisms that may explain observed SES-based language gaps during the early childhood period in the understudied cultural context of Korea. The study also extends both the FSM and the FIM by including two additional maternal characteristics (maternal self-efficacy and maternal knowledge of child development, respectively) to more fully chart the mechanisms that explain the relations between family SES and child outcomes. In doing so, the study also attempts to adapt the two models to reflect factors that have been shown to be significant in prior research in different contexts, including Korea. Below, we summarize the main findings and discuss their implications for the application of the two models.

SES-based Disparities in Maternal Characteristics, Home Experiences, and Child Language in South Korea

The results of the final structural equation model showed that after accounting for child gender, age, birth order, and maternal age, family SES during the first year of children's lives was directly associated with maternal characteristics during the same year, home experiences during preschool, and language outcomes during preschool and kindergarten. That is, consistent with prior work in the U.S. and in Korea (e.g., Moon, 2012; Yeung et al., 2002), Korean mothers from higher SES backgrounds in the current sample tended to experience less psychological stress, had more knowledge of child development (SES → maternal characteristics) and also tended to be more responsive to their children's needs and to provide a richer home learning environment (SES → home experiences).

Interestingly, the size of the association between family SES and maternal psychological stress was much smaller (β = -0.083) than the association between family SES and maternal knowledge of child development observed in this sample (β = 0.325) and than in the prior literature (e.g., Kiernan & Huerta, 2008). This could be due to our operationalization of the construct of

family SES (i.e., a factor that included family income, maternal education level, and paternal education level), which may show different effect sizes from what we may see with the inclusion of only one of the variables (e.g., only family income; e.g., Yeung et al., 2002) or multiple variables separately (e.g., family income and maternal education as separate predictors; e.g., Piccolo & Noble, 2019). Previous research showed that family income and relevant financial circumstances tend to show a stronger association with parental psychological stress (e.g., Bae & Wickrama, 2015; Piccolo & Noble, 2019), suggesting that the associations with parental characteristics may vary across different SES variables. Alternatively, the result could reflect the unique social context of South Korea, where mothers' psychological stress levels are influenced by other sociocultural factors not included in the current model (e.g., social expectations and pressure about their role as mothers), and not necessarily by their financial resources or education levels. Further work that examines additional sociocultural factors of Korea, as well as other social contexts, would be needed to clarify the role of family SES in diverse cultural contexts.

Also consistent with prior work, the results of the current study show that Korean children from higher SES backgrounds tend to have better expressive vocabulary skills at preschool and more advanced language and literacy skills at kindergarten than their less advantaged peers (SES → language outcomes; e.g., Huttenlocher et al., 2010; Kwak et al., 2007). These results suggest that the implications of family SES extend beyond the first year of children's lives, and at least to the kindergarten years. Such direct and long-term relations between SES and other aspects of children's early experiences build on recent work that found growing SES-based differences in school-aged children's outcomes in the Korean context (Byun & Kim, 2010). Together, the current findings provide further evidence that SES-based differences in children's developmental

outcomes appear early in Korea, calling for increased and earlier support for children from low-SES backgrounds.

An Integrated Framework of the Family Stress Model and the Family Investment Model

In addition to identifying these SES-based disparities in children's language outcomes, the current study examined a set of proposed mechanisms using modified versions of both the FSM and the FIM. The results from the integrated model support the mechanisms proposed by the FSM, showing that maternal psychological stress and their responsiveness partially mediated the relation between family SES and child language outcomes, replicating previous findings from other cultural contexts (e.g., Kiernan & Huerta, 2008; Wu et al., 2020). Furthermore, consistent with our hypothesis, we found that mothers' self-efficacy levels, along with depression and parenting stress, reflect mothers' psychological stress. We also found that this construct of maternal psychological stress negatively predicts their responsiveness and the quality of home learning environment, which in turn predicts children's language outcomes. These results suggest that when testing the application of FSM, researchers in other cultural contexts may want to consider including self-efficacy as a dimension of parental psychological stress to more fully represent the construct.

The FIM was similarly applicable to the Korean sample, showing that family SES was positively associated with the quality of children's home experiences, which in turn predicted their language outcomes. Replicating previous findings, these findings add to the growing body of research that support the broad generalizability of the FIM that explains the link between early family SES and child outcomes (e.g., Coddington et al., 2014; Cuartas et al., 2020; Davis-Kean, 2005; Guo & Harris, 2000). Furthermore, we found that while maternal knowledge of child development appears to be a mediator in the relation between family SES and children's language outcomes, it does not relate to children's home experiences, as we hypothesized based on the

traditional FIM. This finding departs from previous studies in other cultural contexts that found only indirect associations between maternal knowledge of child development and child language outcomes via children's home experiences (e.g., participation in cognitively stimulating activities) (Cuartas et al., 2020; Zajicek-Farber, 2010).

There are two possible explanations for the findings on the role of maternal knowledge in the final model. First, this divergence from previous findings in other cultural contexts might be due to the different operationalization of the home experiences. In our study, for example, we used a composite score from the EC-HOME (Caldwell & Bradley, 2003), a measure developed for Western contexts, to measure the quality of children's home learning environment in Korea. Although the measure has been used in the Korean setting before (e.g., Kim & Kwak, 2007), there could be alternative in-home practices Korean mothers are taking on (e.g., showing videos in different languages to raise their children multilingual) that are not captured by this measure, but are associated with maternal knowledge of child development. This may especially be true given that the EC-HOME included limited observational and self-reported items that describe some of children's home experiences, and therefore may not fully capture all the resources available in the homes. Similarly, the measure we used for maternal responsiveness, a subcomponent of the PSQ (Bornstein et al., 1996), focused on mothers' interaction style with their children, which may have excluded other aspects of maternal responsiveness previously captured in the FIM (e.g., high-quality conversation).Alternatively, the current findings that diverge from previous findings from other cultural contexts may point to the potentially different application of the FIM in the Korean context. The observed indirect effect from family SES to language outcomes via maternal knowledge suggests that maternal knowledge may play a role in predicting children's language outcomes not via home experiences included in the final model, but via alternative processes not

included in the model. That is, Korean mothers' knowledge may shape other aspects of their parenting and involvement in children's early development that are not fully captured in the processes posited by the FIM as depicted in our final model. One such area could be Korean mothers' efforts to find helpful educational activities and opportunities for their children that occur outside the home and/or that do not involve direct engagement with mothers themselves, such as private tutoring and *hakwon*, or extra classes outside school settings to learn academic content. With over 80 percent of elementary school-aged children attending some form of private tutoring (Statistics Korea, 2020a), a unique form of parenting in the Korean context (Park et al., 2011), it would not be surprising if mothers are already engaging in similar forms of parenting practices (e.g., participation in home visit programs, or *hakwon*) for their children when they are in preschool. Although the current analyses cannot directly address these hypotheses about the mothers' parenting practices in the Korean context, future studies should consider different forms of parenting across different cultures when examining the application of the integrated model of FSM and the FIM.

Together, the findings indicate that both the FSM and the FIM together explain the relations between family SES and children's language outcomes in South Korea, lending support for the application of an expanded and integrated FSM+FIM model in this context. The findings further highlight the complexity of children's early experiences that influence their development (Bradley & Corywn, 2002; Bronfenbrenner, 1986; 1994) by observing associations between variables that range multiple dimensions. Finally, the findings call for more use of the integrated models that encompasses both the psychological and material aspects of parenting and home experiences in other cultural contexts.

Limitations and Future Directions

The current study has a few limitations worth highlighting. First, except for home learning environment and child expressive vocabulary during preschool, most of the data came from maternal reports from three time points. Such reliance on maternal report may lead to same reporter bias that could artificially inflate associations between key study variables. Undirected paths were included in the models between the disturbance terms of the maternal report variables within the same time points to model potential bias that may exist, but more studies that examine these variables using various sources of data (e.g., maternal and paternal report, observation) are needed.

Moreover, there were varying degrees of missing data in the present sample (Table 1.1). The current analyses therefore employed full information maximum likelihood (FIML) to account for the missingness. While some attrition and missingness is expected given the longitudinal nature of the data (spanning over a period of seven years), such attrition may result in the final sample being non-representative of the original sample. For example, the families that continued with the data collection until Year 7 may be more interested in learning about their children's development (given the overall goal of the larger study), and thus, may be more likely to invest in their children's home learning environment, potentially altering our results on the processes posited by the FIM and compromising external validity. Although a series of *t*-tests that compared the families that stayed in the study until Year 7 and those who dropped out before Year 7 showed that those two groups were overall similar (see Appendix 1.A.1 & Appendix 1.A.2 for more detail), the findings and the implications of the study should be interpreted with caution (e.g., low external validity of the findings).

In addition, the KIDI scale, which measured mothers' knowledge of child development, showed a relatively low level of internal reliability at .52. Although the reliability is relatively low,

the value is comparable to values from other studies that used the KIDI measure (e.g., Rowe et al., 2016; α = .60; Cuartas et al., 2020; α = .64). It is possible that the reliability is low because the segment of the measure used in the study ("principles of development") captures a wide range of knowledge about child development broadly, including social and linguistic development from infancy to preschool years. Alternatively, although the instrument has been used in the context before, the low reliability could indicate poor cultural relevance. Future research should explore whether the measure and its internal reliability could be further improved in the context of Korea.

Furthermore, most of parental variables included in the analyses represented characteristics and behaviors of the participating mothers (c.f., paternal education level). Although maternal variables were selected to represent the general gender role ascribed to mothers in South Korea (i.e., mothers take the lead in supporting children's development; Sorensen, 1994), future research should further examine the role of fathers and other caregivers in promoting children's long-term language development.

Lastly, the current findings cannot ground causal conclusions solely on the relations among the variables. That is, although the findings suggest longitudinal relations among the variables and therefore represent an advance over the previous, largely cross-sectional literature, they do not mean that the parental variables observed in the first years of children's lives (e.g., family SES, maternal psychological stress, and maternal knowledge of child development) necessarily caused the variations in the variables observed later (e.g., maternal responsiveness, home learning environment, and child language outcomes) due to possible issues of selection bias. Although the study examined a longitudinal dataset and observed mechanisms over a span of multiple years, more experimental studies are needed to fully explore the causal relations among the variables.

Conclusion and Implications

In conclusion, this study confirms how SES-based differences in familial processes and child development appear early prior to formal schooling in South Korea. Furthermore, these results show that an integrated model that simultaneously examines mechanisms posited by the Family Stress and Family Investment Models holds true in explaining SES-based differences in children's language development in the Korean context, a cultural context rarely examined in research, and may also be more broadly relevant in other cultural contexts. The study also presents evidence that self-efficacy may be an additional indicator of maternal psychological stress in Korea, and that maternal knowledge of child development may play an independent role outside the two Models in explaining SES-based gaps we observe in children's developmental outcomes.

Showcasing the early sources of SES-based differences we observe in children's language and academic outcomes in schools, a phenomenon observed not just in South Korea, but across different cultural contexts, these results point to the need to develop interventions that address not only mothers' knowledge and beliefs, but also their psychological well-being, for such interventions to have the desired effect on children's developmental outcomes. Educators and researchers can build on current findings to explore ways to work with parents to provide early support for both parents and children from diverse SES backgrounds with the goal of promoting their long-term language development and well-being.

Study 2

Early gesture use predicts children's language development in South Korea: New evidence supporting the cross-cultural importance of index-finger pointing

Background

Before they can speak, young children use gesture to communicate with others (Goldin-Meadow, 1998; McNeill, 1998). Research in the U.S. and other Western countries has shown that children start using gesture to communicate before their first birthday (Bates et al., 1975; Bates, 1979b). Research further shows that early gesture use (e.g., frequency of gesture, the number of meanings conveyed by gesture) by children, as well as parents, is an important precursor to children's later language development (e.g., Rowe, 2000; Rowe & Goldin-Meadow, 2009a), highlighting the significance of early opportunities to practice using gesture.

Despite growing efforts to examine parents' and children's use of gesture in different cultural contexts (e.g., Kishimoto, 2017; Liszkowski et al, 2012; Salomo & Liszkowski, 2013), most of what we know about this mode of communication is still largely based on a small subset of the population of Western countries. Such an approach limits our understanding of the role that culture plays in children's early experiences and development (Henrich et al., 2010; LeVine, 2004; Schieffelin & Ochs, 1986). Thus, there remains a need to further examine the use and role of gesture in different cultures to expand our knowledge about factors that promote children's early language development. In the current study, we examine mothers' and children's use of gesture in a sample of 31 families in South Korea, a context in which this topic has seldom been studied. Building on prior work on the role of gesture in language development, we further explore whether early gesture use by Korean mothers and children when children are 14 months old predicts the children's language outcomes at age three.

Gesture Use and Language Development in the Western Context

Developmental research in the U.S. and European countries has shown that production of gesture starts around 9 to 12 months, around the time children start to communicate intentionally (Bates, 1979b; Bates et al., 1975). Use of gesture allows children to communicate even before they can express themselves via spoken language. Similar to vocabulary size in later years, children's early gesture use shows wide variations (Capirci et al., 1996). Once children start to talk, gesture in combination with speech provides a useful tool that allows them to communicate more than what they can produce with words alone (Butcher & Goldin-Meadow, 2000; Goldin-Meadow, 1998; McNeill, 1992).

Early gesture use in children consists mostly of deictic gestures, including showing, giving and pointing, that are used to indicate a nearby object or person in the context (Bates et al., 1979; Goldin-Meadow, 1998). Deictic gesture often has the goal of causing the interlocutor to join in attending to the target object (Carpenter et al., 1998), and the meaning of such gesture is determined by the physical context (e.g., showing a toy dog to mean "dog"). Two other categories of gesture—conventional gesture and representational gesture—are also apparent in children's early communication. "Conventional gesture" refers to gestures that have "their form and meaning . . . established by the conventions of specific communities" (McNeill, 1998, p. 12), and thus, may vary across different cultural contexts. Some examples of conventional gestures include waving hand to say "hi," and nodding to mean "yes." Representational gesture, gesture used to symbolize an action or an attribute of an object, tends to be produced much later, starting around children's second birthday (Özçalışkan & Goldin-Meadow, 2011). Among representational gestures, those that describe an action (e.g., opening two hands to mean "open a book") tend to

appear earlier than those that describe an attribute (e.g., drawing a circle with both palms to mean "round") (Hodges & Özçalışkan, 2015; Özçalışkan et al., 2014).

Research in Western contexts has shown that early gesture use is an important precursor to children's later language development (e.g., Goodwyn & Acredolo, 1998; Rowe, 2000; Rowe & Goldin-Meadow, 2009a; 2009b). For example, Iverson and Goldin-Meadow (2005) found that objects that children represented with gestures corresponded with the words that they produced in speech three months later, suggesting that early practices with gesture may provide infants with opportunities to learn new vocabulary. Research also points to a link between mothers' and children's gesture use, suggesting that young children may learn the forms and communicative functions of gestures from interacting with and observing their caregivers using gestures (Namy et al., 2000; Rowe, 2000; Rowe & Goldin-Meadow, 2009b). In a longitudinal study with a sample of U.S. families, for example, Rowe and Goldin-Meadow (2009b) found that parents' use of gesture was positively associated with their children's use of gesture at 14 months, which in turn predicted their vocabulary knowledge four years later.

Given the prominence of deictic gestures around children's first birthday, researchers in the U.S. and Europe have also taken a closer look at the role of deictic gestures in children's language development (e.g., Cameron-Faulkner et al., 2015; Özçalışkan et al., 2016; Rowe et al., 2008). In particular, index finger pointing (henceforth, "pointing"), the most common type of deictic gesture starting around 12 months (Bates et al., 1979), has been found to be a strong predictor of children's language outcomes (Goldin-Meadow, 2007; LeBarton et al., 2015; Özçalışkan et al., 2016; Rowe et al., 2008; see Colonnesi et al., 2010 for a meta-analysis). For example, in a sample of U.S. families, Salo and colleagues (2019) showed that the frequency of children's pointing at 12 months predicted their vocabulary scores at 18 months. In an

experimental study with 18-month-olds, LeBarton and colleagues (2015) successfully increased children's speech production by increasing children's pointing in an 8-week intervention, providing further support for a direct link between children's gesture use and language development.

Recently, others have investigated showing and giving gestures, two other types of commonly used deictic gestures, and their potential role as predictors of pointing gestures, and potentially of later language development (e.g., Boundy et al., 2019; Cameron-Faulkner et al., 2015). Like pointing, showing and giving gestures are considered to be deictic, as they similarly share the goal of drawing another's attention to the object of interest. However, unlike, pointing, these giving and showing gestures are both "proximal declarative behavior[s]" that require direct manipulation of objects (Cameron-Faulkner et al., 2015, p. 577). That is, both gestures require caregivers and children to touch and move the target object to direct their interlocutor's attention to the object (Bates et al., 1975), unlike pointing, which can accomplish that goal from a distance. Research thus far suggests that children's giving and showing gestures appear earlier and predict the development of their pointing gestures (Cameron-Faulkner et al., 2015) and later language development (Choi et al., 2021). Here we add to this body of research by examining whether Korean children's early giving, showing and pointing gestures at 14 months predict their language outcomes at 36 months.

Gesture Use and Language Development outside the Western Context

Although research on caregivers and children's use of gesture has been done mostly with families from Western countries, there is an emerging line of international and cross-cultural research observing early gesture use in different cultural settings (e.g., Callaghan et al., 2011; Cameron-Faulkner et al., 2020; Goldin-Meadow & Saltzman, 2000; Haviland, 1998; Kishimoto,

2017; Kita, 2009; Kwon et al., 2018). Such studies have started to provide evidence of both similarities and variations across different cultural contexts. For example, Kwon and colleagues (2018) surveyed 714 parents from the U.S., Austria, Germany, Switzerland, and Taiwan on their children's use of gestures, and found that while children from different cultures used similar repertoires of gestures, such as pointing and nodding, the age at which children start to use these gestures differed across cultures/languages. Similarly, in a study comparing gesture use of mothers and children from Chinese, Mayan, and Dutch families in a playroom setting, Salomo and Liszkowski (2013) found that caregivers' gesture use predicted children's own gesture use within each culture.

Similar to research in Western contexts, many have focused on exploring the role of pointing across different cultures. For example, in a study spanning seven different cultures (Papua New Guinea, Indonesia, Japan, Peru, two regions in Mexico, and Canada), Liszkowski and colleagues (2012) found that most infants were using pointing by around 12 months, and frequencies of pointing during a free-play interaction with their caregivers also did not differ across cultures. However, in the study mentioned above, Salomo and Liszkowski (2013) found that Chinese mothers and children tended to point more frequently than Mayan and Dutch dyads. While these studies suggest the prevalence of pointing gesture across different cultures, there is still a need to better understand how other gestures, as well as pointing, are used in different cultures by caregivers and children, and what role these gestures may play in supporting children's language development. In particular, we do not know much about the role of other commonly used deictic gestures, including showing and giving gestures, that may equally be important.

Furthermore, while there is an increasing interest in examining early deictic gestures in diverse cultures, not much is known about the development of conventional gesture use. With the

limited research on children's conventional gesture use, we can examine international research on adults' conventional gesture use that highlights cultural variations (e.g., Kita, 2009; Matsumoto & Hwang, 2013; McNeill, 1998). For example, in a cross-cultural study with adults from different regions (East Asia, Latin America, Africa, South Asia, Middle East, and the U.S.), Matsumoto and Hwang (2013) found that while some conventional gestures, such as nodding to mean "yes" and shaking head to mean "no," were similarly used and understood by adults across cultures, many others differed in either meaning, form, or both (e.g., waving hand in the U.S. vs. bowing in East Asia to mean "hi," open hand fluttering with palm down in South Asia vs. four fingers curled toward oneself with hand held in front of one's body in Africa to mean "come"). As conventional gestures, by definition, are shaped by each cultural community and thus, often convey social conventions specific to different cultures (McNeill, 1998), a closer look at conventional gesture use by children, along with mothers, may illuminate how young children's acquisition of social conventions of their communities starts early on, even before they acquire spoken language.

In this study, we focus on early gesture use by mothers and 14-month-old children in the context of South Korea for the following two reasons. First, we aim to add to many cross-cultural studies examining potential differences between Western contexts and non-Western contexts, across different domains ranging from parent-child language use to the way people view and think about the world (Nisbett et al., 2001; Rogoff et al, 1993). While this study does not draw direct comparison with gesture use in different contexts, we aim to provide empirical evidence on variations in early conventional gesture that can inform our understanding of cultural variations in early socialization and interactions. Our second goal is to expand our knowledge about variations in early learning experiences in the Asian context. While there has been research focusing on variations in children's early language and socialization experiences in Asia, most of the studies

focus on families in China or Japan (e.g., Kishimoto, 2017; Salomo & Liszkowski, 2013; Wei et al., 2020). By focusing on the understudied context of South Korea, we aim to expand our knowledge on child development in Asia.

Gesture Use in Korean Children

Early gesture use has not been studied much in the Korean context, with only a handful of studies that examined gesture use in Korean children, often over a wide range of ages (e.g., Kim & Kim, 2006; Lee & Kim, 2013; Lee & Lee, 2015). For example, Kim and Kim (2006) examined gesture use between 7- and 24-months during a structured play time with an experimenter and found that the number of gestures produced increased with children's ages. In a longitudinal study, Choi and Lee (2018) examined gesture use between 12 and 18 months and found that total gesture use, along with deictic gesture and pointing, was positively associated with parents' report of their children's vocabulary skills at 24 months.

Despite these findings, gaps remain in our knowledge of gesture use in South Korea. First, studies have examined children's gesture production during a structured interaction with an experimenter in a laboratory setting (Shin & Kim, 2016), making it difficult to know the general patterns of mothers' and children's gesture use in a naturalistic interaction setting that more closely resembles children's everyday experiences. Furthermore, although Choi and Lee (2018) examined a more naturalistic playtime interaction between mothers and children, they did not report any details on gesture use (e.g., frequencies of total gesture and different gesture categories), making it difficult to fully understand their findings on the relation between gesture use and language outcomes. In addition, although some have begun to examine the relation between children's gesture use and language outcomes (e.g., Choi & Lee, 2018; Kim & Kim, 2006), they have used maternal reports of child language skills, rather than directly assessing children's language skills.

Lastly, we do not know much about the role of individual gestures, such as pointing, giving, and showing, in supporting children's language outcomes, as examined in other cultural contexts, and there is more to learn about children's use of conventional gestures early in development. Thus, there is still room to better understand caregivers' and children's gesture use in the Korean context, as well as the potential role that gesture may play in predicting Korean children's language development.

Current Study

In the current study, we examine early gesture use and its relation to children's later language outcomes in the context of South Korea. Specifically, we ask the following research questions:

1) What types of gestures do Korean mothers and children use at 14 months?
2) What is the relation between mothers' gesture use and children's gesture use?
3) What is the relation between children's and mothers' gesture use at 14 months and children's language outcomes (receptive and expressive vocabulary) at 36 months?

The current study extends existing literature in two ways. First, we add to the growing body of international research that aims to expand our understanding of early gesture use and its role in promoting children's linguistic development. Furthermore, we add to the emerging body of research that examines the potential benefits of gesture use in South Korea by examining the relation between early gesture use and children's language outcomes, which could inform educators' efforts to support Korean children's early language development. More specifically, we examine the potential role of giving and showing gestures in predicting children's language development (e.g., Cameron-Faulkner et al., 2015; Choi et al., 2021), in addition to adding to

research on the potential cross-cultural and cross-linguistic importance of pointing by specifically focusing on the understudied context of South Korea.

Methods

Participants

The data for the current study came from a larger study conducted by a research team at Hansol Education, an educational institute in Seoul, South Korea. The aim of the original study was to observe children's development longitudinally and to test the effect of an educational toolkit, which was not related to the early use of gesture.[2] The original study included a convenience sample of 142 families that resided in the Seoul area, whose child was between 6 months and 18 months at the time of the first visit. Of the original sample, 65 families remained in the study when children were 36 months old. Because there were variations in the locations where the observations took place (laboratory playroom vs. families' homes) and the ages of children at the time of the observations (ranging from 6 months to 18 months), we examined a subset of the data from families that met the following two eligibility criteria: 1) the mother-child dyads engaged in a playtime session at the research team's laboratory when children were approximately 14 months; 2) they also participated in a follow-up visit to the laboratory when children were 36 months. Based on the criteria, 31 mother-child dyads (12 girls) that participated in the study at the research team's laboratory when children were approximately 14 months and 36 months, were included in the final analytic sample for the current study. The mean age of children during the initial visit was 14.8 months (*SD* = 1.17; Range = 12 months – 16 months). Mothers provided informed consent for the dyads' participation in the study. All dyads used Korean as their primary language at home and

[2] The educational toolkit included books and toys that are age-appropriate for children from ages 0 to 3 and aimed at providing stimulating learning experiences and promoting children's cognitive development broadly.

during the study. On average, mothers in the sample had at least some college education (education level ranged from community college degree – graduate degree). The average household monthly income for the families in the study was 4,930,000 Korean won (approximately 4,500 U.S. dollars), which is above the national average monthly income of 3,401,000 won ($2,996) (Statistics Korea, 2020b). Most of the children (n = 24) were first-born. No child was reported as having any developmental or linguistic delays by the 36-month visit.

Procedure and Measures

During the visit when children were 14 months old, the mother-child dyads were invited to play as they normally would in a laboratory playroom stocked with toys. After introducing the dyads to the playroom, the researcher left the room for ten minutes before returning. The dyads' interactions were video recorded, and the recordings were transcribed by reliable transcribers up to 10 minutes in the Child Language Analysis (CLAN) program, a software used to transcribe and analyze language data, marking each utterance marked by a clear pause as the unit of analysis. The transcripts followed the Codes for the Human Analysis of Transcripts (CHAT) conventions of the Child Language Data Exchange System (CHILDES), an online system used to conduct research on child language development (MacWhinney, 2000), which allowed for the analysis of the language data using the CLAN. The average length of dyads' interactions was 9 minutes and 39 seconds (SD = 45.97 seconds; range = 6 minutes and 36 seconds - 10 minutes). The gesture and linguistic measures from the videos that were shorter than 10 minutes were prorated to allow for direct comparison across different dyads. That is, we divided the gesture and language measures from the shorter interactions by the actual lengths of the recordings and multiplied them by 10 minutes to calculate what the measures would have been like if the dyads were to engage in the full 10-minute interactions. This approach allowed us to include all available data, and also

allowed for concise interpretation of the results and direct comparison between dyads. Following the initial round of transcription, all transcripts were independently verified by a second trained transcriber to ensure completion and reliability. Transcripts were then coded for both mothers' and children's gesture use, as described below.

Gesture Coding

Following previous research, we defined gesture as any empty-hand or body movement that conveyed communicative intent (Choi et al., 2020; Rowe & Goldin-Meadow, 2009a). Exceptions for empty-hand gesture were giving and showing, which included direct manipulation of a target object (e.g., a child holding a toy trumpet to give it to the mother). Both mothers' and children's gestures during the play interaction were coded into one of three categories: deictic, conventional, or representational gesture, using a coding scheme adapted from previous research in the U.S. (Choi et al., 2020; Iverson & Goldin-Meadow, 2005; Rowe & Goldin-Meadow, 2009a; see Appendix 2.A. for a detailed coding scheme table). Any gesture used to indicate an object or a person in the immediate environment was coded as a deictic gesture. Examples of deictic gesture includes pointing at a toy elephant to mean "elephant," showing a book by holding it up to someone's view, holding an object to give to someone else, reaching out a hand toward an object (without actually grabbing the object) to ask for it, tracing the text on a book while reading the story to indicate the text, and holding out a palm to mean "give me the cup," which we call a palm/take gesture. Pointing was coded as index-finger point only if the index finger was clearly visible; all other cases of pointing with a hand in any other shape, including the cases where the hand shape was not clearly visible, were coded as a whole-hand point. A code for giving was given when the child or the mother held out an object in the direction of the interlocutor's physical space for the interlocutor to take it, and the interlocutor took or received the object. Showing was defined

as holding out an object within the interlocutor's visual range, often accompanied by an extension of the arm toward the interlocutor. In examining the relation between gesture use and children's language outcomes, we combined the giving and showing gestures and used a combined measure of 'giving + showing,' as they both emerge around 10 months (Cameron-Faulkner et al., 2015) and more importantly, both express the shared goal of directing the interlocutor's attention to the target objects by direct handling of the objects (see Cameron-Faulkner et al., 2015, and Choi et al, 2021 for a similar approach).

Any gesture that carried culturally specific meaning was coded as a conventional gesture. Examples of conventional gesture includes nodding to mean "yes," and clapping to mean "good job." Lastly, a code for a representational gesture was given to any gesture that depicted a certain attribute of an object or action. Examples of representational gesture includes opening hands to mean "open the book," and turning hands to mean "spin the toy block." Each instance of gesture was coded, and gesture that continued over multiple sentences was only coded once. Gesture that was part of a routine (e.g., dance movement for a song) was not coded. Two trained coders, who were both native Koreans, coded 20 percent of the transcripts (n = 7). The Cohen's Kappa for the overall gesture coding was calculated for the double-coded transcripts (n = 7) using the total number of gestures across all gesture categories, and the two coders showed high agreement with the Kappa value of .98. Disagreements in gesture coding were reconciled over discussion between the two coders, and one of the coders (the first author) coded the rest of the transcripts.

Child Vocabulary Outcomes

During a follow-up visit to the laboratory when children were 36 months old, a trained researcher assessed children's receptive and expressive vocabulary skills using the Receptive and Expressive Vocabulary Test (REVT; Kim et al., 2009), a standardized vocabulary assessment

commonly used in South Korea. Normed with a monolingual sample in Korea, the assessment was developed to measure vocabulary skills of Korean speakers ranging in age from 30 months to adulthood. The test showed acceptable internal reliability, with test-retest reliability values of .82 for receptive vocabulary and .86 for expressive vocabulary, and split-half reliability values of .88 for receptive vocabulary and .94 for expressive vocabulary (Kim et al., 2009). The assessment includes 185 receptive vocabulary items and 185 expressive vocabulary items, with the assessment being terminated when children answer six out of eight consecutive items incorrect. Similar to the Peabody Picture Vocabulary Test (PPVT; Dunn, 2019), the receptive vocabulary component of the REVT tested children's receptive vocabulary by asking children to examine a set of four images shown on one page and to select an image that corresponds to the word provided by the test administrator. The expressive vocabulary component of the REVT asks children to provide a verbal label for an image shown on the booklet. The raw scores for both receptive and expressive vocabulary scores were used in the analysis. The average receptive vocabulary score for the norming population between 33 and 35 months was 19.13 (*SD* = 6.18) and the average expressive vocabulary was 22.17 (*SD* = 9.18), while the average receptive vocabulary score between 36 and 41 months was 28.45 (*SD* = 8.65) and the average expressive vocabulary score was 33.31 (*SD* = 10.78).

Control Variables

As early language skills predict children's later language skills (e.g., Lee, 2011), we controlled for children's vocabulary scores from the initial visit, taken from a parent report of children's receptive and productive vocabulary using the short version of Korean MacArthur-Bates Communicative Development Inventories (K-MB-CDI; Bae & Kwak, 2011). Furthermore, we controlled for linguistic measures of the interactions, including the mean length of utterances for

mothers, and the number of utterances produced by mothers, as previous research suggests the importance of the linguistic complexity and quantity of speech input for young children (e.g., Rowe, 2012). As children at 14 months did not produce much speech, we did not include the language measures from the interactions for children in our analyses. Linguistic analyses, including the calculation of the mean length of utterance-sentence (MLU-s), were completed using UTagger, a Korean morphology analysis program developed and used in South Korea (Shin & Ock, 2012).

In addition to the main predictor variables (i.e., gesture use) and the linguistic measures, we included several additional control variables. We included children's baseline age in months in the analyses to control for any variations in the baseline language scores that may come from the varying initial ages. We also included maternal education as a control variable in our main analyses, given previous findings that showed predictive relations between maternal education and gesture use (e.g., Rowe, 2000) and between maternal education and children's language outcomes (e.g., Sohr-Preston et al., 2013). Similarly, we controlled for family income, given research that points to strong associations between family income and children's language outcomes (e.g., Yeung et al., 2002). Lastly, we included child gender as another control variable, as research suggests that girls tend to have more advanced language skills early on (e.g., Bornstein et al., 1998) and that these sex differences can be seen in gesture before speech (Özçalışkan & Goldin-Meadow, 2010).

Analytic Plan

To address our first research question about mothers' and children's gesture use, we examined frequencies and proportions of gestures used by both mothers and children during the 14-month visit. More specifically, we looked at the total gesture count, or number of tokens, and

then at the distribution of gestures across the three gesture categories (deictic, conventional, and representational) before further exploring the sub-categories within each gesture category. We also examined "total gesture types," or the number of different meanings conveyed by gesture and used it as a global measure of gesture use, as it is a measure that has been shown to be a stronger predictor of children's vocabulary development than the total number of gestures used by children (i.e., gesture count) in the U.S. (Rowe & Goldin-Meadow, 2009b; Rowe et al., 2008).

To answer our second research question about the relation between mothers' gesture use and children's gesture use, we first examined descriptive statistics and bivariate correlations of mothers' and children's gesture variables and children's language outcomes. Lastly, to address our final research question on the associations between mothers' and children's gesture use and children's subsequent vocabulary outcomes, we conducted multiple regression analyses to examine whether gesture type at 14 months predicted both receptive and expressive vocabulary outcomes at 36 months. To look more closely at individual gesture frequencies, we conducted additional multiple regression analyses to examine whether frequencies of different kinds of deictic gesture (i.e., pointing, and giving+showing) predicted language outcomes at 36 months. All analyses on gesture use and vocabulary measures were conducted using STATA MP 16.0 (StataCorp, 2019).

Results

Korean Mothers and 14-Month-Old Children's Use of Gestures

Table 2.1 shows Korean mothers and children's gesture use across three gesture categories during the interactions. All mothers in the sample used gestures, and most children in the sample (29 of 31) communicated using gesture during the interaction. Total gesture types, or different meanings conveyed by gesture, also varied widely across different mothers and children. Deictic

gesture was the most commonly used gesture category for both mothers and children, accounting for approximately 80 percent of mothers' total gesture production and about 88 percent of children's total gesture production. Conventional gestures accounted for most of the remainder of gesture production (approximately 14 percent of mothers' gesture production and 11 percent of children's gesture production), whereas representational gesture was rarely used by either mothers or children. Below, we describe Korean mothers and children's gesture use for each gesture category.

Table 2.1.
Means, Standard Deviations (SD), and Ranges of Gesture Measures for Mothers and Children (N = 31).

	Mother			Child		
	M	*SD*	Range	*M*	*SD*	Range
Total Gesture Token	27.45	10.58	8–48.65	10.31	8.93	0–34.44
Deictic Gesture	22.37	10.39	6–48.65	9.36	8.02	0–30
Conventional Gesture	3.59	2.95	0–12.22	0.82	1.27	0–4.04
Representational Gesture	1.49	1.95	0–9	0.14	0.46	0–2.22
Total Gesture Type	14.75	4.98	5–25	6.41	4.75	0–15.56

Deictic Gesture

As shown in Figure 2.1, mothers used different categories of deictic gestures during the 10-minute play interaction. The mothers produced an average of 22.37 (*SD* = 10.39) deictic gestures, whereas children produced an average of 9.36 (*SD* = 8.02) deictic gestures. Of all deictic gestures, pointing was, on average, used most frequently by the mothers (*M* = 7.81, *SD* = 5.94), closely followed by the showing gesture (*M* = 7.54, *SD* = 5.38) and by the giving gesture (*M* = 4.53, *SD* = 2.78). Although used relatively infrequently, the mothers in the sample also used other types of deictic gestures, such as whole-hand pointing (as opposed to index-finger pointing) (*M* =

1.25, *SD* = 1.48), holding out a palm (to be handed an object) (*M* = 1.04, *SD* = 0.16) and tracing (*M* = 0.13, *SD* = 0.43).

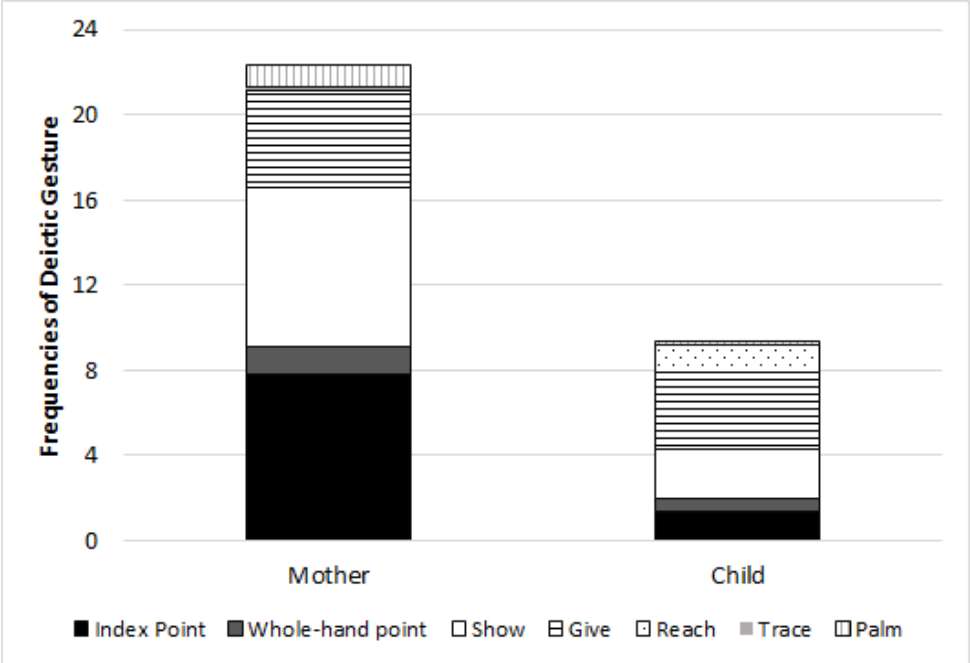

Figure 2.1.
Mean Frequencies of Different Deictic Gestures Used by Mothers and Children.

Similarly, children also used a variety of deictic gestures during the interaction. Unlike the mothers, children in the sample, on average, produced more of the giving (*M* = 3.63, *SD* = 4.39) and showing gestures (*M* = 2.30, *SD* = 3.72) than the pointing gestures (*M* = 1.35, *SD* = 1.51). On average, children in the sample also used the reaching gesture often (*M* = 1.31, *SD* = 1.49), followed by low frequencies of whole-hand pointing (*M* = 0.61, *SD* = 0.79) and holding out a palm (*M* = 1.04, *SD* = 0.37).

Conventional Gesture

Compared to the frequencies of deictic gesture use, conventional gesture was used much less frequently by mothers and children in this sample (Figure 2.2). More specifically, mothers, on average, used only 3.59 conventional gestures (*SD* = 2.95) during the 10-minute interaction. Although there was wide variation in the frequency of conventional gesture across different

mothers (Range = 0–12.22), the highest frequency of conventional gesture (approximately 12 conventional gestures used during the interaction) still reached only half of the overall average frequency of deictic gesture use. Children, on average, produced conventional gestures even less frequently, with an average use of 0.82 conventional gestures during the 10-minute period (*SD* = 1.27).

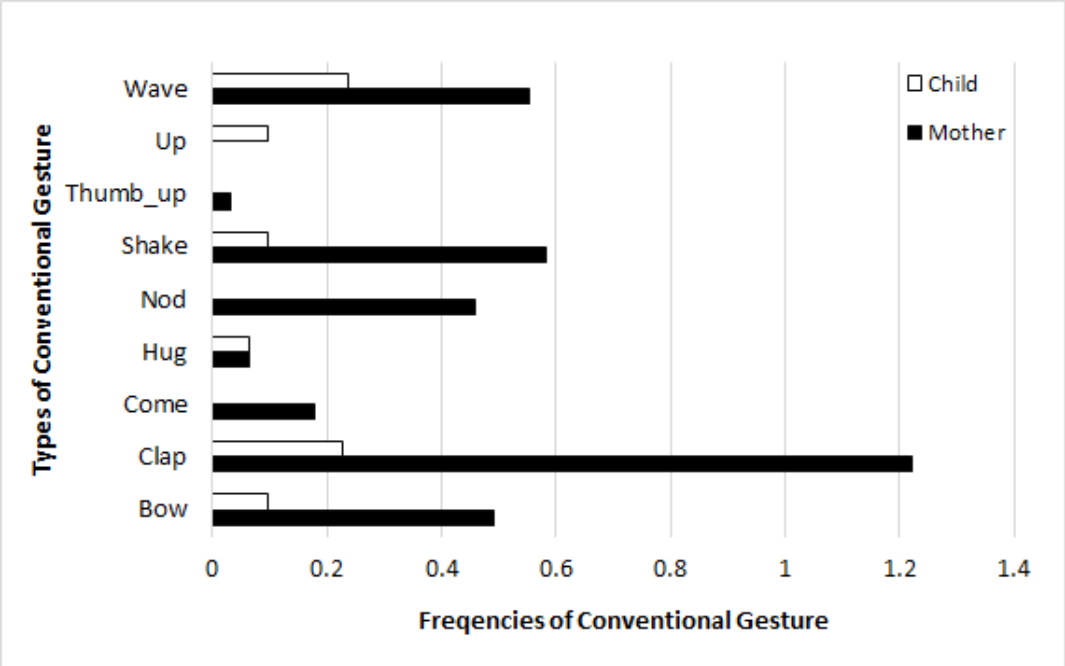

Figure 2.2.
Mean Frequencies (per 10 minutes) of Different Conventional Gestures Used by Mothers and Children.

Even within such a limited usage overall, Korean mothers and children still used a variety of conventional gestures in communicating with each other. Korean mothers encouraged their children by clapping (*M* = 1.22, *SD* = 1.26), nodding (*M* = 0.46, *SD* = 0.90) or shaking heads (*M* = 0.58, *SD* = 1.01) to express agreement or disagreement. They also used the waving gesture as a greeting, or sometimes to show disapproval (*M* = 0.55, *SD* = 1.34). In addition, some mothers in the sample bowed to greet their children and show gratitude during the interaction (*M* = 0.49, *SD* = 0.86). Similarly, children waved to greet (*M* = 0.24, *SD* = 0.81) and clapped to show excitement

(*M* = 0.23, *SD* = 0.67). Although not as frequent, children in the sample also used the bowing gesture to show gratitude (*M* = 0.10, *SD* = 0.40).

Representational Gesture

Representational gesture was the least commonly used category of gesture in the current sample of Korean families. Indeed, the average frequency of representational gesture used by mothers was 1.49 (*SD* = 1.95), with the highest count being 9 during a 10-minute interaction. When used, mothers' representational gestures represented actions (e.g., draw, peel, throw, flip) and objects (e.g., pig, flower, horn, flute, phone), as well as being descriptive in nature (e.g., twinkle, a lot, small). Similarly, children in the sample rarely used representational gesture, with an average of 0.14 (*SD* = 0.46).

Together, the results on the use of gesture in the sample shows that similar to previous findings in other cultural contexts (e.g., Bates et al., 1979), both Korean mothers and 14-month-old children in the sample use a wide range of gesture, and they mostly rely on using deictic gestures. Furthermore, the findings also show that by the time children are one year old, mothers and children have started communicating with conventional gestures and occasional representational gestures, although less frequently.

Descriptive Statistics for Language Measures

Table 2.2 shows the descriptive statistics for the children's language outcomes at 36 months, as well as linguistic measures at 14 months. Korean mothers varied widely in the amount of talk they produced during the interaction, as shown by the mean total utterance, and the linguistic complexity of their talk, as shown by the mean length of utterance on the sentence level (MLU-sentence). There was also wide variation in terms of children's baseline receptive and expressive/productive vocabulary scores. Similarly, children's receptive and expressive

vocabulary scores at 36 months varied widely, with the average receptive and expressive vocabulary scores similar to the normed averages for this age.

Table 2.2.
Means, Standard Deviations (SD), and Ranges of Linguistic Measures for Mothers and Children at Baseline (14 Months) and Language Outcomes for Children at 36 Months (N = 31).

	M	*SD*	Range
14-month measures			
Maternal Total Utterance	203.16	45.10	117.65–285
Maternal MLU-Sentence	3.43	0.53	2.53–4.53
Baseline Receptive Vocabulary	28.39	13.59	5–53
Baseline Expressive Vocabulary	5.73	8.10	0–32
36-month measures			
REVT Receptive Vocabulary	22.52	11.00	5–44
REVT Expressive Vocabulary	25.13	14.00	1–54

Notes: MLU-sentence: Mean Length of Utterance on the Sentence Level; REVT: Receptive and Expressive Vocabulary Test for Korean.

Associations between Maternal Gesture Use and Child Gesture Use

To address our second question on the relations between maternal gesture use and child gesture use, we conducted Pearson's correlation analyses between maternal gesture measures and child gesture measures. As shown in Table 2.3, mothers' gesture types and children's gesture types were positively correlated ($r(29) = .44$, $p < .05$), indicating that mothers who gestured to convey more diverse meanings during the interactions tended to have children who also gestured to a larger variety of meanings during the same interactions. However, the correlation between mothers' gesture tokens and children's gesture tokens was nonsignificant ($r(29) = .22$, $p = .24$). Similarly, both the associations between the frequencies of mothers' pointing and children's pointing, and the associations between the frequencies of mothers' giving + showing gestures and children's giving + showing gestures were nonsignificant.

Table 2.3.

Pearson's Correlations between Parent and Child Gesture Variables, Linguistic Measures, Child Language Outcomes, and Control Variables (N = 31).

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Female	-																
2. Age	- .154	-															
3. MEd	.037	- .008	-														
4. Income	- .076	- .306	.197	-													
5. CDI_p	- .126	.206	- .178	-.110	-												
6. CDI_r	.160	.394*	- .082	.091	.456*	-											
7. REVT_e	.142	.010	- .084	.205	.299	.249	-										
8. REVT_r	.366*	- .137	.011	.306	.222	.295	.754***	-									
9. MType	.133	.182	- .162	- .041	- .025	.237	.225	.249	-								
10. CType	.346	.333	- .391*	- .094	.283	.438*	.550**	.525**	.444*	-							
11. MToken	.376*	.036	- .049	.054	- .136	.105	.081	.092	.722***	.227	-						
12. CToken	.479**	.341	- .213	- .150	.329	.393*	.391*	.437*	.341	.898***	.219	-					
13. MPt	- .051	.166	.144	.154	- .122	.063	.027	-.054	.441*	.052	.652***	.061	-				
14. CPt	.066	.148	- .255	.120	.138	.097	.382*	.386*	.177	.550**	- .088	.554**	-.092	-			
15. MGS	.405*	.059	- .090	.048	- .120	.123	.010	- .034	.397*	.078	.769***	.097	.236	- .101	-		
16. CGS	.521**	.237	- .015	- .179	.179	.238	.274	.403*	.148	.625***	.133	.830***	.035	.312	.076	-	
17. MUtt	.116	.303	.242	.085	.042	.200	.453*	.260	.455*	.271	.474**	.143	.240	- .045	.401*	.058	
18. MMLU	.303	.089	.161	.039	- .291	.101	.124	.252	.405*	.213	.407*	.135	.053	- .165	.444*	.129	.588**

Notes: * $p < .05$; ** $p < .01$; *** $p < .001$. MEd: Maternal education; CDI_p: Baseline productive vocabulary; CDI_r: Baseline receptive vocabulary; REVT_e: 36-month expressive vocabulary; REVT_r: 36-month receptive vocabulary; MType: Maternal gesture type; CType: Child gesture type; MToken: Maternal gesture count; CToken: Child gesture count; MPt: Maternal pointing; CPt: Child pointing; MGS: Maternal giving and showing; CGS: Child giving and showing; MUtt: Maternal utterance count; MMLU: Maternal mean length of utterance-sentence.

Gesture Use as a Predictor of Vocabulary Outcomes at 36 Months

To examine whether gesture measures, language measures, and demographic variables were correlated with children's vocabulary outcomes at 36 months, we conducted additional Pearson's correlation analyses between gesture measures, demographic variables, language measures for mothers and children, and child vocabulary scores (Table 2.3). Children's gesture types at 14 months were positively correlated with both their receptive vocabulary scores at 36 months ($r(29) = .53$, $p < .01$) and expressive vocabulary scores at 36 months ($r(29) = .55$, $p < .01$). However, mothers' gesture types at 14 months did not show statistically significant relations with children's receptive vocabulary outcomes at 36 months, ($r(29) = .25$, $p = .18$), and also with children's expressive vocabulary outcomes, ($r(29) = .22$, $p = .22$). Girls tended to have higher receptive vocabulary scores at 36 months ($r(29) = .37$, $p < .05$) and use more giving + showing gestures ($r(29) = .52$, $p < .01$) than boys, but there was no significant difference between girls and boys in their pointing gestures or total gesture types. Neither maternal education level nor family income was correlated with any of the linguistic or gesture measures, except that maternal education and children's gesture types were negatively correlated ($r(29) = -.39$, $p < .05$). There were no statistically significant relations between the baseline productive or receptive parent report vocabulary scores and the expressive or receptive vocabulary scores at 36 months. Lastly, the total number of mother's utterances, which represented the amount of speech mothers used during the interactions, was positively correlated with children's expressive vocabulary scores at 36 months ($r(29) = .45$, $p < .05$), but not with receptive vocabulary scores at the same timepoint.

Next, we conducted a set of regression analyses to examine whether mothers' and children's gesture types when children were 14 months old predicted children's language outcomes at 36 months old (Tables 2.4 and 2.5). For both sets of regression analyses for receptive

and expressive vocabulary outcomes at 36 months, maternal education and family income were initially included as controls, but were found to be nonsignificant. Thus, maternal education and family income were excluded from the final analyses, given the small sample size and the relatively homogenous nature of the participating families. Table 2.4 shows the results from a series of regression analyses predicting children's receptive vocabulary scores at 36 months. Model 1 included two demographic variables (child gender and age) and children's baseline receptive language scores. In Model 2, as shown in Table 2.4, one of our main predictors, mothers' gesture types, was not a significant predictor of children's receptive vocabulary scores at 36 months. However, Model 3 results showed that our other main predictor, children's gesture types, was a significant predictor of children's receptive vocabulary scores at 36 months, explaining an additional 16 percent of the variance in receptive vocabulary scores.

Table 2.4.
A Series of Multiple Regression Models Predicting Children's Receptive Vocabulary Scores at 36 Months from Mothers and Children's Gesture Types, Demographic Variables, Children's Baseline Vocabulary Scores, Mothers' Linguistic Measures at 14 Months.

	Receptive Vocabulary Score at 36 Months				
14-month Measures	Model 1	Model 2	Model 3	Model 4	Model 5
Female	6.131	5.592	2.055	1.464	1.037
Age	-2.160	-2.405	-3.565*	-4.134*	-3.723*
Baseline Receptive Vocab.	0.276	0.251	0.157	0.158	0.163
Maternal Gesture Type		0.417	0.063	-0.147	-0.067
Child Gesture Type			1.207*	1.226*	1.235*
Maternal Utterance				0.057	
Maternal MLU					3.147
Intercept	44.28	42.68	61.37*	61.45*	54.88*
R^2	0.233	0.266	0.424	0. 464	0.441
df	27	26	25	24	24
F	2.737	2.355	3.679	3.458	3.158

Notes: *$p < .05$. MLU: Mean length of utterance on the sentence level; Baseline Receptive Vocab.: Receptive Vocabulary Scores at 14 months.

These findings indicate that children, who conveyed a larger set of meanings via gesture during mother-child play time at 14 months, tended to have a larger receptive vocabulary at 36 months, even after accounting for variations related to demographic variables and mothers' gesture types. The results from Model 3 held even after controlling for the quantity of maternal speech (Model 4) and the maternal linguistic complexity (Model 5), highlighting the additional benefits of children's own production of gesture at 14 months, and in particular the diversity of meaning conveyed via gesture.

Table 2.5.
A Series of Multiple Regression Models Predicting Children's Expressive Vocabulary Scores at 36 Months from Mothers and Children's Gesture Types, Demographic Variables, Children's Baseline Vocabulary Scores, Mothers' Linguistic Measures at 14 Months.

	Expressive Vocabulary Score at 36 Months				
14-month Measures	Model 1	Model 2	Model 3	Model 4	Model 5
Female	3.930	3.086	-2.752	-4.202	-3.710
Age	-0.295	-0.829	-2.720	-4.406*	-2.900
Baseline Productive Vocab.	0.545	0.563	0.286	0.255	0.358
Maternal Gesture Type		0.574	0.026	-0.532	-0.110
Child Gesture Type			1.696*	1.867**	1.676*
Maternal Utterance				0.152*	
Maternal MLU					3.805
Intercept	25.51	25.12	54.00	46.20	45.73
R^2	0.111	0.153	0.344	0.507	0.359
df	26	25	24	23	23
F	1.085	1.130	2.518	3.549	2.150

Notes: *$p < .05$; **$p < .01$. MLU: Mean length of utterance on the sentence level; Baseline Productive Vocab.: Productive Vocabulary Scores at 14 months.

As shown in Table 2.5, we then conducted a similar series of regression analyses predicting children's expressive vocabulary scores at 36 months. Model 1 included demographic variables and children's baseline productive vocabulary scores, and the addition of mothers' gesture types in Model 2 showed that mothers' gesture types, one of our main predictors, was not a significant predictor of children's expressive vocabulary. Similar to the results for receptive vocabulary

outcomes, Model 3 showed that children's gesture types at 14 months predicted children's expressive vocabulary at 36 months, explaining an additional 19 percent of variance in children's expressive vocabulary scores. These results held even after controlling for the quantity of maternal speech (Model 4) and the maternal linguistic complexity (Model 5).

Pointing at 14 Months, But Not Giving and Showing, Predicts Children's Vocabulary Outcomes at 36 Months

In addition to examining gesture types, or the meanings conveyed in gesture, as a global measure of gesture use of mothers and children at 14 months, we further examined whether frequencies of individual gestures would predict children's language outcomes. Given prior research on deictic gestures and current data that showed that deictic gesture accounted for over 80 percent of both mothers and children's gesture, we focused on deictic gesture. More specifically, we examined the relation between pointing, giving, and showing gestures, the three most frequently used deictic gestures, and children's language outcomes. As mentioned above, for the following analyses, we followed Cameron-Faulkner and colleagues' (2015) and Choi and colleagues' (2020) approach and combined giving and showing gestures (G+S gestures).

Pointing, giving, and showing together accounted for more than 70 percent of mothers' total gesture production and 80 percent of children's total gesture production. Korean mothers produced more of the G+S gestures (M = 12.07, SD = 6.88) than the pointing gesture (M = 7.81, SD = 5.94), with wide variations for both G+S gestures (Range = 3–32) and the pointing gesture (Range = 0–27.03). Similarly, Korean children in the sample produced more of the G+S gestures (M = 7.22, SD = 8.79) than the pointing gesture (M = 1.35, SD = 1.51), again both G+S gestures (Range = 0–40) and the pointing gesture (Range = 0–5.08) with wide ranges of variation.

We conducted additional Pearson's correlation analyses between mothers' and children's pointing and giving + showing, and child vocabulary scores to examine whether the individual deictic gesture variables and children's language outcomes were correlated (Table 2.3). The results from the correlation analyses showed that the frequency of children's pointing was positively

Table 2.6.
Multiple Regression Models Predicting Children's Receptive Vocabulary Scores (Models 1 and 2) and Expressive Vocabulary Scores (Models 3 and 4) at 36 Months from Mothers and Children's Pointing and G+S Gestures, Controlling for Demographic Variables, Children's Baseline Vocabulary Scores, Mothers' Linguistic Measures at 14 Months.

	Receptive Vocabulary		Expressive Vocabulary	
	Model 1	Model 2	Model 3	Model 4
Female	4.221	2.935	1.312	-0.058
Age	-3.612*	-4.075*	-3.138	-3.262
Baseline Receptive Vocab.	0.255	0.253		
Baseline Productive Vocab.			0.480	0.436
Maternal Pointing	-0.073		0.033	
Child Pointing	3.001*		3.758*	
Maternal Giving + Showing		-0.467		-0.403
Child Giving + Showing		0.451		0.437
Maternal Utterance	0.078	0.100*	0.164**	0.182**
Intercept	47.86*	56.65*	29.73	35.82
R^2	0.459	0.462	0.435	0.360
df	24	24	23	23
N	31	31	30	30
F	3.395	3.428	2.954	2.160

Notes: *p<.05, **p<.01. Baseline Receptive Vocab.: Receptive Vocabulary Scores at 14 months; Baseline Productive Vocab.: Productive Vocabulary Scores at 14 months; MLU: Mean length of utterance on the sentence level.

correlated with both their receptive vocabulary scores at 36 months ($r(29) = .39$, $p < .05$) and their expressive vocabulary scores at 36 months ($r(29) = .38$, $p < .05$). Children's G+S measure was positively correlated with their receptive vocabulary scores at 36 months ($r(29) = .40$, $p < .05$), but not with their expressive vocabulary scores at 36 months. Children who pointed more also tended to use more G+S gestures, although it did not reach statistical significance, ($r(29) = .31$, $p = .09$).

Mothers' pointing and G+S measures when children were 14 months and children's vocabulary outcomes at 36 months were not correlated. Lastly, mothers' pointing and G+S measures were not correlated.

Next, we ran a series of multiple regressions predicting children's vocabulary scores at 36 months (Table 2.6). The results showed that controlling for child gender, age, baseline vocabulary score, and mothers' and children's linguistic measures at 14 months, children's frequency of pointing at 14 months was a strong predictor of their receptive vocabulary at 36 months (Model 1). Similarly, children's pointing at 14 months predicted their expressive vocabulary at 36 months, after accounting for demographic variables and linguistic measures at 14 months (Model 3). On the other hand, children's G+S at 14 months did not predict their receptive vocabulary outcomes at 36 months (Model 2) and expressive vocabulary outcomes at 36 months (Model 4), after accounting for child gender, age, baseline vocabulary score, and mothers' and children's linguistic measures at 14 months. Both mothers' pointing and G+S at 14 months were not significant predictors of children's receptive and expressive vocabulary outcomes at 36 months.

Discussion

The present study contributes to the growing body of international research on children's early experiences and language development by examining mothers' and children's gesture use in the understudied context of South Korea. Furthermore, we explore whether the proposed importance of early gesture in the Western literature holds in the Korean context by examining the relation between Korean mothers' and children's gesture and language use when children are 14 months-old, and relations between these early communicative measures and children's vocabulary outcomes when they are 36 months-old. In exploring the longitudinal relations, we examine the role of gesture types, or meanings produced in gesture, as well as frequency of individual sub-

categories of deictic gesture use—namely, pointing, giving, and showing. We summarize the main findings and elaborate on their implications below.

First, we found that Korean mothers and children do indeed use a variety of gestures. Similar to previous findings from the U.S. (e.g., Bates et al., 1979), deictic gesture was the most frequent gesture category used by Korean mothers and children, accounting for over 80 percent of all gestures used. More specifically, Korean mothers and children in the sample used showing and giving gesture as often as pointing, suggesting that in this free play context, they rely on all three sub-categories to direct their interlocutor's attention to a target object, a goal often attributed to pointing (Bates et al., 1975). These findings are similar to Kim and Kim (2006), which showed similar patterns for children's deictic gesture use during a structured interaction with the experimenter. Taken together with previous research, the findings from the current study suggest that for Korean mothers and children at 14 months, pointing may not be the main type of deictic gesture used in daily interactions. More research should examine gesture use of Korean mothers and children in different contexts and at different ages to further our understanding of gesture use patterns in Korea.

Furthermore, the results regarding Korean mothers' and children's use of conventional gesture show both signs of common gesture use and signs of early socialization into the unique norms and customs of the specific cultural context. The descriptive findings on the use of conventional gesture show that Korean mothers and children use conventional gestures that are often observed in other cultural contexts, such as waving their hands to say "hi," nodding to mean "yes," and shaking their heads to mean "no," suggesting that some conventional gestures indeed go beyond cultural boundaries (Matsumoto & Hwang, 2013) and are shared across different cultures even for young children.

At the same time, while still limited in frequency at this age, Korean mothers and children in the sample were observed using a conventional gesture unique to Asian cultures, including South Korea: bowing. Observed across East and South Asian cultures, the "bowing" gesture is often used as a greeting between people of different social ranks (e.g., a young person bows to an elderly) (Matsumoto & Hwang, 2013). Despite its common usage, each culture has attached its own unique form and function to the gesture (Wang, 2009), highlighting the importance of considering variations within Asian culture. Unlike other Asian cultures that include hand gestures in bowing (Wang, 2009), bowing in South Korea mainly entails a movement in the neck and the upper torso (Brown & Brown, 2006). Furthermore, the gesture is used not only to greet someone (both "hi" and "bye"), but also to express gratitude. In the current data, mothers and children were observed using the gesture to express gratitude to each other (e.g., while passing a toy to each other), and in most of the observed cases, mothers were modeling and encouraging their children to bow. These observations show signs of early socialization into customs integral to Korean culture, indicating that such processes begin even before children start producing speech. Thus, albeit limited at 14 months, they highlight the importance of early gestural interaction not only for its potential role in supporting language development, but also for its role in promoting socioemotional learning and socialization into the customs of the cultural context (Ochs & Schieffelin, 2017). Future research should further examine conventional gesture across cultural contexts to illuminate how gesture may show signs of socialization prior to language production, and thereby help enable children become competent members of their own cultural communities.

Next, we observed that use of representational gesture was relatively low in Korean families, replicating previous findings in the Western sample (e.g., Özçalışkan & Goldin-Meadow, 2005; Özçalışkan et al., 2014). We also noted that, in the current sample, the repertoire of mothers'

representational gesture was larger than that of children's representational gesture. Given previous research that shows that mothers' repertoire of gesture appears earlier than children' gesture (Lock et al., 1990), we may expect to see mothers' early production of representational gestures to serve as a model for their children's subsequent representational gestures, which tend to appear later than other gestures (Özçalışkan & Goldin-Meadow, 2011). However, such a prediction is out of the scope of what we can answer with the current data. Thus, future research should examine whether such a long-term relation between mothers' and children's gesture production patterns, especially for gestures that develop later, exists within the Korean population.

Furthermore, we found that mothers' gesture types, or the number of meanings mothers conveyed by using gestures, were positively associated with children's gesture types, while mothers' and children's gesture tokens, or the total number of gestures produced, were not related, replicating previous findings in Western cultures (e.g., Rowe & Goldin-Meadow, 2009). This finding points to an important aspect of early language development that appears to be shared across different cultural contexts: early socialization. Similar to language development research for older children (e.g., Rowe, 2012), this finding highlights the importance of early communication that introduces a diverse range of concepts to children. Given that children's gesture types, which are associated with mothers' gesture types, predict their later vocabulary skills, this finding indicates that the practice of expressing a variety of meanings via gesture at 14 months may help children learn these meanings and corresponding vocabulary. It also suggests that adults may play an important role in encouraging children to engage in such a practice by modeling it themselves. That is, the link between Korean mothers' gesture use and children's gesture use suggests that these social interactions provide a platform for young Korean children to observe, learn, and practice gesture as a communicative tool, which may serve as a building block for their

later language development. Thus, our finding builds on previous research that showed longitudinal role of mothers' gesture use in predicting children's gesture use (and eventually, speech production) in other cultural contexts (e.g., Acredolo & Goodwyn, 1988; Namy et al., 2000). Together, these research findings indicate that mothers' early gesture use, similar to their early language use, may be an important source of learning for children across different cultures.

Replicating previous findings in the U.S. (e.g., Rowe et al., 2008; Rowe & Goldin-Meadow, 2009b), the current results also show that Korean children's gesture use at 14 months, as measured by the number of different meanings conveyed by gesture (i.e., gesture types), but not mothers' gesture use at 14 months, predicts children's vocabulary skills at 36 months, even after controlling for demographic variables and the amount and complexity of speech during the interactions. This finding provides further evidence for the importance of early gesture use that goes beyond the context of Western cultures. In particular, the current findings corroborate previous research that indicate that although caregivers' gesture use predicts children's gesture use (e.g., Ger et al., 2018; Rowe et al., 2008; Rowe & Leech, 2019), children's own gesture use may be the essential element to the link to language outcomes.

Furthermore, we found that children's frequency of pointing, but not giving and showing, at 14 months predicted both children's receptive and expressive vocabulary outcomes at 36 months, after accounting for variations related to mothers' pointing, demographics and other linguistic measures of the interactions. The importance of children's pointing at this age replicates previous findings in other cultural contexts (e.g., LeBarton et al., 2015; Lucca & Wilbourn, 2018), suggesting that early pointing may indeed support Korean children's long-term language development. This finding is particularly powerful, given that pointing was less frequently used than the giving and showing gestures by both Korean mothers and children. It suggests that it is

not merely the frequency of any gesture that matters, but pointing that may play a special role at this age in development. As giving and showing have been shown to appear earlier in other cultural contexts and are considered to be *precursors* of pointing (Cameron-Faulkner et al., 2015), Korean children, by 14 months, may similarly be ready to move on from giving and showing, and instead, use pointing to learn about the world around them.

Indeed, a recent study by Choi and colleagues (2021) found in a sample of American children that giving and showing at 10 months predicted children's vocabulary skills at 18 months, but the association between giving and showing at 14 months and vocabulary skills at 18 months was no longer observed. Instead, they found that pointing at 14 months emerged as a stronger predictor of children's later vocabulary at 18 months. Although the current data focus on children's gesture use at 14 months, the present finding with Choi and colleagues (2021) together suggest that perhaps a similar developmental trajectory of gesture use may be observed in the Korean context, where giving and showing may prove to be more helpful for children earlier than 14 months of age.

In explaining these findings, Choi and colleagues (2021) suggested that perhaps higher frequencies of pointing gesture use at 14 months in their sample, as compared to frequencies of giving and showing gestures, might show that because children at 14 months point more, these pointing gestures would elicit more responses from their caregivers that promote their language learning. In the Korean data examined in the current study, however, we found that even in a sample that used more giving and showing gestures than pointing gesture, pointing at 14 months was still a stronger predictor of children's later language skills. Along with Choi and colleagues' (2021) findings, then, the observed longitudinal relation between pointing and later language

outcomes suggests that there may be something unique about pointing, beyond its frequencies, that is particularly helpful in promoting children's language development.

One potential explanation for the predictive relation between pointing at 14 months and vocabulary scores at 36 months is that Korean children at this age, like children in other cultural contexts, are using pointing as a means to obtain information about the objects in their environment (Southgate et al., 2007; Tomasello et al., 2007). That is, children, by 14 months of age, have learned that they can effectively request information and learn about the target object by pointing to direct their interlocutor's attention to a target object (e.g., pointing to request a label for an object and learning the vocabulary).

Recent findings from experimental research adds weight to this line of explanation in that children may indeed be perceptive of the responses they get for their pointing and learn from information they get when they point (e.g., Begus et al., 2014; Kovác et al., 2014; Lucca & Wilbourn, 2018). For example, Lucca and Wilbourn (2018) found that 18-month-olds who pointed at target objects were more likely to learn the names of the objects than when they were given the information without pointing, suggesting that pointing may be used as a way to request information. Research on caregivers' responsiveness to children's gesture also indicates that caregivers may perceive children's pointing as a request for information, helping children use the pointing gesture as an effective tool for gathering information (e.g., Ger et al., 2018; Kishimoto et al., 2007; Miller & Lossia, 2013). For example, Kishimoto and colleagues (2007) showed that children's pointing is often followed by caregivers providing information about the pointed object. Similarly, Wu and Gros-Louis (2015) found that during free play times, caregivers of 12-month-olds responded more to children's pointing than to their vocalizations by providing labels to the target objects, suggesting that pointing indeed leads to more targeted linguistic input and knowledge for children.

Building on current findings that highlight the relation between pointing and language outcomes in Korean children, future studies should further explore the mechanisms, such as caregiver responsiveness, that may explain the observed longitudinal relation between children's pointing and language outcomes.

Limitations and Future Directions

The present study has a few limitations of note. First, although we explore the role of gesture in relation to children's language development in the understudied cultural context of South Korea, the small sample of 31 families does not necessarily represent gesture use of all Korean mothers and children. The gesture measures came from a short, 10-minute interaction for each mother-child dyad, where mothers were aware that they were being recorded by a camera, which may have influenced how they interact with their children. Although the interactions were meant to be as naturalistic as possible while controlling for potential confounding variables (e.g., having every pair engage with the same set of toys in the same room at the laboratory), it could be the case that these interactions do not represent the actual everyday interactions that children have with their mothers. More research that incorporates diverse data collection methods (e.g., parent report, less salient recording measure, longer observations of interactions) would be needed to get a fuller picture of children's everyday experiences.

Relatedly, the present sample was mostly middle-class in the Korean context, with an average income of approximately 4,500 U.S. dollars and with a majority of college-educated mothers. Even with such a relatively homogenous sample, however, we saw wide variation in mothers' and children's gesture use, as well as in children's language outcomes. Furthermore, even with a relatively small sample, the current analyses detected significant relations between children's gesture use and language outcomes, suggesting a strong association between the two.

More research is needed to explore variations that may exist across a wider range of populations within South Korea to fully understand the patterns of gesture use and their relation to children's language development.

Furthermore, although the results show a longitudinal relation between early gesture use and later vocabulary outcomes, they do not definitively indicate that more gesture types and more pointing at 14 months led to larger vocabulary sizes at 36 months. However, given intervention and experimental work in Western contexts that suggest causal effects of gesture use on language development (e.g., LeBarton et al., 2015; Lucca & Wilbourn, 2018; Rowe & Leech, 2019), we may expect to find a similar relation in Korean children's development. More experimental research that explores the causal relations between early gesture use and language development in South Korea and other non-Western contexts would help further support the universality of the link, in addition to providing evidence for the potential causal effect.

Conclusion and Implications

In conclusion, the findings from the current study add to the existing research on children's early language development by exploring the role of gesture in children's early language development in the cultural context of South Korea. More specifically, the results highlight both gestures that are used more widely across different cultures and gestures that are unique to the Korean context. These findings highlight the importance of early gesture use that begins to socialize children into the norms and expectations of their community, even before language production begins. Furthermore, showing that children's gesture use and their pointing at 14 months predict subsequent language outcomes at 36 months, the results provide further support for the importance of communicative experiences and early gesture use in children's development. The findings, along with previous work in other cultural contexts, highlight the need to better

understand how different gestures could be promoted early on to support children's long-term language development. With additional research that builds on the current findings and examines potential causal relations between early gesture use and children's language development, we may be able use the knowledge to create programs that support families with young children to use gesture as a means of supporting their children's early language practice and long-term language development.

Study 3

Parent-Child Interactions in Multilingual and Monolingual Families in South Korea

Background

With a focus on the role of day-to-day interactions between parents and children, decades of research in Western contexts has shown that both quantity of speech (i.e., how much parents speak) and additional features of speech (i.e., how diverse or abstract such speech is) are positively associated with children's language growth (e.g., Huttenlocher et al, 1991, 2010; Reese et al., 1993; Rowe, 2012; Uccelli et al., 2019). Together, this body of research on parent-child interactions has highlighted the importance of children's early experiences with language as an important part of their language development, where language input children receive from their parents serves as a source of language learning (Ninio & Snow, 1996; Vygotsky, 1978).

While there is a continued effort to study early experiences of children in different cultures (i.e., languages and social customs that vary across different national contexts) (e.g., Bornstein et al., 2012; Crane & Fernald, 2017; Richman et al., 1992; Vaughan et al., 2015; Zhang et al., 2008), most of what we know about the relations between parent-child interactions and early childhood development is based on research in Western contexts (Henrich et al., 2010; LeVine, 2004). This limits our understanding of potential variations that may arise across different cultures, as parent-child interactions take place within a particular cultural setting, and thus, shape the role that such interactions may play in promoting children's development (Garrett & Baquedano-López, 2002; Ochs & Schieffelin, 1984; 2017; Trommsdorff & Kornadt, 2003). Furthermore, research also has highlighted factors (e.g., maternal education, geographical location) that may contribute to differences in parents' and children's language use and children's language development within cultures (e.g., Heath, 1983; Mastin & Vogt, 2016; Richman et al., 1992). These findings from both

Western and non-Western contexts indicate the importance of taking into account family and parent factors, when studying variations in children's early language experiences and development both within and across cultures.

To add to our international knowledge of variability in parent-child interactions and child development, this study examines interactions of 3- to 5-year-olds and their mothers from 33 multilingual families and 36 monolingual families in South Korea. By examining variations in mothers' and children's language use during interactions across these families, and their concurrent associations with children's vocabulary skills, this study aims to examine whether and, if so, how these associations vary by families' language and cultural backgrounds.

Multilingual Families in South Korea

While international migration has been a persistent feature of the global landscape for centuries, South Korea has experienced its largest surge of international migration only in the last few decades (Bahk, Kim, & Khang, 2017; Suárez-Orozco, Suárez-Orozco, & Sattin-Bajaj, 2010). In addition to migrant workers who move to Korea to find employment and international students who move to Korea to attend school, an increase in marriage migrants has added momentum to the rapid recent growth in immigration to Korea. Marriage migrants move to Korea mainly to marry Korean spouses and become part of Korean society, increasing cultural and linguistic diversity in the country. The upward trend in international marriages started in the early 1990s, when, with rapid urbanization, the population shifted from rural towns and small cities to urban, bigger cities, leaving smaller towns and cities relatively less economically prosperous and fewer young people (Choi, 2010; Statistics Korea, 2011). Thus, younger men who decided to stay in the smaller towns and cities started to seek wives from other Asian countries, such as China, Japan, Vietnam, or the Philippines, with the marriages often organized by private organizations and local

governments (Bahk et al., 2017; Ministry of Women and Family, 2007). With the increase in these marriage arrangements, along with marriages between ethnic Koreans and other immigrants, there has been an increase in what we call "multilingual families,"[3] where one parent is ethnic Korean, born and raised in Korea, and the other parent is an immigrant who immigrated to Korea from a variety of countries and brings cultural and linguistic knowledge from those countries to their families in Korea. These multilingual families are often contrasted against those that we call here "monolingual families," where both father and mother are ethnic Koreans, born and raised in Korea. In 2010, over 10 percent of new marriage certificates were issued to international couples (Statistics Korea, 2011), with the Korean population claiming at least partial foreign heritage expected to be approximately ten percent of the total population by 2050 (Chang et al., 2008), calling for an increased understanding of the developmental trajectories of those children born into multilingual families.

Relations between Parents' Language Input, and Children's Language Use and Language Development

Research that examines the day-to-day interactions between parents and children in Western contexts has consistently shown that parents' language input, or their language use with their children, plays an important role in shaping children's early language use and language development. More specifically, researchers have found that the amount of speech parents produce

[3] Although the families of interest (i.e., families with one ethnically Korean parent, who was born and raised in South Korea and another parent, who is an immigrant to Korea) are often called "multicultural families" in Korea, I have opted to call them "multilingual families" in the current study, to 1) highlight the fact that although many such families rely on the Korean language, there are also mothers' languages and cultures represented by the families, and 2) highlight the main point of distinction from monolingual families in the study. However, as elaborated in the discussion section, there are additional factors, in addition to linguistic differences, between these two types of families (e.g., immigration status, cultural knowledge, etc.) that must be taken into account to fully represent the differences between them.

while interacting with their children ("quantity"), as often measured by the total number of utterances, or the total number of words produced (i.e., word tokens), predicts children's own speech quantity and their subsequent language development (Hoff, 2003; Huttenlocher et al, 1991; Raikes et al., 2006; Rowe, 2012). For example, in examining interactions between U.S. mothers and children, Hoff (2003) found that mothers' word tokens during mother-child interactions were predictive of the number of different words children used (i.e., word types). Similarly, in a study with English-learning infants in the U.S., Huttenlocher and colleagues (1991) showed that parents who spoke more (and thus, offered a larger quantity of language input) had children with faster productive vocabulary growth than children of less talkative parents.

Further research has indicated that in addition to the quantity of parents' language input, additional features of language use, such as use of diverse words, syntactic complexity, and discussion of abstract topics, matter for children's language development in Western cultures (e.g., De Temple & Beals, 1991; Pan et al., 2005; Wade et al., 2018). For example, in the study mentioned above, Hoff (2003) also found that mothers' syntactic complexity, as measured in mean length of utterances (MLU), was positively associated with their children's word types, suggesting that mothers who provide more complex language input to their children may be helping them learn because mothers' language input contains more information on the functions and meanings of words. Similarly, use of decontextualized language, or conversations about non-present topics (e.g., talk about the past or future, pretend play, or explanations about causal relations) has been highlighted as an important aspect of children's early language experiences that may support their language development (e.g., Katz, 2001; Rowe, 2012; Uccelli et al., 2019). For example, Rowe (2012) found that U.S. mothers' use of decontextualized language (e.g., talk about the past and future) when children were 42 months predicted children's vocabulary scores at 54 months (see

also Wade et al, 2018). Uccelli and colleagues (2019) also found that even after taking into account mothers' decontextualized language use and demographic variables, children's own use of decontextualized language at 30 months predicted their academic language outcomes in adolescence. Together, research in the U.S. has consistently shown positive associations between different aspects of children's early language experiences (i.e., mothers' language input and children's language use), and children's language development, again emphasizing the important role that parents play in shaping children's early development.

In examining the associations between children's early language experiences and language development, many studies in Western contexts attempt to explain variations within a culture by examining different factors, such as parental education, location (e.g., rural vs. urban), race/ethnicity, parenting goals, immigration status, and language exposure (e.g., monolingual vs. multilingual) (e.g., Hart & Risely, 1995; Heath, 1983; Mastin & Vogt, 2016; Richman et al., 1992; Tamis-LeMonda et al., 2008, 2012). For example, Richman and colleagues (1992), in examining variations across families from a region in Mexico, found that mothers' responsiveness during interactions with their children varied widely based on their education level, suggesting that the experience of schooling may shape mothers' language skills, knowledge, or beliefs, that may in turn influence how they communicate with their children.

Other researchers have examined language experiences and language development of bilingual children growing up in immigrant families (e.g., Hoff, 2018; see Barac & Bialystok, 2011 for a research timeline). Similar to monolingual children's language development, parents' and caregivers' language input is important for bilingual children's language development (De Houwer, 2007; Hoff, 2018). For example, Place and Hoff (2011) showed that the extent to which children are exposed to native speakers of the societal language (i.e., language that is not their immigrant

parents' native language) positively predicts children's language outcomes, whereas Hoff (2018) found that the extent to which they hear and practice their parents' native language predicts their development in that language. These findings point to the complexity of understanding language development of children growing up in immigrant families, where additional factors, such as their parents' decisions on which language(s) to use and teach and differential language exposures, need to be considered. Adding to this body of research, the current study takes into account the role of immigrant parents' language use, as well as the potential role of maternal education, in studying variations in language use and development in two distinct groups within the cultural context of South Korea: multilingual families and monolingual families.

Early Language Experiences and Language Development in South Korea

Most studies examining mother-child interactions and language use in Korea have focused on examining monolingual children's language development (e.g., Chang et al., 2003). Replicating findings from other cultural contexts (e.g., Huttenlocher et al, 1991; Rowe, 2012), Korean researchers have shown that monolingual Korean parents' language input is important for children's language development (e.g., Chang et al., 2003; Chang & Sung, 2011). For example, in a study with children between 18 and 24 months of age, Chang and Sung (2011) found that the quantity of monolingual mothers' language input, as measured by the total number of utterances, predicted monolingual children's expressive vocabulary at 24 months, even after controlling for children's baseline expressive vocabulary. Furthermore, Chang and colleagues (2003) showed that Korean-learning monolingual children whose parents used more sophisticated, more uncommon words and varied types of words also produced more diverse types of words themselves.

Despite much speculation about multilingual children's early language experiences, not much is known about how these mothers are supporting their children's language development at

home, and whether there are similar associations between their language input and children's language use and development as compared with their monolingual counterparts. Based on research findings that suggest that multilingual children often experience more academic challenges than their monolingual peers, researchers often attribute these challenges to low proficiency or delay in their Korean language development (Cho, 2006; Lee et al., 2012; Jeong, 2004). For example, in examining multilingual children's language production, Jeong (2004) found that the mean length of these children's utterances, a measure of syntactic complexity, tended to be shorter than their monolingual peers. Researchers (e.g., Cho, 2006; Jeong, 2004; Park et al., 2014) point to varying features of these children's early home experiences, especially their language interactions with their mothers, as the potential reason for such delays. As the Korean language is the national language used in school and the broader society, multilingual mothers are often encouraged and expected to use Korean, their non-native language, to communicate with their children and to teach them the language along the way, instead of using and teaching their native language (Kim, 2013; Hong, 2012). This task can be challenging, as multilingual mothers, whose native linguistic and cultural knowledge is not as appreciated in the Korean context, are themselves simultaneously developing proficiency in the Korean language.

Some studies have started to examine multilingual mothers' Korean language skills, reports on their language use, and children's language development and suggested potential differences and similarities with monolingual families (Hwang & Jeong, 2008). Only a few have directly examined mother-child interactions in multilingual families (e.g., Park et al., 2012). For example, Hwang and Jeong (2008) hinted at potential similarities, showing that multilingual mothers' Korean skills (e.g., receptive and expressive vocabulary, and listening comprehension) were positively correlated with children's expressive vocabulary scores. In one study directly examining

mother-child interactions, Park and colleagues (2012) compared the mean length of utterances between multilingual and monolingual families, and found that multilingual mothers' and children's utterances were, on average, shorter than their monolingual peers.

While these studies start to explore the potential role of mothers' language input and children's language practice in multilingual families, additional observational research that provides a more holistic description of children's early language experiences is needed. The aforementioned study focused on only one aspect of the interactions, and as Park and colleagues (2012) note as a limitation, did not consider any potential sociodemographic variables (e.g., maternal education) that might have explained the differences they observed between multilingual and monolingual families in their study. Thus, in the current study, we examine mother-child interactions in multilingual families, as well as monolingual families in Korea, to better understand the nature of mothers' language input, as well as children's language use during everyday interactions.

Current Study

In the current study, we examine naturalistic interactions between mothers and their 3- to 5-year-old children from 33 multilingual and 36 monolingual families in South Korea. We chose this age range because children at this age still spend much of their time at home with their mothers and have not entered formal schooling yet. We address the following research questions:

(1) Do multilingual and monolingual mother-child dyads differ in quantity and features of their language use?

(2) Is mothers' language input similarly associated with children's language use in multilingual and monolingual Korean families?

(3) Is mothers' and children's language use similarly predictive of children's language outcome in multilingual and monolingual Korean families?

This study aims to contribute to the field of child language development in the following ways. First, we contribute to the growing body of international research by examining mother-child interactions in the rarely examined cultural context of South Korea. In particular, we aim to expand our knowledge about the growing population of multilingual children in South Korea to better understand different factors that may predict their language development. Second, we highlight variations in language use within a cultural context based on maternal characteristics, including their immigration/language status, and education, and in doing so, examine various measures of language use simultaneously to more fully capture the linguistic features of mother-child interactions. To our knowledge, this is one of the first studies to directly examine language use of multilingual mothers and children during mother-child interactions. It is also the first study to examine multilingual mothers' use of decontextualized language in the Korean context.

Methods

Participants

The current study included a total of 69 families from South Korea (see Table 3.1 for descriptive statistics). The sample included 33 multilingual families (18 girls), where the father was ethnically Korean, born and raised in Korea, while the mother was an immigrant who immigrated to Korea from one of a variety of countries. While there can be different types of multilingual families with multicultural backgrounds in Korea (e.g., families with both non-ethnically-Korean parents, Korean father and non-Korean mother, and Korean mother and non-

Korean father, etc.), we focus on families with a Korean father and a non-Korean mother, which accounts for a majority (74.6%) of these multilingual families (Statistics Korea, 2011).

Participating multilingual mothers were, on average, 30.97 years old (*SD* = 3.28) and came from Vietnam (*n* = 16), China (*n* = 11), Cambodia (*n* =3), the Philippines (*n* = 2), and Uzbekistan (*n* = 1). On average, multilingual mothers reported having graduated from high school. Mothers reported having studied Korean for an average of 8.29 years (*SD* = 2.27), with a range of 4 to 13 years, the beginning of which mostly coincided with their arrival in Korea. Most mothers reported using Korean with their children more than 50% of the time. When directly asked to estimate their native language use with their children, four mothers reported regularly using their native language with their children most of the time (i.e., more than 50%). During the mother-child interactions collected for this study, however, all multilingual mother-child dyads primarily used Korean spontaneously without any prompt from the researcher. The average age of multilingual children was 4 years and 6 months (*SD* = 9 months), with a range from 3 years and 0 months to 5 years and 10 months. Of 30 families who reported their child's birth order, 18 children were first-borns, 11 were second-borns, and 1 was a third-born.

Monolingual families included 36 families (19 girls), where both the father and the mother were ethnic Korean, who were born and raised in Korea. The average age of participating mothers from monolingual families was 36.89 (*SD* = 3.69). Most monolingual mothers (*n* = 35) had a college degree. Mothers reported using Korean as the primary language at home. Monolingual children were, on average, 4 years and 4 months (*SD* = 9 months), with a range from 3 years and 2 months to 5 years and 10 months. Most (*n* = 20) were first-borns, with 13 second-borns, 2 third-borns, and 1 fourth-born.

Table 3.1.
Descriptive Statistics for Multilingual Families (N = 33) and Monolingual Families (N = 36).

	Multilingual Families				Monolingual Families					
	n	*M*	*SD*	Range	*n*	*M*	*SD*	Range	*t*	*p*
Child age (months)	33	54.42	0.51	36-70	36	52.06	9.19	38-70	-1.06	.29
Child birth order	30	1.43	0.57	1-3	36	1.56	0.73	1-4	0.76	.45
Mother age (years)	33	30.97	3.28	22-37	36	36.89	3.69	32-46	7.05	< .001
Maternal Education	32	3.16	1.11	1-5	35	5.11	0.58	3-6	8.92	< .001
Paternal Education	27	3.63	1.15	2-6	36	5.06	0.79	3-6	5.54	< .001
Family Income	30	3.53	1.74	1-8	36	6.5	1.96	3-10	6.51	< .001

Notes: The observed *t*-values are from two-sample *t*-tests with unequal variance.

A two-sample *t*-test with unequal variances showed that the average age of children did not differ across the two groups, $t(67) = -1.06$, $p = .29$. Results from an additional two-sample *t*-test with unequal variances for mothers' ages showed that multilingual mothers were, on average, younger than monolingual mothers in the sample, $t(67) = 7.05$, $p < .001$. This age difference reflects the general trend for monolingual mothers to marry at a later age (Kim, 2004) and for multilingual mothers to move to Korea and marry at a younger age (Kang, 2010; Kim et al., 2011; Ministry of Women and Family, 2007). A series of additional two-sample *t*-tests with unequal variances for maternal education and paternal education, respectively, showed significant differences between multilingual and monolingual families, with monolingual mothers and fathers, on average, having received more education than multilingual mothers and fathers. This was expected given the relatively high levels of college attendance among monolingual Koreans (Kim & Lee, 2010). Similarly, a two-sample *t*-test for family income showed a significant difference between family income between the families, similar to previous studies highlighting socioeconomic differences between multilingual and monolingual families (Kim et al., 2011). A

series of Spearman's rank correlation analyses showed that maternal education and paternal education were positively correlated, ($r(60) = .56$, $p < .001$), and that family income was also positively correlated to maternal education, ($r(62) = .69$ $p < .001$), and paternal education, ($r(59) = .49$, $p < .001$), respectively. Given these correlations and the current study's focus on mothers, we used maternal education as a proxy for family's socioeconomic background. This also allowed us to include most of the data in the analyses, as there were more missing values for paternal education and family income.

Procedure

Both multilingual and monolingual families were recruited by contacting teachers and local preschools and community childcare centers that serve both populations. In addition, multilingual families were also recruited via "multicultural centers" that provide support specifically for these families with multilingual backgrounds. Mothers and children were invited to participate in a research study about children's language development that would last about an hour. A trained researcher met with mother-child dyads at a location convenient to the families, which included families' homes ($n = 10$), classrooms at preschools or childcare centers ($n = 33$), and local university laboratories ($n = 26$). Regardless of the location, all mother-child dyads participated in the study in a quiet, small room. All mothers provided written consent for their and their children's participation in the study. From all the data collected during the visit, the present study focuses only on the mother-child interactions, children's vocabulary scores from researcher-administered vocabulary assessment, and maternal responses on a set of questionnaires on demographic information and language use at home.

During the visit, a trained researcher assessed children's receptive vocabulary using the receptive portion of the Receptive and Expressive Vocabulary Test (REVT; Kim et al., 2009), a

standardized vocabulary assessment for the Korean language normed on a population of monolingual Korean speakers. Following the vocabulary assessment, mother-child dyads engaged in a 5-minute snack time, which was presented as a break time for them where they could have snacks the researcher provided. The snack time was selected as an appropriate setting for mother-child interactions because it allows for more naturalistic conversation between mothers and children that can involve a variety of conversation topics (c.f., bookreading). It was also selected because it emulated family mealtimes, which involve varieties of conversational topics and often include decontextualized language use by parents and children (e.g., Beals, 2001; Leech et al., 2018). The mother-child snack time interactions were video-recorded and transcribed following the CHAT conventions on the Child Language Analysis (CLAN) program (MacWhinney, 2000). Utterances were used as the unit of analysis. Of note, while a few multilingual mothers used their native language a few times during the interactions, these were not as common in the current dataset and were excluded from the analyses, given the current focus on the use and development of Korean language.

The average length of the snack times was 4 minutes and 29 seconds (*SD* = 45.46 seconds; Range = 2 minutes and 20 seconds – 5 minutes) for multilingual families and 4 minutes and 20 seconds (*SD* = 58.33 seconds; Range = 2 minutes and 8 seconds – 5 minutes) for monolingual families. Given the variations in the video lengths, the language measures from the interactions that were shorter than 5 minutes were prorated to allow for a direct comparison across the mother-child dyads. That is, the languages measures from shorter interactions were divided by the length of the video and multiplied by 5-minutes to estimate what the language measures would have been for those dyads, if they were to engage in full 5-minute interactions. After the initial transcription, the transcripts were verified by an independent, trained second transcriber. The language measures

were analyzed using the CLAN and the UTagger, a Korean morphology analysis program commonly used in South Korea (Shin & Ock, 2012), as described below.

Table 3.2.
Coding Scheme for Decontextualized Language Use adapted from Leech et al. (2018), Rowe (2012; 2013).

Category	Definition	Example
Narrative	Talk that refer to past events or events that will happen in the future	"오늘 어린이집에서 뭐 했어 (what did you do at preschool today)?" "근데 이번 주 너 체육도 못 하겠네 (you won't be able to do PE this week)."
Explanation	Talk that requests or provides a definition, describes a phenomenon, and/or draws (logical/temporal) connection between events and concepts	"I don't want to play the game because I'm tired."
Pretense	Talk that involves pretense, such as stating that an object is something else, attributing feelings, speech, and actions to an inanimate object	(holding up a piece of snack) "이거 배야 배 (this is a boat)."
Other	Decontextualized talk that does not belong to any of the above categories, such as discussion of scripts, general rules, knowledge, or non-present person	"체육은 목요일날 해 (PE is on Thursdays)." (scripts) "친구랑 싸우면 안 되지 (you should not fight with friends)." (general rules) "손에 세균이 많아 (there are a lot of germs on your hand)." (knowledge)

Measures

Language Quantity

To measure the quantity of speech, we examined the total number of utterances produced by both mothers and children during the five-minute snack time interactions. In addition, following previous research in the U.S. (e.g., Rowe, 2012), we counted their word tokens, or the total number of words, used during the mother-child interactions as a measure of speech quantity.

Language Features

In addition to measuring the quantitative aspects of speech production, we also examined other features of parent input and child speech that have been shown to relate to language development in Western samples. Specifically, we examined mothers' and children's word types, or the diversity of words used during the interactions, MLU to indicate the syntactic complexity of speech, and decontextualized language use (e.g., Huttenlocher et al., 2010; Rowe, 2012).

Coding of Decontextualized Language. Following existing research on decontextualized language, we defined decontextualized language as talk on topics that are "beyond the here and now" and thus, are more abstract in nature (Snow et al., 2001, p. 2; see also Rowe, 2012). We coded all utterances that fit the definition using a coding scheme adapted from previous research in the U.S. Table 3.1 shows the full coding scheme and examples for each category. In particular, we focused on three categories that have been highlighted in previous research: narrative, explanation, and pretense. Sentences that discussed past events (e.g., reminiscing about a vacation the previous month) or future events (e.g., planning an activity to engage with siblings in the evening) were coded as "narrative." The code "explanation" was given to utterances that provided explanation about causal or logical connections between events or actions. Utterances that involved discussing inanimate objects as animate or having emotions (e.g., pretend play) were coded as "pretense." As the main goal of the current analysis was to broadly capture the use of decontextualized language, we also decided to code all other decontextualized utterances that did not fit the previous three categories (i.e., narrative, explanation, and pretense) as "Other" to acknowledge their use. Each sentence received only one code, except for sentences that discussed past or future events (i.e., narratives) that also involved explanations. Such sentences were double-coded, but in the final counts of total decontextualized language use, they were only counted once.

Two trained coders, who were both native Korean speakers, coded 20 percent of the transcripts (n = 15). The Cohen's Kappa for the overall decontextualized language use codes for the double-coded 15 transcripts across all categories of decontextualized language codes was .85. Disagreements in decontextualized language coding were reconciled via discussion between the two coders to reach consensus on the codes for the double-coded transcripts, and one of the coders (the first author) coded the rest of the transcripts.

Child Receptive Vocabulary Outcome

Children's Korean receptive vocabulary was measured using the REVT (Kim et al., 2009). During the assessment, children were shown a series of pages with four images and were asked to select an image that matches the vocabulary word provided by the researcher. The researcher terminated the assessment when children answered six out of any eight consecutive items incorrect, following the termination rule provided by the assessment developers. Based on the raw scores from the assessment, children's score-equivalent ages were calculated based on the Korean-monolingual norms. For example, a child with a raw score of 30 was assigned a score-equivalent age of 31 months, whereas a child with a raw score of 50 was assigned a score-equivalent age of 58 months. Then, the difference between score-equivalent ages and children's ages at the time of assessment were calculated to yield 'month-difference scores (in months),' indicating how advanced or delayed children's receptive vocabulary scores were compared to the norms. Score-equivalent ages were used instead of the raw scores, given the relatively wide range of participating children (3 years 0 month – 5 years 10 months).

Analytic Plan

To answer the first research question, we conducted a series of regression analyses to examine differences in mothers' and children's language use across multilingual and monolingual

families. In comparing language variables between multilingual and monolingual families, we controlled for maternal education, given research that suggests its association with mothers' and children's language use (e.g., Hoff, 2003; Rowe et al., 2016). To address the second research question examining associations between mothers' language variables and children's language variables from the mother-child interactions, we next conducted a series of multiple regression analyses to examine the relative contribution of mothers' language measures in predicting children's language measures. To examine whether the associations differ across multilingual and monolingual families, we included an interaction term between each of mothers' language measure and a group variable for whether families were multilingual or monolingual. Lastly, to examine whether mothers' language measures and children's language measures predict children's concurrent month-difference vocabulary scores—independently measured using the REVT—and whether these associations differ across multilingual and monolingual families (RQ3), we conducted an additional set of regression analyses predicting children's month-difference vocabulary scores from mothers' and children's language measures, controlling for maternal education, child age in months, and child gender. In each regression model, we included an interaction term between each of mothers' language measures and the group indicator variable and an interaction term between each of children's language measures and the group indicator variable to determine whether the associations differ between multilingual and monolingual families.

Table 3.3.

Means, Standard Deviations (*SD*), Ranges, and *t*-test Results (*t*-values and probabilities) Comparing Language Quantity and Feature Measures in Multilingual and Monolingual Families ($N = 69$).

	Multilingual Families ($n = 33$)			Monolingual Families ($n = 36$)		
	M	*SD*	Range	*M*	*SD*	Range
Language Quantity						
MOT Total Utterances	75.32	27.57	34 – 139.18	78.59	16.63	49 - 116
MOT Word Tokens	174.11	84.65	74.24 – 385	219.26	59.45	102 – 333.85
CHI Total Utterances	43.02	20.41	9 – 90.74	45.75	15.19	17 – 80
CHI Word Tokens	96.85	55.07	10 – 262.96	100.88	38.43	30 – 165
Language Feature						
MOT Word Types	100.93	42.34	45 – 206.19	147.16	39.05	68 – 238.13
MOT MLU	3.61	0.71	2.55 – 5.79	4.69	0.84	3.25 – 7.00
MOT Dxt Tokens	17.75	16.20	1.25 – 65	29.27	15.30	4.26 – 67
MOT Dxt Proportions	0.24	0.20	0.03 – 0.71	0.37	0.16	0.06 – 0.65
CHI Word Types	61.37	35.68	6 – 185.19	66.13	26.66	18 – 114.86
CHI MLU	3.29	0.85	1.56 – 5.23	3.35	0.80	1.77 – 5.60
CHI Dxt Tokens	11.15	12.57	0 – 61.11	16.41	9.94	2.13 – 40.60
CHI Dxt Proportions	0.24	0.20	0 – 0.67	0.37	0.19	0.06 – 0.79

Notes: MOT: Mother, CHI: Child, Dxt: Decontextualized language.

Results

Descriptive Statistics

Descriptive statistics are presented in Table 3.3. Replicating previous findings in Western contexts (e.g., Huttenlocher et al., 2010), the quantity of language (i.e., the total number of utterances and word tokens) and additional features of language (i.e., word types, MLU, and decontextualized talk) during the 5-minute interactions varied widely for mothers and children from both multilingual and monolingual families.

Table 3.4.
Series of Multiple Regression Models Examining Differences in Mothers' Language Measures between Multilingual and Monolingual Families, Controlling for Maternal Education (n = 67).

	M_Utt	M_Token	M_Type	M_MLU	M_DXT
Multilingual	-7.982	-53.262~	-39.436*	-0.917**	-2.782
M_Edu	-2.940	-5.483	2.727	0.070	4.160
Intercept	93.529***	247.592***	133.503***	4.337***	7.861
R^2	0.607	0.085	0.240	0.322	0.156
df	64	64	64	64	64
F	0.50	2.96	10.13***	15.19***	5.91**

Notes: ~p < .01; * p < .05; ** p < .01, *** p < .001. M: Mother; M_Edu: Maternal Education; M_Utt: Total number of mother's utterances; M_DXT: Mothers' total decontextualized language use.

Do Multilingual and Monolingual Mother-Child Dyads Differ in Their Language Use?

One of the goals of this study was to examine whether multilingual and monolingual families differed in their language use during mother-child interactions. Given our current focus on examining variations based on families' linguistic background (i.e., multilingual vs. monolingual), we included maternal education as a control variable in all our main analyses, given previous research suggesting its predictive relation with mothers' and children's language use (e.g., Hoff, 2003), and given that maternal education differed between multilingual and monolingual families in the current sample (Table 3.1). As one mother from multilingual families and one

mother from monolingual families did not report their educational level (Table 3.1), those families were not included in subsequent analyses including the variable of maternal education.

We first conducted a series of regression analyses with the indicator variable for multilingual vs. monolingual families predicting mothers' and children's language quantity variables, controlling for maternal education to examine whether multilingual and monolingual families differed in the quantity of their language use during the mother-child interactions, after accounting for the variance explained by variations in maternal education levels (Table 3.4). The results showed that controlling for maternal education, multilingual mothers and monolingual mothers produced similar amounts of utterances and used similar numbers of words (i.e., word tokens) during the interactions. Results from a similar series of regression analyses examining language feature measures (i.e., word types, MLU, decontextualized language use) showed diverging patterns (Table 3.4). While multilingual and monolingual mothers used similar amount of decontextualized language, the results showed that there was a statistically significant difference in mothers' word types between multilingual and monolingual families, $t(64) = -2.61$, $p < .05$, and a statistically significant difference in mothers' MLU, $t(64) = -3.15$, $p < .01$, where monolingual mothers, on average, produced more different words and longer utterances than multilingual mothers. An additional series of regression analyses including paternal education and family income as additional covariates showed similar results for mothers' language measures, except that the marginal difference in mothers' total number of words between multilingual and monolingual families in the main analyses, $t(64) = -1.97$, $p = .053$, was now statistically significant, $t(55) = -2.11$, $p = .04$ (Appendix 3.A).

Table 3.5.
Series of Multiple Regression Models Examining Differences in Children's Language Measures between Multilingual and Monolingual Families, Controlling for Maternal Education (n = 67).

	C_Utt	C_Token	C_Type	C_MLU	C_DXT
Multilingual	-10.834	-11.504	-7.511	0.496	-0.647
M_Edu	-4.130	-4.744	-2.306	0.254*	2.175
Intercept	66.546***	123.850**	76.894**	2.029**	5.278
R^2	0.046	0.008	0.007	0.074	0.073
df	64	64	64	64	64
F	1.54	0.26	0.21	2.55	2.50

Notes: * $p < .05$; ** $p < .01$, *** $p < .001$. C: Child; M_Edu: Maternal Education; C_Utt: Total number of children's utterances; C_DXT: Children's total decontextualized language use.

We then conducted a series of similar regression analyses examining whether multilingual and monolingual children differed in their language quantity and feature variables, after accounting for maternal education (Table 3.5). The results from the regression analyses indicated that, on average, multilingual and monolingual children in the sample produced similar numbers of utterances and used similar numbers of words during the interaction with their mothers. Similarly, children's word types, MLU, and decontextualized language use did not differ across the two groups. An additional series of regression analyses including paternal education and family income as additional covariates showed that the results from the main analyses held even after taking into account additional variance in children's language use variables explained by the two additional demographic variables (Appendix 3.B). Although the direction of the coefficient for the group indicator "Multilingual" changed from negative to positive, the coefficients were nonsignificant, and the magnitude of the coefficients was relatively small. Taken together, these results showed that while some of mothers' language features differed across multilingual and monolingual families, children's speech did not show significant differences between multilingual and monolingual families.

Is Mothers' Language Input Similarly Associated with Children's Language Use in Multilingual and Monolingual Korean Families?

We next conducted Spearman's rank correlation analyses for parents' and children's measures of both language quantity and language features to explore whether the relations between mothers' language use and children's language use vary between multilingual and monolingual families (Table 3.6). The results from the correlation analyses showed that, replicating previous findings from other cultural contexts (e.g., Hoff, 2003), mothers' language quantity measured as total utterances was positively correlated with children's utterances, although the correlation between mothers' word tokens and children's word tokens did not reach statistical significance ($r(67) = .22$, $p = .07$). The results for language feature measures showed that some of mothers' feature measures were positively correlated with children's feature measures. Mothers' word types was positively and statistically significantly correlated with children's decontextualized language use ($r(67) = .42$, $p < .001$). Mothers' MLU was positively correlated with children's decontextualized language use ($r(67) = .42$, $p < .001$), but not with children's MLU ($r(67) = .04$, $p = .75$). Lastly mothers' decontextualized language use was positively associated with children's word types ($r(67) = .27$, $p < .05$) and children's decontextualized language use ($r(67) = .84$, $p < .001$).

To examine whether there are any differences in these associations between mothers' language measures and children's language measures between multilingual and monolingual families, we next conducted a set of multiple regression analyses to examine the relative contribution of mothers' language measures in predicting children's language measures,

Table 3.6.

Spearman's Correlations (*n*) for Mothers' and Children's Language Measures, Children's Vocabulary Outcomes, and Demographic Variables (N = 69).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.M_Edu	-															
	67															
2. Female	-.096	-														
	67	69														
3. M_Age	.602***	-.045	-													
	67	69	69													
4. Multi	-.757***	.046	-.705***	-												
	67	69	69	69												
5. M_Utt.	-.006	-.103	.096	-.125	-											
	67	69	69	69	69											
6. C_Utt.	-.041	-.072	.185	-.089	.395***	-										
	67	69	69	69	69	69										
7. M_Token	.214	-.161	.236	-.344**	.871***	.258*	-									
	67	69	69	69	69	69	69									
8. C_Token	.002	.021	.214	-.095	.333**	.904***	.218	-								
	67	69	69	69	69	69	69	69								
9. M_Type	.408***	-.185	.392***	-.505***	.752***	.243*	.919***	.222	-							
	67	69	69	69	69	69	69	69	69							
10. C_Type	.041	.023	.228	-.140	.298*	.846***	.196	.963***	.234	-						
	67	69	69	69	69	69	69	69	69	69						
11. M_MLU	.475***	-.163	.419***	-.594***	.367**	-.004	.724***	.030	.798***	.059	-					
	67	69	69	69	69	69	69	69	69	69	69					
12. C_MLU	.180	.205	.132	-.044	-.052	.212	-.037	.547***	-.022	.597***	.038	-				
	67	69	69	69	69	69	69	69	69	69	69	69				
13. M_DXT	.418***	-.050	.346**	-.403***	.458***	.213	.595***	.257*	.619***	.270*	.601***	.155	-			
	67	69	69	69	69	69	69	69	69	69	69	69	69			
14. C_DXT	.382**	-.044	.275*	-.312**	.287*	.470***	.371**	.535***	.422***	.540***	.420***	.324**	.836***	-		
	67	69	69	69	69	69	69	69	69	69	69	69	69	69		
15. M_DXTprop	.424***	.013	.327**	-.384**	.138	.092	.337**	.176	.394***	.202	.546***	.230	.926***	.825***	-	
	67	69	69	69	69	69	69	69	69	69	69	69	69	69	69	
16. C_DXTprop	.444***	.019	.248*	-.331**	.133	.093	.299*	.186	.343**	.200	.461***	.256*	.851***	.881***	.913***	-
	67	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69
17. REVT_month	.237	.010	.327*	-.347**	.112	.395**	.096	.450***	.150	.427***	.081	.234	.084	.237	.081	.092
	58	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

Notes: * $p < .05$; ** $p < .01$, *** $p < .001$. M: Mother; C: Child; M_Edu: Maternal Education; Multi: Multilingual/Monolingual Group; M_DXT: Mothers' total decontextualized language use; C_DXT: Children's total decontextualized language use; M_DXTprop: Proportion of mothers' decontextualized language use over total numbers of sentences; C_DXTprop: Proportion of children's decontextualized language use over total numbers of sentences; REVT_month: Month-difference scores from the receptive vocabulary assessment.

controlling for covariates. Given high correlations between mothers' language measures (Table 3.6), we included only one of mothers' language measures in each model. To examine whether there is a statistically significant group difference, we included an interaction term between each of mothers' language measure and an indicator variable for whether families were multilingual or monolingual (i.e., "Multilingual"). For all the analyses, we included maternal education, child gender, and child age as covariates, given previous findings that suggest predictive relations between these variables and children's early developmental outcomes (e.g., Davis-Kean, 2005; Huttenlocher et al., 1991; Reese & Fivush, 1993).

Table 3.7.
Series of Multiple Regression Models Predicting Children's Language Measures from Mothers' Language Measures, Controlling for Demographic Variables (n = 67).

	C_Utterance		C_DXT	
Variable	Model 1	Model 2	Model 3	Model 4
M_Utterance	0.282**	0.552**		
M_Utterance*Multilingual		-0.385		
M_DXT			0.589***	0.568***
M_DXT*Multilingual				0.041
Multilingual	-8.901	21.245	1.006	-0.003
M_Edu	-3.128	-3.100	-0.025	-0.041
Age	0.337	0.295	0.172*	0.172~
Female	-2.869	-3.017	1.617	1.550
Intercept	23.215	4.060	-10.365	-9.643
R^2	0.193	0.241	0.717	0.717
df	61	60	61	60
F	2.93*	3.17**	30.83***	25.37***

Notes: ~p = .05; *p < .05, ** p < .01, *** p < .001. M: Mother; C: Child.

Table 3.7 shows significant regression models predicting children's language measures from mothers' language measures, controlling for demographic variables. Results from Model 1 indicated that one language quantity measure, mothers' total number of utterances, was a significant independent predictor of children's total number of utterances during the interactions. Model 2 showed that the interaction term between mothers' total number of utterances and the

group indicator variable was nonsignificant, indicating that there was no statistically significant difference in the association between the quantities of mothers' speech and children's speech between multilingual and monolingual families.

Similarly, Model 3 showed that one language feature measure, mothers' decontextualized language use, was positively associated with children's use of decontextualized language. Results from Model 4, which included an interaction term between mothers' decontextualized language use and the group indicator variable, indicated that there was no difference in the association between mothers' decontextualized language use and children's decontextualized language use. Examination of regression models predicting additional measures of children's language use from mothers' language measures showed that controlling for covariates, mothers' word tokens, word types, and MLU did not predict children's word tokens, word types, or MLU, respectively (see Appendix 3.C for results on the nonsignificant regression models). A different set of regression analyses including additional covariates of paternal education and family income showed similar results, indicating that even after taking into account potential variation in children's language features explained by paternal education and family income, mothers' total number of utterances and decontextualized language use predicted children's number of utterances and decontextualized language, respectively (Appendix 3.D). Together, these models suggest that certain aspects of mothers' language use—namely, their language quantity (i.e., total number of utterances) and features (i.e., decontextualized language use) variables—were associated with similar children's language variables, and these associations did not differ for multilingual and monolingual families in the study.

Is Mothers' and Children's Language Use Similarly Predictive of Children's Language Outcome in Multilingual and Monolingual Korean Families?

In the sample, receptive vocabulary scores were available for 60 children. Looking at the descriptive statistics, the average month-difference in receptive vocabulary scores for multilingual children (n = 29) was -9.52 (SD = 13.51) with a range of -37 to 17, indicating that based on the norms, multilingual children in this sample, on average, were approximately 9 months behind their age-equivalent peers. The average month-difference in receptive vocabulary scores for monolingual children (n = 31) was 0.68 (SD = 12.55) with a range of -17 to 29, suggesting that on average, monolingual children in the sample were comparable to the norming population in their receptive vocabulary. Similar to previous analyses, we conducted a regression analysis predicting children's month-difference vocabulary score from their family background (i.e., multilingual vs. monolingual), controlling for maternal education, to examine whether these month-difference scores, on average, differed between multilingual and monolingual families. The results from the analysis showed that controlling for maternal education, there was no statistically significant difference in children's month-difference scores based on their family background, $t(55) = -0.69$, $p = .49$.

To examine whether mothers' language measures and children's language measures predict children's concurrent vocabulary scores, independently measured using the REVT, we conducted a series of regression analyses predicting children's month-difference vocabulary scores from mothers' and children's language measures, controlling for maternal education, child age in months, and child gender. As above, we only included one language measure for mothers and children in each analysis, given high correlations among mothers' language measures and among children's language measures (Table 3.6). In each regression model, we included an interaction

term between each of mothers' language measures and the group indicator variable to examine whether we see differences in the associations between mothers' language measures and children's month-difference vocabulary outcomes between multilingual families. In addition, we also included an interaction term between each of children's language measures and the group indicator variables to determine whether the associations between children's language measures and their independent vocabulary outcomes differ between multilingual and monolingual families.

Table 3.8.
Series of Multiple Regression Models Predicting Children's Month-Difference Receptive Vocabulary Scores from Mothers' and Children's Language Measures, Controlling for Demographic Variables (n = 58).

Variable	Children's Month-Difference Receptive Vocabulary Scores				
M_Utterance	-0.106				
C_Utterance	0.435**				
M_Token		-0.023			
C_Token		0.132**			
M_Type			-0.040		
C_Type			0.174**		
M_MLU				-2.358	
C_MLU				2.354	
M_DXT					-0.368~
C_DXT					0.631*
Multilingual	-3.073	-6.982	-7.946	-12.085*	-8.882~
M_Edu	3.693~	2.217	2.023	0.532	1.374
Age	0.275	0.254	0.226	0.428*	0.351~
Female	0.722	-1.135	-1.242	-1.644	-1.129
Intercept	-44.006**	-31.304*	-26.200~	-20.358	-23.636~
R^2	0.400	0.369	0.334	0.257	0.306
df	51	51	51	51	51
F	5.66**	4.97***	4.26**	2.95*	3.74**

Notes: ~ $p < .01$; *$p < .05$; **$p < .01$; ***$p < .001$. M: Mother, C: Child, M_Edu: Maternal education.

None of the interaction terms between mothers' language measures and group indicator and the interaction terms between children's language measures and group indicator were significant (see Appendix 3.B for regression results including the interaction terms), showing that

there are no statistically significant group differences between multilingual and monolingual families in the associations between mothers' language use variables and children's vocabulary outcomes, and also in the associations between children's language use variables and their vocabulary outcomes. Next, we conducted a similar set of regression analyses without the interaction terms, predicting children's month-difference vocabulary outcomes from mothers' and children's language measures, controlling for maternal education and child demographic variables (Table 3.8). An additional set of regression analyses including additional covariates of paternal education and family income showed overall similar results, where children's language measures from the interactions were positive predictors of children's independent vocabulary scores, although not all coefficients reached statistical significance, potentially due to the small size of the sample (Appendix 3.F). Results from these analyses showed that while mothers' language measures were not statistically significant predictors of children's vocabulary outcomes, most of children's language measures, excluding their MLU, were significant predictors of their vocabulary outcomes.

Discussion

This study contributes to the research on parent-child interaction and early language development by examining language use of mothers and children in multilingual and monolingual families in South Korea, and by exploring whether mothers' language measures and children's language measures from the interactions were predictive of children's independently-measured vocabulary outcome, controlling for maternal education, child gender, and age. We found that for both multilingual and monolingual families, mothers' and children's language measures showed wide variation within each group. Furthermore, controlling for maternal education, multilingual and monolingual mothers in the sample produced similar quantity of speech and engaged in similar

amount of their decontextualized talk. Their language use differed in two features of language—namely, word types (i.e., diversity of vocabulary) and mean length of utterance, where monolingual mothers, on average, provided more diverse and complex input for their children. However, controlling for maternal education, there was no significant difference in any of the language measures between multilingual and monolingual children. Similarly, controlling for maternal education, we did not see a significant difference in children's receptive vocabulary assessment scores between multilingual and monolingual children. We also found that there was no group difference in the associations between mothers' language measures and children's language measures between multilingual and monolingual families. The results showed that for both multilingual and monolingual families, mothers who spoke more, as measured by the total number of utterances, also tended to have children who spoke more during the same interactions, and those mothers who engaged in more decontextualized talk also tended to have children who similarly engage in more decontextualized talk. In examining the associations between mothers' and children's language measures and children's vocabulary outcome, we also found that there was no significant group difference. The results showed that controlling for demographic variables and mothers' language measures, children's language measures (except MLU) were significant independent predictors of children's concurrent receptive vocabulary scores for both multilingual and monolingual families. Below, we discuss each finding and its implications.

First, we found that within these Korean families, there was wide variation in how much mothers and children talked, how diverse their vocabulary use was, how complex their sentences were, and how much decontextualized language they used during a five-minute period of naturalistic observation. For example, while some mothers barely discussed non-present topics with their children during the observed interactions, others engaged in these decontextualized

conversations over 70 percent of the time. These variations in language use replicate previous findings from other cultural contexts that also showed variation within groups observed (e.g., Heath, 1982; Huttenlocher et al., 2007), highlighting the importance of examining variations within groups.

The results also showed that monolingual mothers in the sample, on average, provided more diverse and longer language input for their children than multilingual mothers. This finding is similar to other studies that found differences in mothers' language use during mother-child interactions across different ethnic groups within a national context (e.g., Luo et al., 2014; Tamis-LeMonda et al., 2012). As Tamis-LeMonda and colleagues (2012) noted based on their findings of early differences in parent-child interactions across ethnic groups in the U.S., these early differences may indicate an "early onset of divergent developmental paths" (p. 395) that children from different linguistic, cultural, or ethnic backgrounds may encounter and thus, will need to be considered as educators and researchers devise ways to support children with different linguistic and/or immigration backgrounds not only in Korea, but in other cultures.

The differences in mothers' language input we observed were statistically significant, even after controlling for maternal education. Many studies, both in Korea and in other cultural contexts, have shown how some of the variations we see in parent-child interactions and children's language development can be explained by parents' socioeconomic status, or more specifically, their education levels (Hoff, 2003; Huttenlocher et al., 2007; Lee & Kwak, 2008; Rowe & Goldin-Meadow, 2009; Tamis-LeMonda et al., 2012). Given the varying educational levels between multilingual mothers, we included the measure of maternal education in all the analyses. The results showed that even after controlling for maternal education, there were still significant differences in two language feature measures (i.e., maternal word types and MLU).

One potential factor that may explain the differences we observed between multilingual and monolingual mothers' language input may be their differing proficiencies in the Korean language. As immigrants, many of the multilingual mothers in the sample noted that they were still trying to learn the language themselves and felt that they were not proficient enough to be effective teachers of Korean for their children. Although we did not have a separate measure of mothers' Korean language skills to test this hypothesis in the current sample, it is reasonable to expect these multilingual mothers to be less proficient in Korean than monolingual mothers, as the multilingual mothers in the sample had been learning Korean for only about eight years, on average. With previous studies documenting multilingual mothers' varying proficiencies in the Korean language (Jeong, 2008; Woo et al., 2009), the differences in mothers' Korean language measures could be attributed to differing language skills. Alternatively, there could be other factors that have been shown to shape how parents interact with children, such as parenting goals (e.g., do multilingual and monolingual mothers share similar goals when it comes to teaching Korean to their children?; Tamis-LeMonda et al., 2008) and mothers' parenting stress (e.g., do monolingual mothers experience more or less stress related to parenting and child-rearing than multilingual mothers?; Moon, 2012) that we did not directly observe in the sample.

At the same time, multilingual and monolingual mothers, on average, produced similar numbers of utterances, word tokens, and decontextualized language use, also indicating that language input of mothers from multilingual and monolingual families are not as starkly different as previous research has suggested. Instead, we only observed some of the additional features of language input to be different, again emphasizing the need to continue examining these mother-child interactions to better understand the nature of multilingual children's early language experiences. Although multilingual mothers' talk with their children may not be as diverse or

complex as monolingual mothers' talk with their children, multilingual mothers' talk is still similarly targeted at engaging their children in conversations about more abstract and challenging topics (i.e., decontextualized talk). This may be particularly important considering that these abstract conversations have been previously shown to be helpful for children's language and cognitive development (e.g., Rowe, 2012). The findings indicate that these multilingual mothers are indeed actively engaging in such helpful conversations, and by doing so, providing opportunities for their children to practice thinking about and discussing abstract topics. Future studies examining parent-child interactions in multilingual families should explore how additional factors related to the families may explain the differences (and similarities) we observed in mothers' language input across families, and whether the use of decontextualized language similarly predict children's development in additional language and cognitive skills.

Next, none of children's language measures, differed, on average, between multilingual and monolingual families, after accounting for variations associated with maternal education. Similarly, controlling for maternal education, children's vocabulary outcomes, measured independent of the interactions, also did not show a statistically significant difference between multilingual and monolingual families in the study. This finding contrasts with previous studies that made the comparison between multilingual and monolingual children without considering additional sociodemographic factors (e.g., maternal education) and have indicated that multilingual children tend to show delay in both oral language and early literacy development in the Korean context (e.g., Jeong, 2004; Woo et al., 2009). The current findings, therefore, suggest that the disparities observed in children's Korean language skills in previous studies may be mostly explained by variations related to maternal education. As children's early language experiences and development are influenced by multitude of different family and parent factors, future studies

should examine language measures and outcomes of multilingual children by taking into account different factors to fully understand their language development.

In addition, we found that there was no statistically significant difference between multilingual and monolingual families in the associations we examined between mothers' language features and children's language features. These findings replicate previous findings in Korea and in different linguistic and cultural contexts (e.g., Demir et al., 2015; Huttenlocher et al., 2007; Rowe & Goldin-Meadow, 2009) that similarly found positive correlations between mothers' and children's language measures during interactions. These findings, along with longitudinal research that found positive associations between mothers' language input and children's language outcomes (e.g., Rowe, 2012), highlights important functions of parent-child interactions, where exposure to higher quantities and more varied types of language input from parents may help children acquire vocabulary and syntax from such input. Daily exposure to such language input, then, can help children practice and produce language themselves (Huttenlocher et al., 2007).

They also provide evidence for the shared importance of mothers' language input and children's early language experiences for children growing up in multilingual families in Korea. In particular, we found that for both multilingual and monolingual families, mothers' quantity of talk, as measured by the number of their utterances, and their decontextualized language use were predictive of children's quantity of talk and decontextualized language use, respectively, controlling for maternal education, children's age, and children's gender. This finding suggests that despite potential variations in proficiency in the Korean language, multilingual mothers, just like monolingual mothers, still engage in abstract and more cognitively challenging conversations with their children, which can help prepare them for discourses prevalent in formal schooling (Snow, 1983). In an intervention study, Leech and colleagues (2018) successfully increased

children's decontextualized language use by increasing mothers' decontextualized language, suggesting that such language use may be malleable and further strengthened. Thus, given the benefits of decontextualized language use, educators can further encourage multilingual mothers to continue engaging in these conversations by highlighting a tool that they already have to support their children's language practice and development. More research that explores the potential role that such language use may play in promoting multilingual children's language development would help further clarify the meaning of the association we observed in this study.

We also found that there was no statistically significant difference between multilingual and monolingual families in the associations between mothers' and children's language features and children's vocabulary outcome. The results showed that for both multilingual and monolingual families, children's language measures (except MLU), which were positively correlated with mothers' language measures, were independent predictors of their concurrent vocabulary outcomes, controlling for mothers' language measures, maternal education, child's age and gender. This finding adds to previous research in the U.S. that highlight the importance of understanding children's own language use in a "context of heavily scaffolded interactions with caregivers" (Uccelli et al., 2018, p. 10). Indeed, children's language quantity and decontextualized language measures were overall highly correlated with their mothers' measures, providing additional support to understanding children's language production as a part of children's language experience that is shaped by the adults—in this case, mothers—around them.

Limitations and Future Directions

There are a few limitations worth noting in this study. First, although we examine potential causal links from mothers' language use to children's language use, we cannot draw any causal link between mothers' language measures and children's language measures in the current

analyses. Both mothers' and children's language measures were taken from the same interactions, so it is possible that there are bidirectional relations, where how mothers engage in the conversation influences children's engagement, and vice versa. However, building on other longitudinal studies that found predictive relations between similar language measures for mothers and children's language skills (e.g., Hoff, 2003), we expect the associations we observed in the current study to show a longitudinal trend. Future studies should further explore how language features of mother-child interactions longitudinally relate to Korean children's language development in these families.

Relatedly, the language measures for mothers and children were taken from a short, 5-minute interaction, which may not fully represent mother-child dyads' everyday interactions and language use. In particular, mothers and children in the study were aware that they were being recorded and that the recording would be examined by a researcher afterwards, which may have influenced how they interacted with each other. For example, the context of a research study setting, where the researcher was a Korean speaker, might have led the multilingual mothers in the study to use more Korean than they usually would with their children, and led the children to rely more on Korean than usual. Building on the current approach of directly observing language interactions between mothers and children in multilingual families, future research should involve methods that will allow for a more comprehensive representation of children's everyday experiences, such as longer and longitudinal observation of interactions in the homes.

In addition, while we treated multilingual and monolingual families as two distinct groups, it is important to note that there may be additional factors driving the similarities and differences we observed in the data. While we included the measure of maternal education as an additional variable of consideration in our analyses, it certainly does not fully capture the complexity of

experiences and circumstances that shape children's early language experiences. For example, multilingual mothers in the sample came from five different countries (Vietnam, China, Cambodia, Philippines, and Uzbekistan), and also varied in how long they have been in Korea studying the language and culture. Given previous research that highlighted potential variations across multilingual families with mothers from different countries (e.g., Oh et al., 2009), further analyses that examine potential variations within the current sample of multilingual families may allow us to disentangle variations within what we may often treat together as multilingual families. In brief conversations with multilingual mothers, we also noted different levels of their spouses' and families' support for childrearing and children's language development at home. Thus, the current findings should be understood with caution, and future research should examine additional factors that may explain variations in mothers' language input and children's language development.

Conclusion and Implications

In conclusion, the current findings add to the emerging body of international research that studies parent-child interactions and children's language development by examining mother-child interactions in multilingual and monolingual samples in South Korea. By exploring similarities and differences in mothers' and children's language use during the interactions, the study provides further evidence of within-culture differences. Highlighting potential variations in mothers' language input and similarities in the importance of early language experiences for both multilingual and monolingual children, the current study calls for continued effort to examine early experiences of children growing up in multilingual families and to better understand the sources of language learning that multilingual children have early on. Given that there is an "achievement gap" between multilingual children and their peers in school, more research should be done to examine multilingual children's early language environment to identify ways to better support

multilingual children and their families. Such a close examination of language use in multilingual families in Korea, in particular, can help educators highlight these families' strengths and build on what already works to support these children's early language development and later academic success.

General Conclusions

As early home language experiences shape children's language development and their academic success in schools (Weizman & Snow, 2001), it is important to understand the relations between children's early experiences and their language development. Given that much of what we know comes from only a small segment of the world's population, the current dissertation aims to expand our knowledge of the role of parenting in children's language development by examining parenting in the context of South Korea.

The first study explores the generalizability of two prominent theoretical models of family context, the Family Stress Model and the Family Investment Model, by testing their applicability in a sample of Korean families. The findings show that while both models hold in the Korean context, additional parental variables, such as mothers' self-efficacy and knowledge of child development, can help these models draw a more culturally relevant picture of the relations between early family factors and children's language development by taking into account such factors that are important in the context. The findings also suggest that the use of an integrated model that encompasses both the psychological and material aspects of children's early experiences, as shown by the processes posited by the two theoretical models, may help us develop a more comprehensive understanding of the relations among family factors, children's early experiences and language development, calling for more studies to take the more comprehensive approach of an integrated model of family context.

The second study aims to add to a growing body of research on the role of gesture use by exploring mother-child interactions in a sample of monolingual Korean families. The findings from the study show that Korean mothers' gesture use is related to children's gesture use at 14 months, which predicts children's language outcomes two years later. Replicating previous

findings in other cultural contexts (e.g., Rowe & Goldin-Meadow, 2009b), these findings provide further evidence of potentially cross-cultural patterns of benefits of early gesture use during everyday interactions between parents and children that extend beyond any particular cultural context. In addition, the findings also highlight culturally specific features of gesture use, such as bowing, that suggest that gesture use can be another way that we may be able to examine signs of culturally specific socialization practices.

The third and last study explores language use in multilingual and monolingual families in South Korea to highlight variations within Korea and to explore how variations in mothers' cultural and linguistic backgrounds may shape how they interact with their preschool-aged children. The findings show wide variations in the language that mothers and children use in both multilingual and monolingual families. The findings further demonstrate that contrary to previous speculations, multilingual mothers' and children's language use may not be as different as some have expected from that of their counterparts in monolingual families. The findings also indicate that in considering children's early language experiences and development, especially in increasingly diverse populations as multilingual families in Korea, it is important to consider various aspects of their early experiences and backgrounds simultaneously to more fully understand and identify factors that promote children's early development.

Together, the findings from the three studies add to the growing effort to expand our knowledge about child development and language development that has mostly highlighted the experiences of children growing up in the Western contexts. The findings from Korea point to both similarities to and divergences from research in other cultural contexts in children's early learning environment and the links between such environment and children's language learning. The similarities, such as the applicability of the models in Study 1, the observed association between

early pointing and later language outcome in Study 2, and the positive correlations between mothers' language use and children's language use, as well as children's own production of language as a predictor of language development, in Study 3, all indicate different aspects of children's early environment that inform their language development, highlighting the importance of acknowledging and examining the complexities of children's early experiences that are shaped and influenced by multitudes of parenting and family factors, such as parent-child interactions and parental cultural backgrounds (Bronfenbrenner, 1986). The potential differences we observed between the findings from Korea and from other cultural contexts, such as the role of maternal self-efficacy and knowledge of child development in Study 1, and use of a culturally specific gesture in Study 2, highlight the need to continue the examination of early environment and experiences of children from diverse cultural, linguistic, and geographical backgrounds. This continued effort will allow us not only to expand our knowledge about child development, but also to find ways to meet the unique needs of different children from diverse backgrounds.

In addition to focusing on the understudied context of South Korea, the studies also highlight the importance of cross-cultural and international research that not only documents similarities and differences across samples from different cultural, linguistic, and national contexts, but also draws attention to the variability within various contexts, allowing us to appreciate both the within- and cross-cultural variations in early learning environment that informs children's language development. Study 1, examining a national sample of mostly monolingual Korean families, highlights the longitudinal associations that early family socioeconomic differences may have with children's experiences and language outcomes. Study 2 shows a wide range of variations in mothers' and children's gesture use even in the relatively homogenous sample of middle-class, monolingual families with highly educated mothers. Lastly, Study 3 emphasizes the need to

expand our knowledge base by continuing to identify and examine new family contexts, and increasing diversity within any cultural context in the global society. Together, these findings that illustrate variations within the Korean context, and in particular the findings from Study 3, highlight the importance of examining various factors within each sample in these three studies and also in any future studies exploring children's early language development to fully capture the complexity of children's early experiences and learning.

Furthermore, the three studies point to the importance of the early socialization processes and their potential implications on other aspects of children's development (e.g., socioemotional learning) that go beyond language development. For instance, the findings from Study 2 suggest that early gesture use may serve as early source of language learning, but that it could also provide children with a platform where they can learn the social and cultural norms that are necessary to grow as competent members of their society. The bowing gesture is a good example here. In addition to teaching Korean infants the concept of gratitude, the bowing gesture in the mother-child interactions observed in the study seemed to provide children with an additional means to express their emotion, even before they can learn and produce the phrase "thank you." That is, Korean children, who observe their caregivers model bowing when receiving a toy from their children, for example, would have an extra source of learning to understand the meaning of gratitude (i.e., both the verbal cue of mothers saying "thank you" and also the visual cue of bowing) and also to practice expressing such emotion as needed. Through observation and practice, Korean children may also be able to express signs of gratitude earlier—before producing spoken language, which may also serve as an early source of emotional development for them.

Similarly, the findings from Study 1 have shown that as part of the processes suggested by the Family Stress Model, maternal responsiveness to their children is an important aspect of

children's early learning experiences. In particular, research in the Western context suggests that maternal responsiveness predicts not only children's cognitive and language outcomes (e.g., Wade et al., 2018), but also their social skills and socioemotional learning (e.g., Connell & Prinz, 2002). Given that maternal responsiveness captures both linguistic aspects (e.g., providing timely linguistic input when requested) and emotional aspects (e.g., mothers' sensitiveness to children's needs, and provision of emotional support and warmth) of everyday interactions that children have, it would then be reasonable to expect that maternal responsiveness during everyday interactions will shape not only children's language outcomes, but also their socioemotional learning. Although beyond the realm of the questions answerable by the data and analyses in the current dissertation, future research should test the hypothesis that early socialization processes, marked by early gesture and language use during these interactions, serve as a source of socioemotional learning for young children, and further examine how these processes may look different across cultural contexts. In light of the findings from Study 1, which highlights the importance of examining the effect of both psychological and material aspects of children's early experiences and environment, such studies would benefit from including direct measures of parent-child interactions that examine both linguistic and emotional aspects of such interactions to help inform our understanding of the role that these everyday interactions play in the broader development of children from diverse backgrounds.

Building on previous work that highlights the important role that different maternal characteristics and language input play (including the findings from Study 1), the main analyses from Studies 2 and 3 that examine micro-interactions between mothers and children further indicate that children's own active participation in these interactions is as important as, if not more important than, the input and modeling from mothers and other caregivers. The current studies

show that children's own gesture production (Study 2), and their own language use (Study 3) are independent longitudinal and concurrent predictors of their vocabulary knowledge, an important building block for their overall language development. Although the findings from current observational studies cannot provide clear next steps for mothers and caregivers, they do suggest the potential importance of providing space for young children to practice the repertoire of gestures and language they learn in everyday interactions with adults to further develop their language skills. It would be necessary to conduct additional experimental research examining the role of children's gesture and language use in predicting their overall language skills to provide concrete advice to caregivers to better support their children's language development.

In conclusion, the three studies, each taking a different methodological approach of examining the role of different family and parent factors and experiences, together point to the value and potential benefits of longitudinal studies that examine these associations in large samples that represent diverse populations in a cultural context and include diverse measures that can capture different aspects of children's early experiences, including direct observations of children's everyday language interactions. Such efforts to examine these associations longitudinally while taking into account diverse family contexts and factors will help us generate knowledge and research that can help educators and researchers identify ways to turn everyday interactions between parents and their children into rich learning opportunities for all young children.

Appendices

Appendix 1.A.1.
Mean or Percentage (SD) of Variables for the Families that Stayed in the Study (Continued Families) and the Families who Discontinued Their Participation in the Study (Discontinued Families) by Year 7.

Variables	Continued Families (N = 1,620)	Discontinued Families (N = 530)	*t*-value (df)
Child gender			0.995 (900)
Female	48.64%	51.13%	
Male	51.36%	48.87%	
Birth order	1.67 (0.72)	1.60 (0.70)	**-1.968 (862)**
Maternal age	31.26 (3.68)	31.59 (3.81)	1.673 (828)
Family SES			
Monthly income	3.39 (1.41)	3.58 (1.65)	**2.315 (744)**
Maternal education	5.14 (0.93)	5.14 (1.92)	-0.124 (779)
Paternal education	5.28 (1.03)	5.40 (1.04)	**2.001 (809)**
Maternal Knowledge	0.68 (0.16)	0.66 (0.17)	-1.786 (639)
Maternal Psychological Stress			
Parenting stress	2.75 (0.62)	2.71 (0.60)	-1.350 (687)
Lack of Self-efficacy	2.23 (0.62)	2.19 (0.65)	-1.075 (695)
Depressive symptoms	1.94 (0.71)	1.97 (0.69)	0.878 (681)
Home Learning Environment	27.52 (3.13)	27.36 (3.60)	-0.609 (232)
Maternal Responsiveness	3.80 (0.49)	3.92 (0.49)	**3.757 (232)**
Year 4 Expressive Vocabulary	4.84 (3.23)	4.58 (3.19)	-1.080 (242)
Year 7 Language Skills	3.78 (0.82)	-	-

Notes: The observed *t*-values are from unequal variance independent sample *t*-tests. The bolded values indicate statistically significant differences between the two groups at $p < .05$ level.

Appendix 1.A.2.
Mean or Percentage (SD) of Variables for the Final Analytic Sample, Total Sample (Initial Sample from Year 1), and Excluded Sample.

Variables	Total sample (N = 2,150)	Final sample (N = 1,894)	Excluded sample (N = 256)
Child gender			
Female	49.26%	48.35%	53.91%
Male	50.74%	51.65%	46.09%
Birth order	1.65 (0.72)	1.65 (0.72)	1.66 (0.68)
Maternal age	31.34 (3.72)	31.39 (3.70)	30.87 (3.85)
Family SES			
Monthly income	3.44 (1.48)	3.43 (1.46)	3.47 (1.58)
Maternal education	5.14 (0.96)	5.15 (0.96)	5.05 (0.95)
Paternal education	5.31 (1.03)	5.31 (1.03)	5.44 (1.09)
Maternal Knowledge	0.68 (0.16)	**0.68 (0.16)**	**0.63 (0.16)**
Maternal Psychological Stress			
Parenting stress	2.74 (0.62)	2.74 (0.61)	2.71 (0.65)
Lack of Self-efficacy	2.22 (0.68)	2.22 (0.69)	2.19 (0.65)
Depressive symptoms	1.95 (0.70)	1.95 (0.70)	1.91 (0.70)
Home Learning Environment	27.50 (3.19)	27.56 (3.14)	27.04 (3.51)
Maternal Responsiveness	3.80 (0.49)	3.80 (0.49)	3.76 (0.49)
Year 4 Expressive Vocabulary	4.81 (3.23)	4.82 (3.22)	4.74 (3.30)
Year 7 Language Skills	3.78 (0.82)	3.78 (0.81)	3.73 (0.89)

Notes: The observed *t*-values are from unequal variance independent sample *t*-tests. The bolded values indicate statistically significant differences between the two groups at $p < .05$ level. Maternal Knowledge, $t(204) = -3.60$, $p = .004$.

Appendix 2.A.

Detailed Coding Scheme for Gesture Use, adapted from Choi et al., (2021); Iverson & Goldin-Meadow (2005); Rowe & Goldin-Meadow (2009).

Category	Sub-category	Definition
Deictic	Point	indication of an object by using the index finger or the whole hand (e.g., pointing to a cup to mean "cup")
	Show	holding out an object within the interlocutor's field of vision (e.g., holding out a toy elephant to mean "look at this toy elephant")
	Give	holding out an object in the direction of the interlocutor's physical space for the interlocutor to take the object (e.g., holding out a toy car toward mother to mean "take this toy car" & mother takes the toy)
	Trace	following the course or position of an object with a finger or hand (e.g., following the train rail with a finger to indicate "train rail")
	Reach	stretching out of the hand to an object to request the object without grabbing/getting the object (e.g., stretching out an open hand toward a toy ball on top of the shelf to mean "I want that ball" without grabbing the ball)
	Palm	holding out a palm (or both palms) upward toward an object to request the object (e.g., holding out a palm close to a cup to mean "give me the cup")
Conventional	Wave	moving an open hand (or both hands) to greet or show disagreement
	Up	reaching out two arms upward toward mother to mean "pick me up"
	Thumb up	showing one thumb (or both thumbs) to mean "good job"
	Shake	shaking head to mean "no"
	Nod	nodding head to mean "yes"
	Hug	stretching two arms toward mom to mean "hug me"
	Come	beckoning one or two hands toward oneself to mean "come here"
	Clap	clapping with both hands to mean "good job," "look here," or "excited"
	Bow	moving head and torso forward to mean "thank you" or to greet
Representational	Open	putting hands together and apart to mean "open"
	Draw	moving a fist sideways with the hand shaped as if it is holding a pen in the motion of drawing
	Pig	pushing up the nose with a finger to highlight the shape of a pig's nose

	Flower	putting both palms below chin to indicate petals of flowers and sepal
	Twinkle	moving one or two hands in semi-circle motion to indicate twinkling

Appendix 3.A.

Series of Multiple Regression Models Examining Differences in Mothers' Language Measures between Multilingual and Monolingual Families, Controlling for Maternal Education, Paternal Education, and Family Income (n = 60).

	M_Utt	M_Token	M_Type	M_MLU	M_DXT
Multilingual	-12.506	-59.482*	-33.796*	-0.809*	-0.146
M_Edu	-3.957	-7.220	1.329	0.078	4.569
P_Edu	-4.561	-10.554	0.750	0.004	1.029
Family Income	2.402	8.595	4.806	0.081	0.647
Intercept	106.022***	253.557***	105.572**	3.753***	-3.622
R^2	0.098	0.189	0.321	0.396	0.209
df	55	55	55	55	55
F	1.49	3.20	6.48***	9.00***	3.62**

Notes: * $p < .05$; ** $p < .01$, *** $p < .001$. M: Mother; M_Edu: Maternal Education; P_Edu: Paternal Education; M_Utt: Total number of mother's utterances; M_DXT: Mothers' total decontextualized language use.

Appendix 3.B.

Series of Multiple Regression Models Examining Differences in Children's Language Measures between Multilingual and Monolingual Families, Controlling for Maternal Education, Paternal Education, and Family Income (n = 60).

	C_Utt	C_Token	C_Type	C_MLU	C_DXT
Multilingual	-9.457	-12.393	-6.823	0.374	0.808
M_Edu	-5.169	-5.411	-1.728	0.303*	2.663
P_Edu	0.435	-3.686	-1.251	-0.224*	0.820
Family Income	0.529	2.221	1.122	0.053	0.240
Intercept	66.219***	131.330**	72.926**	2.557**	-2.898
R^2	0.060	0.022	0.016	0.186	0.160
df	55	55	55	55	55
F	0.88	0.31	0.22	3.15*	2.62*

Notes: * $p < .05$; ** $p < .01$, *** $p < .001$. M: Mother; M_Edu: Maternal Education; P_Edu: Paternal Education; C_Utt: Total number of children's utterances; C_DXT: Children's total decontextualized language use.

Appendix 3.C.

Series of Multiple Regression Models Predicting Children's Language Measures from Mothers' Language Measures, Controlling for Demographic Variables (n = 67).

	C_Token		C_Type		C_MLU	
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
M_Token	0.126	0.250~				
M_Type			0.124	0.790		
M_MLU					0.076	0.152
Multilingual	-5.146	34.575	-2.953	19.724	0.583	1.384
M_Token*Multilingual		-0.192				
M_Type*Multilingual				-7.191		
M_MLU*Multilingual						-0.195
M_Edu	-2.660	-2.472	-1.289	-0.785	0.281*	0.286*
Age	1.242	1.193~	1.207**	1.135**	0.011	0.011
Female	3.797	5.740	3.689	2.530	0.411*	0.440*
Intercept	19.261	-7.408	-11.071	5.254	0.737	0.368
R^2	0.090	0.109	0.155	0.140	0.154	0.162
df	61	60	61	60	61	60
F	1.20	1.23	2.24~	1.62	2.23~	1.94~s

Notes: ~$p < .01$; *$p < .05$, ** $p < .01$, *** $p < .001$. M: Mother; C: Child.

Appendix 3.D.

Series of Multiple Regression Models Predicting Children's Language Measures from Mothers' Language Measures, Controlling for Child Age and Gender, Maternal Education, Paternal Education, and Family Income (n = 60).

	C_Utterance		C_DXT	
Variable	Model 1	Model 2	Model 3	Model 4
M_Utterance	0.458***	0.558**		
M_Utterance*Multilingual		-0.171		
M_DXT			0.514***	0.561***
M_DXT*Multilingual				-0.114
Multilingual	-4.149	8.539	0.853	3.593
M_Edu	-3.603	-3.430	0.197	0.326
P_Edu	2.077	1.785	0.263	0.248
Family Income	-0.225	-0.328	0.021	0.015
Age	0.302	0.271	0.100	0.091
Female	-1.161	-1.649	1.115	1.186
Intercept	3.788	-1.021	-6.788	-8.235
R^2	0.371	0.380	0.723	0.730
df	55	55	55	55
F	4.37***	3.91**	19.36***	17.24***

Notes: ~p = .05; *p < .05, ** p < .01, *** p < .001. M: Mother; C: Child.

Appendix 3.E.

Series of Multiple Regression Models with Interaction Terms Predicting Children's Month-Difference Receptive Vocabulary Scores from Mothers' and Children's Language Measures, Controlling for Demographic Variables (n = 58).

Variable	Children's Month-Difference Receptive Vocabulary Scores				
M_Utterance	-0.289~				
C_Utterance	0.410*				
M_Token		-0.064~			
C_Token		0.092			
M_Type			-0.072		
C_Type			0.132		
M_MLU				-3.139	
C_MLU				-0.286	
M_DXT					-0.599*
C_DXT					0.894~
Multilingual	-26.670*	-27.476*	-21.022~	-43.838~	-14.178*
M_Utterance*Multilingual	0.257				
C_Utterance*Multilingual	0.092				
M_Token*Multilingual		0.070			
C_Token*Multilingual		0.066			
M_Type*Multilingual			0.075		
C_Type*Multilingual			0.064		
M_MLU*Multilingual				1.726	
C_MLU*Multilingual				6.909	
M_DXT*Multilingual					0.432
C_DXT*Multilingual					-0.430
M_Edu	3.861*	2.233	2.037	-0.230	0.885
Age	0.304~	0.298	0.261	0.390*	0.361~
Female	1.411	-1.170	-0.938	-2.397	-1.671
Intercept	-31.317~	-20.790	-20.941	-1.720	-18.839
R^2	0.453	0.426	0.355	0.300	0.326
df	49	49	49	49	49
F	5.07***	4.55***	3.36**	2.62*	2.96**

Notes: ~ $p < .01$; *$p < .05$; **$p < .01$; ***$p < .001$. M: Mother, C: Child, M_Edu: Maternal education.

Appendix 3.F.

Series of Multiple Regression Models Predicting Children's Month-Difference Receptive Vocabulary Scores from Mothers' and Children's Language Measures, Controlling for Demographic Variables including Maternal Education, Paternal Education, and Family Income (n = 52).

Variable	Children's Month-Difference Receptive Vocabulary Scores				
M_Utterance	-0.147				
C_Utterance	0.414**				
M_Token		-0.025			
C_Token		0.116*			
M_Type			-0.032		
C_Type			0.152~		
M_MLU				-0.818	
C_MLU				0.965	
M_DXT					-0.309
C_DXT					0.522~
Multilingual	-6.840	-9.464~	-10.078~	-12.755*	-11.457*
M_Edu	3.218	1.982	1.766	0.636	0.992
P_Edu	-1.157	-0.430	-0.497	-1.244	-1.415
Family Income	-0.625	-0.856	-0.892	-0.659	-0.535
Age	0.315	0.306	0.296	0.473*	0.428*
Female	-0.138	-1.516	-1.421	-1.539	-1.168
Intercept	-29.415	-23.066	-20.074	-15.494	-14.955
R^2	0.376	0.336	0.312	0.259	0.305
df	43	43	43	43	43
F	3.24**	2.72*	2.43*	1.88~	2.36*

Notes: ~ $p < .01$; *$p < .05$; **$p < .01$; ***$p < .001$. M: Mother, C: Child, M_Edu: Maternal education; P_Edu: Paternal education.

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