

QUANTITY, DIVERSITY, AND FUNCTION OF CAREGIVER LANGUAGE INPUT  
ACROSS CONTEXTS IN LOW-SES HOUSEHOLDS

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## THESIS ABSTRACT

Quantity, Diversity, and Function of Caregiver Language Input Across Contexts in Low-SES Households

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The current study examined the differences in the amount, diversity, and functions of caregivers' language use with their infants (14-27 months old) across three interactive contexts (book-reading, toy play, clean-up). Participants were 33 caregiver-infant dyads from low-income families. The interactions between caregivers and infants were video-recorded, transcribed, and coded. Results suggested that book-reading and toy play elicited more diverse language input from caregivers than did clean-up. In contrast, the sheer amount of language input did not differ across contexts. Additionally, caregivers used language for different functions during these interactive contexts. Although didactic language (e.g., "This is an apple.") accounted for a significant portion of language input across all three contexts, it was used most often during book-reading, followed by toy play, then clean-up. In contrast, directive language (e.g., "Put it here!") was used the most during clean-up, followed by toy play, then book-reading. Affirmative (e.g., "Great job!") and corrective (e.g., "Stop!") language was used more often during clean up than the other two contexts. These findings highlight the potential for language learning across various contexts. While some activities naturally elicit rich language input, others may preoccupy caregivers with behavioral management and task goals, making it more

challenging to provide high-quality language input. Language interventions for vulnerable populations should take this into account and explore ways to overcome these barriers.

## Introduction

From birth, children are surrounded by their caretakers' environment and the language used to describe it. In the field of early language development, copious and diverse maternal input is regarded as the primary social vehicle for children's language acquisition (Bloom, 1998; Hoff & Naigles, 2002). Indeed, environments in which maternal language behaviors introduce instead a limited vocabulary (Hoff-Ginsberg, 1991; Weizman & Snow, 2001), fewer complex sentence structures (Salo, Rowe, Leech, & Cabrera, 2016), and lower cognitive engagement (Luo & Tamis-LeMonda, 2017) may result in setbacks in the child's language development. Given that language delays have been associated with lower academic performance, reading comprehension, abstract thinking, and behavioral and emotional regulation (Adrian, Clemente, & Villanueva, 2007; Dickinson, Griffith, Golinkoff, & Hirsh-Pasek, 2012; Morgan, Farkas, Hillemeier, Hammer, & Maczuga, 2015; Muter, Hulme, Snowling, & Stevenson, 2004; Tamis-LeMonda et al., 2014b), multiple interventions (e.g. Thirty Million Words Initiative, Too Small to Fail) target caregivers' language practices in potentially vulnerable populations, most notably families in low-income households (Hart & Risley, 1995; Tamis-LeMonda, Kuchirko, & Tafuro, 2013).

In recent years, however, a new focus has been brought to the importance of the interactive contexts within which maternal language input occurs. Activities such as book reading are well-known for promoting rich linguistic interactions (Dickinson et al., 2012) but less is known about the linguistic potential of other common daily activities. This is particularly important as supports—and pressure—are brought into the homes of vulnerable families, who may operate under routines and language practices that are

different, though not inferior, to those standardized by widely accepted research findings. In this study, I seek to identify which types of language input are more likely to arise naturally across different interactive contexts in low-income households. Findings of the study will reveal the potential of each setting in eliciting high-quality language input, thus revealing more input opportunities for language acquisition within these homes.

### **Quantity and Diversity of Language Input**

Early research in language development focused on the quantity of caregiver language input. Language quantity is traditionally measured in the number of utterances (each defined as the simplest unit of independent clause) and in the number of word tokens, that is, the number of each individual word produced by the speaker. A logical association between the quantity of caregiver language input and their child's language learning presumes that the more words the caregiver speaks, the more words the child will acquire. The most well-known evidence supporting this claim was gathered in Hart & Risley's (1995) longitudinal study of language production in 42 families over three years: children's patterns of word token production resembled that of their caregivers, and those who heard more words from their caregivers as infants scored better on vocabulary assessments in third grade. Rowe (2012) also found that the number of caregiver word tokens directed at children at 18 months predicted their vocabulary at 30 months, although word tokens at 30 months did not predict vocabulary at 42 months. This suggests that the amount of language input might be more impactful earlier in language development, and that other elements of language input might be more important as the child's language skills grow.

Researchers have turned towards examining the quality of caregiver language input. A key measurement of input quality is the number of caregiver vocabulary diversity based on word types, that is, the number of each unique word produced during speech, is also a strong contributing factor to children's vocabulary growth (Pan, Rowe, Singer, & Snow, 2005; Rowe, 2012; Weizman & Snow, 2001). Moreover, Rowe (2012) found that the number of caregiver word types consistently increased with child's age, unlike measures of word tokens which varied but did not increase steadily over time. This pattern suggests that word diversity might be increased throughout the child's development in acknowledgement of the sophistication of the child's language skills. Quality of verbal input, then, also pertains to the "fluency and connectedness" and joint engagement of caregivers and children during verbal interactions that nurture language skill acquisition and practice, to a degree that might exceed the impact of input quantity (Hirsh-Pasek et al., 2015).

Quantity and diversity together provide a description of the amount of valuable caregiver input. Both measures are important, as the higher the amount of words (word tokens) a caregiver produces, the more opportunities there are for higher word diversity (word types). Given the limited capacity of infants to correspond with language of their own, both measurements of caregiver input provide valuable information to better understand the child's linguistic environment.

### **Function of Language Input**

In addition to quantity and diversity of words, caregiver input has also been studied based on its intention or purpose. For instance, caregivers can use language for the purpose of teaching children new concepts and knowledge about the world. Didactic

language refers to verbal identifications of target objects, situations, internal and external states, and social norms by labeling them or describing their attributions (e.g., “That is an apple. It is red and delicious”). A large portion of caregivers’ language to infants is didactic (Paavola, Kunnari, Moilanen, & Lehtihalmes, 2005). The referential properties of these utterances provide rich vocabulary during activities thereby supporting children’s vocabulary growth (Tamis-LeMonda, Kuchirko, & Song, 2014a). There is also evidence that maternal didactic input predicts children’s noun comprehension (Vibbert & Bornstein, 1989).

Unlike didactic language, directive language regulates the child’s interactions with the environment by guiding the child’s actions. Directive language has been associated with fewer benefits than didactic language and has been thought to contribute less to vocabulary growth (Tomasello & Farrar, 1986). It is often perceived as a marker of intrusive caregiver behavior, which has been negatively associated with children’s exploratory behaviors (Diaz, Neal, & Vacchio, 1991) as well as language comprehension and expressive language (Keown, Woodward, & Field, 2001) in populations at risk for language delays. Directive language, however, is necessary during goal-oriented activities or to prolong an activity in which a child is already engaged. Studies have documented that caregivers use directives to guide children towards target items as well as to maintain children’s attention on the target item after the child has displayed interest towards it (Lloyd & Masur, 2014; Masur, Flynn, & Lloyd, 2013). Directives that support the child’s interest have been linked to vocabulary growth during the child’s second year of life (Akhtar, Dunham, & Dunham, 1991; Markus, Mundy, Morales, Delgado, & Yale, 2000; Masur, Flynn, & Eichorst, 2005).

Other types of language functions have been less studied but could nonetheless be important to document. Attention-getting language, for instance, is used to guide or maintain the child's attention on a target item or activity (e.g. calling child's name; "hey"). Maternal language that regulates the child's attention may facilitate language learning as it prolongs the child's attention on an object or learning activity (Masur et al., 2013; Karrass, Braungart-Rieker, Mullins, & Lefever, 2002). Similarly, praise and words of affirmation (e.g., "Great job!"; "Go on") may serve as reinforcement for a child's developing language behaviors. Verbal praise, even when ambiguous, has positive motivational effects on infants that may carry over into their school years as they attribute success to hard work rather than to innate traits (Morris & Zentall, 2014; Gunderson et al., 2013). In contrast, language used for corrective purposes, such as criticism (e.g. "Stop!"; "You're so bad") that discourages a child's behavior but does not provide clear direction of a desired course of action as directive language does, could be counterproductive to fostering language development in an interaction. In Huebner's (2000) book-reading intervention, caregivers were advised to refrain from using criticism while reading to their toddlers. An increase in children's language use was observed after three months, in which children were producing more utterances and words than the comparison group who did not receive the intervention.

Despite recommendations to abstain from certain types of language in order to reap developmental benefits, more research is necessary to understand the natural use of language functions and their value across contexts. Huebner's (2000) intervention was designed under the assumption that caregivers need to be "taught" productive ways to read to their children. Indeed, the caregivers' training involved identifying the



shortcomings in video simulations and to perform role-play scenarios after which, ironically, caregivers themselves received “corrective feedback.” Furthermore, the process of coding caregivers’ language input was designed to capture when they “failed” to adhere to the recommendations outlined in the intervention. Though this mindset might be necessary to properly evaluate the fidelity of implementation, it highlights the pressure that these interventions place on caregivers to alter their language practices and the nature of their interactions with their children to meet standards that might not be tailored to their lifestyles and resources available.

Not all language functions may be at the center of prior research, but they are ever-present in interactive contexts. In order to fully understand the role that maternal language plays in children’s language development, it is important to catalog the various ways in which language is naturally used across contexts.

### **Early Language Development in Low-SES Populations**

Decades of language research point to SES as an environmental factor that impacts early language development. Hart & Risley’s (1995) research concluded that children from lower income families were exposed to a significantly lower quantity of caregiver language input compared to their higher-income counterparts. Moreover, their calculations predicted that over the span of the first three years of life, children from low-SES would have a language exposure deficit of 30 million words, thus coining the name of the “30 Million Word Gap.” Results from other studies (Hoff, 2003, Hoff-Ginsberg, 1991) coincide in that low-SES caregivers generally speak for less time and produce less vocabulary and fewer prompts for topic-continuation than caregivers from higher-SES backgrounds. Researchers have also documented SES-related disparities in other aspects

of language development, including language processing skills, expressive and receptive language, oral skills, and syntactic skills during infancy and preschool years (Farkas & Beron, 2004; Fernald et al., 2013; Vasilyeva, Waterfall, & Huttenlocher, 2008).

Despite these SES differences, a recent debate on the existence of the Word Gap raises multiple methodological concerns, such as the use of non-representative samples and the lack of data across various contexts of everyday life (Paugh & Riley, 2019; Sperry, Miller, & Sperry, 2018). Most researchers agree on the dangers of making broad assumptions about language patterns across a population based solely on SES, given the demonstrated variation within SES strata (Sperry, Sperry, & Miller, 2019). For this reason, more studies are needed to understand the variations in caregiver language input within low-SES samples. In order to discern nuances in caregiver input in low-SES families and to address the methodological concerns mentioned above, the current study focuses on language interactions across different natural contexts within low-SES population.

### **The Role of Interactive Context**

When examining caregiver language input, it is necessary to take context into account. Features of language input vary across the activities in which caregivers and children engage. Book reading, for instance, has been repeatedly found to be the richest context in terms of opportunities for high-quality vocabulary, complex structures, and advanced language. Book reading often yields higher levels of vocabulary production and quality than other contexts (Soderstrom & Wittebolle, 2013; Tamis-LeMonda, Custode, Kuchirko, Escobar, & Lo, 2018; Weizman & Snow, 2001) so it is typically the vehicle for interventions targeting vocabulary growth (Dickinson et al., 2012).

An important caveat, however, is that most of the data inspiring targeted interventions comes from middle-class families, which causes reservations about the fit of their recommendations for low-income families. For instance, dialogic reading, which encourages the active participation of the child through dialogue referencing the book, is a common staple in language development interventions (Huebner, 2000); however, there is some evidence suggesting that at-risk toddlers do not benefit as much from traditional dialogic reading as toddlers who are not at-risk (Mol et al., 2008). Reese and colleagues (2010) posited that low-income children's narrative and story comprehension skills improved when caregivers engaged them in conversations relevant to personal experiences, as those may feel more natural for low-income caregivers than vocabulary-oriented prompts. These findings raise the question of whether widely accepted language learning strategies properly fit with natural interactions and accessible activities for low-income families. For example, it is estimated that some high poverty areas have more resident preschool children than age-appropriate books for sale in the area (Neuman & Moland, 2016). Residents would have to arrange for travel outside of the area to acquire personal books, which may discourage reading at an early age. Instead, rich language interactions may be occurring through interactive activities that do not require outside materials, such as cultural games, songs, story-making, and religious events (Avineri et al., 2015). For this reason, it is important to consider activities beyond book reading that may already occur naturally in low-income households.

Researchers have recognized the potential for interactive play as a contributor for language development. Toy play contributes to word diversity by eliciting vocabulary pertaining to movements and actions (Weizman & Snow, 2001), and it can elicit longer

utterances and more high cognitive engagement than book reading (Salo et al., 2016). Observations of play interactions have shown that caregivers tend to follow their child's lead increasingly as the child grows older (Newland, Roggman, & Boyce, 2001). This finding suggests that toy play appears to be a context that is child-centered and in which the child can take the lead. Indeed, although caregivers use more directive language in toy play than book reading, research has revealed that caregivers often use it to support the child's attention rather than intrude in it (Flynn & Masur, 2007).

Other contexts have also been studied for their conduciveness to language, but research is limited. Richness of input, particularly regarding rare words during bath time, getting dressed, and mealtime during the preschool years, has been found to predict vocabulary when the child enters school (Weizman & Snow, 2001; Beals, 1997). As such, it is important to study other common activities and tasks to assess the types of language contributions that can be made during these. Clean-up is an activity that may occur naturally following play activities and offer the opportunity for adult-supported vocabulary review, which has been shown to reinforce learning of target vocabulary in experimental conditions (Toub et al., 2018). In the same manner as toy play, clean-up also requires caregivers to negotiate the child's attention, in this case, to accomplish a task. Language comparisons across interactive contexts have focused on child-centered activities rather than on goal-oriented tasks until this point, even though children are expected to understand and follow orders with increasing independence as they grow older. Thus, clean-up activity presents a great opportunity to gain information on caregivers use of language during a goal-oriented context.

## Current Study

Quantity, diversity, and function of caregiver language relate to early language development for children. Studies comparing language performance across SES conclude that low-income families tend to exhibit lower amount and quality of language, which in turn consistently predict greater risk of language delays and subsequent developmental and academic challenges for low-SES children. However, less frequently do researchers account for the barriers that low-SES families must work around, such as limited access to resources, limited time and energy, and financial stress, in order to engage in language-promoting activities. Instead, interventions targeting perceived deficits continue to base their design on standards set by more privileged populations.

For this reason, it is important to explore research questions that more accurately capture the challenges and patterns of this population to provide a comprehensive picture of language input within low-SES families. The current study examined how different aspects of caregiver language input varied across three interactive contexts: book-reading, toy play, and clean-up. The current study aimed to answer three research questions.

1) How does the amount of caregivers' language input (i.e., number of utterances and tokens) vary across the three interactive contexts?

Based on prior work that documents the high rate of maternal speech during reading, I predicted that the amount of maternal language input would be the greatest during book reading, followed by toy play, and lastly by clean-up.

2) How does the diversity of caregivers' language input (i.e., word types) vary across the three interactive contexts?

Based on studies (Weizman & Snow, 2001) attesting to the richness of opportunities to talk about a variety of actions and movement during book-reading and toy play, I predicted that the diversity of maternal language input would be the greatest during book reading and toy play, followed by the more restrictive task of clean-up.

3) How does the function of caregivers' language (i.e. didactic, directive, attention-getting, affirmative, corrective) vary across contexts?

Within each interactive context, given that didactic and directive language are the most frequently studied, I expected that these two functions would be the most predominant, while attention-getting, affirmative, and corrective language would occur less frequently across all contexts.

Across the three contexts, I expected didactic language to be used the most in book reading due to the richness of language references contained within a book, followed by toy play and clean-up. In contrast, directive language would occur the most in clean-up due to its goal-oriented nature, followed by toy play and book reading. Additionally, affirmative language would occur the most during toy play and book-reading as these are activities that are child-centered and attractive to the child. Finally, attention-getting and corrective language would occur the most during clean-up, which could be perceived as highly goal-oriented and require more regulations of attention and behaviors.

## **Methods**

### **Participants**

This study used a subset of the sample from a caregiver-focused, early language intervention study aiming to enhance the quantity and quality of caregiver-child

interaction and children's language development. The original study was conducted in Philadelphia between 2016 and 2017. A total of 41 families were recruited through Maternity Care Coalition (MCC), a Philadelphia-based agency providing services to expecting mothers and caregivers of young children in low-income neighborhoods. MCC advocates served as liaisons for recruitment given their direct engagement with families. Of the 41 families, 8 were removed from the present analysis. Two dyads spoke a language other than Spanish or English at home; one dyad had two caregivers interacting with the child simultaneously during the videos; and five dyads had malfunctioning video recordings due to technical errors. If more than three minutes of a video were not usable, that participant's data was excluded from analysis.

Participant demographics are reported in Table 1. Among the final 33 dyads (Table 1), the average child age was 19.6 months ( $SD= 4.03$ ). About half of the children were female (45.5%) and all caregivers identified as female. Information on standard SES predictors (Hoff, Laursen, & Tardiff, 2002) suggested financial hardship: 74.2% of participants who disclosed their income reported a household income of under \$25,000, 81.8% reported being unemployed, and 48.5% reported a high school diploma or equivalent as the highest education level achieved. Furthermore, 81.8% of participants reported 4 or more people per household. According to the Department of Health and Human Services (2016), the poverty line was drawn at \$24,300 for a household of four people, indicating that the majority if not all the dyads in this sample would fall under the poverty line for 2016 when this data was collected.

Caregivers reported the same ethnic backgrounds for themselves as for their children: 12 identified as Black, 16 as Latino, three as White, and 2 as multiracial. About

a third of caregivers (36.4%) reported being born outside of the United States, and 45.5% reported regular use of Spanish at home growing up. In contrast, 72.8% reported using regular English at home during this study.

### **Procedure**

For data collection, MCC advocates facilitated recruitment by distributing flyers to families they serviced. Project researchers and assistants completed consent protocol with caregivers. Due to the children's age, assent could not be obtained, but caregivers consented on behalf of the dyad. MCC services were not compromised by participation in research. Each participating dyad was compensated for their participation at the end of the intervention study with the kitchen toy set (worth about \$10) used during one of the tasks.

Participants were assigned to an intervention group and a non-intervention comparison group. Before and after the intervention, research assistants conducted direct child assessments, caregiver survey interviews, and observations of caregiver-child interactions. The current study only focused on caregiver-child interactions at baseline.

Each dyad completed three interaction sessions (book reading, toy play, and clean-up) of five minutes each, for a total of approximately 15 minutes of video-recorded material. Interaction sessions occurred in the same order and took place in the participant home or at the MCC building. The assigned MCC advocate and researchers in charge of recording were present in the room to increase familiarity and comfort for participants. Caregivers were asked to interact with the child as they would normally and to continue the interaction for at least 5 minutes if possible. The research assistant intervened only to indicate the transition to the next activity.



**Book sharing.** Caregivers were asked to start with *Hug* (Alborough, 2000). The book primarily utilizes pictures to convey the story of a young monkey searching for its mother in a jungle and its encounters with various animals. Minimal use of repetitive vocabulary (“hug,” “mommy,” and “Bobo” for the monkey’s name) eliminated variability due to differences in caregiver literacy in English. The second book available at caregiver’s request was *Numbers, Colors, and Shapes* (Priddy, 2011), which displays a series of labeled items in multiple colors, counts, and shapes. Dyads were asked to use only these two books during the book reading session.

**Toy play.** Dyads were provided with a toy kitchen set for a semi-structured play interaction. The set contained a unit with a sink and a stove, as well as kitchen utensils and a large assortment of toy food items. Dyads were asked to play as they would normally.

**Clean-up.** Researchers provided dyads with a bin to clean up after the toy play session. Dyads were not guided to any particular clean-up style or strategy.

## Measures

Videos were transcribed using CLAN (Child Language Analysis, MacWhinney, 2000), a transcription software that generated the number of utterances, word tokens, and word types caregivers produced during each interactive task. Videos in Spanish were transcribed in Spanish.

**Utterances.** Defined by units of independent clauses. For the purposes of this study, utterances were separated at conjunctions uniting sentences, changes in topic, or pauses longer than three seconds.

**Word tokens.** The number of words caregivers produced.

**Word types.** The number of different words caregivers produced.

**Example.** “I have a blue flower. Blue is my favorite color” would yield two utterances, ten tokens (ten words in total), and nine word types (because “blue” is one word type that is used twice).

**Rate per minute.** To account for individual differences in the duration of interactions, the rates of utterances, word tokens, and word types per minute were calculated for each interactive task.

### **Coding**

Each video was coded in its entirety in the below listed categories. To account for individual differences at the start and conclusion of interactions, only data from the middle four minutes of each video was used in analysis. Missing or unintelligible audio time was deducted from the total period of interaction for the context. The Mangold INTERACT software (Mangold, 2017) was used to code language functions and run coder reliability tests. Coder reliability was calculated through double coding of 20% of videos selected at random, and it was determined to be very strong for all coding categories ( $Kappa = 0.87-.088$ ).

**Function of language.** Utterances were coded based on their function during the interaction as didactic, directive, attention getting, affirmative, or corrective. Didactic language (e.g. “that’s a red nose,” “the monkey is crying”) was characterized by use of labeling and descriptions of objects, actions, and internal or external states. Directive language (e.g. “let’s play here,” “wash the dishes”) pertained to caregiver comments that aim to guide or manage child’s actions and behaviors. Attention getting language (e.g. “hey,” child’s name) referred to specific words or phrases used for the sole purpose of

drawing the child's attention to the caregiver or intended object or activity. Affirmative language (e.g. "thank you," "good job!") corresponded to words or phrases used to reinforce or encourage a behavior, whereas corrective language (e.g. "no," "stop") was that used to stop or chastise a behavior without guidance towards a more acceptable behavior. The detailed coding scheme used during the coding process is included in Appendix 1.

**Others.** Utterances that did not fit the description of any of the language functions above (e.g. incomplete utterances, onomatopoeia, intermittent noises) were categorized as Other during the coding process. This category was not relevant to the hypotheses in this study and was excluded from analyses.

## Results

Descriptive statistics (means, standard deviations, and confidence intervals) for the quantity and diversity of language input and the frequencies of different language functions for each context are shown in Table 1.

### Quantity and Diversity of Language Input

Two Repeated-Measures ANOVAs were conducted to examine whether the quantity of language input varied across contexts, using contexts (book-reading, toy play, and clean-up) as the independent variable and the rate of utterances and word tokens per minute as dependent variables, respectively. As seen in Figure 1, there were no significant differences in the amount of utterances ( $F(2, 64) = 2.97, p = .06$ ) or tokens ( $F(2, 64) = 1.42, p = .25$ ) that caregivers produced per minute across contexts, suggesting that the amount of language did not vary across contexts.

In contrast, a Repeated-Measures ANOVA using word types as the dependent variable yielded a significant difference in the diversity of maternal input across the three contexts ( $F(2, 64) = 6.93, p = .002$ ) (see Figure 1). Caregivers produced fewer word types per minute during clean-up ( $M = 18.17, SE = 1.12, 95\% CI = [15.89, 20.46]$ ) than during toy play ( $M = 21.68, SE = 1.12, 95\% CI = [19.41, 23.95], p = .005$ ) and book-reading ( $M = 22.49, SE = 1.2, 95\% CI = [20.05, 24.92], p = .015$ ).

### **Language Function across Contexts**

A 3 Context (book-reading, toy play, clean-up)  $\times$  5 Language Function (didactic, directive, attention-getting, affirmative, corrective) Repeated-Measures ANOVA revealed a main effect for context ( $F(2, 64) = 7.58, p = .001$ ), in which book-reading elicited a significantly higher rate of the language functions per minute ( $M = 4.62, SE = .26, 95\% CI [4.09, 5.15]$ ) than toy play ( $M = 3.62, SE = .23, 95\% CI [3.14, 4.1]$ ) and clean-up ( $M = 3.67, SE = .25, 95\% CI [3.17, 4.18]$ ). There was no difference in the overall rate of language functions per minute between the toy play and clean-up contexts.

Additionally, there was a significant main effect for language function ( $F(4, 128) = 129.25, p < .001$ ). Didactic language was the language function most used across contexts ( $M = 9.99, SE = .62, 95\% CI = [8.74, 11.25], p < .001$ ), followed by directive ( $M = 4.77, SE = .32, 95\% CI = [4.11, 5.43], p < .01$ ), and attention getting language ( $M = 3.41, SE = .32, 95\% CI = [2.77, 4.05], p < .01$ ). Affirmative ( $M = 1.13, SE = .13, 95\% CI = [.86, 1.4]$ ) and corrective functions ( $M = .55, SE = .07, 95\% CI = [.4, .7]$ ) were used the least overall ( $p < .01$ ).

More importantly, there was a significant interaction effect ( $F(8, 256) = 35.2, p < .001$ ) (see Figure 2), indicating that caregivers used different language functions in

different interactive contexts. Post hoc analyses suggested that caregivers used didactic language most frequently during book-reading ( $M= 14.81, SD= 6.09, 95\% CI= [12.65, 16.96]$ ), followed by toy play ( $M= 9.75, SE= .87, 95\% CI= [7.99, 11.52]; p= .001$ ), and then clean-up ( $M= 5.42, SE= .53, 95\% CI= [4.34, 6.51], p<.001$ ). In contrast, caregivers used directive language more often during clean-up ( $M= 7.28, SE= .55, 95\% CI= [6.16, 8.4]$ ) than during toy play ( $M= 4.39, SE= .51, 95\% CI= [3.35, 5.42], p<.001$ ) and book-reading ( $M= 2.65, SE= .42, 95\% CI= [1.8, 3.49], p<.001$ ). Similarly, caregivers used affirmative language more during clean-up ( $M= 1.53, SE= .2, 95\% CI= [1.13, 1.94]$ ) than during toy play ( $M= .74, SE= .12, 95\% CI= [.5, .98]; p=.002$ ), though there were no significant differences in its use during either those two contexts when compared with book-reading ( $M= 1.12, SE= .21, 95\% CI= [.69, 1.55], p>.05$ ). Corrective language was used significantly more during clean-up ( $M= .8, SE= .14, 95\% CI= [.52, 1.07], p<.001$ ) than during book-reading ( $M= .37, SE= .08, 95\% CI= [.21, .52], p=.01$ ) with toy play falling in the middle ( $M= .49, SE= .1, 95\% CI= [.29, .7], p>.05$ ). Finally, caregivers' use of attention-getting language did not differ across the three contexts (book-reading:  $M= 4.17, SE= .59, 95\% CI= [2.96, 5.34]$ ; toy play:  $M= 2.73, SE= .39, 95\% CI= [1.95, 3.51]$ ; clean-up:  $M= 3.34, SE= .49, 95\% CI= [2.34, 4.33], p's>.05$ ).

Within each interactive context, caregivers also used different patterns of language functions (see Figure 3). During book-reading caregivers produced more didactic language than directive and attention-getting language ( $p's<.001$ ), which were in turn more frequent than affirmative and corrective language ( $p's<.05$ ). Additionally, affirmative language was used more than corrective language ( $p<.05$ ).

Similarly, during toy play caregivers used didactic language more frequently than directive, attention-getting, affirmative, and corrective language ( $p$ 's<.001). Directive language was used more than affirmative and corrective languages ( $p$ <.001). There was no difference in the use of affirmative and corrective language ( $p$ >.05) during toy play.

During the clean-up task caregivers produced both directive and didactic language more frequently than attention-getting, affirmative, and corrective language ( $p$ 's<.05). There was also no significant difference in the use of didactic and directive language ( $p$ >.05). Attention-getting was used more than affirmative and corrective languages ( $p$ 's<.01). Like during toy play, there was no difference in the use of affirmative and corrective languages ( $p$ >.05) during clean-up.

### **Discussion**

The aim of this study was to determine whether the amount, diversity, and function of maternal input would vary across different interactive contexts in low-income families. Specifically, I compared two well-researched contexts (book-reading and toy play) and a daily routine context (clean-up) that had not been widely studied before. Clean-up differed from the other two contexts as it was essentially a goal-oriented activity, in which the interaction centered on the completion of a task. Findings from this study support the argument that maternal input is not constant within SES, but rather, it varies across interactive contexts.

#### **Amount and diversity of language input**

Findings from the current study suggested that the amount of maternal input was relatively consistent across the three contexts, meaning that caregivers were generally equally talkative in each situation. This is contradictory to previous findings that book-

reading elicited more language input from caregivers compared to other contexts such as toy play and mealtime (Yont, Snow, & Vernon-Feagans, 2003; Soderstrom & Wittebolle, 2013; Salo et al., 2016), though it is not inexplicable. Hart & Risley (1995)'s most salient conclusion was about the drastic difference in word tokens between SES groups and related consequences, but findings have not always been replicable (Sperry et al., 2019). Indeed, researchers have turned their attention towards the more consistent, robust role that the diversity and function of maternal language play in language development (Weizman & Snow, 2001; Rowe, 2012; Tamis-LeMonda et al., 2018). Given the overall stability of caregiver language amount across contexts, it might be better for language interventions to focus on enhancing the quality of language input, as opposed to simply more talking.

In regard to the diversity of language input, there was no significant difference between the number of word types used during book-reading and toy play. This finding is consistent with those in previous research. Many studies report rich linguistic opportunities during book-reading activities (Mol et al., 2008; Dickinson et al., 2012), but the smaller pool of studies looking at toy play indicate that play can support vocabulary growth as well (Newland et al., 2001). Results of the current study provide further evidence of the importance of studying other contexts such as toy play more thoroughly. Toy play may be structured (puzzles, toy tasks) or unstructured (pretend play), and could involve any item that is introduced for the purpose of play, opening the possibilities for vocabulary enrichment to anything within the participants' reach. This is particularly important in the context of low-SES families, for whom the assortment of resources available, such as books, may be much more limited (Neuman & Moland, 2016). During

play, families may initiate games around sources for boundless creativity (e.g. drawing) or reference items that are not physically available through songs and stories (Avineri et al. 2015). The toy play task designed for this study could be considered as less structured than those in other studies (Tamis-LeMonda et al., 2013; Toub et al., 2018), as it introduced an assortment of items the dyads could engage with and discuss in any way. The similar level of vocabulary variety used in book-reading and toy play suggests that both contexts have a similar potential to introduce more novel vocabulary, and that more variations of toy play need to be studied to better understand the ways in which play fosters language development.

Consistent with my hypothesis, caregivers used fewer word types during clean-up than during the other contexts. Although very few studies had directly compared maternal language use during clean-up with that in other contexts, literature regarding behavior management can help understand the maternal behaviors observed in this specific context. Gauvain and Perez (2008) found that caregivers increased their use of directive language and made it more specific and negative when they perceived their child was not compliant. Furthermore, it is possible that caregivers limited the variation of their words as they tried to get their children to follow instructions, given that word repetition facilitates encoding of language in working memory (Baddeley, 2003). It stands to reason that a simple directive using a repetitive identifier (“put this in here”) accompanied by gestures (e.g. pointing, modeling of action) is a more straightforward instruction than a variation of that instruction using novel terms (“put the doll/apple/plate in the box”). Caregivers also may have limited their words to labels they know to be recognizable to child; “put the asparagus in the basket” would be less familiar to the child than “put the



toys in here.” The possibility that caregivers limited their vocabulary during clean-up in order to facilitate the goal of putting toys away is also apparent in the patterns observed for the language functions they used.

### **Functions of language input**

Didactic and directive functions were the most predominant across all contexts, as predicted. However, caregivers emphasized didactic and directive language to a different extent when they engage in different activities with their children. In line with my hypothesis, caregivers used more didactic language during book-reading and toy play, and used more directive language during clean-up. This study continues to support the valuable learning opportunities in book-reading and toy play activities. It is also worth noting that, although caregivers used didactic language less frequently during clean-up than during book-reading and play, didactic language accounted for a significant percentage of maternal language input across contexts. The frequency of didactic language during clean up did not significantly differ from that of directive language and was greater than the frequencies of all other language functions. While the competing use of directive language highlights caregiver’s preoccupation with achieving the goal of clean-up during this interaction, there is still room to incorporate didactic language into this goal-oriented task. Other studies that have documented language behaviors during activities with a clear finish goal such as grooming and mealtime have also reported changes in language employed for the purpose of facilitating the completion of the activity (Snow & Beals, 2006; Tamis-LeMonda et al., 2018).

Patterns observed in the use of affirmative and corrective language further suggest that caregivers prioritized behavior management over language learning when there was a

goal to achieve. Caregivers increased the use of both affirmative and corrective language during clean-up, an activity that is more associated with the achievement of a goal rather than as a vehicle for teaching. Moreover, caregivers maintained a relatively consistent use of attention-getting language throughout contexts, and, partially in agreement with my hypothesis, this use was greater than affirmative and corrective language use in each context. These patterns, combined with the increase in directive language as stated above, illustrate caregivers' preoccupation with the management of their children's compliance and attention to task. Thus, the interaction of the language behaviors suggest that caregivers adjusted their language behaviors to match the nature of the task.

### **Limitations and future directions**

As with any study, there are limitations to consider for the results presented here. Despite dedicated attempts to document natural interactions within these households, there were design factors implemented to ensure internal validity that may have decreased the impacted the ways in which these interactions would normally develop. For instance, all families were asked to complete the same reading tasks with only the two books provided by the researchers in order to eliminate any effects due to differences within the reading materials. It is possible that caregivers interact differently with familiar books, as they may elaborate on the text to make it more novel or to call forth connections to their family routine (Reese, Leyva, Sparks, & Grolnick, 2010). Additionally, families completed the tasks in the same order, that is, book-reading followed by toy play and then clean-up, during the same visit in order to minimize behavioral challenges between transitions (it might be more difficult to put away the toys and then read a book) and potential inconveniences caused by multiple visits. It is

possible that dyads were simply tired by the last task, especially in cases in which more behavioral management was required. Also, the items used during toy play were the same ones used during clean-up, which may have resulted in a lesser engagement with the items due to lack of novelty. The current order, though, did allow us to identify that caregivers named items less during clean-up than during toy play, despite these being the same items. This pattern could be inquired into more by switching the order of tasks in future studies. Future studies ought to also incorporate other caretakers' behaviors to identify potential differences in language behaviors due to gender or relationship to the child.

Future studies should examine behaviors across goal-oriented and child-centered activities. When considering the linguistic properties of goal-oriented tasks, one must also account for the participants' perception of what must be prioritized in the situation, as the pressure of completing a goal may be interfering with the teaching potential of each activity. For instance, clean-up is a task, often non-preferred, with a clear achievement to accomplish. It is possible that linguistic behaviors will intentionally reflect caregivers' prioritizing of the goal over the possibility of teaching words and concepts to their children. Future interventions could also focus on helping families identify potential learning opportunities within their routine, and encourage flexibility to prioritize the process rather than the goal when possible.

### **Conclusion**

This study contributes to existing research on language use in low-SES households by examining the variation of caregivers' language input in two widely studied contexts (i.e., book-reading and toy play) and a common, yet understudied

context (i.e., clean up). I found that word diversity tends to vary more than speech amount across contexts. Though book-reading and toy play elicited more didactic language than clean-up, the similar use of didactic and directive language during clean-up emphasizes the potential for language development in activities other than book-reading and toy play. It also denotes that each context elicits language that is oriented to the purpose of facilitating the activity, as clean-up also elicited activity-specific language that facilitated the task at hand. Furthermore, the consistent use of the languages with a regulatory function (attention-getting, affirmative, corrective) throughout contexts suggest that future interventions ought to consider caregivers' preoccupation with task completion during verbal interactions. This point is key especially when working with families for whom interventions could become yet another task to accomplish within limited time and resources.

Table 1. Participants' Demographics: SES, age, sex, and racial and linguistic background

Participants (n= 33)	n(%), or <i>M (SD)</i> ; range
Income <\$25k	23 (74.2%)*
Highest education	
Less than high school	4 (12.1%)
High school/equivalent	12 (36.4%)
Some college	14 (42.4%)
Associate/Bachelor's	3 (9.1%)
Current employment	
No	27 (81.8%)
Yes	6 (18.2%)
Marital status	
Single	23 (70%)
Married	10 (30.3%)
Dyad race/ethnicity	
Black	12 (36.4%)
Hispanic Latino	16 (48.5%)
Non-Hispanic White	3 (9.1%)
Hispanic White	1 (3%)
Multiracial	1 (3%)
Caregivers born abroad	11
Years in the U.S. (years)	17.64 (11.54); 3-38
Caregiver's language in childhood	
English	18 (54.5%)
Spanish	13 (39.4%)
Half-Half	2 (6.1%)
Language spoken at home now	
English	22 (66.7%)
Spanish	9 (27.3%)
Half-half	2 (6.1%)
Child age (months)	19.6 (4.03); 13.83-27.24
<b>CHILD FEMALE</b>	<b>15 (45.5%)</b>

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\*Percentage based out of 31 dyads who disclosed income.

Table 2. Mean Rates per Minute for Quantity, Diversity, and Function of Caregiver Language across Contexts

<b>Variables</b>	<b>Book-reading</b>			<b>Toy play</b>			<b>Clean-up</b>		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max	Mean (SD)	Min	Max
<i>Language Quantity</i>									
Utterances	26.15 (7.88)	5.18	44.62	24.23 (7.46)	6.68	43.71	22.32 (7.95)	7.01	39.29
Word Tokens	59.82 (20.90)	20.91	107.78	57.96 (28.34)	18.61	138.66	52.95 (26.70)	14.73	120.92
<i>Language Diversity</i>									
Word Types	22.49 (6.87)	7.48	45.1	21.68 (6.41)	9.93	34.85	18.17 (6.44)	6.09	32.5
<i>Language Function</i>									
Didactic	14.81 (6.09)	6.31	30.85	9.75 (4.98)	1.75	24.69	5.42 (3.06)	1.01	14.72
Directive	2.65 (2.38)	0	13.69	4.39 (2.92)	0.97	11.23	7.28 (3.16)	1.24	15.48
Attention-									
Getting	4.17 (3.40)	0.48	12.18	2.73 (2.21)	0	9.76	3.34 (2.81)	0	10.95
Affirmative	1.12 (1.22)	0	6.47	0.74 (0.68)	0	2.74	1.53 (1.14)	0	3.52
Corrective	0.37 (0.44)	0	1.73	0.49 (0.59)	0	2.52	0.8 (0.79)	0	2.74

Figure 1. Caregiver Production of Utterances, Tokens, and Types across Contexts

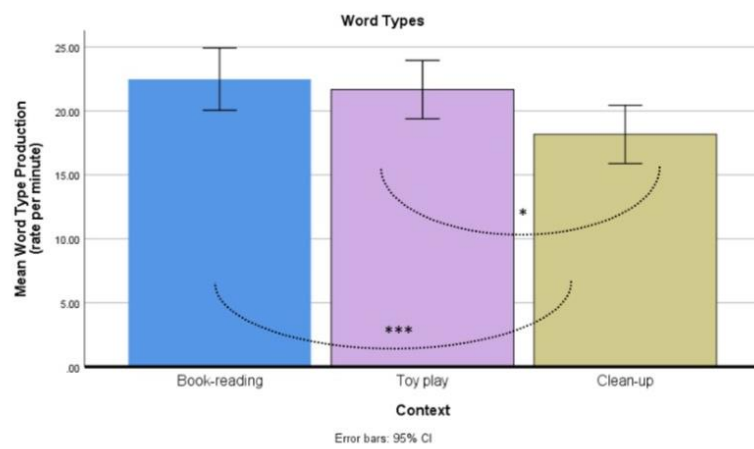
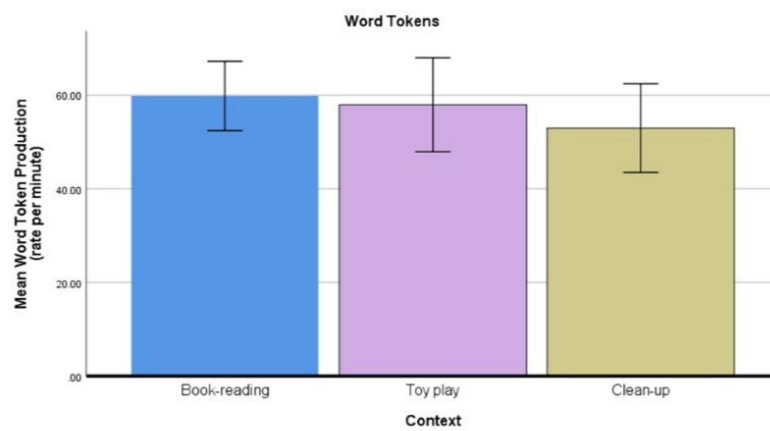
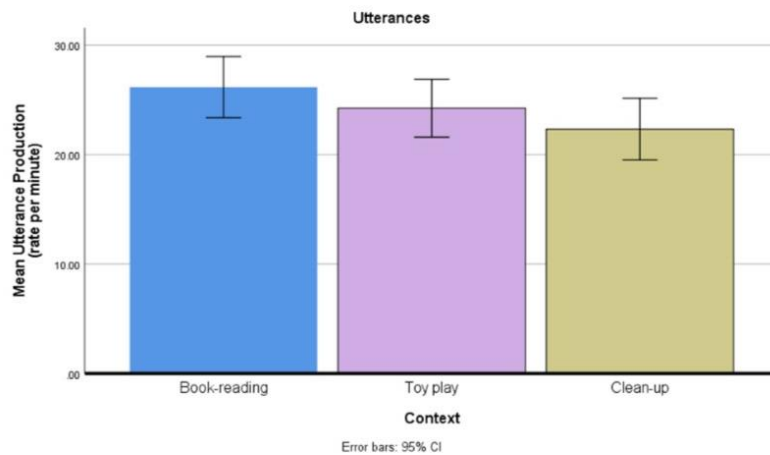


Figure 2. Interaction Effects of Language Functions and Contexts (by Language Functions)

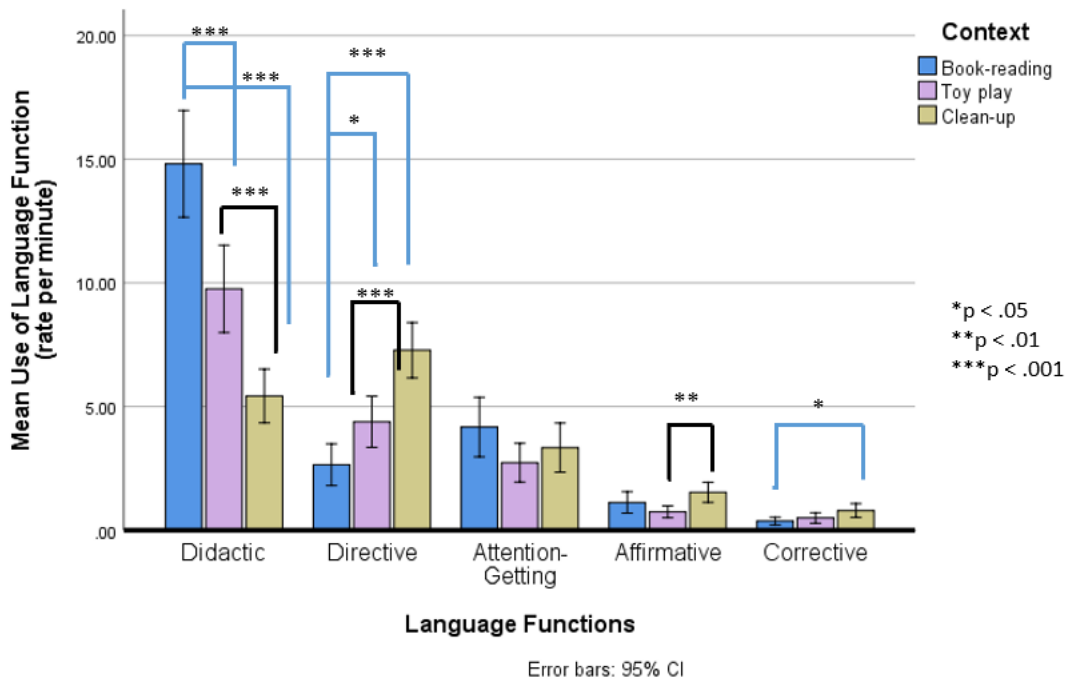
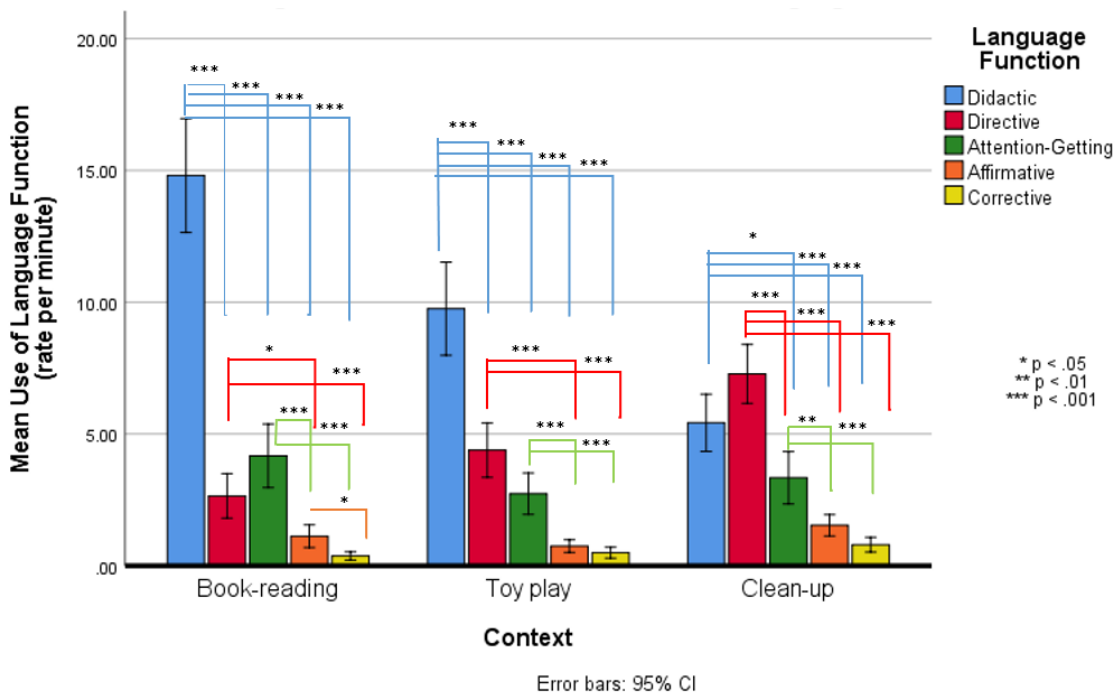




Figure 3. Interaction Effects of Language Functions and Contexts (by Context)



### Appendix 1. Coding Scheme for Caregiver Language Functions

Category	Definition	Examples
Didactic	Utterances used to ask about or describe objects, actions, internal or external states, or social norms to teach children about their physical and social world.	<p>“What is this?”; “Where does he go?”; “It’s a rooster”; “He is over there”; “Is he hungry?” “There’s the elephant”; “Do you see the monkey?”;</p> <p>“Here goes the elephant”; “Time to clean-up”; “What sound does a monkey make?” “Look, a monkey” / “Mira un monito” “Look at the monkey”</p> <p><u>Describing an action:</u> “You are cooking” “I am cooking” “We’ll go see what’s in the other box” (<i>when the child was already looking at the box, the mom was describing the child’s action</i>)</p> <p><u>Verbalizing child’s actions or intentions:</u> “Do you like it?”; “Do you wanna read the book?” (<i>as child is looking at object</i>) “What is this?”; “It’s a rooster”; “Where is he going?”; “He is over there”; “He is hungry”; “Do you like it?” (<i>when mom is trying to ask for the child’s preference</i>); “I see you wanna read the book”</p>
Directive	Utterances used to direct children’s actions and tell children what to do in specific tasks, or that are used to manage children’s behaviors that were not related to the specific tasks.	<p>“Turn it this way”; “Push it like this”; “It’s your turn”; “Show me the rooster”; “Let’s sit on the floor”; “We gotta clean up”; “Look at this” / “Mira esto”; “Wait” (<i>as in physically staying put</i>); “Come here” (<i>or “come on” when asking the child to physically go somewhere</i>)</p> <p><u>Suggesting new activity or turn taking:</u> “Wanna play with this?” “It’s your turn” “It’s my turn”</p>

Telling the child what **not** to do:  
 “Don’t break the box”; “We’re not doing that”; “You can’t do that”  
Telling the child how to do something: “like this”  
 “Wait” “I’ll take it out/I’ll get it”  
 (when asking the child to wait)  
 “Come here!” “Dale”

Attention-Getting	Words used to get child's attention within activity/about object of child's interest	Child's name, “hey”; “yo!”; “you see?”; “look”/ “mira”; “here”; “c’mon”/ “ven” ( <i>parent is trying to get child's attention only</i> ), “Come on”
Affirmation	Words conveying encouragement of child's action or acknowledgement of child's utterance.	“Yeah!”; “Yay”; “Good job!” <u>Mother is recognizing child's behavior or is agreeing with child:</u> “There you go”; “Thank you” <u>Acknowledgement:</u> “Um-hm”; “mhmm”; “yeah”; “okay” <u>Comforting (to crying):</u> “It’s ok”; “It’s all right”
Corrective	Words to correct child's behavior, without telling them what to do.	"No!"; "Don't do that!"; “You are being bad”; “You are so rough!”; “Stop”; “Wait”; “Where are you going?” ( <i>as child is eloping</i> ); “Pórtate bien”
Other	Uncodable; Utterances that do not fall under any of the categories above (transitions, onomatopoeia, guttural sounds)	“Oh”, “Ah”, “Uh-oh” “What?” “Haah” “No?” “Aw” <u>When used as transitions:</u> “ok” “all right” “yeah” “let’s see” <u>Exclamations:</u> “goodness!” “yummy” “girl!”

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