CHANGE OVER TIME IN THE TYPE AND FUNCTIONS OF CRIB SPEECH AROUND THE FOURTH BIRTHDAY

by

Danielle L. Mead

A Thesis
Submitted to the
Graduate Faculty
of
George Mason University
in Partial Fulfillment of
The Requirements for the Degree
of
Master of Arts
Psychology

Committee:

_____ Director

_____

_____

_____ Department Chairperson

_____ Dean, College of Humanities and Social Sciences

Date: July 25, 2013

Summer Semester 2013
George Mason University
Fairfax, VA

Change Over Time in the Type and Functions of Crib Speech Around the Fourth Birthday

A Thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts at George Mason University

by

Danielle L. Mead
Bachelor of Science
University of Mary Washington, 2007

Director: Adam Winsler, Professor
Department of Psychology

Summer Semester 2013
George Mason University
Fairfax, VA

Copyright 2013 Danielle L. Mead
All Rights Reserved

DEDICATION

This is dedicated to my loving family, who has always given me the love and support that I have needed to accomplish my goals.

ACKNOWLEDGEMENTS

I would like to thank my family and friends who continue to support me throughout my pursuit of attending graduate school. Special thanks to my advisor, Dr. Adam Winsler, for providing the guidance and support I needed to accomplish my goal, as well as the fellow students who have helped me in the preparation of the transcripts.

TABLE OF CONTENTS

Page
List of Tables vii
List of Figures viii
List of Abbreviations ix
Abstract x
Introduction 1
Crib Speech 2
Private Speech 8
Functions of private speech. 8
Private speech and play. 10
Private speech and creativity. 13
Solitary Play 15
Present Study 15
Method 19
Participant 19
Materials 19
Procedure 19
Duration of speech. 20
Falling asleep. 21
Transcriptions 21
Coding of Transcripts 22
Length of utterances. 23
Whisper or full-volume speech. 24
Spoken or sung. 24
Humming and making noises. 24
Social speech or private speech. 24
Inter-Rater Reliability 28

Units of Analyses and the Organization of Data 30
Calculation of proportions. 31
Results 32
Research Question 1: What is the content of her pre-sleep monologues, and does the content change over time? 32
Totals across all days. 32
Descriptive statistics of within-day variables. 34
Dichotomous codes 35
Time spent in non-speech. 36
Private speech content codes. 36
Content changes over time. 37
Research Question 2: How does her crib speech evolve linguistically over time? 40
Research Question 3: Does the language/literacy practice function of crib speech change over time? 42
Research Question 4: How does her pretend play crib speech develop over time? 44
Research Question 5: Does the content of her speech differ from whether or not she fell asleep before the recording ended? 46
Supplementary Analyses 48
Correlations among within-day proportions. 49
Co-occurrences of codes. 51
Discussion 54
Crib Speech Content 55
Patterns of content over time. 57
Falling asleep. 59
Correlations and co-occurrence among codes. 60
Limitations 62
Implications for Parents 62
Appendix 64
Appendix 1 64
Appendix 2 69
References 74

LIST OF TABLES

Table Page
Table 1. Coding System 23
Table 2. Kappa and Percentage Agreement (and Spearman Correlation) for Each Category 29
Table 3. Total Counts and Grand Proportions on the Content of Crib Speech (File A, N = 19,428 utterances over 57 days) 33
Table 4. Descriptive Statistics on the Content of Crib Speech (File B, N = 57 days) 35
Table 5. Differences among Content Codes Over Three Time Periods 37
Table 6. Differences in Proportions of Codes from Whether or Not She Fell Asleep 47
Table 7. Descriptive Statistics and Point-Biserial Correlations for Mean Length of Utterance per Code 49
Table 8. Correlations among Within-Day Proportions of Crib Speech Codes (N = 57) .. 50

LIST OF FIGURES

Figure Page
Figure 1. Visual Representation of the Proportion of Emotion Private Speech Over Time 39
Figure 2. Visual Representation of the Proportion of Undecipherable Private Speech Over Time 40
Figure 3. Visual Representation of the Mean Length of Utterance (MLU) Over Time ... 42
Figure 4. Visual Representation of the Proportion of Language/Literacy Practice Private Speech Over Time..... 43
Figure 5. Visual Representation of the Proportion of Fantasy Dialogue Speech Over Time 45
Figure 6. Visual Representation of the Frequency of Fantasy Dialogue Private Speech Over Time 46

LIST OF ABBREVIATIONS

Codes for Human Analysis of Transcripts.....CHAT
Diagnostic and Statistical Manual (3rd ed.).....DSM-III

ABSTRACT

CHANGE OVER TIME IN THE TYPE AND FUNCTIONS OF CRIB SPEECH AROUND THE FOURTH BIRTHDAY

Danielle L. Mead, M.A.

George Mason University, 2013

Thesis Director: Dr. Adam Winsler

Crib speech, the monologue speech of a young child just before he or she falls asleep, has been examined in very few studies to date. Crib speech falls under the larger domain of private speech, which is more broadly defined as overt speech that is not directed to another person. Private speech has been explored in relation to motivational and self-regulatory functions, and there are few studies that have examined private speech in pretend play or pre-sleep contexts. This study examines the crib speech of a young girl between the ages of 46 and 50 months, and examines the different functions of her crib speech, as well as the course of linguistic and fantasy dialogue development. More specifically, this study addresses (1) what the content of her pre-sleep monologues is and if the content changes over time, (2) how her crib speech evolves linguistically over time, (3) whether the language/literacy practice function of crib speech changes over time, (4) how her fantasy dialogue in crib speech develops over time, and (5) whether there are

differences in the content of speech depending on whether she fell asleep by the end of the recording. A total of 57 recordings were analyzed over months, and each lasted up to 45 minutes during her daily nap or "quiet time." Every utterance in each transcription was coded as whispered or in full volume, spoken or sung, and social or private speech. Content codes within private speech were reliably coded into several categories: self-regulation (and then further coded as either: talk-relevant self-regulation, emotion regulation, or language modification), fantasy dialogue (and then further coded as containing role-playing content), emotion, and language/literacy practice. Repeated-measures ANOVAs and linear curve estimations were run to detect changes in the content and complexity of crib speech over three time periods (e.g., each time period consisted of 19 days), as well as over individual days. Results indicated that she did use crib speech during each recording day, lasting for an average of 41 minutes. On average, each day consisted of 340 utterances and had a mean length of utterance (MLU) of around three words, and the MLU over the recorded days revealed a non-linear, inverted-U shape curve. There was a strong positive correlation between the within-day proportions of emotion talk and self-regulation utterances. Language practice was found to increase over time, while emotion content, fantasy dialogue, and role-playing dialogue revealed a non-linear, inverted U-shape over time. She had fewer undecipherable and emotion utterances on days that she fell asleep, compared to days where she played the entire time. While the girl in this study was older than the children in prior crib speech studies, language practice and language-modification was still prevalent. Since her sung utterances were longer than spoken utterances, it may be beneficial for some children to

encourage them to express their thoughts in song and to practice singing long strings of words to promote language development.

INTRODUCTION

"Clean our hand
Clean the bed
Then we clean
Sleep tight
Now go to nappy
Nappy no!
Oh, you don't want nap, don't you?
I'll read three books and then go to nappy" (Nora, Day 38)

When young children are left alone in their rooms to go to sleep, they are able to speak freely to themselves. The above quote is an example of private, dialogic language spoken by a young girl, Nora, between herself and a stuffed animal, acting out a bedtime routine before taking a nap. This monologue speech of a young child just before he or she falls asleep is referred to as crib speech (Weir, 1962). Crib speech falls under the larger umbrella of private speech, which is defined as overt speech that is not directed to another person. Lev Vygotsky (1934/1962) hypothesized that there is an interaction between thought and language, and a manifestation of this interaction is private speech. Private speech research has primarily focused on self-regulation during structured tasks (Winsler, 2009), with few studies examining private speech in a solitary play context or in pre-sleep monologues (i.e., crib speech). Research in the area of crib speech has been limited to only a handful of case studies (Kuczaj, 1983; Nelson, 1989; Weir, 1962), yet one study showed that 55% of interviewed mothers reported that their young child engaged in crib speech (Winsler, Feder, Way, & Manfra, 2006). The purpose of past crib

speech research has been to explore the apparent linguistic functions of pre-sleep monologues, as well as to identify common themes found in the content of the speech itself (Nelson, 1989; Weir, 1962). The current study examines the content and function of the private speech of a young girl during her daily nap or "quiet time" over a four-month period. Differences within the content of her speech were examined over time, as well as between days that she stayed awake or fell asleep. The context of this study allows for the distinction between features of her speech that may be different on days in which the speech was "pre-sleep" compared to speech on days when she is simply privately talking to herself while engaging in solitary play and not falling asleep. I will first discuss the background of crib speech research, followed by a brief discussion of the larger domain of private speech as well as solitary play before presenting the details of the current study.

Crib Speech

The ages of the children studied in prior work on crib speech have been between 15 and 36 months of age (Kuczaj, 1983; Nelson, 1989; Weir, 1962). Techniques for obtaining the monologues were generally consistent across studies. A parent would begin by placing a recording device or microphone on or above the child's crib/bed. The recording began when the parent left the room, and continued until the child fell asleep, which could last up to an hour in duration. In Kuczaj's (1983) study, each child's speech was also observed in a social context, in that the investigator visited the child in his or her home, and the investigator and at least one parent were present during the social context sessions. All tapes were then transcribed in order to be analyzed.

Different methods of transcription were used in order to fit the approach of each study. Ruth Weir (1962) collected the crib speech of her son, Anthony, between the age of 28 and 30 months, and documented the phonology, grammar (e.g., morpholology, content, function, syntax, vocabulary), and paragraphs of the speech. Kuczaj (1983) recruited 14 children between the ages of 15 and 24 months, and collected their crib speech on a weekly basis ranging from 6 to 27 weeks. He used the mean length of utterance in morphemes as a unit of measurement, but also measured different types of linguistic practice, which involve modifications and imitation/repetition utterances. Modifications were adjustments from a previously stated utterance, such as adding a word to a phrase, completing a more complex phrase, or substituting a different word in the same format as the original utterance, such as "The baby doll/I found your baby doll." Imitation and repetition involved the child repeating what someone else had previously said or repeating his or her own words, such as "No mommy upstairs/No mommy upstairs." Katherine Nelson (1989) examined the crib speech of her daughter, Emmy, between the ages of 21 and 36 months, and analyzed episodes of uninterrupted, single-topic talk, as well as smaller, intonation units—sequences of about six words that are produced in roughly one single breath. Nelson's primary goal was to examine the theme and organization of the episodes, and how theme and organization interact. Themes included anticipation of an upcoming event speaking in the future tense, memories of past events, and general talk. Anticipation of events was marked by the use of the future tense, as well as words such as "tomorrow" or "are going." Memories were marked by the use of the past tense, as well as words such as "yesterday" and "and then." General talk was

marked by the use of the present tense, as well as words such as “we” and “you.” Since each study used a different method of transcribing crib speech, it becomes a challenge to compare outcomes across the studies. Common findings, however, are discussed below.

The most common presumed function of pre-sleep monologues is the practice of using language through word play (Kuczaj, 1983; Nelson, 1989; Weir, 1962). In the end of Weir’s book, she concluded that “the pleasure of play is structured so that it serves as a linguistic exercise” (1962, p. 144). For example, her son, Anthony, used alliteration of first consonants, such as “Daddy dance” (Weir, 1962, p. 105). He used echo repetition, which she defined as identical repetitions of phrases, as well as questions followed by answers, such as “What color TV? Red,” (Weir, 1962, p. 107). Anthony practiced grammar through metalanguage practice, such as word or pronoun substitution of similar grammatical phrases. For example,

> “What color
> What color blanket
> What color map
> What color glass” (Weir, 1962, p. 109).

Kuczaj (1983) found that the proportion of linguistic practice was more frequent in crib speech than in social speech, suggesting that the environment in which a child uses crib speech is more conducive to practice in comparison to a child in a social setting. He also added that a combination of play and language is enjoyable to the child and provides a pleasurable environment for practicing language. The most common type of practice observed in his study was exact reproductions (i.e., imitation and repetition), which suggests that this form of repetition may be a language-learning method.

Nelson (1989) discussed a shift over time in terms of the themes in crib speech, in that there was a shift to memory, then anticipatory, and then general knowledge talk once her daughter, Emmy, was enrolled in nursery school. More specifically, Emmy's peak of referencing memories was around 27-28 months, and it was around this time that Emmy began to use her memories to predict and anticipate future events. For example, a prediction would be, "Maybe that tow truck tow another car" (Nelson, 1989, p. 65). Other developmental changes were tracked over time through a subset of six transcripts of memory episodes and six transcripts of anticipation episodes. In her analysis, she recorded the total length (i.e., number) of intonation units in each episode (as defined by words in a single breath), the mean length of morphemes in the intonation units, the mean length and longest string of words in each unit, and the number of units per proposition in a clause, which she used as her indicator of efficiency since propositions aid in the sequencing and flow of ideas in a narrative. Her results indicate that there was an increase in the length of utterances, an increase in the organization and coherence of her thoughts, and more efficient use of words to express her thoughts.

In Nelson's book, other researchers also used the data for further analyses. Among these, Watson (1989) examined the regulatory function of Emmy's speech within the dialogic speech with her parent before she was left alone, as well as once she was alone in her crib. Watson found that Emmy used her language to attempt to keep her parent from leaving her alone, but once she was by herself, her crib speech reflected self-regulatory phrases, such as "Nighty night," and "Emmy sleep" (p. 278). While these self-regulatory phrases were observed in Emmy's crib speech, the developmental pattern of

the use of self-regulatory utterances within crib speech has not been examined over time, which is a new element of the current study.

There are a few additional studies that have examined crib speech in different contexts from the previously discussed studies (Pickert, 1981; Schaerlaekens & Swillen, 1997; Winsler et al., 2006). Pickert (1981) used the pre-sleep monologues of Weir's son (as reported in Weir, 1962) and of her own daughter to examine the imaginary dialogues in crib speech. While Weir's son's was recorded from 28 to 30 months of age, Pickert's daughter was recorded for a longer period of time, from 28 to 52 months of age. Pickert used dialogue as one of her units of measurement, which was defined as a series of utterances related to one topic. For example,

> "Who is that knocking on the shower
> I was
> I was knocking on the
> Don't knock on it" (Pickert, 1981, p. 13).

She found differences between the two children in the proportion of dialogue in crib speech, in that her daughter used proportionately more dialogue than Weir's son. Most of her daughter's speech involved dialogue with imaginary playmates, and she addressed these imaginary playmates more as she grew older. Pickert also noted that the content of the children's crib speech incorporates the children's thoughts and imagination, as well as imaginative role play. As for the developmental changes, the two children's dialogues became less repetitive, more concrete, and more representative of adult conversation over time (Pickert, 1981). The researcher suggested that perhaps children engage in private speech to keep themselves company when left alone, and that the social nature of the conversations make private speech research another way of

studying social development (Pickert, 1981). Fernyhough, Bland, Meins, and Coltheart (2007) propose that there might be an association between children's use of private speech and having an imaginary companion, and that children's private speech with an imaginary companion might be beneficial for both social and cognitive development.

Rather than examining crib speech in typically developing children, one study looked at the crib speech of three autistic and two young psychotic children (Schaerlaekens & Swillen, 1997). The children in this study were recruited from specialized daycare centers and child psychiatric units in a region of Belgium, and were included if they were diagnosed as autistic or psychotic according to DSM-III criteria and if they engaged in crib speech that consisted of at least two-word phrases articulated well enough to be understood (Schaerlaekens & Swillen, 1997). The five children in this study were older—between four and seven years of age—than the children from previous studies of crib speech. Over a period of up to two weeks, the researcher collected at least 45 minutes of crib speech for each child. Schaerlakens and Swillen (1997) report that in addition to monologues, only the two psychotic children used dialogue, in that they alternated between acting as the speaker and the listener in their crib speech. The crib speech of the three autistic children, therefore, only consisted of monologues. Children in an earlier stage of language development (e.g., phrase speech such as two- or three-word phrases) used sound play and repetition in their crib speech, while children with more advanced language (e.g., fluent speech) added self-corrections. For example, one child self-corrected in the following dialogue,

> "Your name isn't Kristof
> Your name is Krostoffer

No it's Kistoffer
Didn't I say that?
I couldn't have been listening properly
It's Kristof" (Schaerlaekens & Swillen, 1997, p. 315).

Although this sample had a later onset of crib speech compared with the onset for typically developing children, the presumed linguistic functions appeared similar, in that crib speech was assumed to primarily serve the function of practicing language. The content of the crib speech was also similar to previous work (e.g., reflections of the day, sleep rituals), but some of the content in this sample was in the form of delayed echolalia, such as repeating things that adults had said earlier in the day (Schaerlaekens & Swillen, 1997).

Winsler and colleagues (2006) interviewed 48 mothers on the use of private speech in their preschool-age children, and included a question on whether or not their child talked to him or herself at bedtime. As stated above, 55% of mothers reported that at some point in time, their children regularly engaged in bedtime private speech. The authors added that these children were also reported to use private speech frequently during problem-solving situations and fantasy play. Interestingly, this group of children also had slightly higher difficulties with self-control as reported by parents. The authors suggested that using speech at bedtime may relate in some way to the development of self-control, since increased use of private speech and delays in private speech internalization are also associated with poor self-control (Winsler et al., 2006).

Private Speech

Functions of private speech. Since Vygotsky has introduced his theory, researchers within the past few decades have examined the contexts of private speech and

the associated functions of private speech, with a focus on its use in young children (for a review, see Winsler, 2009) (Atencio & Montero, 2009; Berk, 1999; Beaudichon, 1999; Behrend, Rosengren, & Perlmutter, 1999; Chiu & Alexander, 2000; Fernyhough & Russell, 1997; Frauenglass & Diaz, 1999; Furrow, 1984; Goudena, 1999; Krafft & Berk, 1998; Murray, 1999). Two common examples of functions that have been identified are self-regulation and motivation. The use of private speech in self-regulation has been a particular area of interest for researchers (Behrend et al., 1999; Fernyhough & Russell, 1997; Frauenglass & Diaz, 1999; Furrow, 1984; Krafft & Berk, 1998; Murray, 1999; Winsler, 2009). Furrow (1984) compared the social and private speech in 2-year-old children, specifically on twelve potential functions: instrumental, regulatory, self-regulatory, attentional, referential, imaginary, informative, incomprehensible, interactional, descriptive of one's activity, expressive, and questioning. An utterance was coded as regulatory if the child referenced an action to be completed by another agent, such as "Go there;" self-regulatory if the child referenced an action to be completed by his or herself, such as "I put that there;" referential if the child referenced an event that did not include the child, such as "that;" and describing own activity when a child narrated an ongoing event, such as "Putting it" (Furrow, 1984, pp. 387-358). Results showed that the referential function was most prominent in both social and private speech contexts, but describing one's own activity and self-regulatory functions were both higher in the context of private speech compared with social speech. Research suggests that the self-regulatory use of private speech is beneficial to accomplishing tasks successfully. It has been suggested that teachers should allow children to talk to themselves in class in

order to help them solve problems (Furrow, 1984; Krafft & Berk, 1998; Winsler, 2009; Winsler & Diaz, 1995).

Chiu and Alexander (2000) examined the motivational nature of social and private speech. In their study, 31 children between the ages of three and five completed a gross-motor jumping task, a fishing task, and a puzzle task in which the researchers encouraged the children to work independently. Their speech was classified as either social or private, and within the private speech domain, the children's speech was classified as off-task, task-relevant and nonfacilitative, cognitive, or metacognitive. These authors found that proportions of metacognitive private speech (i.e., self-reinforcing cognitive process) were positively correlated to the children's mastery motivation in order to work independently through the challenging tasks (Chiu & Alexander, 2000). Atencio and Montero (2009) review the literature on private speech and motivation, and conclude that there is a sufficient amount of evidence to support the contention that private speech does play a role in children's motivation, although there are few studies that have made this a primary focus. The importance of this function is that it has implications in education, such that teachers can encourage children to say motivational phrases aloud to themselves as they work, which may improve their performance on tasks.

Private speech and play. While there is much research on private speech use and self-regulation, there are few studies that have observed private speech in the context of a child's play (Krafft & Berk, 1998; Smolucha, 1992). There is one piece by Vygotsky (1933/1967) that discussed his view on the role of play in development. He began by first

clarifying that play should not be defined on the basis of pleasure, since that definition ignores the needs and incentives associated with the play activity. He went on to explain that play activity includes the feature of creating an imaginary situation. Imaginary situations involve rules of behavior, such as the accepted behavior roles of a mother or father, or a doctor and a patient, that a child can act out (Sachs, Goldman, & Chaillé, 1985). According to Vygotsky (1967), play with imaginary situations begins when children are three years of age, yet when a child reaches school age, play becomes an internal process, moving toward internal speech and abstract thought. The trajectory of play is similar to private speech, in that the frequency and use of private speech declines as children become school-aged since private speech becomes internal and abstract. When children engage in play, they have the opportunity to develop self-regulatory behaviors in an environment that is not completely free, but not restrictive (Bodrova & Leong, 2009).

Smolucha (1992) was the first to examine private speech during pretend play. Six children were observed every two months between 14 and 28 months of age, and two children were included in the discourse analysis. Smolucha (1992) saw a developmental trend in the types of transition from social speech to private speech in pretend play. First, the mother would engage in interactive speech with the child by either verbally directing or responding to the child's actions. For example, when the child put a spoon on the table, the mother says "Spoon" (Smolucha, 1992, p. 131). Second, the mother or the child would use a social monologue, which was a narrative spoken to the other person about what is going on. For example, when the child picks up a male doll, the mother says,

"Should we let them eat? Should we let the family eat?" and then names each piece of silverware on the table, "What that? A knife. A spoon. And a fork" (Smolucha, 1992, p. 131). Finally, the mother and child engaged in dialogue, comprising of questions and answers between the two. For example, the mother asked her child, "What's baby gonna do now?" and the child answered, "Have breakfast" (Smolucha, 1992, p. 136). These types of social speech were found before the child engaged in pretend play private speech, indicating that parental involvement plays a role in children's pretend play, which Smolucha (1992) described as crucial for parents and educators to know in order to facilitate pretend play in children.

Krafft and Berk (1998) were interested in the development of private speech in the context of free-choice play in a preschool classroom. They observed 59 children, between the ages of three and five, who were enrolled in either a Montessori or traditional preschool classroom. The types of play that were analyzed were function, constructive, and fantasy, and they also indicated if the child were unoccupied or transitioning between activities. The goal of each activity was coded as either open-ended or closed-ended, and the levels of peer and adult involvement were also coded. The children's speech was classified as either social (i.e., intended toward others) or private (i.e., not directed to others), and then private speech was classified into six categories: affect expression (marked by expression of emotion), word play and repetition, fantasy play speech (marked by role play that uses the self or an object in a conversation), describing one's own activity and self-guidance (marked by narrating what is happening or thinking out loud), inaudible muttering, and other speech (Krafft & Berk, 1998).

These authors found that fantasy play was the most common type of private speech, and this type was positively correlated with open-ended activities and associative play with peers. They also analyzed private speech across the three age groups (i.e., 3-year-olds, 4-year-olds, and 5-year-olds), and their results show a decrease in the total amount of private speech as the age of the children increased, largely due to the decrease in fantasy play and word play and repetition types of private speech. The results reflected the overall theory, as suggested by Vygotsky (1934/1962), that the trajectory of private speech peaks at age three and decreases in school age as the child's speech turns inward. Feigenbaum (1992) hypothesized that there may be a developmental shift from fantasy-play private speech dialogue to private monologues, and found support in a cross-sectional study that fantasy-dialogue appears to be more prevalent in younger children compared to the more monologue speech of older children (Feigenbaum, 2009).

Private speech and creativity. There is limited research in the area of private speech and creativity (Daugherty & White, 2008; Daugherty, White, & Manning, 1994; White & Daugherty, 2009). In a study by Daugherty and colleagues (1994), 42 preschool and kindergarten children were measured on creativity and completed a problem-solving exercise designed to elicit private speech. Private speech was then coded into five different types: task irrelevant (i.e., speech not related to completing the task), nonfacilitative task relevant (i.e., comments on the task, but not facilitating completion of the task, such as "I hate this,"), task relevant (i.e., speech related to completing the task), coping/reinforcing (i.e., words of encouragement, reinforcement, or praise while working on the task, such as "slow down, take it easy"), and solving (i.e., solutions to the problem

while working on the task) (Daugherty et al., 1994, p.23). The researchers compared these types of private speech with standard scores of fluency, imagination, originality, and the average creativity scores from the Torrance Test of Thinking Creatively in Action and Movement (TCAM; Torrance, 1981). Both coping/reinforcing and solving private speech were each positively related to all four scores of creativity, indicating a potential motivational function of private speech for the highly creative children.

In order to examine if children of low-income backgrounds would show similar relationships between private speech and creativity as previously found, Daugherty and White (2008) examined creativity and private speech in 32 children enrolled in Head Start or state-funded pre-kindergarten programs. Creativity was also measured by the TCAM, and private speech was captured in open play and in math activity contexts. The private speech was coded into several categories, including humming and singing, random isolated private speech (i.e., not related to the task or situation), fantasy play (i.e., role-play and talks to objects), self-direction (i.e., describes task and gives directions), emotional release (i.e., comments that express feelings), inaudible muttering, and reading aloud (Daugherty & White, 2008). Results indicated that standard scores of fluency and originality were both positively correlated with the total amount of private speech among the children (Daugherty & White, 2008). The results from both of these studies suggest that there may not be differences in private speech use of low-income children compared to children of middle-class in terms of its relation to measures of creativity.

Solitary Play

While many studies of pretend play behavior focus on sociodramatic play, there has been little attention paid to solitary play (Coplan, 2011). Further, there is little known of the private speech of children engaged in solitary play. In a study by Wolf and Pusch (1985), symbolic development was observed in nine children between the ages of 1 and 7 years. Narrative speech—or "autonomous texts" as the authors describe it—was observed in their play behavior. Within the play behavior, the authors made a distinction between dramatic and replica play; dramatic play involved children acting out as a character, and replica play involved children assigning roles to toys or dolls to act out. The authors found that children around the age of 2 begin using dramatic play, but then around the preschool years, children begin to rely on replica play. When children are within the context of their room, they have access to a variety of toys and dolls that they may play with during solitary play. Therefore, it may be possible that if a child were alone in his or her room during a nap or bedtime, he or she may not fall asleep right away and engage in extended bouts of solitary play, as is seen in the present study.

Present Study

Crib speech was first introduced in Ruth Weir's book *Language in the crib* (1962) and has remained as a relatively untapped area of child development research. Reasons for the lack of research may be due to the methodological challenges of obtaining and transcribing the crib speech of a child. Researchers have been limited to small sample sizes, and due to the nature of a case-study design, the results from crib speech research become difficult to generalize and disseminate. Even with limitations, research should

continue to explore this area since there is little known on the different functions of crib speech over time, how the functions of crib speech relate to the functions of private speech, and how the complexity of pretend play in crib speech develops over time. Learning more about crib speech will broaden the knowledge we have about the course of development of private speech, and allow us to see how these functions potentially contribute to a child's development.

To build upon the existing works by Weir (1962), Kuczaj (1983), and Nelson (1989), I believe that it is important to apply the work of pretend play in private speech research to the context of crib speech. This can be done by coding crib speech into various categories, such as emotion-regulation, singing/humming, or dialogue between the child and imaginary characters or stuffed animals. Through this new method of coding a child's speech, we will learn more about how imagination develops at a young age.

Studies on crib speech have primarily focused on the pre-sleep nature of the language, as opposed to considering the speech samples as solitary private speech. Therefore, these studies have not teased apart any differences in the content or nature of crib speech based on whether or not the child fell asleep. This may not have been possible if the child consistently did fall asleep before the recording ended, or because the recording took place at bedtime as opposed to a quiet, nap time. If children talk to themselves during "quiet time" in their cribs and do not actually fall asleep, then it could be that the nature of the solitary monologues may be qualitatively different in solitary play than in "pre-sleep" speech. Since language practice has been demonstrated to be

common in previously analyzed "pre-sleep" monologues, perhaps language practice would be more associated with falling asleep than simply talking to themselves during solitary play while alone in their cribs.

The present study examines the crib speech of a young girl, Nora. Her crib speech was collected in the same manner as previous studies, in that just as she was left alone for a nap, her parents turned on a tape recorder and recorded her pre-sleep monologues until she fell asleep or the tape ran out. Over a period of four months, between 46 to 50 months of age, a total of 60 crib speech sessions were recorded. It is important to note that Nora is older that the children in previous works—between 15 and 36 months—providing an opportunity to study whether crib speech appears different for an older child (Kuczaj, 1983; Nelson, 1989; Weir, 1962). Since pretend play is common around the age of three years (Vygotsky, 1967), Nora is in the appropriate age range to include analyses of her pretend play crib speech.

The goal of this case study was to examine and analyze Nora's crib speech in order to ask the following research questions: (1) what is the content of her pre-sleep monologues, and does the content change over time? (2) How does her crib speech evolve linguistically over time? More specifically, does the mean length of utterances of each day/recording increase or decrease over time? It is hypothesized that the mean length of utterances will increase over time as Nora gets older. (3) Does the language/literacy practice function of crib speech change over time? It is hypothesized that language/literacy practice will decrease over time as Nora gets older. (4) How does her pretend play crib speech develop over time? An indication that her pretend play is

evolving in its complexity would show that the proportion and raw frequency of daily utterances in fantasy dialogues would increase over time. (5) Does the content of her speech differ between days where she does or does not fall asleep before the recording ended?

METHOD

Participant

One Caucasian female, Nora, was recorded in 2000 and 2001 between the ages of 46 months and 12 days (46:12) and 50 months and 8 days (50:8). Nora is from an upper-middle class family; her father is a professor at a university outside Washington, D.C., her mother is a music teacher, and she has an older brother. At the time that her recordings were analyzed, Nora was a teenager and assisted in the verification of the data.

Materials

A small, audio cassette recorder was positioned between the wall and the headboard of the participant's bed; by doing so, Nora remained unaware of the recording device. The audio cassette tapes used were blank, two-sided tapes and could record for up to 45-minutes each side. Every recording day either began on a new tape or an opposite, blank, 45-minute side.

Procedure

On each recording day, roughly between 12:30 and 1:30 in the afternoon, Nora would be put down for her daily nap, or "quiet time." Leading up to this time, Nora and her parent would interact briefly, either through dialogue or song; during which, her parent would discretely turn on the recording device while Nora was not paying attention.

Once the recorder was switched on, her parent exited the room, leaving Nora alone in her bed.

Each recording lasted approximately 45 minutes, which was usually before Nora fell asleep. A total of 60 days were recorded over the four-month period, between October 21, 2000 and February 16, 2001. On average, the recordings were every day or every two days, although there was a two-week period over the Christmas holiday that was not recorded. Once all of the recordings were collected, the audio cassettes were then uploaded onto a computer, where they were digitized and then converted to compact-discs (CDs), each with one day's recording in order to be transcribed by multiple users.

Three recordings (Days 27, 39, and 60) had technical difficulties with the recorder and were not able to be analyzed, leaving a total of 57 days to be coded. In order to analyze changes over time, the remaining 57 days were divided into three time periods (*n* = 19 per time period) for some analyses; Days 1 through 19 were considered Time 1, Days 20 through 40 (excluding Days 27 and 39) were considered Time 2, and Days 41 through 59 were considered Time 3.

Duration of speech. The duration of crib speech was calculated as the amount of time she spent talking to herself, beginning from the moment the parent left the room until the last utterance of the recording. The minimum amount of time was 5:05 (i.e., 5 minutes and 5 seconds), the maximum was 47:01 (i.e., 47 minutes and 1 second), and the mean amount was 41:10 (*SD* = 11:28). The distribution of time was negatively skewed (*skewness* = -2.18).

Falling asleep. Each day's speech sample was coded as being pre-sleep speech (*n* = 8) or not (*n* = 49) depending on if she appeared to fall asleep within the time of the recording. In order to determine if she fell asleep, contextual cues such as yawning were noted in the transcripts, followed by extended silence from the audio feedback. On all days that were considered "pre-sleep" speech, the extended pause ranged from 25 to 40 minutes, which lasted until the end of the tape recording.

Transcriptions

Recordings were transcribed and formatted according to the Codes for the Human Analysis of Transcripts (CHAT: MacWhinney, 2000), which is a standardized set of codes and symbols used for translating verbal cues into computer text formats. Transcriptions were done by a combination of undergraduate and graduate students. Each transcriber was given copies of the CHAT guidelines and a transcription for training purposes, which was then verified by one other researcher. Once the student was comfortable with the CHAT system, he or she was assigned to either transcribe a new day of recording into a Microsoft Word document, or verify a previous day's transcription using the track changes function on Microsoft Word. The purposes of the verifications included to correct any mistakes found in the original transcription, to add any verbal cues omitted from the original transcript, and to interpret any verbal cues that were undecipherable to the original transcriber. All transcriptions and verifications were completed by two different students and the Word documents were stored on a communal computer. Once all of the recordings were transcribed and verified, Nora assisted in the final verification in the accuracy of the data collected. More specifically, she listened to

each recording and clarified many remaining undecipherable verbal cues beyond those from the previous verification. In addition to these improvements, Nora was able to add further details to the context of some content, such as the name of the song she was singing or the names of the stuffed animals involved in a dialogue.

Coding of Transcripts

For the purposes of this study, each utterance was coded as the unit of measure. An utterance was considered a complete unit of speech, marked by the completion of a thought and/or followed by a pause or a breath (Winsler, Fernyhough, McClaren, & Way, 2005). Every utterance in each transcription was coded as whispered or in full volume, spoken or sung, and social or private speech. Bouts of humming and making noises were also coded for duration. Content codes within private speech were coded into several categories (which are described in more detail below): self-regulation (and then further coded as either: talk-relevant self-regulation, emotion regulation, or language modification), fantasy dialogue (and then further coded as containing role-playing content), emotion, and language/literacy practice. For a summary of all the coded material, including the organization of codes, the definition of each code, and at least one example for each code, refer to Table 1.

Table 1. Coding System

Category	Definition	Example
Each utterance is either:		
Whisper	At least one intelligible word, described in the transcript as a whisper	"not now" [=! Whispered]
or		
Full Volume	All utterances not described as a whisper	"I love you"
Each utterance is either:		
Spoken	All utterances not described as being sung	"Oh mother, I do want to grow up"
or		"I love you, you love me…" (singing a
Sung	All utterances noted in the transcript as being sung	Barney song)
Each utterance is either:		
Social Speech	Utterances with father or mother; calling out to either one	"Mom! Mom!" [=! Calling out to mom]
or		
Private Speech	Utterances not directed to another	"I love cars"
Humming	All bouts that are noted in the transcript as being hummed, as well as the duration (in seconds)	[=! Humming, 22 seconds]
Making noises	All bouts that are noted in the transcript as making various noises, as well as the duration (in seconds)	[=! Making cat noises, 8 seconds]
Content Codes of PS		
Undecipherable	No decipherable words in an utterance	"xxx"
Self-Regulation	Self-guidance or self-monitoring	
Task-Relevant	Description of action or goal, or questions to the self	"Put it in there"
Emotion Regulation	An utterance reflecting on her own emotional state	"It's going to be okay" "Calm down, don't cry"
Language Modification	Self-corrections or word substitution	"I didn't got to / I didn't get to do it"
Fantasy Dialogue	Having a conversation (with stuffed animals)	"Please, I need to go" "No you're not going err no!"
Role-Playing	Whether or not dialogue is part of a role-playing sequence (e.g.,, mother/daughter roles)	"Oh mother, I do want to grow up" "Oh my honey, you're so good"
Emotion	An utterance containing at least one word describing emotion (i.e., can have more than one emotion word in an utterance)	"I so worried about you"
Language/Literacy Practice	Any practice with words, letters, numbers, shapes, etc.	"X – W – M – K" "Rect-tangle… rectangle"

Length of utterances. The number of words per utterance was totaled for each utterance. For each recording day, the mean length of utterances was calculated by taking the total number of words spoken and dividing that by the number of utterances that day. For example, if Day 54 had a total of 1,200 words in 416 utterances, the mean length of utterances would be 2.88 for Day 54. In addition to calculating the mean length of

utterances for each day, the mean length of utterances was calculated for each time period (Times 1-3).

Whisper or full-volume speech. Every utterance's intensity was coded as being full volume or whispering. An utterance was considered to be full volume if it were fully audible. Quieter whispering was marked in the transcriptions if the utterance had at least one quieter decipherable word (i.e., a whisper).

Spoken or sung. Any utterance that Nora sang was coded in the transcript as being sung, whether the utterance was her own words being sung or if it were a line from a song, such as a line from the song "Puff the Magic Dragon." All other utterances that were not sung were coded as spoken.

Humming and making noises. Humming was also marked in the transcripts, but rather than counting single utterances of humming, bouts of humming, such as a 10-second period of continuous humming, were coded. Similarly, bouts of Nora making various noises, such as barking or making the sound of an airplane, were also coded. For both of these codes, continuous duration was counted in seconds, and pauses longer than three seconds indicated the end of a bout of humming or noise making. For example, in Day 8, Nora hummed for 30 seconds continuously, followed by a four-second pause, and then continued humming for seven more seconds, totaling 37 seconds of humming for Day 8.

Social speech or private speech. There were occasions when Nora would call out or talk to someone outside her room, such as calling out to her mother who had left the room, and these occasions were clearly identifiable both in context and content. These

occasions were coded as social speech since they were directed toward another person. Other social speech included in the transcriptions was the dialogue between Nora and her parent before being left alone, but this dialogue was not analyzed in the current study. The vast majority of Nora's speech was private, in that she was left alone in her room and her speech was not directed to another person, so most of her utterances were coded as private speech. After an utterance is coded as private speech, the utterance was then coded for specific private speech content codes, and these content codes are not all mutually exclusive.

Undecipherable speech. If there were no decipherable words in an utterance, a code of undecipherable speech was given. Once an utterance was coded as undecipherable, no further content-related codes (e.g., emotion, self-regulation, etc.) was given.

Self-regulation. Utterances that included Nora speaking to herself in a constructive way, such as self-guidance or self-monitoring were coded as self-regulation (see Table 1 for examples). It is important to note that self-regulation codes were only given to utterances spoken to herself, not within a dialogue between stuffed animals. Once an utterance was coded as self-regulation, it was classified into one of three mutually exclusive categories: task-relevant, emotion regulation, or language modification. Task-relevant self-regulation speech consisted of utterances that were descriptions of actions and goals or questions to the self (Winsler et al., 2005), such as "put it in there," and "no, that's not it." If Nora used a phrase to regulate her own emotional state, such as "calm down" or "it's going to be okay," the utterance was coded

as emotion regulation. Lastly, language modification/correction self-regulation utterances were coded when Nora corrected herself or substituted one word to create a similar phrase, such as "A, B, D, no wait, it's A, B, C, D" or "I didn't got to/I didn't get to do it."

Fantasy dialogue and role-playing. Fantasy dialogue codes were given to utterances that are part of a conversation, usually involving herself and/or her stuffed animals. Due to the nature of the data collection, transcribers were not able to view Nora during recordings, but they did know from Nora's father that she had access to her stuffed animals and frequently engaged in dialogue with them; often it was one animal talking to another animal. Utterances that were decipherable as dialogue between Nora and/or her stuffed animals (i.e., the characters involved in the dialogue) were marked by a change in voice or pitch. For example,

"Wow! Wow!	*Full volume, spoken, private, fantasy dialogue*
A treasure	*Full volume, spoken, private, fantasy dialogue*
I think pirates left it there	*Full volume, spoken, private, fantasy dialogue*
A secret hide out of pirates…	*Full volume, spoken, private, fantasy dialogue*
I might found it.	*Full volume, spoken, private, fantasy dialogue*
What about it, Nora?	*Full volume, spoken, private, fantasy dialogue*
I don't know	*Full volume, spoken, private, fantasy dialogue*
We'll find it	*Full volume, spoken, private, fantasy dialogue*
We'll find the treasure"	*Full volume, spoken, private, fantasy dialogue*
(Nora, Day 12)	

Once an utterance was coded as fantasy dialogue, it was determined as to whether or not it was part of a role-playing sequence between accepted behavioral roles (Vygotsky, 1967), such as mother/daughter, doctor/patient, or brother/sister, of the characters that Nora was acting out in the dialogue. For example, a mother/daughter role-playing sequence would be coded for, "Oh mother, I do want to grow up/Oh my honey, you're so good."

Emotion. If an utterance included at least one emotional word, such as "love," "hate," and "sad," then the utterance was coded as containing an emotion word (for a complete list of emotion words, see Appendix 1). However, some words or phrases may have related to an emotion, but did not contain emotion words. Context was evaluated for utterances within a dialogue that are in response to an emotion-related question (see example below for utterances marked with an asterisk), and these responses were coded as an emotion. For example, a dialogue between her stuffed animals that contained emotion words would be coded as follows,

"Petita, are you gonna stay with me?	*Full volume, spoken, private, fantasy dialogue,*
Are you feeling good?	*Full volume, spoken, private, fantasy dialogue, emotion*
Um not very good	*Full volume, spoken, private, fantasy dialogue, emotion*
Are you feeling good	*Full volume, spoken, private, fantasy dialogue, emotion*
No*	*Full volume, spoken, private, fantasy dialogue, emotion*
Petita, wait!	*Full volume, spoken, private, fantasy dialogue*
I don't feel like it	*Full volume, spoken, private, fantasy dialogue, emotion*
Petita, why are you crying?	*Full volume, spoken, private, fantasy dialogue, emotion*
I don't want to go your house*"	*Full volume, spoken, private, fantasy dialogue, emotion*
(Nora, Day 18)	

Language/literacy practice. An utterance was coded as language/literacy practice if Nora used repetition or practiced concepts (e.g.,, reciting the alphabet, shapes, numbers, or colors) or if she read aloud from a book, which was determined by the audible sound of turning pages and marked in the transcript (see Table 1 for examples). Language/literacy practice was not mutually exclusive, so an utterance could be coded as language/literacy practice as well as emotion if it included an emotional word. An example of practicing concepts is,

"P purple P pink	*Full volume, spoken, private, language/literacy practice*
Pink pink	*Full volume, spoken, private, language/literacy practice*
Purple	*Full volume, spoken, private, language/literacy practice*

Purple	*Full volume, spoken, private, language/literacy practice*
Lellow-? Lellow. Lellow-?	*Full volume, spoken, private, language/literacy practice*
Lellow. Lellow.	*Full volume, spoken, private, language/literacy practice*
Pink"	*Full volume, spoken, private, language/literacy practice*
(Nora, Day 19)	

Inter-Rater Reliability

The primary author and two other students (one graduate, one undergraduate) who had previously transcribed and verified Nora's speech independently coded several transcripts in order to achieve inter-rater reliability. For the dichotomous codes of whisper/full-volume, spoken/sung, and social/private speech, as well as for bouts of humming and making noises, the primary author and an undergraduate student completed twelve transcripts (n = 3,626 utterances) for reliability (i.e., four transcripts were chosen from each time period). Inter-rater reliability was examined by using Kappa and percentage agreement for each dichotomous code, and Spearman correlations were calculated for the continuous number of seconds Nora spent humming or making noise. As displayed in Table 2, all of reliability statistics were above .70, with the exception of whisper/full-volume. For this dichotomous code (1= whisper, 0= full-volume), the Kappa value was low (κ = .51) due to a low frequency of whispers; however, additional training took place and a second batch of eight transcripts (n = 2,816 utterances) were coded for reliability, and that Kappa was above the threshold (κ = .75).

Table 2. Kappa and Percentage Agreement (and Spearman Correlation) for Each Category

Category	Percentage Agreement	Kappa (κ)	Spearman Correlation
Whisper/Full-Volume *n* = 2816 utterances	99.7%	.749	
Spoken/Sung *n* = 3626 utterances	98.0%	.934	
Social/Private *n* = 3626 utterances	99.1%	.833	
Making Noises *n* = 12 days			.89
Humming *n* = 12 days			.98
Self-Regulation *n* = 662 utterances	98.9%	.857	
Dialogue *n* = 3387 utterances	87.3%	.740	
Role-Playing Dialogue *n* = 3387 utterances	98.6%	.906	
Emotion *n* = 662 utterances	98.9%	.852	
Language/Literacy Practice *n* = 3387 utterances	98.8%	.821	

For the private speech content codes of self-regulation, dialogue, role-playing dialogue, emotion, language/literacy practice, the primary author and a graduate student completed eight transcripts for reliability (*n* = 3,387 utterances). Inter-rater reliability was examined by using Kappa and percentage agreement for each content code. As displayed in Table 2, the reliability statistics were above .70 for dialogue, role-playing dialogue,

and language/literacy practice. For self-regulation, the Kappa value was low ($\kappa = .44$) due to its low frequency, and the Kappa was also low for emotion ($\kappa = .45$). A second batch of three transcripts ($n = 662$ utterances) were coded for reliability after additional training and discussion; these Kappas were above the threshold (self-regulation: $\kappa = .86$; emotion: $\kappa = .85$).

Units of Analyses and the Organization of Data

Since this study has one subject, the data violate the assumption of independence (Creswell, 2009). The option of using a temporal unit of analysis (Hayes, 1981) was used in this study, both in terms of days and time periods. In order to answer the variety of research questions, the data were organized into two separate files. First, all coded transcripts were initially entered into a data file (File A) with utterances as the rows (i.e., the units of analysis). For example, if Day 1 had 278 utterances and Day 2 had 414 utterances, the first 278 rows of the data file consisted of each utterance from Day 1, followed by the next 414 rows of utterances from Day 2. All codes (e.g., whisper, self-regulation, language/literacy practice) were represented as columns, so each utterance was entered as a dichotomous yes/no variable for each coded column (see Appendix 2 for an excerpt from Day 38's transcript and codes). As discussed below, File A consisted of 19,428 rows, meaning that there were a total of 19,428 utterances spoken over the 57 recorded days. Second, once the first data file was complete, frequency counts for each code were computed for each day, and a new data file (File B) was created with days as the units of analysis, which yielded a data file with 57 rows. Just as in the initial data file, all codes were represented as columns, but for this second data file, the value entered for

each column reflected the total frequency of that code for that day. For example, if Day 1 had 23 of the 278 utterances coded as language practice, then the row for Day 1 consisted of a column of the total number of utterances for that day (i.e., 278) as well as a column of the number of times language practice was coded (i.e., 23). In this data file (File B), an additional column indicated the time period for each day. This column served as a categorical independent variable for ANOVA analyses.

Calculation of proportions. Since the amount of speech used on any given day varied considerably—in terms of time and the number of words and utterances—several proportions were calculated and used for analysis. First, grand proportions were calculated by dividing the frequency of each code across all days by the total number of utterances across all days (from File A). Second, within-day proportions were calculated by dividing the frequency of each code per day by the total number of utterances for that day (from File B). Third, within-period proportions were calculated by dividing the frequency of each code per time period by the total number of utterances for that time period (from File B). It should be noted that except for the proportion of social and private speech, the proportions of private speech codes were calculated by dividing each private speech code by the total number of private speech utterances, as opposed to the total number of utterances.

RESULTS

Research Question 1: What is the content of her pre-sleep monologues, and does the content change over time?

Descriptive statistics and proportions of coded material are presented in several ways: grand count across all 57 days (File A, Table 3 below), within-day for all 57 days (File B, descriptives in Table 4 below) Within-period proportions were calculated but revealed very similar values to the average within-day proportions for each time period, so the proportions presented in Table 5 are the within-day proportions averaged for each time period.

Totals across all days. Total counts and grand proportions across all 57 days (File A) are presented in Table 3. The total number of utterances Nora spoke across the 57 days of recording was 19,428 consisting of a total of 57,053 words, resulting in an overall mean length of utterance of 2.94 words per utterance (i.e., the total number of words divided by the total number of utterances). For the dichotomous codes, 99% of her speech was spoken in full volume (with very few whispered utterances) and was spoken privately to herself (as opposed to calling out to someone), and 11% of her private crib speech was in the form of singing. Over all of the recorded time, she spent almost 90 minutes humming to herself, and roughly one hour making noises (such as barking, meowing, making airplane noises, etc.). While many efforts were made to decipher her speech by verifying each transcription, with many followed by a second verification by

Nora herself 10 years later, 16% of her utterances remained undecipherable. Over half of her speech was part of a fantasy dialogue with herself and/or her stuffed animals, with 14% of her fantasy dialogue utterances classified as part of a role-playing dialogue, such as a dialogue between mother and daughter or doctor and patient.

Table 3. Total Counts and Grand Proportions on the Content of Crib Speech (File A, N = 19,428 utterances over 57 days)

	Total	*Proportion(s)*	
Number of Utterances	19,428		
Number of Words	57,053		
Mean Length of Utterance (MLU)	2.94		
Dichotomous Codes			
Whispering[a]	146	.01	
Sung[a]	2,067	.11	
Social Speech	169	.01	
Private Speech	19,259	.99	
Time Spent in Non-Speech (in seconds)			
Humming[b]	5,371	.04	
Making Noise[b]	3,488	.03	
Private Speech Content Codes			
Undecipherable[a]	3,149	.16	
Self-Regulation[a]	218	.01	
Task-Relevant	68	.31[c]	.003[a]
Emotion Regulation	87	.40[c]	.005[a]
Language Modification	63	.29[c]	.003[a]
Fantasy Dialogue[a]	10,738	.56	
Role-Playing	1,465	.14[d]	.08[a]
Emotion[a]	731	.04	
Language/Literacy Practice[a]	1,495	.08	

[a] Calculated by the total number of each code per day / total number of private speech utterances per day
[b] Calculated by the number of seconds / total number of seconds of recording time
[c] Calculated by the number of each self-regulation type / number of self-regulation utterances
[d] Calculated by the number of role-playing utterances / number of fantasy dialogue utterances

Descriptive statistics of within-day variables. Descriptive statistics were run on the within-day data derived from File B. The means, standard deviations, and the minimum and maximum values for the within-day frequencies of all codes are presented in Table 4. Also found in Table 4 is the percentage of days—for each code—in which no code was endorsed. Histograms were generated for the total number of utterances, the total number of words per day, and the MLU per day; these variables appeared to be normally distributed. On average, there were 341 utterances with 1,001 words per transcript, with an average mean length of utterance of 2.98 words (i.e., the mean length of utterance calculated for each day, and then averaged across all 57 days). There was a wide range in the number of utterances (18-619) and the number of words (45-2,120) per day, but she did use overt crib speech in all 57 days of recording.

Table 4. Descriptive Statistics on the Content of Crib Speech (File B, N = 57 days)

						Proportion Statistics[a]			
	Mean	*(SD)*	*Min.*	*Max.*	*% of days with at least 1 code*	*Mean*	*(SD)*	*Min.*	*Max.*
Number of Utterances	340.84	(156.99)	18	619					
Number of Words	1000.93	(502.99)	45	2,120					
Mean Length of Utterance (MLU)	2.98	(0.74)	1.07	4.67					
Dichotomous Codes									
Whispering	2.56	(3.44)	0	17	69.4%	.01	(.01)	.00	.04
Sung	36.26	(40.93)	0	166	93.0%	.11	(.01)	.00	.52
Social Speech	2.96	(4.56)	0	21	54.4%	.01	(.01)	.00	.25
Time Spent in Non-Speech (in seconds)									
Humming	94.23	(112.25)	0	620					
Making Noise	61.19	(41.86)	2	162					
Private Speech Content Codes									
Undecipherable	55.25	(47.10)	0	204	98.2%	.16	(.11)	.00	.51
Self-Regulation	3.82	(6.21)	0	27	56.1%	.02	(.07)	.00	. 54
Task-Relevant[b]	1.19	(2.24)	0	10	79.9%	.39	(.40)	.00	1.00
Emotion Regulation[b]	1.53	(4.85)	0	27	59.6%	.20	(.36)	.00	1.00
Language Modification[b]	1.11	(2.05)	0	11	79.9%	.41	(.42)	.00	1.00
Fantasy Dialogue	188.39	(114.97)	0	449	98.2%	.53	(.21)	.00	.92
Role-Playing[c]	25.70	(40.44)	0	187	62.4%	.18	(.27)	.00	1.00
Emotion	12.82	(9.16)	0	31	96.5%	.04	(.02)	.00	.12
Language/Literacy Practice	26.23	(50.63)	0	249	49.1%	.08	(.15)	.00	.73

[a] Calculated by averaging the daily proportions of the total number of each code per day / total number of private speech utterances per day

[b] Calculated by the number of each self-regulation type / number of self-regulation utterances

[c] Calculated by the number of role-playing utterances / number of fantasy dialogue utterances

Dichotomous codes. On average, only 1% of her utterances were whispered, and 68.4% of days contained at least one whisper. Singing was detected in 93% of the days,

and about 11% of her daily speech was sung, with one day's speech being sung for over half of the utterances. On average, 1% of her utterances were coded as social speech with 54.4% of days containing at least one utterance of social speech; however, one day containing as much as 25% of utterances that were called out to someone else (Day 51, described later).

Time spent in non-speech. The mean amount of time Nora spent humming per day was 94 seconds, with as little as no humming and as much as over 10 minutes of humming within one day. Nora spent about one minute making noises per day, ranging from 2 seconds to over 2.5 minutes of making noises, indicating that every recording contained some amount of noise-making.

Private speech content codes. The vast majority of Nora's private speech was decipherable, but there was a mean amount of 16% of undecipherable speech; however, one day contained as much as half of her speech being determined undecipherable. Only half of the transcripts contained at least one self-regulatory utterance, with a roughly equal proportion of task-relevant and language modification, and a smaller amount containing emotion regulation. On average, half of her crib speech was part of a fantasy dialogue, with only one day without any fantasy dialogue. About one-fifth of her fantasy dialogue was within the context of role-playing. It is interesting to note that the two days in which all of her fantasy dialogue was part of role-playing were on days that she fell asleep. For example, on Day 56, Nora role played a dialogue between a mother and daughter about going to sleep, saying,

> "Honey,
> No mom

Oh
Honey I know, I know
Let me snuggle with…
I am asleep, okay" (Nora, Day 56)

All but two days contained at least one emotion word, and the day that contained the highest proportion of emotion words (Day 18) was on a day that she fell asleep, repeating the phrase "I don't feel like it" many times. There was a wide range in the proportion of language/literacy practice utterances, with half of the days containing none. However, on Day 58, Nora read aloud to herself for almost three-quarters of her speech.

Content changes over time. Due to the large variability in the amount of speech Nora used on each day, changes in the proportions of the content over time were examined, although the results remained the same when the raw frequencies were used. Three repeated-measures ANOVAs were run to determine if the proportions of self-regulation, emotion, and undecipherable private speech content codes were different over time. Table 5 breaks down the average within-day proportions for each of the three time periods.

Table 5. Differences among Content Codes Over Three Time Periods

	Time Period 1		Time Period 2		Time Period 3	
	M	(*SD*)	*M*	(*SD*)	*M*	(*SD*)
MLU	2.90	(.72)	3.17	(.57)	2.86	(.91)
Proportions of Private Speech Codes						
Undecipherable*	.21	(.14)	.11	(.07)	.17	(.08)

Self-Regulation	.02	(.01)	.02	(.02)	.04	(.12)
Fantasy Dialogue	.55	(.20)	.59	(.17)	.46	(.25)
Role-Playing	.15	(.24)	.21	(.26)	.20	(.32)
Emotion	.04	(.03)	.04	(.02)	.04	(.02)
Language/Literacy Practice	.06	(.10)	.06	(.12)	.12	(.21)

* $p < .05$

There were no significant differences across time for self-regulation and emotion across the three time periods, but there was a significant difference for undecipherable speech, $F(2, 36) = 4.92$, $p < .05$. Linear regression curve estimations did not find any significant linear or non-linear pattern for self-regulation speech. For emotion speech, there was a marginally significant quadratic inverted U-shape curve, with an increase over the first half of the days and a decrease over the second half in the proportion of emotion speech (see Figure 1).

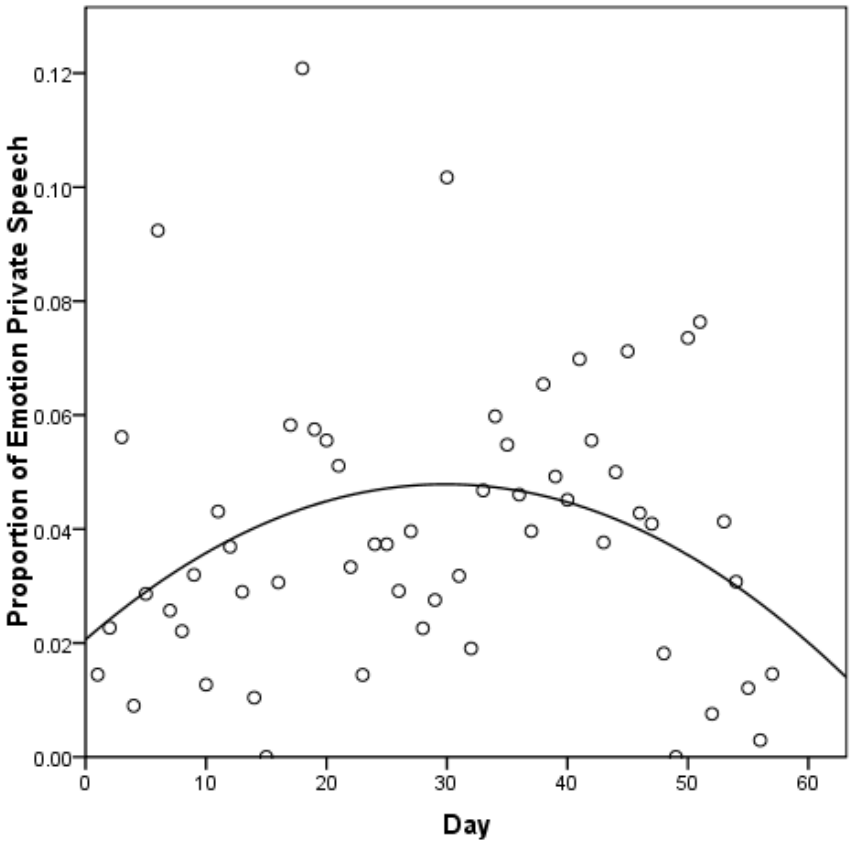

Figure 1. Visual Representation of the Proportion of Emotion Private Speech Over Time

For undecipherable speech, there was a significant quadratic U-shape curve; there was a decrease over the first two-thirds of the days, followed by an increase in the proportion of undecipherable speech in the last third of the days (see Figure 2).

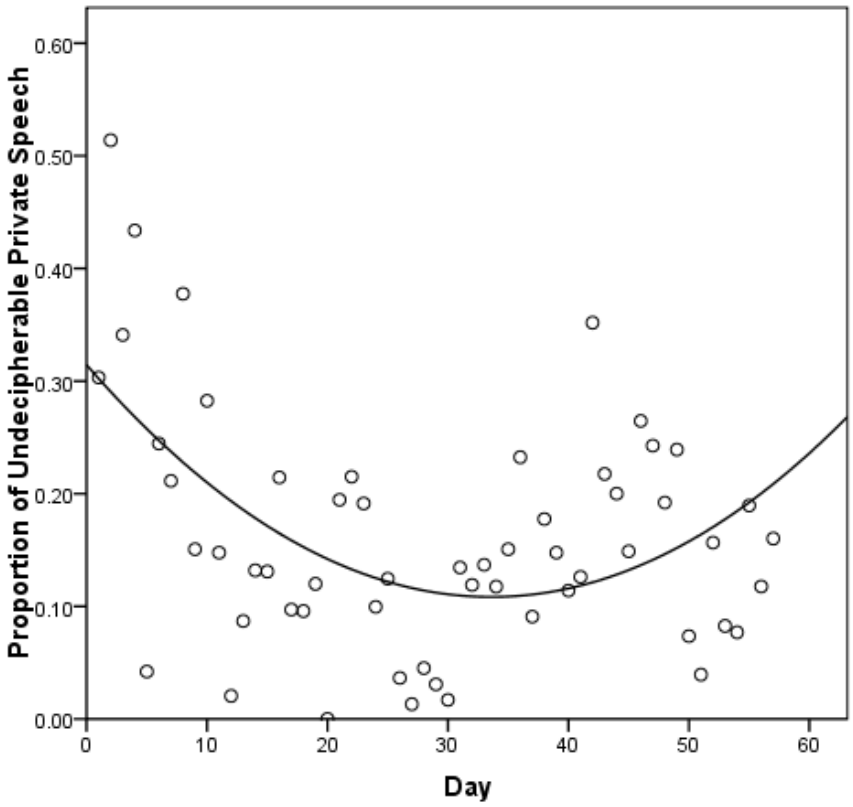

Figure 2. Visual Representation of the Proportion of Undecipherable Private Speech Over Time

Research Question 2: How does her crib speech evolve linguistically over time?

A repeated-measures ANOVA was run to determine if the average length of utterances was different over time. The dependent variable was the mean length of utterance for each of the three time periods. In addition to running a repeated-measures ANOVA, a smoothing technique of linear regression curve estimation was done to explore the changes of the mean lengths of utterances over individual days (derived from the data in File B with 57 time points, as opposed to three discrete time periods). It was

hypothesized that the mean length of utterances would increase over time as Nora gets older. For MLU, there were no significant differences over time, $F(2, 36) = 1.00$, $p = .378$ (see Table 5 for the average within-day proportions for each of the three time periods). A series of regression curve estimations was run to test for the type of equation that best fit this non-linear change, and the coefficients for an S-curve did achieve statistical significance. Upon further investigation, the shape of the MLU plotted over all 57 days indicated an increase in MLU over the first few days, followed by a relatively stable MLU over the remainder of the days (see Figure 3).

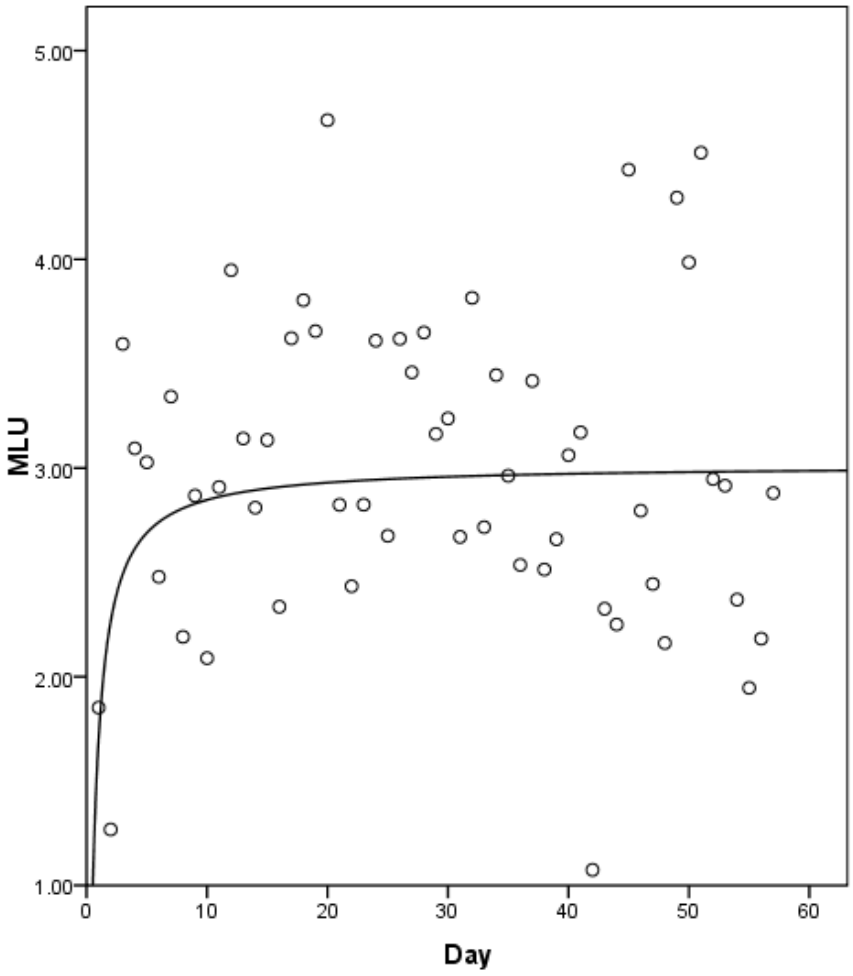

Figure 3. Visual Representation of the Mean Length of Utterance (MLU) Over Time

Research Question 3: Does the language/literacy practice function of crib speech change over time?

A repeated-measures ANOVA was run to determine if the proportion of language/literacy practice in Nora's crib speech was different over time. It was hypothesized that the amount of language/literacy practice would decrease over time as Nora gets older. There was no significant difference over the three time periods (see

Table 5 above), but a quadratic curve did significantly fit the data, with a relatively steady amount of proportions of language/literacy practice over the first third of the days and then an increase over the remainder of the days (see Figure 4). When the raw frequencies (rather than proportions) of language/literacy practice were examined over time, the results were the same.

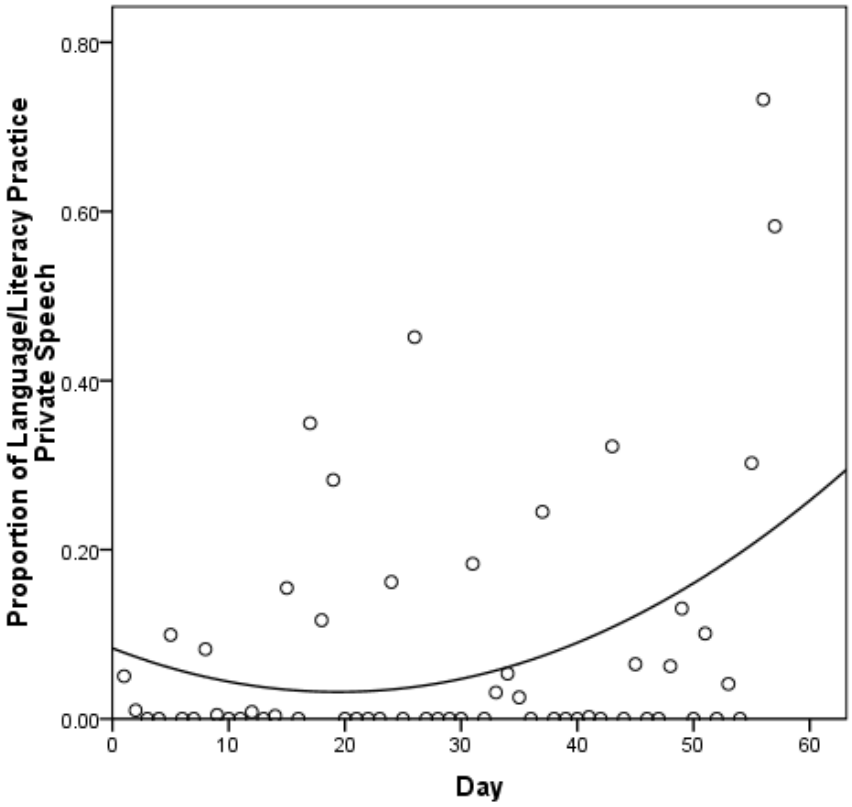

Figure 4. Visual Representation of the Proportion of Language/Literacy Practice Private Speech Over Time

Research Question 4: How does her pretend play crib speech develop over time?

Repeated-measures ANOVAs were run on the proportions, as well as the raw frequencies, of fantasy dialogue and the sub-category of role-playing fantasy dialogue. The proportions of fantasy dialogue and role-playing fantasy dialogue were not significantly different over time (see Table 5 above); however, for the raw frequencies, there was a marginally significant difference for fantasy dialogue, $F(2, 36) = 3.12$, $p = .056$, but not for role-playing. The proportion and raw frequencies for fantasy dialogue both significantly fit quadratic inverted U-shape curves, with an increase over the first half of the days, followed by a decrease in the proportion and raw frequency of fantasy dialogue over the remainder of the days (see Figure 5 and Figure 6).

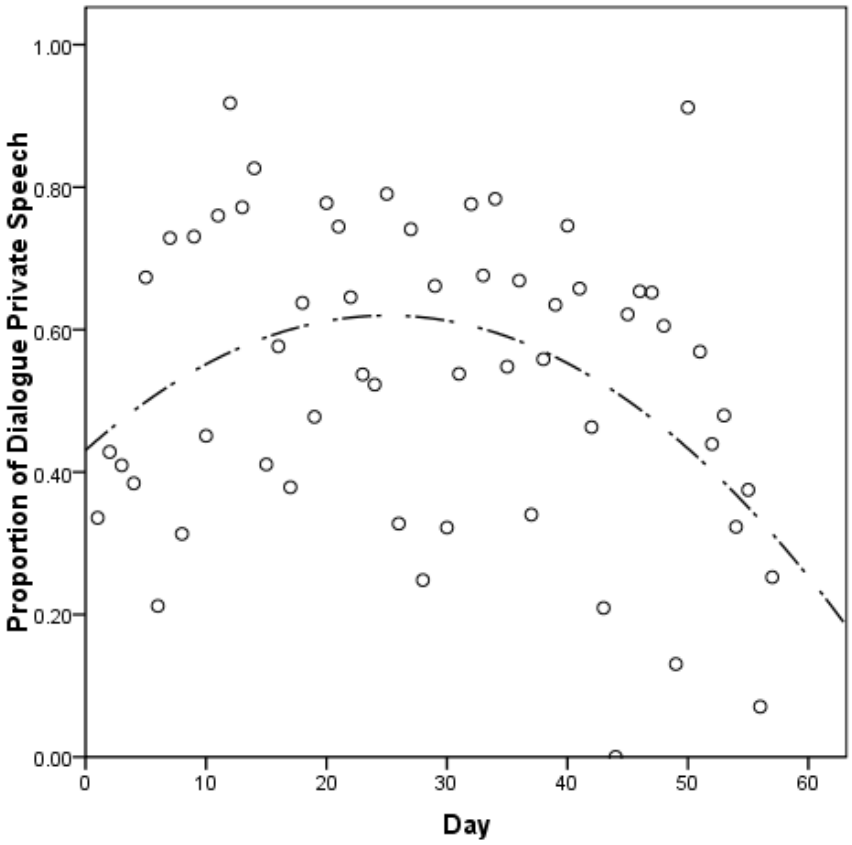

Figure 5. Visual Representation of the Proportion of Fantasy Dialogue Speech Over Time

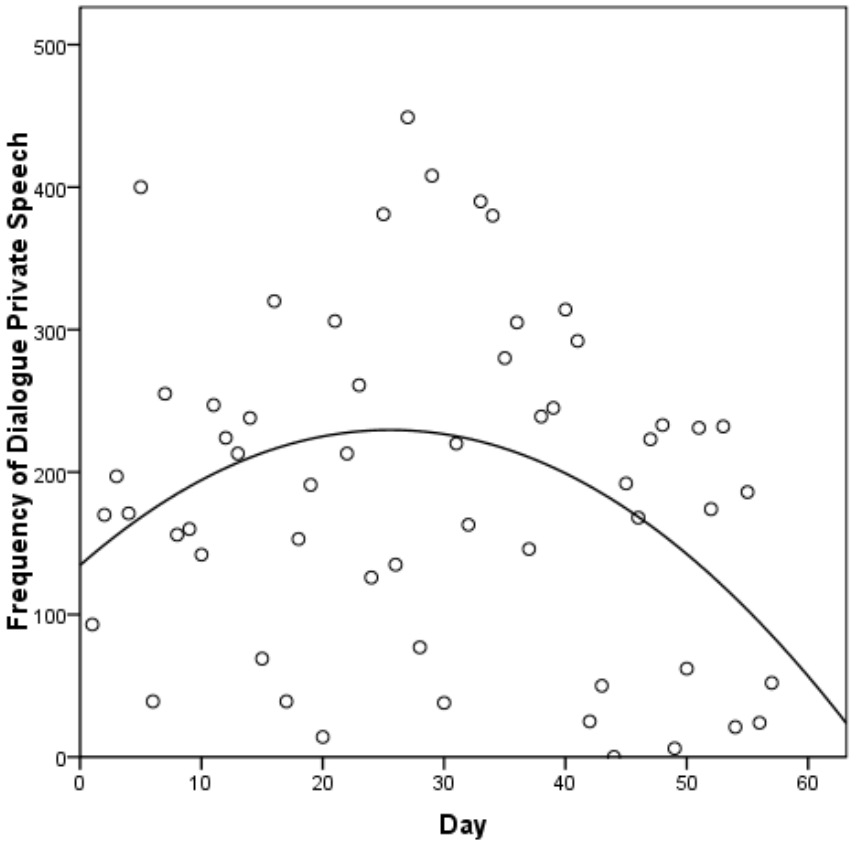

Figure 6. Visual Representation of the Frequency of Fantasy Dialogue Private Speech Over Time

Research Question 5: Does the content of her speech differ from whether or not she fell asleep before the recording ended?

A series of *t*-tests was run to determine if the content of crib speech was related to whether or not she fell asleep before the end of each recording. The independent variable was whether or not Nora fell asleep that day, and the dependent variables were the proportions of the dichotomous and private speech codes, as well as the MLU. The *t*-tests indicated that there were not significant differences in proportions of coded material

between days when Nora fell asleep (n = 8) and when she stayed awake (n = 49), with the exception of the proportion of undecipherable utterances, $t(55) = 1.78$, $p = .08$, $d = .68$, and utterances containing emotion words, $t(55) = 2.86$, $p < .01$, $d = -1.09$. More specifically, there were marginally more undecipherable utterances on days that Nora stayed awake, and significantly more emotion-coded utterances on days that Nora fell asleep. It is important to note that all effect sizes of all differences ranged from small to large (see Table 6 for the means, standard deviations, and Cohen's *d* values for all dependent variables). Additional analyses were run with raw frequencies as the dependent variables, and, as expected, there were large differences driven by the longer amount of time spent talking on days that she stayed awake.

Table 6. Differences in Proportions of Codes from Whether or Not She Fell Asleep

	Stayed Awake		Fell Asleep		
	n = 49 days		n = 8 days		
	Mean	*(SD)*	*Mean*	*(SD)*	Cohen's *d*
MLU	2.94	(.67)	3.20	(1.11)	-0.34
Dichotomous Codes					
Whispering	.01	(.01)	.01	(.01)	0.06
Sung	.11	(.11)	.08	(.09)	0.28
Social Speech	.01	(.04)	.00	(.01)	0.35
Proportions of Private Speech Codes					
Undecipherable	.17	(.10)	.10	(.11)	0.68^{+}
Self-Regulation	.02	(.08)	.02	(.03)	0.01

Fantasy Dialogue	.53	(.21)	.57	(.23)	-0.19
Emotion	.04	(.02)	.06	(.03)	-1.09**
Language/Literacy Practice	.09	(.16)	.06	(.12)	0.16

+ $p < .10$, * $p < .05$, ** $p < .01$

Supplementary Analyses

Additional analyses were run to examine the relations between private speech categories and the context in which they occurred. Correlations were run between length of utterance and the raw frequencies of dichotomous and private speech content codes from File A (see Table 7). There were significant positive correlations between the length of utterance and utterances coded as sung, self-regulatory, fantasy dialogue, emotion, and language practice utterances. These positive correlations reflect longer utterances for those coded as sung (as opposed to spoken), and self-regulatory utterances (as opposed to non-self-regulatory), and so on (see Table 7 for the descriptive means for length of utterance for each category). There was, however, a negative correlation between length of utterance and social speech, which means that social speech utterances were shorter than private speech utterances.

Table 7. Descriptive Statistics and Point-Biserial Correlations for Mean Length of Utterance per Code

	Coded Utterances		'Other' Utterances		
	MLU	(*SD*)	MLU	(*SD*)	*r*
Dichotomous Codes					
Whispering	3.21	(2.12)	2.94	(2.50)	.01
Sung	3.50	(3.01)	2.87	(2.42)	.08***
Social Speech	2.49	(2.41)	2.94	(2.50)	-.02*
Proportions of Private Speech Codes					
Self-Regulation	4.62	(4.43)	2.92	(2.46)	.07***
Fantasy Dialogue	3.52	(2.32)	2.21	(2.52)	.26***
Emotion	4.87	(2.97)	2.86	(2.45)	.15***
Language/Literacy Practice	3.56	(2.99)	2.89	(2.45)	.07***

Note. Coded utterances refer to the utterances that received each coded; 'Other' utterances refer to all other utterances that did not receive that code.

* $p < .05$, ** $p < .01$, *** $p < .001$

Correlations among within-day proportions. Correlations were run between all of the proportions of codes from File B, in that the correlations represent the relation among the daily proportions of different codes (see Table 8).

Table 8. Correlations among Within-Day Proportions of Crib Speech Codes (N = 57)

	Whisper	Sung	Social	Undecipher.	Self-Reg.	Dialogue	Emotion	Lang./Lit. Pract.
Whisper	--							
Sung	.11	--						
Social	-.02	.04	--					
Undecipherable	-.13	-.18	.09	--				
Self-Regulation	-.08	-.03	.90**	.01	--			
Fantasy Dialogue	-.11	-.33*	-.29*	-.29*	-.32*	--		
Emotion	-.05	-.11	-.30*	-.24+	-.15	.19	--	
Language/Literacy Practice	.30*	-.15	-.04	-.14	.08	-.50**	-.21	--

$+p < .10$, $* p < .05$, $** p < .01$

For social speech, there was a strong positive correlation with self-regulatory utterances, and a negative correlation with fantasy dialogue and emotion speech. A possible explanation for the strong positive correlation between social speech and self-regulation may be that on days that Nora was upset (i.e., marked by crying and whimpering) or having a problem finding a desired object, she would use a combination of emotion-regulation or task-relevant utterances, followed or preceded by calling out to her parent in order to cope with the situation. For example, on Day 51, Nora calls out to her mother asking, "What? Momma can you [undecipherable word]?" and says while crying privately to oneself,

> "No I didn't get to say goodnight
> But I didn't get to say goodbye, I didn't
> But I didn't get to say goodbye
> No no no no… I don't want to [undecipherable word] again
> I don't want anything
> I didn't get to say goodbye

I didn't get to say goodbye" (Nora, Day 51)

In another example, on Day 15, Nora calls out to her mother asking, "Mommy, can we sleep on the umm," then repeats to herself "No mommy upstairs" three times, followed by calling out to her mother, "Mommy!" multiple times.

There was a negative correlation between proportion of language/literacy practice and fantasy dialogue. Since the code for language/literacy practice was used for utterances when Nora read aloud to herself, it is possible that there were days when she read aloud for a large portion of the recording, which left little time for fantasy dialogue between her and/or her stuffed animals. Another possibility is because there were many days when the majority of her crib speech was within a fantasy dialogue context, and therefore did not contain any reading. There were, however, several instances when Nora would practice counting in the middle of a fantasy dialogue. For example, on Day 32, Nora is engaged in a fantasy dialogue between two characters concerning how old one of the characters is:

"I'm not a one girl, I'm a eight girl
I can't believe it!
You are eight now…
I'm eight!
1, 2, 3, 8!
1, 2, 3, 4, 5, 6
Na
1, 2, 3, 4, 5, 6
6!
I am 6!" (Nora, Day 32)

Co-occurrences of codes. Further investigation into the relations among speech categories was done by examining the co-occurrence of codes within any given utterance through running cross-tabulations on File A (N = 19,428 utterances). Overall, it was not

often that there would be multiple private speech content codes within an utterance, but there were some interesting findings, which are discussed below.

Singing. Since almost all days contained some singing, cross-tabulations were run to identify any unique content related to the 2,062 sung utterances. Within the self-regulation codes, only 3 out of the 65 (4.4%) task-relevant utterances were sung, while 18 out of the 87 (20.7%) emotion regulation utterances were sung, and 10 out of the 53 (15.9%) language modification utterances were sung (as opposed to spoken), χ^2 (3) = 13.94, $p < .01$. Thus, emotion regulation utterances were most likely to be sung compared to other types of utterances. Sixty-four of the 729 (8.8%) utterances containing an emotion word were sung; therefore, 91.2% of the emotion words were spoken, but this was not significant, χ^2 (1) = 2.69, $p = .10$. Finally, within the language/literacy practice codes, 78 of the 1,440 (5.4%) of the utterances were sung; therefore, 94.6% of language/literacy practice utterances were spoken, χ^2 (1) = 44.28, $p < .001$.

Self-regulation. Among the utterances that were coded as emotion-regulation, only 12 out of the 87 (13.8%) contained an emotion word, and the remaining 86.2% of emotion-regulation utterances did not contain any emotion words. There were no instances that an emotion-regulation utterance was found in the contexts of fantasy dialogue or language/literacy context. For the language modification utterances, 31 out of 63 (49.2%) happened during fantasy dialogue, and 22 (34.9%) occurred during language/literacy practice; therefore, 84.1% of the language modification utterances were found in the contexts of fantasy dialogue or language/literacy context, with the remaining 15.9% occurring through song (as stated in the above paragraph).

Fantasy and role-playing dialogue. Among the 10,797 fantasy dialogue utterances, 584 (5.4%) contained an emotion word. In other words, most (584 out of the 729) (80.1%) emotion words were said during a fantasy dialogue context, with the remaining emotion words found in different contexts (e.g., 18 in language/literacy practice, 64 in song, 7 in social speech, 6 in whispers, 15 in self-regulation) or not coded in any context. Upon examining the subset of 1,465 role-playing dialogue utterances, 90 (6.1%) contained an emotion word. Finally, only 112 (1.0%) of the 10,797 fantasy dialogue utterances were also coded as language/literacy practice.

DISCUSSION

The current study examined the content of crib speech over the course of four months around the fourth birthday of a young girl, Nora. This study provided a glimpse of what crib speech looks like in a child that is older than previously studied, which allowed for an opportunity to study whether crib speech appears to be different for an older child. In the introduction of Nelson's (1989) study of crib speech from her daughter, Emmy, there is a discussion on whether or not crib speech could be considered a type of private speech based on her young age, 21-36 months. Nelson speculated that since private speech and self-regulatory language do not typically emerge until the age of three, it would difficult to classify her daughter's crib speech as Vygotsky's notion of private speech, even though there were some instances of self-regulatory use of language in her pre-sleep monologues. This particular position, however, requires speech to be self-regulatory in order for it to be considered private speech. In the current study, we used a broader definition of private speech as any speech not directed toward another person. This combined with Nora's older age—between 46 and 50 months—suggests that the speech analyzed in this study was clearly private speech.

Overall, it appears that Nora's crib speech followed an interesting course of development, showing a quadratic, inverted-U shape for the mean length of utterance (MLU) over four months of recordings, starting with a shorter MLU in the early days,

increasing toward the middle of the sampling, and then decreasing toward the last few days. These findings do not reflect the normal course of development found in social speech, with MLU increasing with age (Hoff, 2009). This may be because she was advanced in terms of verbal ability, as well as beyond the age when MLU is a useful indicator of language complexity (Eisenberg, Fersko, & Lundgren, 2001). The trajectory of her crib speech, however, is similar to the internalization of private speech in early childhood, in that the frequency and use of private speech declines as children become school-aged since private speech becomes internal (Berk & Winsler, 1995; Winsler, 2009). This pattern was found between the ages of 46 and 50 months, perhaps there is something unique happening developmentally with her crib speech around her fourth birthday. Another possibility is that Nora might have begun to internalize her private speech earlier than research would suggest, which may be related to the high quality of language stimulation in her home environment (Berk & Garvin, 1984).

Crib Speech Content

Over the course of 57 days of 45-minute recordings, she engaged in private crib speech on every occasion, which included a wide variety and number of utterances, words, and the amount of time spent in different contexts (e.g., self-regulation, language/literacy practice, etc.). This variability, along with the 16% of undecipherable speech, makes it crucial to collect data for long segments at a time, over several time points in order to get a better sense of what is happening when a child is left alone to go to sleep. Interestingly, 11% of her speech was in the form of singing, which may be related to her family's background and interest in music and Nora's participation in early

childhood music and movement classes. Winsler, Ducenne, and Koury (2011) have examined the relation between the participation of music classes, self-regulation, and private speech use. The authors found that children who had prior or past experience in such classes used more task-relevant private speech, and they also used singing or humming as a strategic distraction from a delay task compared to children who had never enrolled in music and movement classes (Winsler et al., 2011). Encouragement for children to engage in musical play is emphasized in the early education literature (e.g., Andress, 1989; Berger & Cooper, 2003). Future research with these data can be analyzed to further examine the nature of her private sung speech.

Around half of the recordings contained at least one self-regulation utterance, with emotion regulation as the most common type of self-regulation, followed by roughly equal amounts of task-relevant and language-modification utterances. The emotion regulation function of private speech has not been explored much, but a study by Broderick (2001) found that 4- and 5-year-old children who were reported as having good emotion regulation skills used more private speech in Head Start classrooms than children who had poor emotion regulation skills.

Over half of her time was spent in fantasy dialogue, which suggests that this study captured a large amount of solitary play activity—an area that has not been well researched (Pellegrini, 2009). Future research should be conducted to compare the private speech of children during solitary play activity in different settings (e.g., before naptime, before nighttime, during a naturalistic playtime in a classroom) in order to determine if there are any unique features of the content and function of language used in each

environment. Bodrova and Leong (2009) believe that the freedom associated with the play environment provides children with an opportunity to develop self-regulation, so it would interesting to compare the self-regulatory speech used in different settings; each setting offers a different amount of freedom, with being alone in one's bed offering the least amount of restriction. It was also interesting to find that 14% of her fantasy dialogue was in the form of role-play. Levy (1989) found that some of Emmy's dialogic crib speech followed similar patterns to her dialogue with her father, as early as 24 months of age. Nora also demonstrated several mother/daughter role-playing dialogues in her speech. These findings support Vygotsky's (1934/1962) theory on how language begins in the social context and becomes internalized through private speech.

Patterns of content over time. Overall, there were few significant differences in the proportions of crib speech content over the three time periods, but similar to the MLU results, there were interesting patterns over the four months. An inverted-U shape curve was found for the proportions of emotion and fantasy dialogue codes, as well as for the frequency of fantasy dialogue over all 57 days. The reversed pattern, a U-shape quadratic curve, was found for the proportions of undecipherable and language/literacy practice codes.

It was hypothesized that language/literacy practice would decrease as Nora got older, yet the results indicated that the opposite trend was true: the proportion of language/literacy practice was relatively steady for the first half of the days and then increased over the remainder of the days. It is possible that she was becoming strategic in using the time alone in her bed to practice language as she got older. Although the

different types of language practice were not differentiated in this code (e.g., reciting the alphabet, counting, or reading), she may also be learning new concepts with time and then using the time alone to practice. It could have been the case that in the earlier months, language practice consisted of more word play and repetitions and in the latter months, such practice took the form of reading and literacy-related activities. This finding reveals that while Nora was older than the children in previous studies of crib speech, the prevalence of language practice still exists. A possible reason for this may be because the broad scope of my language practice code compared to previous studies, which mostly focused on word play, repetition, and modifications. Since Nora was older, the concept of language practice needed to be adjusted to include more developmentally appropriate activities, such as practicing literacy and reading aloud. Future research should continue to collect and analyze crib speech of children beyond the age of four in order to determine if and when there is a decline in language/literacy practice.

It was also hypothesized that the proportion and number of fantasy dialogue utterances would increase over time, and the results indicated a different pattern. Rather than finding a linear increase in the proportion and number of fantasy dialogue utterances over time, there was an increase over the first half of the recordings, followed by a decrease over the second half. Future research should aim to collect data over a longer period of time in order to detect any other interesting extended longitudinal patterns of fantasy dialogue. It is possible that there is no developmental trend over time, and that this pattern may simply be dependent of the activity she chose on each day. Feldman (1989) looked at the emergence of Emmy's pretend play, which began around 28 months

of age and it was found to be more abstract in later pre-sleep monologues (around 33 months of age), describing this as "a shift from the mundane to the fanciful" (p. 118). Feldman went on to say that there is some evidence that Emmy used more complex language in narrating her own fantasy dialogue compared to the dialogue with her parents. A similar pattern was found in the positive correlation between MLU and fantasy dialogue in this study, but the amount of fantasy dialogue utterances did not significantly change over time in this study. In a study by Feigenbaum (1992), younger children engaged in more fantasy-dialogue private speech than older children, who used more monologue speech. Krafft and Berk (1998) found a similar age-related pattern in their study on private speech use in a naturalistic free-play setting (i.e., younger children using more fantasy play speech compared to older children), but these studies have relied on cross-sectional designs. Future research should aim to implement more longitudinal designs in the study of fantasy-dialogue private speech in order to determine the developmental patterns within a child over time.

Falling asleep. A new approach to examining crib speech was used in this study, by comparing the speech content between days that Nora fell asleep and days that she stayed awake. By including this new independent variable of falling asleep, this study was tried to distinguish "pre-sleep monologues" from private speech during a solitary quite time. There were mostly null findings, although she had proportionally less undecipherable speech and more emotion speech on days that she fell asleep. Since language practice is the presumed function previously found in previous studies of pre-sleep crib speech, it was speculated that there would be more language/literacy practice in

days that she fell asleep, but this difference was not found. It is possible that the lack of differences for most of the content codes may be due to the small number of days that she actually fell asleep; therefore, it would be important for future research to collect a large number of speech samples in order to detect if there are any differences. Future research could also vary the timing of the data collection to detect if there are any differences in speech prior to a naptime compared to bedtime, and perhaps the pre-naptime speech would be more similar to solitary play.

Correlations and co-occurrence among codes. In this study, there were several interesting relations among the codes and with the length of utterance. Among the several positive correlations found, MLU was greater for utterances that were sung as opposed to spoken. Stern (1989) discusses briefly that it is not uncommon for infants to hum or sing to themselves at bedtime, but that the use and development of song in a self-regulatory or in pre-sleep monologue form have not been studied. The finding that sung utterances were longer in length than spoken ones suggests that Nora was able to elaborate her thoughts or practice repeating long lines from songs in the privacy of her room, more so than the elaboration she used in private spoken speech. Therefore, it may be beneficial for some children to encourage them to express their thoughts in song and to practice singing long strings of words to promote language development.

Correlations were also run among the within-day proportion content codes. There was a strong positive correlation between daily proportions of social speech and self-regulatory speech, meaning that on days that she used more social speech, she was also using more self-regulatory private speech. This finding suggests that Nora was using a

combination of social speech and self-regulation to handle emotional or task-relevant situations. Watson (1989) states that the amount of self-regulation a child will use depends on what activity a child is engaged in, but this relation has not been explored in crib speech. Since there were several times that Nora could not rely on her own regulatory skills, such as finding a desired toy, she then needed to rely on her parent to help her regulate, but if she were reading a story to herself, she could modify her own language without the help of another person.

There was a negative correlation between within-day proportions of language/literacy practice and fantasy dialogue. This may have been related to the trade-off between her choice of activities on a daily basis, whether her time was spent playing with her stuffed animals in a fantasy dialogue or reading aloud to herself. There were, however, some days when she used language/literacy practice within the context of her fantasy dialogue, but this was not the case in most dialogues. Since there were some occasions that this did occur, Nora was able to practice counting or labeling colors in the midst of her pretend play dialogue. Children should be encouraged to incorporate such language practice in their pretense to promote positive cognitive and language skills.

Most of the time, utterances were only coded as one category, but there were some utterances marked as two content codes. Within the self-regulatory language modification utterances, half were within the context of fantasy dialogue and a third were during language/literacy practice, which means that she was correcting herself while in the midst of fantasy play or reading aloud. The remainder of the corrections or extensions of utterances were found in song. While language modification was not very frequent, it

was still present in the context of the crib speech in this study, which means that even though this type of function was found in previous studies of younger children, it is still used by an older child. Over all of the recordings, around four-fifths of her emotion words were spoken in dialogue and another handful were used in song. These findings demonstrate that there were some unique features of her use of different words within various contexts.

Limitations

The current study does have some limitations. First, three recordings had technical difficulties with the recorder and were not able to be analyzed. Second, the repeated-measures ANOVAs were based on three discrete time periods with only 19 recorded days in each one, which may have been related to the lack of statistical significance, although the linear regression smooth estimations offered a clearer picture of how the data looked. Finally, like many studies of language development, the data were collected from one subject, so the data violate the assumption of independence, and results are not intended to generalize to other children.

Implications for Parents

In Winsler et al.'s (2006) study, where mothers were interviewed about their preschool children's use of private speech, slightly more than half reported that their children engaged in crib speech and yet there is little information available for parents to know why their children do this. The current study suggests that interesting and potentially developmentally beneficial activities go on during designated "quiet/nap times" during the day when a child is made to entertain herself for an extended period of

time. For language, singing one's thoughts or lines from songs may provide a chance for more elaboration than in spoken words, and it is an easy and fun way for children to practice using complex sentence structures. Having access to books in one's bedroom also allows for an opportunity to read aloud and practice one's literacy skills at an early age. For social and emotional development, being left alone is a minimally restrictive environment is an opportunity for the child to regulate emotions or practice role-playing and language, which may promote positive development. Parents and teachers are encouraged to listen in and learn from, but not interrupt or get involved in children's crib speech and private speech during solitary play.

APPENDIX

Appendix 1

	Emotion Word			*Emotion Word*			*Emotion Word*			*Emotion Word*
1.	Absorbed		20.	Appreciated		39.	Bliss		58.	Cheerful
2.	Accepting		21.	Approving		40.	Boastful		59.	Choosing
3.	Accusing		22.	Argumentative		41.	Bold		60.	Close
4.	Adoring		23.	Ashamed		42.	Bored		61.	Clueless
5.	Affectionate		24.	Assessing		43.	Bothered		62.	Cocky
6.	Afraid		25.	Assured		44.	Brave		63.	Cold
7.	Aggressive		26.	Astonished		45.	Broken		64.	Comfortable
8.	Agony		27.	Astounded		46.	Brokenhearted		65.	Comforting
9.	Agreeable		28.	Attacked		47.	Calculating		66.	Commiserating
10.	Alarmed		29.	Attracted		48.	Calm		67.	Compassionate
11.	Alert		30.	Aware		49.	Carefree		68.	Complacent
12.	Amazed		31.	Bad-tempered		50.	Caring		69.	Complaining
13.	Amused		32.	Baffled		51.	Cautious		70.	Conceited
14.	Angry		33.	Bashful		52.	Certain		71.	Concentrating
15.	Annoyed		34.	Battered		53.	Challenging		72.	Condescending
16.	Anticipating		35.	Begging		54.	Charitable		73.	Confrontational
17.	Anxious		36.	Betrayed		55.	Charmed		74.	Confronted
18.	Apologetic		37.	Bewildered		56.	Cheated		75.	Confused
19.	Appalled		38.	Bitter		57.	Cheered		76.	Considerate

	Emotion Word			*Emotion Word*			*Emotion Word*			*Emotion Word*
77.	Contempt		98.	Defeated		119.	Disbelieving		140.	Disturbed
78.	Content		99.	Defensive		120.	Discomfort		141.	Dominated
79.	Contrary		100.	Definite		121.	Discontented		142.	Doubtful
80.	Controlled		101.	Delighted		122.	Discouraged		143.	Dread
81.	Convinced		102.	Demanding		123.	Discouraging		144.	Dreamy
82.	Cooperative		103.	Depressed		124.	Disgrace		145.	Eager
83.	Courageous		104.	Desire		125.	Disgust		146.	Easy-going
84.	Cowardly		105.	Despair		126.	Disheartened		147.	Embarrassed
85.	Crafty		106.	Desperate		127.	Disinterested		148.	Encouraged
86.	Cranky		107.	Detached		128.	Dislike		149.	Encouraging
87.	Craving		108.	Determined		129.	Dismayed		150.	Enjoyment
88.	Critical		109.	Detesting		130.	Dispirited		151.	Enthusiastic
89.	Cross		110.	Devious		131.	Displeased		152.	Excited
90.	Cruel		111.	Devoted		132.	Disregard		153.	Fascinated
91.	Crushed		112.	Dictating		133.	Disrespectful		154.	Favor
92.	Cunning		113.	Difficult		134.	Dissatisfied		155.	Fear
93.	Curious		114.	Dignified		135.	Distant		156.	Fed up
94.	Daring		115.	Disagreeable		136.	Distaste		157.	Fierce
95.	Daydreaming		116.	Disappointed		137.	Distracted		158.	Fine
96.	Dazed		117.	Disapproval		138.	Distress		159.	Fired up
97.	Deciding		118.	Disbelief		139.	Distrust		160.	Flattered

	Emotion Word			*Emotion Word*			*Emotion Word*			*Emotion Word*
161.	Focused		181.	Grumpy		201.	Ignored		221.	Liked
162.	Fond		182.	Guilty		202.	Impatient		222.	Listening
163.	Foolish		183.	Happy		203.	Impressed		223.	Lively
164.	Forbidding		184.	Harsh		204.	Injured		224.	Lonely
165.	Forceful		185.	Hassled		205.	Innocent		225.	Longing
166.	Forgiving		186.	Hate		206.	Inspired		226.	Lost
167.	Friendly		187.	Heartache		207.	Insulted		227.	Love
168.	Frightened		188.	Heartbroken		208.	Insulting		228.	Lovesick
169.	Frustrated		189.	Heated		209.	Interested		229.	Low
170.	Furious		190.	Helpful		210.	Involved		230.	Loyal
171.	Generous		191.	Helpless		211.	Irritated		231.	Lying
172.	Gentle		192.	Hollow		212.	Jealous		232.	Mean
173.	Giving		193.	Homesick		213.	Joking		233.	Merry
174.	Glad		194.	Hopeful		214.	Jolly		234.	Mischievous
175.	Gloomy		195.	Hopeless		215.	Joy		235.	Miserable
176.	Glum		196.	Horrified		216.	Judging		236.	Misjudged
177.	Grateful		197.	Humiliated		217.	Jumpy		237.	Mistreated
178.	Grave		198.	Humored		218.	Keen		238.	Misunderstood
179.	Grief		199.	Hurried		219.	Kind		239.	Mocking
180.	Grouchy		200.	Hurt		220.	Knowing		240.	Modest

	Emotion Word			*Emotion Word*			*Emotion Word*			*Emotion Word*
241.	Moody		261.	Panic		281.	Scared		301.	Tender
242.	Moved		262.	Peaceful		282.	Secure		302.	Tense
243.	Murderous		263.	Pity		283.	Sensitive		303.	Terrified
244.	Mystified		264.	Playful		284.	Serious		304.	Terror
245.	Nasty		265.	Pleased		285.	Settled		305.	Thankful
246.	Needed		266.	Pleasure		286.	Shaken		306.	Thinking
247.	Needy		267.	Protective		287.	Shocked		307.	Thoughtful
248.	Neglected		268.	Proud		288.	Shy		308.	Threatened
249.	Nervous		269.	Puzzled		289.	Sickened		309.	Threatening
250.	Nosy		270.	Questioning		290.	Sneaky		310.	Thrilled
251.	Numb		271.	Regret		291.	Sorry		311.	Touched
252.	Obsessed		272.	Rejected		292.	Spiteful		312.	Trapped
253.	Offended		273.	Relaxed		293.	Startled		313.	Troubled
254.	Outgoing		274.	Relief		294.	Stupid		314.	Trusting
255.	Outraged		275.	Respect		295.	Sulky		315.	Uncaring
256.	Overcome		276.	Responsible		296.	Sure		316.	Uncertain
257.	Overjoyed		277.	Restless		297.	Surprised		317.	Uncomfortable
258.	Overpowered		278.	Sad		298.	Tearful		318.	Understanding
259.	Overpowering		279.	Safe		299.	Teasing		319.	Unfriendly
260.	Overwhelmed		280.	Satisfied		300.	Tempted		320.	Unhappy

	Emotion Word									
321.	Unsure									
322.	Upset									
323.	Uptight									
324.	Useless									
325.	Vain									
326.	Wanted									
327.	Warm									
328.	Watchful									
329.	Weary									
330.	Weepy									
331.	Whining									
332.	Wishful									
333.	Wonder									
334.	Wondering									
335.	Worried									
336.	Worthless									

Appendix 2

UTTERANCE	UNDECIPH	WHISPER	SOCIAL	SUNG	SELFREG	SELFREG TYPE	DIALOGUE	DIALOGUE ROLE	EMOTION	LANG PRACTICE
257. *CHI: clean our <hand>[?]							x			
258. *CHI: clean the bed.							x			
259. *CHI: then we clean xxx.							x			
260. *CHI: xxx. sleep tight xxx.							x			
261. *CHI: sleep tight xxx.							x			
262. *CHI: xxx sleep tight xxx.							x			
263. *CHI: now go to nappy!							x			
264. *CHI: NAPPY NO!							x			
265. *CHI: oh, xxx don't want nap don't you?							x			
266. *CHI: I'll read three books and then go to nappy.							x			
267. *CHI: xxx <four>[?] xx goodnight!							x			
%act: child reads story										
268. *CHI: um xxx <sound>[?] in the <newspaper>[?] xxx and xxx sleep xxx and cat sleep.										x
269. *CHI: sleep by a drink.										x
270. *CHI: sleep by a house.										x
271. *CHI: sleep by <bank>[?]										x
272. *CHI: sleep...										x
273. *CHI: they sleep on, a xxx.										x
274. *CHI: they sleep on door.										x
275. *CHI: they sleep... everywhere!										x
276. *CHI: they sleep on TV.										x
277. *CHI: they sleep on the <soup>[?]										x
278. *CHI: and the door.										x
279. *CHI: they sleep...										x
280. *CHI: they sleep on your lap.					x	Lang.				x
281. *CHI: sleep in a box.										x

UTTERANCE	UNDECIPH	WHISPER	SOCIAL	SUNG	SELFREG	SELFREG TYPE	DIALOGUE	DIALOGUE ROLE	EMOTION	LANG PRACTICE
282. *CHI: they sleep in <grass>[?]										x
283. *CHI: they sleep they sleep on a car.										x
284. *CHI: they they sleep with the dog.										x
285. *CHI: ok! Time for two more songs.										x
286. *CHI: two more books.										x
%tim: 25:18										
%act: new book?										
287. *CHI: this xxx.										x
288. *CHI: this is my dad.										x
289. *CHI: these xxx are the beautiful xxx.										x
290. *CHI: yay. have you xxx										x
291. *CHI: xxx clean everything.										x
292. *CHI: clean everything... my garden.										x
293. *CHI: this is xxx!										x
294. *CHI: this is called xxx xxx.										x
295. *CHI: the boy xxx.										x
296. *CHI: xxx.	x									
297. *CHI: this is xxx!										x
298. *CHI: here we eat anything xxx afterschool.										x
299. *CHI: you play after xxx.										x
300. *CHI: you play after nap.					x	Lang.				x
301. *CHI: you xxx xxx.										x
302. *CHI: xxx lot of <kitties>[?]										x
303. *CHI: xxx and read a book.										x
304. *CHI: a book with puppies!										x
305. *CHI: round and round and round the race										x
306. *CHI: they go up xxx.										x
307. *CHI: playing in a party										x

UTTERANCE	UNDECIPH	WHISPER	SOCIAL	SUNG	SELFREG	SELFREG TYPE	DIALOGUE	DIALOGUE ROLE	EMOTION	LANG PRACTICE
308. *CHI: dance and dance.										x
309. *CHI: they xxx they play xxx...										x
310. *CHI: sleep tight little one.										x
311. *CHI: good xx.										x
312. *CHI: xxx and <trolls and xxx go away>[?]										x
313. *CHI: and look at the sun and then look at the clouds.										x
314. *CHI: you play, you play.										x
315. *CHI: xxx and+... books xxx.										x
316. *CHI: you climb up xxx.										x
317. *CHI: climb down.										x
318. *CHI: and up.										x
319. *CHI: you go to a party xxx and xxx.										x
320. *CHI: and you <dance around>[?]										x
321. *CHI: xxx that you are <happy>[?] xx									x	x
322. *CHI: and then it starts to get xxx.										x
323. *CHI: and then you xxx and xxx at the xxx.										x
324. *CHI: at <beats>[?]										x
325. *CHI: and then xxx a baby and you+...xxx										x
326. *CHI: and play with kittens now.										x
327. *CHI: play with kittens.										x
%act: story ends?										
%tim: 28:34										
%act: new book?										
328. *CHI: and xxx...										x
329. *CHI: oooh hooo.										x
330. *CHI: <theres a lot of cat>[?]										x
331. *CHI: <theres a lot of cat>[?]										x

UTTERANCE	UNDECIPH	WHISPER	SOCIAL	SUNG	SELFREG	SELFREG TYPE	DIALOGUE	DIALOGUE ROLE	EMOTION	LANG PRACTICE
332. *CHI: xxx xxx	x									
333. *CHI: xxx	x									
334. *CHI: and look. xxx <noses>[?]										x
335. *CHI: and play with the <elbow>[?] xxx dog!										x
336. *CHI: and the <butter>[?] dog.										x
337. *CHI: and the xxx										x
338. *CHI: xxx	x									
339. *CHI: xxx	x									
340. *CHI: xxx.	x									
341. *CHI: and you build a castle with all the <sticks>[?]										x
342. *CHI: and we had fun at the rodeo.										x
343. *CHI: and now we look at a book and xxx.										x
344. *CHI: and...										x
345. *CHI: that was your favorite book!										x
346. *CHI: and now xxx cow!										x
347. *CHI: oo what can a <cow call>[?]										x
348. *CHI: what can a xxx call?										x
349. *CHI: what can a cat call a xxx? xx										x
350. *CHI: what can call a duck?										x
351. *CHI: what can call a swan?										x
352. *CHI: what can call a rooster?										x
353. *CHI: what can call a pig?										x
354. *CHI: what can call a frog?										x
355. *CHI: what can call a puppy?										x
356. *CHI: what can call a fish.										x
357. *CHI: what can you call everyone?										x
%tim: 30:50										

UTTERANCE	UNDECIPH	WHISPER	SOCIAL	SUNG	SELFREG	SELFREG TYPE	DIALOGUE	DIALOGUE ROLE	EMOTION	LANG PRACTICE
358. *CHI: what										x
359. *CHI: pig										x
360. *CHI: be with										x
361. *CHI: be with lambs.					x	Lang.				x
362. *CHI: cow be with chickens.										x
363. *CHI: cat be with dogs.										x
364. *CHI: lambs be with sheeps.										x
365. *CHI: duck										x
366. *CHI: you... you just stay										x
367. *CHI: what										x
%act: story ends										
368. *CHI: isn't that a great xxx?							x	x		
369. *CHI: time for nap!							x	x		
370. *CHI: NO! no nap!							x	x		
371. *CHI: you have to have nap.							x	x		
372. *CHI: <you're the baby, remember>[?]							x	x		
373. *CHI: oh yeah.							x	x		
374. *CHI: goodnight, <sweety>[?]							x	x		
375. *CHI: goodnight!							x	x		
376. *CHI: no but daddy <needs to sing a song>[?]							x	x		
377. *CHI: ok.							x	x		
378. *CHI: Daddy?							x	x		
379. *CHI: what?							x	x		
380. *CHI: uhh.. put Lady to sleep.							x	x		
381. *CHI: ok.				x			x	x		

REFERENCES

Andress, B. (1989). Music for every stage: How much? What kind? How soon? *Music Educators Journal, 76*, 22-27.

Atencio, D. J., & Montero, I. (2009). Private speech and motivation: The role of language in a sociocultural account of motivational processes. In A. Winsler, C. Fernyhough, & I. Montero (Eds.), *Private speech, executive functioning, and the development of verbal self-regulation* (pp. 201-223). New York, NY: Cambridge University Press.

Beaudichon, J. (1999). Nature and instrumental function of private speech in problem solving situations. In P. Lloyd & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language* (Vol. 2, pp. 230-247). Florence, KY: Taylor & Frances/Routledge.

Behrend, D. A., Rosengren, K., & Perlmutter, M. (1999). A new look at children's private speech: The effects of age, task difficulty, and parent presence. In P. Lloyd & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language* (Vol. 2, pp. 384-398). Florence, KY: Taylor & Frances/Routledge.

Berger, A. A., & Cooper, S. (2003). Musical play: A case study of preschool children and parents. *Journal of Research in Music Education, 51*(2), 151-165.

Berk, L. E. (1999). Children's private speech: An overview of theory and the status of research. In P. Lloyd & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language.* (Vol. 2, pp. 33-70). Florence, KY: Taylor & Frances/Routledge.

Berk, L. E., & Garvin, R. A. (1984). Development of private speech among low-income Appalachian children. *Developmental Psychology, 20,* 271-286.

Bodrova, E., & Leong, D. J. (2009). Tools of the mind: A Vygotskian-based early childhood curriculum. *Early Childhood Services: An Interdisciplinary Journal of Effectiveness, 3*(3), 245-262.

Broderick, N. Y. (2001). An investigation of the relationship between private speech and emotion regulation in preschool-age children. *Dissertation Abstracts International: The Sciences & Engineering, 61*(11-B), 6125.

Chiu, S., & Alexander, P. A. (2000). The motivational function of preschoolers' private speech. *Discourse Processes, 30*(2), 133-152. doi:10.1207/S15326950DP3002_03

Coplan, R. J. (2011). Not just "playing alone:" Exploring multiple forms of nonsocial play in childhood. In A. D. Pellegrini (Ed.), *The Oxford handbook of the development of play* (pp. 185-201). New York, NY: Oxford University Press.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, CA: Sage.

Daugherty, M., & White, C. S. (2008). Relationships among private speech and creativity in Head Start and low-socioeconomic status preschool children. *Gifted Child Quarterly, 52*(1), 30-39. doi:10.1177/0016986207311059

Daugherty, M., White, C. S., & Manning, B. H. (1994). Relationships among private speech and creativity measurements of young children. *Gifted Child Quarterly, 38*(1), 21-26. doi:10.1177/001698629403800103

Eisenberg, S. L., Fersko, T. M., & Lundgren, C. (2001). The use of MLU for identifying language impairment in preschool children: A review. *American Journal of Speech-Language Pathology, 10*, 323-342.

Feigenbaum, P. (1992). Development of the syntactic and discourse structures of private speech. In R. M. Diaz & L. E. Berk (Eds.), *Private speech: From social interaction to self-regulation* (pp. 181-198). Hillsdale, NJ: Earlbaum.

Feigenbaum, P. (2009). Development of communicative competence through private and inner speech. In A. Winsler, C. Fernyhough, & I. Montero (Eds.), *Private speech, executive functioning, and the development of verbal self-regulation* (pp. 105-120). New York, NY: Cambridge University Press.

Feldman, C. F. (1989). Monologue as problem-solving narrative. In K. Nelson (Ed.), *Narratives from the crib* (pp. 98-119). Cambridge, MA: Harvard University Press.

Fernyhough, C., Bland, K. A., & Meins, E., Coltheart, M. (2007). Imaginary companions and young children's responses to ambiguous auditory stimuli: Implications for typical and atypical development. *Journal of Child Psychology and Psychiatry, 48*, 1094-1101.

Fernyhough, C., & Russell, J. (1997). Distinguishing one's own voice from those of others: A function for private speech? *International Journal of Behavioral Development*, *20*(4), 651-665.

Frauenglass, M. H., & Diaz, R. M. (1999). Self-regulatory functions of children's private speech: A critical analysis of recent challenges to Vygotsky's theory. In P. Lloyd & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language* (Vol. 2, pp. 371-383). Florence, KY: Taylor & Frances/Routledge.

Furrow, D. (1984). Social and private speech at two years. *Child Development*, *55*(2), 355-362. doi:10.2307/1129948

Goudena, P. P. (1999). The social nature of private speech of preschoolers during problem solving. In P. Lloyd & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language* (Vol. 2, pp. 321-339). Florence, KY: Taylor & Frances/Routledge.

Hayes, S. C. (1981). Single case experimental design and empirical clinical practice. *Journal of Consulting and Clinical Psychology*, *49*(2), 193-211. doi:10.1037/0022-006X.49.2.193

Hoff, E. (2009). *Language development* (4th ed.). Belmont, CA: Wadsworth.

Krafft, K. C., & Berk, L. E. (1998). Private speech in two preschools: Significance of open-ended activities and make-believe play for verbal self-regulation. *Early Childhood Research Quarterly*, *13*(4), 637-658. doi:10.1016/S0885-2006(99)80065-9

Kuczaj, S. A. (1983). *Crib speech and language play*. New York, NY: Springer-Verlag.

Levy, E. (1989). Monologue as development of the text-forming function of language. In K. Nelson (Ed.), *Narratives from the crib* (pp. 123-170). Cambridge, MA: Harvard University Press.

MacWhinney, B. (2000). *The CHILDES project: Tools for analyzing talk: Transcription format and programs* (3rd ed., Vol. 1). Mahwah, NJ: Erlbaum.

Murray, J. D. (1999). Spontaneous private speech and performance on a delayed match-to-sample task. In P. Lloyd & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language* (Vol. 2, pp. 248-264). Florence, KY: Taylor & Frances/Routledge.

Nelson, K. (1989). *Narratives from the crib*. Cambridge, MA: Harvard University Press.

Pellegrini, A. D. (2009). *Role of play in human development*. New York, NY: Oxford University Press.

Pickert, S. M. (1981). Imaginative dialogues in children's private speech. *First Language, 2*(4), 5-20. doi:10.1177/014272378100200401

Sachs, J., Goldman, J., & Chaillé, C. (1985). Narratives in preschoolers' sociodramatic play: The role of knowledge and communicative competence. In L. Galda & A. D. Pellegrini (Eds.), *Play, language, and stories: The development of children's literate behavior* (pp. 45-61). Norwood, NJ: Ablex.

Schaerlaekens, A., & Swillen, A. (1997). Crib speech in autistic and psychotic children: Case studies of form, content, and function. *First Language, 17*(51, Pt 3), 303-319. doi:10.1177/014272379701705114

Smolucha, F. (1992). Social origins of private speech in pretend play. In R. Diaz & L. Berk (Eds.), *Private speech: From social interaction to self-regulation* (pp. 123-141). Hillsdale, NJ: Erlbaum.

Stern, D. N. (1989). Crib monologues from a psychoanalytic perspective. In K. Nelson (Ed.), *Narratives from the crib* (pp. 309-319). Cambridge, MA: Harvard University Press.

Torrance, E. P. (1981). *Thinking creatively in action and movement*. Bensenville, IL: Scholastic Testing Services.

Vygotsky, L. S. (1962). *Thought and language*. Cambridge, MA: MIT Press. (Original work published 1934).

Vygotsky, L. S. (1967). Play and its role in the mental development of the child. *Soviet Psychology, 5*(3), 6-18. (Original work published 1933).

Watson, R. (1989). Monologue, dialogue, and regulation. In K. Nelson (Ed.), *Narratives from the crib* (pp. 263-283). Cambridge, MA: Harvard University Press.

Weir, R. (1962). *Language in the crib*. The Hague, Netherlands: Mouton.

White, C. S., & Daugherty, M. (2009). Creativity and private speech in young children. In A. Winsler, C. Fernyhough, & I. Montero (Eds.), *Private speech, executive functioning, and the development of verbal self-regulation* (pp. 224-235). New York, NY: Cambridge University Press.

Winsler, A. (2009). Still talking to ourselves after all these years: A review of current research on private speech. In A. Winsler, C. Fernyhough, & I. Montero (Eds.),

Private speech, executive functioning, and the development of verbal self-regulation (pp. 3-41). New York, NY: Cambridge University Press.

Winsler, A., & Diaz, R. M. (1995). Private speech in the classroom: The effects of activity type, presence of others, classroom context, and mixed-age grouping. *International Journal of Behavioral Development, 18,* 463-488.

Winsler, A., Ducenne, L., & Koury, A. (2011). Singing one's way to self-regulation: The role of early music and movement curricula and private speech. *Early Education and Development, 22*, 274-304.

Winsler, A., Feder, M., Way, E. L., & Manfra, L. (2006). Maternal beliefs concerning young children's private speech. *Infant and Child Development, 15*(4), 403-420.

Winsler, A., Fernyhough, C., McClaren, E.M., & Way, E. (2005). *Private speech coding manual*. Unpublished manuscript, Department of Psychology, George Mason University, Fairfax, VA. Retrieved from http://classweb.gmu.edu/awinsler/Resources/PsCodingManual.pdf

Wolf, D. P., & Pusch, J. (1985). The origins of autonomous texts in play boundaries. In L. Galda & A. D. Pellegrini (Eds.), *Play, language, and stories: The development of children's literate behavior* (pp. 63-97). Norwood, NJ: Ablex.

BIOGRAPHY

Danielle L. Mead graduated from Pascack Hills High School, Montvale, NJ, in 2003. She received her Bachelor of Science from University of Mary Washington in 2007. She was employed as a research assistant in Washington, DC hospitals and National Institute of Mental Health for three years, and received her Master of Arts in Psychology from George Mason University in 2013.