

Comparing the Length of Maternal Verbal  
Initiations with the Length of Maternal Verbal  
Responses

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**NORTHERN ILLINOIS UNIVERSITY**

**Comparing the Length of Maternal Verbal Initiations with the  
Length of Maternal Verbal Responses**

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The current study examined if the length of maternal verbal initiations and maternal verbal responses were different. Thirty-one 13-month-old infants interacted with their mothers for six minutes while experimenters observed and videotaped from an adjacent room. Mothers were given a standard toy set and asked to play as they typically would. Videos of the mother-infant dyads were transcribed in SALT and mothers' verbal initiations and verbal responses during the play session were identified. Maternal verbal responses were further categorized as responses to infant vocalizations, responses to

infant verbalizations, maternal imitative responses, and maternal non-imitative responses. Mothers' verbal initiations were significantly longer than mothers' verbal responses to infant vocal/verbal behavior. Maternal responses to infant vocalizations were found to be significantly longer than maternal responses to infant verbalizations. In response to infant verbalizations, mothers responded more frequently with imitative responses than nonimitative responses. These conclusions demonstrate that as infants begin using more words to communicate during the second year of life, mothers' MLU decreases because more of mothers' utterances are responses to the increasing number of infant words.

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### Abstract

The current study examined if the length of maternal verbal initiations and maternal verbal responses were different. Thirty-one 13-month-old infants interacted with their mothers for six minutes while experimenters observed and videotaped from an adjacent room. Mothers were given a standard toy set and asked to play as they typically would. Videos of the mother-infant dyads were transcribed in SALT and mothers' verbal initiations and verbal responses during the play session were identified. Maternal verbal responses were further categorized as responses to infant vocalizations, responses to infant verbalizations, maternal imitative responses, and maternal non-imitative responses. Mothers' verbal initiations were significantly longer than mothers' verbal responses to infant vocal/verbal behavior. Maternal responses to infant vocalizations were found to be significantly longer than maternal responses to infant verbalizations. In response to infant verbalizations, mothers responded more frequently with imitative responses than nonimitative responses. These conclusions demonstrate that as infants begin using more words to communicate during the second year of life, mothers' MLU decreases because more of mothers' utterances are responses to the increasing number of infant words.

## Introduction

High maternal verbal responsivity has been shown to promote better language skills in children (Brady, 2004; Gros-Louis, 2006; Tamis-LeMonda, 2001). However, studies of maternal verbal responsivity have not often considered the length of mothers' responses and how they might vary as a function of infants' developing verbal abilities. It is known that infants play an increasingly active role in conversations as they start using an increasing number of words during the second year of life (Fenson, Marchman, Thal, Reznick, & Bates, 2007). It is also known that mothers' overall utterance length decreases during this same developmental time period. It is possible that the changing verbal participation of infants results in a decreased MLU for the mothers. We do not know if mothers are adjusting the length of all their utterances or if they are only adjusting utterances in response to infant words and because there are more words to respond to, their MLUs decrease (Phillips, 1973). The current study will address this question by comparing the MLU of maternal verbal initiations compared to maternal verbal responses.

It is also not determined if an infant vocalization versus an infant verbalization affects the MLU of mothers' responses differently. This could be important because early in the second year of life infants increasingly produce more words and fewer vocalizations, which might influence mothers' MLU. Therefore, researchers need to understand if the length of mothers' responses varies following infants' vocal and verbal behaviors. The current study will determine if verbal responses to infant vocalizations are longer than verbal responses to infant verbalizations.

Mothers' responses to infants' verbalizations can also be classified as imitative and nonimitative responses. Imitative and nonimitative responses can influence the length of the maternal responses. This is important because it is known that responses to verbal imitation are shorter in length than the other utterances mothers use (Olson & Masur, 2012). Mothers usually

imitate one word or a few words that were previously produced by the child. Since the length of responses could be affected by imitative and nonimitative responses, the current study will determine how often maternal verbal responses are imitative and nonimitative following infant verbalizations.

In summary, the current study will determine if maternal verbal initiations are longer than mothers' verbal responses to their infants' vocal/verbal behaviors. In addition, it will examine if the length of mothers' responses to infants' vocal and verbal behaviors are different. Finally, we will determine if mothers respond to infant words more often with imitative versus nonimitative responses.

## Methods

### Participants

The current study used an existing video database collected from thirty-one infants and their mothers; 14 male infants and 17 female infants when the infants were 1;1. The ethnic demographics of the thirty-one infants were 1 Hispanic, 1 African American, 1 Asian American, and 28 Anglo-American. The mothers' average age was 31.6 years old, with a range of 19 to 46. Twenty-nine of the thirty-one infants lived with their mother and father in the home. Of the thirty-one mothers, nine received a high school diploma, twenty-two received a college degree, and 11 received a degree higher than college. Twenty-five of the mothers' had occupations outside of the home. Sixteen mothers reported their child had no other siblings. English was the native language for all of the 31 participants. None of the dyads had a history of language impairment or learning difficulties in the family history. As measured by the *McArthur-Bates Communicative Development Inventory: Words and Gesture (MCDI)* or parent interview

(Fenson, Marchman, Thal, Reznick, & Bates, 2007), the 31 infants had expressive vocabulary sizes of 65 or fewer words ( $M = 13.03$ ;  $SD = 15.51$ ; range 0-65).

## **Procedure**

### **Language Sample**

The current study utilized an existing set of videos and corresponding language samples. This sample was collected as infants interacted with their mothers for 18 minutes while experimenters videotaped and observed through an adjacent observing room as part of a larger longitudinal project. Mothers were asked to play with their infant as they usually would at home. They were given a toy set that included a ball, stacking blocks, a stuffed animal, plastic ducks and bears, a car, a feeding/cooking set, and a shape sorter. This study will use the mother-infant play session that occurred only during the first six minutes of the session and their corresponding written transcripts. Pairs of trained transcribers had previously transcribed the videos of the 6-minute play sample achieving word for word reliability.

In order to analyze mothers' and infants' verbal behaviors during the 6-minute play sample, Systematic Analysis of Language Transcripts (SALT) software was used for the current project (Miller & Iglesias, 2008). The SALT software was involved in three different aspects of the study: coding language targets, tallying targets, and calculating mean length of utterance in words (MLUw; Brown, 1973). Previous codes from the larger longitudinal study were referenced to distinguish between maternal initiations and maternal responses (Ranstead, 2012).

**Coding.** Five different codes will be entered in the SALT transcripts for the current study. The codes will identify maternal verbal initiations, maternal verbal responses to infant vocalizations, maternal responses to infant verbalizations, imitative maternal responses, and non-imitative maternal responses.

**Maternal verbal initiations.** A maternal verbal initiation is a behavior that directs the infant's attention to a new subject, such as showing or offering a new toy (Newland, 2001). For example, the mother drew her infant's attention to a play ball by saying, '*What is that? Is that a ball?*'. For this study, maternal initiations were counted when the mother verbally attempted to direct the infant's behavior to a new topic. The code for maternal verbal initiations was formatted as [mi] in the SALT software. SALT was used to calculate MLUw for maternal verbal initiations.

**Maternal verbal responses.** A maternal response is a significant change of the mother's behavior in response to the child's behavior (Tamis-LeMonda, 2001; Olson & Masur, 2012). Although maternal responses can be in response to non-verbal/verbal behavior, this study focused on only maternal verbal responses to infants' vocal/verbal behaviors. SALT was used to calculate MLUw for maternal responses to infants' vocal/verbal behaviors.

Maternal responses were further coded into two additional categories: responses to infant vocalizations and responses to infant verbalizations. An infant vocalization is when an infant vocalizes sounds through babbling. The code for maternal utterances in response to infant vocalizations was formatted as [mr-v] in SALT. An infant verbalization is when an infant vocalizes through words or attempted parts of words. The code for maternal utterances in response to infant verbalizations was formatted as [mr-w] in SALT.

Finally, maternal responses to infant words will be further coded as imitative and non-imitative. An imitative response is when a mother responds to her child with the same word the child vocalized in her response (Clark & Bernicot, 2008; Olson & Masur, 2012; Snow, 1981; Tamis-Monda, 2001). For example, if the child says '*ball*', and the mother responds with '*ball*' or with '*big ball*', the response will be counted as an imitation. The code for imitative maternal

responses was formatted as [mr-i] in SALT. Non-imitative maternal responses are when mothers do not repeat any part of what the child said in their response. The code for non-imitative maternal responses was formatted as [mr-n] in SALT.

**Reliability.** Inter-rater reliability was conducted for coding mothers' imitative and nonimitative responses on four participants, two boys and two girls. Two professionals found 100% inter-rater agreement for the utterances, Cohen's Kappa = 1.

## Hypotheses & Results

The following three hypotheses were evaluated in the current study.

### Hypothesis 1

Maternal verbal initiations will be longer than maternal utterances that are responses to infant vocal/verbal behaviors.

A dependent t-test was conducted comparing the length of mothers' initiating utterances to mothers' responding utterances. Thirty dyads had infant vocal/verbal initiations and were included in this analysis. Results showed that the average MLU was 2.59 for all maternal verbal responses to infants' vocal/verbal behavior and 4.13 for maternal verbal initiations. Maternal verbal initiations were significantly longer than maternal verbal responses to vocal/verbal behavior,  $t(29) = 9.455; p < .000$ .

### Hypothesis 2

Mothers' verbal responses to infant vocalizations will be longer than their responses to infant verbalizations.

A dependent t-test was conducted comparing the length of mothers' verbal responses to infant vocalizations with mothers' verbal responses to infant words. Sixteen infants had vocal and verbal initiations and were included in this analysis. The average MLU was 2.75 for

maternal verbal responses to infant vocalizations and 1.47 for maternal verbal responses to infant words. Mothers' verbal responses to infant vocalizations were significantly longer than mothers' verbal responses to infant words,  $t(15) = 3.147; p < .007$ .

### **Hypothesis 3**

Mothers' will respond more often with imitations of infant utterances than non-imitative utterances.

A dependent t-test was conducted comparing the frequency of mothers' imitative responses with the number of nonimitative utterances. Sixteen dyads had infant verbal initiations and were included in this analysis. The average number of imitative utterances in response to infant words was 2.06. The average number of nonimitative utterances in response to infant words was .31. Mothers responded to infant words using imitative utterances significantly more often than nonimitative utterances,  $t(15) = 2.573; p < .021$ .

### **Discussion**

The purpose of this study was to determine if mothers' adjust the length of their utterances when they initiate and respond to their children. As children enter the second year of life, they take on a more active verbal role in the conversation. During this same time period, the MLU of mothers' utterances decreases. This study focused on how the MLU of maternal verbal initiations and maternal verbal responses was affected in the mothers' interactions by the vocal/verbal behaviors of their thirteen-month old infants.

It was expected that the MLU of maternal verbal initiations would be longer than the MLU of maternal verbal responses based on the idea that at thirteen months, infants are just starting to have a verbal role within a conversation. It has been shown that mothers tend to adjust their utterance length to the developmental level of their child (Phillips, 1973). However if this

were a general rule, maternal verbal initiations and maternal verbal responses would be expected to be the same utterance length. Since our results found a difference between maternal verbal initiations and maternal verbal responses, mothers are not reducing their utterance length in general. Instead, they are reducing their utterance lengths for responsive utterances. Therefore, the increasing number of vocal/verbal initiating behaviors by the child could be explained by the general decrease in mothers' MLU. When the child initiates more frequently, the mother has more opportunities to respond. As mothers respond more, their MLU decreases.

In hypothesis two, it was expected that mothers would have longer responses to infant vocalizations rather than infant words. Most children vary at this age in the number of verbalizations and vocalizations they produce. Discovering that mothers respond with longer utterances to vocalizations than verbalizations displays that mothers are adjusting their utterance length in relation to their child's vocal productions. These results provide evidence that as children use more words, mothers respond with shorter utterances that could recast or expand their child's words.

Lastly, it was expected that mothers would respond using imitative utterances more often than nonimitative utterances in response to infant words. It has been shown that mothers' imitative responses are shorter in length than other utterances produced in response to infant words (Olson & Masur, 2012). When mothers respond to their child's words, they tend to repeat their child or expand on the child's topic. Both of these ways encourage the child to continue to communicate with words through scaffolding. Evidence has also been shown that imitations and expansions help a child's language development (Snow, 1981; Girolametto, 1999; Clark & Bernicot, 2008). Imitation could explain why mothers' MLU decreases during the second year of life, especially because mothers have many opportunities to imitate their child's words. This



evidence suggests that the MLU reduction seen in mothers' utterances during the second year of life may be a very specific rather than a general reduction in all utterances. The MLU reduction is specific to maternal responses in relation to infant words and imitations.

One limitation of the current study was related to the way maternal verbal initiations were coded. Because codes from a larger longitudinal study were used for maternal initiations and maternal responses, maternal initiations were only identified when a new toy or topic was directed. If the child initiated through playing with a new toy, the mothers' verbal utterance on that topic was not counted as a maternal initiation. A narrow definition of maternal initiations was used, which left a large portion of maternal utterances out of analyses. For future studies, it might be helpful to use a broader definition of maternal verbal initiations to provide more representative results. Another limitation of the current study is that thirteen months was the only age focused on in this study. As children get older, their role in conversation and the way mothers initiate and respond to their vocal/verbal participation may continue to change. In future studies, different ages should be explored to see how the way mothers' responsive and initiating MLUs change with time. It was also difficult to analyze the difference between mother responses to vocal and verbal behaviors since many participants produced few verbalizations. If children at 17 months were analyzed, it would be a better way to analyze change since more children would be talking.

These results demonstrate that as infants begin using more words to communicate during the second year of life, the length of mothers' is dependent upon whether mothers are initiating conversations or responding to vocal/verbal infant behaviors. The MLU for maternal responses was shorter than the MLU for maternal initiations. This could serve as preliminary evidence accounting in part for the decrease in maternal MLU reported during the second year of life.

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## Appendix A

### Coding Manual for Maternal Verbal Initiations and Maternal Verbal Responses

#### Maternal Verbal Initiations

- Write down the mother's first statement.
- Write out every utterance by the mother that occurs in an unbroken sequence during the initiation. The sequence will be broken when there is a pause of 2 seconds or greater. When the sequence is broken and there has been no response from the partner, code the next vocalization/verbalization as a new initiation.
- Only code verbalizations until a response is coded. Do not code verbalizations throughout the Joint Attention episode.

#### Maternal Verbal Responses

- Count First Utterance of the mothers' responses
  - Do not count interjections, such as yeah, as the first utterance of the mother's response.
- Is it a vocalization or a word?
  - Consider Context- Is the child referring to someone or something? Look at body language, eye gaze, sign, etc.
  - Consider mother's reply- Is she recasting the child's approximation?
    - Is the child confirming the mother's recast?
  - Is the child's production consistent? (i.e. is the child using the same utterance to refer to the same things?)
  - Is the child echoing their mother? (Mom says "star", child says an approximation of "star")
- Imitative or nonimitative?
  - Imitative = mother says same word as part of her response that her child just spoke
  - Nonimitative = mother does not say any of the same words her child just spoke
- Mothers must respond within 3 seconds after infants' verbal initiations in order to be counted as a maternal response.

**\*\*Remember: Place Codes Before Punctuation of Each Utterance**

#### Current SALT Codes

- Maternal Initiations: [mi]
- Maternal Responses to Vocalizations: [mr-v]
- Maternal Responses to Words: [mr-w]
- Imitative Maternal Responses [mr-i]
- Non-imitative Maternal Responses [mr-n]

**\*\*Remember: Wear headphones for Maximal Phonetic Detection**