

Fathers' Language Influence On Their Six-month-old Infants' Vocalization During Free-play

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FATHERS' LANGUAGE INFLUENCE ON THEIR SIX-MONTH-OLD
INFANTS' VOCALIZATION DURING FREE-PLAY

by

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A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Arts
in the Department of Child, Family and Community Sciences
in the College of Education
at the University of Central Florida
Orlando, Florida

Summer Term
2010

ABSTRACT

Data for this study were derived from videotapes of 26 father-infant dyads, specifically from a five minute period of free-play. The first step was the creation of a literal transcription of the father-infant dyads interaction. Subsequently, nine variables of fathers' language characteristics and one infant characteristic were coded employing the literal transcriptions and observing the videotapes. The fathers' language variables were number of : (1) father utterances, (2) father words, (3) father contingent responses, (4) father teaching utterances, (5) father descriptive teaching utterances, (6) father directive teaching utterances - making commands, (7) father directive teaching utterances – asking questions, (8) percentage of father teaching utterances, and (9) mean length of father utterances (MLU). The infant variable was number of vocalizations. Eight out of the nine variables were positively correlated to infant vocalizations, indicating the importance of fathers' input in child language development. The only negative correlation in the present study was between Mean Length of Utterance (MLU) and infant vocalizations and the possible reasons are discussed. The findings support the idea that there are positive relationships between fathers' language characteristics and infant vocalizations. Recommendations are made that fathers should be involved in early intervention programs.

Keywords: infant vocalizations, father utterances, father words, contingent responses, mean length of utterances, teaching utterances, transcriptions

ACKNOWLEDGMENTS

I am sincerely grateful to my advisor and committee chairperson, Rex E. Culp, Ph.D., JD, for his continuous supports during the process of this research project, and his guidance of my entire graduate career. I would also like to thank Anne Culp, Ph.D. and Judit Szente, Ph.D., for kindly being my thesis-committee members and offering brilliant advice on my thesis. Moreover, I thank Tara Saathoff-Wells, Ph.D. at Central Michigan University, for her inspiration of my research idea and help with the statistical results. In addition, I appreciate the support from my graduate fellow Nicole Bourlier, and my lab teammates Janisse Guzman, Kristin Kestner, and Kristen Smith. Last but not least, I must thank my families, who always support my decisions, especially when I decided to study abroad.

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INTRODUCTION

Over the past 30 years, fathers' involvement and influences on children's development has received much attention across the world (Laflamme, Pomerleau, & Malcuit, 2002; Lamb, 2010; Lewis & Lamb, 2003; Shannon, Tamis-LeMonda, & Margolin, 2005). However, few studies have been done to investigate the relationship of fathers' language characteristics and child language characteristics. The purpose of this study is to clarify the relationships between fathers' language characteristics and children's vocalizations. The following questions are addressed in the present study in order to examine the relationships between fathers' language characteristics and infant language development: Is there a relationship between:

- (1) the total number of father utterances and the number of infant vocalizations;
- (2) the total number of father words and the number of infant vocalizations;
- (3) the number of father contingent responses and the number of infant vocalizations;
- (4) the total number of father teaching utterances and the number of infant vocalizations;
- (5) the number of father descriptive teaching utterances and the number of infant vocalizations;
- (6) the number of father directive teaching utterances - making commands and the number of infant vocalizations;
- (7) the number of father directive teaching utterances - asking questions and the number of infant vocalizations;

(8) the percentage of father teaching utterances and the number of infant vocalizations; and

(9) the mean length of father utterances and the number of infant vocalizations?

Definitions of Terms

Infant Vocalizations

The variable “infant vocalizations” is an actual count of individual sounds the infant made during the five minute free play session.

Father Utterances

The variable “father utterances” is the actual count of each utterance the father made. An utterance is a complete unit of talk, bounded by the father’s silence. Each line of fathers’ utterances in the transcriptions was counted as one utterance. Idiosyncratic sounds the father made to present an object (e.g., car sounds, animal sounds, etc.) were counted as utterances. Partially intelligible utterances were counted as utterances. Unintelligible utterances and utterances directed at the researcher or the mother, or utterances that were noises such as a laugh, sigh, and cough were not counted as utterances.

Father Words

The variable “father words” is an actual count of the number of fathers’ words in each utterance.

Contingent Responses (CR)

The variable “contingent responses” is the count of the number of episodes of contingent responses for each father-infant dyad. An episode of contingent responses occurred when the father verbally responded to the infant within two seconds of an infant vocalization.

Father Teaching Utterances (FTU)

The variable father teaching utterance was a count of all father utterances that occur during joint attention. Joint attention was defined as any father utterance spoken to the infant that was related to what the infant is doing or saying. These father teaching utterances were coded into three categories of teaching utterances:

Descriptive Teaching (D1)

During joint attention, descriptive teaching was coded when the father was describing in concrete terms what the infant was looking at (e.g., “It’s a violin.”).

Directive Teaching – Making Commands (D2)

During joint attention, directive teaching – making commands was coded when the father directed the infant’s attention or behavior to do something with the object that the infant was looking at (e.g., “Go get it.”).

Directive Teaching – Asking Questions (D3)

During joint attention, directive teaching – asking questions was coded when the father suggested doing something with an object by asking a question (e.g., “Can you take it out?”).

Percentage of Father Teaching Utterances (Percent of FTU)

The variable “percentage of father teaching utterances” was calculated by dividing the number of father teaching utterances by the total number of father utterances.

Mean Length of Utterances (MLU)

The variable “mean length of utterance (MLU)” was calculated by dividing the total number of father words by the total number of father utterances.

LITERATURE REVIEW

Infant Language Development: Nature or Nurture?

Infants learn much about language and are able to discriminate different sounds far before they can literally say a word (Gopnik, Meltzoff, & Kuhl, 1999). They believe that “newborn babies already go well beyond the actual physical sounds they hear, dividing them into more abstract categories” (p. 106).

Mattys and Jusczyk (2001) reported that even nine-month-old infants made use of phonotactic cues to segment words from fluent speech. In accord with these studies, Maccoby (1992) reviewed the two major theories on child development – behaviorism and psychoanalytic theory and found a body of research supported that “an innate language acquisition device” equipped infants with necessary capabilities to learn language and “they do much of the work of language acquisition themselves” (p. 1009).

Although learning language is a complicated process, infants are born with their brains prepared to distinguish speech and link sound patterns with meanings (Gopnik et al., 1999; Maccoby, 1992). This birthright mechanism is a prerequisite for infants to be able to learn how to pronounce and use language like adults (Kuhl, 2000). However, Maccoby (1992) did not believe that infants developed language without any inputs of others. The author stated “parents were important in that they were the primary source of children’s exposure to their culture’s language” (Maccoby, 1992, p. 1009).

In accordance with Vygotsky’s theory, a considerable body of research demonstrated that children learn language in social contexts and are greatly influenced by the adults in their environments (e.g., Fowler, Ogston, Roberts, & Swenson, 2006). Tamis-LeMonda, Bornstein, and Baumwell (2001) investigated forty mother-child dyads during free-play in

order to evaluate the effects of maternal responsiveness on child language development. In their study, maternal responsiveness and children's activities such as vocalizations and play were coded at nine and thirteen months and children's language acquisition was obtained through interviews with mothers from nine to twenty-one months. The findings in this longitudinal study showed that maternal responsiveness at both ages predicted the children's achievement of language milestones.

However, children do not only simply receive and imitate their parents' language (Maccoby, 1992). Rather, language learning is a two-way and ongoing process that children also dynamically interact with their environment (Gopnik et al., 1999; Kuhl, 2000). Similarly, Maccoby (1992) also stressed that while absorbing the information that parents provided, children used their own learning processes to understand the meaning of words.

A body of research (e.g., Gopnik et al., 1999) has agreed that nature and nurture of language learning are inevitably intertwined. Both parent and child play an essential role in language acquisition through an ongoing and communicative process. Other studies focused on how parent influence on their children's development and begun to address the role of fathers in children's life and education.

Fathers' Influence on Children's Development

Lewis and Lamb (2003) mentioned that "for the past 15 years, more than 700 articles on fathers have been cited each year in the *Psychological Abstracts* database" (p. 211). Most studies agreed that fathers have a considerable influence on children's development, though it is less clear whether fathers demonstrate similar or different play styles and quality compared to mothers during play interactions. Differences between father-infant interaction

and mother-infant interaction during play are evident in previous studies. Fathers are more likely to engage in rough-and-tumble play (Stevenson, Leavitt, Thompson, & Roach, 1988), are less responsive than mothers to infant cues of interest and attention (Power, 1985), have less utterances and make fewer requests than mothers (Laflamme et al., 2002), and tend to exhibit less reciprocity in the interactions (McGovern, 1990). On the other hand, other studies argued that fathers and mothers both encourage exploration and simple manipulation of objects during play (Power, 1985). Tamis-LeMonda, Shannon, Cabrera, and Lamb (2004) noticed that there is a body of research that identifies “more similarities than differences between parents” (p. 1807). Although many studies have demonstrated the important role of fathers in children’s development and compare father-infant interaction and mother-infant interaction during play, few of them focused on the relationships between father contingent responses, words, utterances, especially teaching utterances and infant vocalizations. Research on mothers’ influence on child language development might provide insights on future father studies.

Parent Utterances, Words and Child Vocalizations

The supporting role of maternal verbal responsiveness for the transition from prelinguistic stage to intentional communication is well documented (e.g., Landry, Smith, Swank, & Guttentag, 2008; Tamis-LeMonda, Bornstein, & Baumwell, 2001). In addition, there is evidence that early language enrichment is consistently advantageous and has positive impact on later language development (Fowler, Ogston, Roberts, & Swenson, 2006).

Contingent Responses and Children’s Development

Responsive parenting plays an essential role in children’s development in that children internalize and generalize their learning and new knowledge through consistently

interaction with parents (Landry, Smith, Swank, & Guttentag, 2008). They used videotapes to teach mothers responsive interactive behaviors (e.g., maintaining infants' attention focus and warm sensitivity) and help them plan for how to use the target behaviors. The findings of their study showed that early intervention increased maternal responsiveness including contingent responsiveness and mothers' quality of language input. It was also evident in their study that there were apparent benefits on children's outcomes in the intervention group. Children whose mothers received multiple doses of the intervention demonstrated an increase of using words in joint attention. Moreover, children in the intervention group increased cooperating and social engaging behaviors. Other studies also support the idea that maternal contingent responsiveness has positive effects on child language development and social behaviors such as smile and social bids (Gros-Louis, West, Goldstain, & King, 2006; McQuaid, Bibok, & Carpendale, 2009).

Teaching Utterances, Percentage of Teaching Utterances, and Child Vocalizations

Many studies have addressed the importance of parent verbal input and interaction with infants. However, only a few have investigated the effects of different kinds of parent utterances. Tamis-LeMonda et al. (2001) suggested that "maternal responsiveness may be more profitably studied as a multidimensional construct, with certain outcomes in children being affected by specific types of responsiveness at specific periods in development" (p. 749).

As an example, it is possible for two mothers to receive similar scores on overall responsiveness (e.g., the frequency of responsiveness), and yet be totally different in the type and content towards a same situation: one mother may describe what her child is doing (e.g.,

You got the block.), and another mother may direct the child's action by asking a question (e.g., Could you put the block back in the bucket?). Tamis-LeMonda et al. (2001) suggested that certain types of responses predicted certain language milestones. For instance, descriptions that provide verbal information particularly maintain children's attention, while asking questions specifically benefits children's use of language to retrieve their past experiences (Tamis-LeMonda et al., 2001).

Gros-Louis, West, Goldstein, and King (2006) discriminated seven categories of maternal vocal/verbal response: (1) naming, (2) questions, (3) acknowledgments, (4) imitations, (5) attributions, (6) directives and (7) play vocalizations. They investigated ten mother-infant dyads during unstructured play sessions and indicated that mothers' contingent feedback to prelinguistic vocalizations was related to the quality of infants' vocalizations (i.e., vowel-like sounds and consonant-vowel clusters), and thus provided relevant stimuli to facilitate child language development.

Another study by Culp, Howell, Horton, Culp, Palermo, and Ward (2003) focused on different kinds of teaching utterances and their relationships with infant vocalizations. The authors investigated three different kinds of teaching utterances: (1) descriptive teaching, (2) directive teaching: making commands and (3) expansion in teaching: asking questions in both intervention and control groups. The findings in their study showed that the intervention mothers had higher counts of all the three kinds of teaching utterances than their counterparts in the control group. Also, they found that the percentages of teaching utterances across all maternal utterances were significantly different between the two groups. More importantly,

it was evident that even at an early age of 12 months and with only a year of intervention, the infants in the intervention group had more vocalizations than the infants in the control group.

Mean Length of Utterance and Children's Language Development

Mean length of utterance (MLU) is frequently used as a measure of expressive language ability and is usually implemented to diagnose language impairments as well as to monitor treatment progress of children (Dethorne, Johnson, & Loeb, 2005). However, a body of research also used MLU to measure syntactic complexity of parent input (e.g., Johnson-Glenberg & Chapman, 2004). It is also documented that there is a positive relationship between mothers' MLU and their children's language development (Murray, Johnson, & Peters, 1990). In their study, the findings suggested a decrease in maternal MLU in the second half of the infant's first year. Moreover, previous studies found that parent MLU tends to increase as children's age and average MLU increase (Johnson-Glenberg et al., 2004). These studies showed that MLU is one of the measures that could predict child language development and thus should be considered when investigating parent-infant interaction.

In summary, a body of research has been focused on maternal responsiveness and verbal input, as well as their relationships to child development. Yet few studies have been done to investigate the relationships of fathers' involvement and interaction on children's development. Additionally, there is an absence of research on the relationships between fathers' utterances, especially their teaching utterances, and child vocalizations. The present study addresses the relationships between fathers' language characteristics and infant vocalizations.

METHODOLOGY

Participants

The data for the current study was provided by a subset of fathers from a home visitation research entitled Community-Based Family Resource Services (Culp, Culp, Hechtner-Galvin, Howell, Saathoff-Wells, & Marr, 2004). Three hundred and fifty-five first-time, low-income and low educated mothers were recruited into the original home visitation program before 28 weeks of gestation in 12 rural counties in Oklahoma. When the infants were 12 months, 156 intervention mothers and 107 control mothers provided data. Intervention mothers received both standard health department services and CBFRS services including weekly visits for the first three months after the infants' birth and then bi-weekly visits thereafter until the infants were 12 months. Parent educators provided curriculum that included "the detailed material on child development, child health, effective parenting skills, and home safety" (Culp et al., 2004, p. 6). The control mothers received the standard health department services (Culp et al., 2004).

The sub-set in the present study includes data from 26 fathers and their six-month old infants. The 26 fathers were selected based on the following criteria: (a) presenting during the free-play session with their six-month old infants; and (b) playing with their infants for more than five minutes in the videotapes. See Table 1 for demographic characteristics of the fathers.

TABLE 1
Demographic Characteristics for All Participants.

Characteristics	Mean (Standard Deviation)/ %	Number
Age in years	22.3 (3.98)	26
Education in years	12.9 (1.85)	25
Marital status (%)		26
Married	38.5	
Single, never married	61.5	
Ethnicity (%)		26
Caucasian	76.9	
African-American	7.7	
Native American/Alaskan Native	7.7	
Other	7.7	
Hispanic (%)		25
Yes	4	
No	96	

Procedures

During a videotaped free-play session, fathers were encouraged to play with their infants. The researcher set a standard set of toys on the floor for each father and infant. The fathers were asked to play with their infant as they normally do.

Measures

Language Transcript

A literal language transcription was created for each of the father-infant dyads. Each language transcript on all 26 father-infant dyads was completed and reviewed by a series of three transcribers. A first transcript consisted of word-for-word recording of what the father said and the infant vocalized. A second transcriber independently watched the videotape making any changes the second transcriber thought was necessary. A third transcriber then watched the videotape again making any further changes that were necessary. The changes were made to existing file creating the final transcript. The final transcript was printed for use in subsequent coding.

Father Language Characteristics

Nine father language characteristics were coded from the videotapes or calculated from the coded scores. The fathers' language variables were number of : (1) father utterances, (2) father words, (3) father contingent responses, (4) father teaching utterances, (5) father descriptive teaching utterances, (6) father directive teaching utterances - making commands, (7) father directive teaching utterances – asking questions, (8) percentage of father teaching utterances, and (9) mean length of father utterances (MLU).

Infant Language Characteristic

One infant variable, namely infant vocalizations was coded from the videotapes.

Training of the Coders

Five coders including two graduate students and three undergraduate students were trained to do coding for contingent responses and the teaching utterances. First, the coders discussed each variable and clarified all the definitions. Second, the coders used the completed transcripts watched two videotapes together to practice coding the variables. Third, the coders observed and coded two additional videotapes independently. Forth, the coders met to compare their codes. They had reached close to 85% reliability. At this time they watched the videotapes again and stayed until they reached 100% agreement.

Reliability

Inter-observer reliability was calculated for the eight coded variables that were coded from the videotapes. Inter-observer reliability was determined by score comparison of two observers who independently coded 25% of the videotapes ($n = 7$). The videotapes used for reliability were randomly selected from the set of all videotapes. Inter-observer reliability was calculated by dividing the lesser total number of events by one coder by the greater number of events by the other coder.

The inter-observer reliabilities was 100% for the number of infant vocalizations; 97.16% for the number of father utterances; 93.39% for the number of father words; 95.24% for the number of contingent response (CR); 99.24% for the number of father teaching utterances; 94.23% for the number of descriptive teaching (D1); 95.24% for the number of directive teaching – making commands (D2); and 92.86% for the number directive teaching – asking questions (D3).

RESULTS

The results of the analyses of (a) descriptive data for the nine independent variables and one dependent variable, (b) correlations between the independent variables and the dependent variable were carried out using Pearson's Product Moment Correlations (two-tailed 0.01 alpha level) with the Statistical Package for the Social Sciences (SPSS) version 18.0 for Windows (SPSS Inc., 2009).

Descriptive Analysis

TABLE 2
Descriptive Statistics for All Participants.

Variables	Mean (N = 26)	Standard Deviation (N = 26)	Range (N = 26)
VOC	10.08	9.25	1-36
Father Utterances	30.35	19.89	1-76
Father Words	98.54	78.92	1-279
CR	2.50	3.09	0-11
FTU	8.92	8.69	0-27
D1	4.46	5.94	0-21
D2	3.65	4.06	0-15
D3	0.81	1.79	0-8
Percentage of FTU	25.46%	18.85%	0-75%
MLU	2.91	.91	1-4.73

Note. VOC = Infant Vocalizations; CR = Contingent Responses; FTU = Father Teaching Utterances; D1 = Descriptive Teaching; D2 = Directive Teaching – Making Commands; D3 = Directive Teaching – Asking Questions; Percentage of FTU = Percentage of Father Teaching Utterances; MLU = Mean Length of Utterances.

The descriptive statistics for all variables in the present study are presented in Table 2. A fairly sizable amount of variability in the variables is apparent. For example, the exclusive range of father utterances was 75 and the standard deviation was 19.89. Another variable, father words, had even more exclusive range, which was 278 and its standard deviation was 78.92.

Correlation Analysis

To evaluate the effects of fathers' language characteristics relationship to infant vocalizations at six months, two-tailed Pearson's Product Moment Correlations were carried out between the variables of fathers' language characteristics and infant vocalizations. See Table 3 for detailed correlation results.

TABLE 3
Correlations between Fathers' Language Characteristics and Infant Vocalizations (N = 26).

Fathers' Language Characteristics	Infant Vocalizations
Father Utterances	.234
Father Words	.150
CR	.674**
FTU	.560**
D1	.661**
D2	.117
D3	.262
Percentage of FTU	.584**
MLU	-.019

Note. CR = Contingent Responses; FTU = Father Teaching Utterances; D1 = Descriptive Teaching; D2 = Directive Teaching - Making Commands; D3 = Directive Teaching - Asking Questions; Percentage of FTU = Percentage of Father Teaching Utterances; MLU = Mean Length of Utterances.
** $p < 0.01$.

Because the main interest was in examine the relationships between father language characteristics and infant vocalizations, the only correlation analyses conducted were those between each of the nine father variables and infant vocalizations. Of these nine correlations, four of the correlations were significant at the 0.01 level. The four significant correlations were infant vocalizations with (1) contingent responses, (2) father teaching utterances, (3) directive teaching, and (4) percent of father teaching utterances.

Father Utterances and Infant Vocalizations

The Pearson correlation between father utterances and infant vocalizations was positive ($r = .234, ns$). It had a small effect size according to Cohen's subjective standards (Cohen, 1988).

Father Words and Infant Vocalizations

Two-tailed correlation was generated between father words and infant vocalizations. It had a weak but positive relationship with a small effect size.

Contingent Responses and Infant Vocalizations

The correlation between CR and infant vocalizations had a medium effect size ($r = .674, p < .01$). It is evident that there was a moderate relationship between CR and infant vocalizations.

Father Teaching Utterances and Infant Vocalizations

The correlation between father teaching utterances and infant vocalization was positive ($r = .560, p < .01$). The correlation had a medium effect size.

Descriptive Teaching (D1) and Infant Vocalizations

The highest correlation examined in the present study emerged between D1 and infant vocalizations ($r = .661, p < .01$). The correlation had a medium effect size.

Directive Teaching – Making Commands (D2) and Infant Vocalizations

The correlation between D2 and infant vocalization was also positive, but had a weak relationship and a small effect size.

Directive Teaching – Asking Questions (D3) and Infant Vocalizations

Similar with D2, the correlation between D3 and infant vocalizations also had a weak relationship and a small effect size.

Percent of FTU and Infant Vocalizations

The correlation between the percentage of father teaching utterances and infant vocalizations had a medium effect size ($r = .584, p < .01$).

MLU and Infant Vocalizations

The correlation between MLU and infant vocalizations was the only negative relationship that was found in the present study ($r = -.019, ns$). It had a small effect size.

In summary, all the correlations that were examined in the present study were positive, except the relationship between mean length of utterances and infant vocalizations, which was slightly negative. Among the nine correlations, four measures of fathers' language characteristics: (a) contingent responses, (b) father teaching utterances, (c) descriptive teaching utterances, and (d) percentage of father teaching utterances moderately related to infant vocalizations and the correlations were significant at the 0.01 level.

DISCUSSION

The purpose of this study is to investigate the relationships between fathers' language characteristics and infant vocalizations during a free play session. Pearson correlations coefficients were calculated to examine the relationships between the nine measures of fathers' language characteristics and infant vocalizations. In general, the findings in this study showed that eight out of nine variables were positively related to the number of infant vocalizations. The correlations of four variables were identified statistically significant at the 0.01 level. These findings provide additional evidence of the importance of fathers' involvement in child language development.

The Important Role of Fathers' Involvement in Child Development

In accordance with previous studies (Laflamme et al., 2002; Lewis et al., 2003; Shannon et al., 2005), the findings support the conclusion that fathers play an essential role in child development. Four variables of fathers' language characteristics were identified that positively related to infant vocalization at six months. This indicates that fathers' responses and verbal inputs have a positive impact on six month old infant vocalizations.

In addition, a body of studies has demonstrated that maternal contingent responses and verbal input are predictors of child language development (e.g., Culp et al., 2003; Landry et al., 2008; Tamis-LeMonda et al., 2001). The findings in the present study future suggest that fathers' involvement also predict child language development.

The Predictors of Infant Vocalizations

Four correlations in the current study were higher than 0.50, which had theoretical or practical value in educational research (Fraenkel & Wallen, 2008). The four variables that had moderate correlations with infant vocalizations are discussed as below:

Contingent Responses (CR) and Infant Vocalizations

The positive effects of maternal responses on child cognitive, language, and social development is well documented (e.g., Gros-Louis et al., 2006; Landry et al., 2008; McQuaid et al., 2009). The findings in the present study indicate that fathers' contingent responses also facilitate child language acquisition. This is in contrast to the Power (1985) study in which fathers often disregarded the infant's cues of interest and attention.

It is interesting to note that verbal responses to infant vocalizations could actually encourage more vocalizations at such an early age. It showed that infants at six months already be able to notice stimuli around them and are encouraged to generate more vocalizations if their voices or gestures are responded to immediately.

Father Teaching Utterances and Infant Vocalizations

Like previous studies (Fowler et al., 2006; Tamis-LeMonda et al., 2001), the findings suggest that infants learn language from social interactions and are greatly influenced by their environment. Teaching utterances that occurs during joint attention significantly correlated with infant vocalizations in the current study, which supports the idea that verbal input during joint attention has a positive impact on child language development (Saxon, Colombo, Robinson, & Frick, 2000).

Descriptive Teaching (DI) and Infant Vocalizations

Descriptive teaching utterances that describe in concrete terms during joint attention were identified to have the closest correlation with infant vocalizations with infants at six-month old. This finding supports previous studies (Tamis-LeMonda et al., 2001) that descriptions more likely predict language milestones at an early age. Tamis-LeMonda et al. (2001) investigated the correlations between descriptions of an object, event, or activity and

child language milestones at nine and thirteen months respectively. The findings in their study reported that mothers' descriptions at nine months, but not thirteen months, predicted early language achievements in children. They concluded that "certain forms of responsiveness are more or less appropriate or effective vis-à-vis children's abilities and the cognitive challenges children face at different developmental stages" (Tamis-LeMonda et al., 2001, p. 763). Children at six to nine months begin to explore the world around them. Therefore, providing labeling and describing the objects that infants are focusing on would be particularly effective to facilitate infants to relate sounds to specific object. Moreover, certain parent responses are evident to be more effective with older infants. For instances, Tamis-LeMonda et al. (2001) indicated that "at 13 months, maternal questions predicted the timing of children's first use of language to talk about the past" (p. 763). It reminds us that age appropriate responding strategies should be taken into account when designing language intervention programs for parents.

Percentage of Father Teaching Utterances and Infant Vocalizations

In accordance with Culp, Howell, Horton, Culp, Palermo, and Ward's study (2003), the percentage of parent teaching utterance could be a predictor of infant language development. This study's findings suggest that the more infants hear teaching utterances instead of general-teaching utterances (percentage of teaching utterances) during joint attention, the more vocalizations infants generate at six-month old. It is probable that teaching utterances rather than general utterances are more likely relevant to infants' attention focus, and thus are more effective on their language acquisition.

MLU and Its Relationship with Child Age

MLU was the only measure that negatively related to infant vocalizations in the current study. How can this negative correlation be interpreted? The low and negative correlation between MLU and infant vocalizations in the current study were not overly surprising given the age of the sample infants. It is evidence that there is a positive correlation between parent MLU and child MLU (Chapman, 1981, as cited in Johnson-Glenberg & Chapman, 2004). Power (1985) also suggested that “parents of older infants were more likely to use verbal techniques along and less likely to physically perform behaviors for their child” (p. 1514). It is probable that parent may use short sentences and less complicated words when playing with six-month old infants in order to maintain their attention. We could expect though that parents will increase their MLU as children’s age increases.

The Predictor Variables with Weak Correlations

The number of father utterances, the number of father words, making commands (“Drop the ball!”) or (“What does a ball do?”) instead of stating (“The ball is in your hand”) had weak correlations with infant vocalizations. This may be because the simple description of the ball is more developmentally appropriate than commanding a six-month-old to drop the ball or asking the six month old what a ball could do. The findings suggested that for six-month-old infants, verbally responding to their vocalizations immediately, and describing toys and events in concrete terms during joint attention can get attention from the infants and thus stimulating them to generate more vocalizations (Tamis-LeMonda et al., 2001). The length and complexity of father utterances, as well as directive utterances may have more effects on older infants (Power, 1985; Tamis-LeMonda et al., 2001).

It is interesting to notice that there is a fairly sizable amount of variability in the variables. This variability is not unusual, in fact it appears rather typical of parent responses, verbal input, as well as early language development (e.g., Culp et al., 2003; Dethorne et al., 2005). Parents might have totally different frequency of responses as well as different capabilities of verbal inputs while playing with their infants. On the other hand, infants might also be at different stages of language development. Thus, it was expected that the variables in the current study would have such variability.

Evidence to Support Early Intervention Services

Eight out of the nine measures of fathers' contribution positively related to the number of infant vocalizations in the present study, with four being highly significant. The only negative correlation was between MLU and infant vocalizations, which mostly resulted from the age of the infants. These findings advocate the idea that fathers should be included in early intervention services (Doherty, Erickson, & LaRossa, 2006; Turbiville, Turnbull, & Turnbull, 1995). Additionally, most variables of fathers' language contribution positively related to infant vocalizations even at six-month old, which supports that the earlier intervention starts, the better outcomes children have (Fowler, Ogston, Roberts, & Swenson, 2006). Finally, father teaching utterances, especially descriptive teaching utterances, were identified to have significant effects on infant vocalizations. This finding demonstrates the importance of language intervention at an early age (Culp et al., 2003).

It is important to notice that the mean age of the fathers in this study was 22.3 and the average years of education the fathers received was 12.9. Furthermore, 61.5% of the fathers were single. Some of the mothers in the original home visitation program were

adolescent mothers and were from low income families. These young and at-risk parents particularly needed support from their families, the communities, and the entire society. Early intervention that addresses how to raise a child and how to support child development will benefit the families.

Limitations of the Study

The major limitation of the present findings is its relatively small sample size. Further studies need to collect data on more diverse groups with larger sample. Moreover, the findings focused strictly with six-month old infants, yet following this sample would be beneficial to support the conclusions. A longitudinal study of the sample may have more meaning to assess the effects of fathers' contributions on child language development and to examine whether the correlation between MLU and infant vocalizations will become positive as children's age increases. Finally, this study only investigated the correlations between fathers' language characteristics and infant vocalizations during free-play. Future studies could be done to compare father-infant interaction and mother-infant interaction to clarify their roles in child development.

CONCLUSION

The present study was undertaken to improve our understanding of fathers' contributions on child language acquisition. Specifically nine variables of fathers' language contributions were explored whether they had correlations with the infant vocalizations of six-month old infants. In general, the data revealed that most variables of fathers' language characteristics were positively related to infant vocalization, indicating the importance role of fathers' involvement.

Furthermore, contingent responses, father teaching utterances, descriptive teaching utterances, and percentage of father teaching utterances particularly contributed to infant vocalizations. The findings suggest to involve fathers in early intervention programs, as well as to address language intervention at an early age. Future studies could collect data on both father-infant interaction and mother-infant interaction and follow the infants' development in order to examine the effects of fathers' contributions and parent roles in child development.

APPENDIX
APPROVAL OF EXEMPT HUMAN RESEARCH



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: UCF Institutional Review Board #1
FWA00000351, IRB00001138
To: Rex E. Culp
Date: December 22, 2009

Dear Researcher:

On 12/22/2009, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination
Project Title: Fathers' Language with Children: Secondary Analysis of Videotapes
Investigator: Rex E Culp, Ph.D., JD
IRB Number: SBE-09-06648
Funding Agency:
Grant Title:
Research ID: n/a

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Joseph Bielitzki, DVM, UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 12/22/2009 03:34:52 PM EST

A handwritten signature in cursive script that reads "Joanne Muratori".

IRB Coordinator

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