Assessing the effects of parent-child interactions on child communication skills

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Assessing the effects of parent-child interactions on child communication skills

by

Meredith Anne Scott

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

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TABLE OF CONTENTS

LIST OF FIGURES iii

LIST OF TABLES iv

ABSTRACT v

CHAPTER 1. GENERAL INTRODUCTION 1
   Introduction 1

CHAPTER 2. REVIEW OF LITERATURE 5
   Literature Review 5
   Purpose 23
   Guiding Research Questions 24

CHAPTER 3. METHODS AND PROCEDURE 25
   Participants 25
   Design and Procedure 25
   Measures 26

CHAPTER 4. RESULTS 30
   Results 30

CHAPTER 5. SUMMARY AND DISCUSSION 39
   Discussion 39
   Limitations 40
   Implications 41
   Future Research 42
   Conclusion 42

APPENDIX A. ECI SCORING SHEET 43

APPENDIX B. IPCI SCORING SHEET 44

APPENDIX C. IRB APPROVAL NOTIFICATION 45

BIBLIOGRAPHY 46
LIST OF FIGURES

Figure 1. Individual Growth and Development Decision Making Model ................................................................. 22
Figure 2. Raw ECI Total Communication Scores for Children 0-11 Months ................................................................. 31
Figure 3. Raw ECI Total Communication Scores for Children 12-23 Months ................................................................. 31
Figure 4. Raw ECI Total Communication Scores for Children 24-30 Months ................................................................. 32
Figure 5. Raw Time 1 IPCI Total Percentage Scores for Children 0-11 Months ................................................................. 32
Figure 6. Raw Time 1 IPCI Total Percentage Scores for Children 12-23 Months ................................................................. 33
Table 7. Raw Time 1 IPCI Total Percentage Scores for Children 24-30 Months ................................................................. 33
Figure 8. Raw Time 3 IPCI Total Percentage Scores for Children 0-11 Months ................................................................. 34
Figure 9. Raw Time 3 IPCI Total Percentage Scores for Children 12-23 Months ................................................................. 34
Figure 10. Raw Time 3 IPCI Total Percentage Scores for Children 24-30 Months ................................................................. 35
LIST OF TABLES

Table 1. Mean and Standard Deviation Values for ECI Total Communication and IPCI Domain Percentage Scores at Times 1, 2, and 3 30
Table 2. Correlations Between ECI Total Communication Scores and IPCI Domain Percentage Scores Concurrently 32
Table 3. Regression Analysis Summary for IPCI Domains Predicting ECI Total Communication Scores at Time 2 33
Table 4. Regression Analysis Summary for IPCI Domains Predicting ECI Total Communication Scores at Time 3 33
ABSTRACT

This study examined the role maternal and child characteristics play in children’s subsequent communication development. The relationship between parent-child interactions and child communications skills was examined using the Indicator of Parent-Child Interactions (IPCI) and the Early Communication Indicator (ECI). Twenty-two mother-child dyads were assessed at three time points. Children ranged in age from 7 months to 30 months at the start of the study. Significant concurrent relationships were found between child engagement behaviors and total communication scores at time 1 and 3. A significant negative concurrent correlation existed between child reactivity behaviors and total communication scores at time 1. No significant predictive relationships were found. The IPCI total percentage scores at time 1 did not predict ECI total communication scores at time 2 or 3. The need for future research and implications for the field of parent-child interactions are discussed.
CHAPTER 1. GENERAL INTRODUCTION

Introduction

With increasing pressure on schools to demonstrate student achievement, more emphasis has been placed on children coming to school ready to learn. Children who enter school more than one grade level behind are more likely to stay behind (Bruner, Elias, Stein, & Schaefer, 2004). Despite legislation such as the No Child Left Behind Act of 2001, a large number of children are still entering school without the skills needed to learn (Bowman, Donovan, & Burns, 2001). Key to school readiness is the development of effective communication skills, especially expressive language and vocabulary. Children need communication skills (Crais & Roberts, 1996; Walker, Greenwood, Hart, & Carta, 1994), especially expressive communications (Kaiser, 1993), to develop cognitively. When children enter school without these essential communication skills, they are at greater risk for delays (Hart & Risley, 1995). However, the earlier communication problems can be identified, the more likely a program of intervention can be implemented and the child can enter school with the skills needed to learn (Hart & Risley, 1992).

One of the strongest predictors of children’s vocabulary is adult communication with the child (Hart & Risley, 1995). The communication skills a child acquires are affected by many variables including the child’s socioeconomic status (SES) (Hart & Risley, 1995; Walker et al., 1994). Children from lower SES homes hear far fewer words than their more advantaged peers, putting them at risk for speech and reading delays (Hart & Risley, 1995). In addition to SES, maternal interactions play a large role in how children acquire communication skills (Fewell & Deutscher, 2004).
In the seminal longitudinal study, Hart and Risley (1992) showed children learn to talk through casual social interactions with caregivers. The authors used direct observation of 40 families from a range of economic backgrounds to examine the development of communication. Each month parents and children were observed for one hour during everyday play activities until children were 27 months old. Behaviors measured during observations included: time present with the child, joint activities, response to child’s initiations, prohibitions, mean length of utterances, different words used, questions, and turn taking. Hart and Risley found large variation in parent-child interactions and communication based on the family’s socioeconomic status.

Children, whose parents were less involved in their interactions, heard far fewer words per hour (less than 100 words spoken) than children whose parents were more involved in daily interactions (more than 500 words spoken) heard. Not only did these children hear far fewer words per hour, many of the words they did hear were prohibitions. For these children, as many as one in every five words spoken to them by their parents were to prohibit something the child was doing. Parents who used fewer prohibitions and spoke more to their children also asked their children more questions. These parents also tend to use more frequent repetition and elaboration when speaking with their children. Taken together, these findings were all linked to the child’s subsequent IQ measures with children who hear more words, questions, repetitions and elaborations, and fewer prohibitions from their parents scoring higher than those who do not. Hart and Risley (1995) concluded, based on their longitudinal research that children with fewer of these experiences with language in their home have the consequence of learning fewer words and acquiring a vocabulary of words more slowly.
A more recent study found similar findings to that of Hart and Risley (1995). Landry, Smith, Swank, Assel, and Vellet (2001) found a connection between maternal responsiveness and subsequent cognitive growth of the child. Mothers who were consistently responsive to their child had children with higher cognitive growth in comparison to mothers who were inconsistent in their interactions with their child. This study further supports the connection between parent-child interactions and children’s cognitive development.

In some of Hart and Risley’s (1980) earliest work they outline effective strategies for promoting language growth in three year old preschool children. These strategies include: following the child’s lead, commenting and labeling, imitating and expanding, asking questions, using fill in the blank, using positive feedback, praise, and attention, and providing choices. This incidental teaching has been found to be successful in promoting vocabulary words in disadvantaged preschoolers (Hart & Risley, 1980). These strategies have also been shown to be effective in promoting communication between parents and children in the home (Warren & Walker, 2005). Hart and Risley have laid much of the foundation for a connection between parent-child interactions and child language development. Through their work, we know that children who have fewer language rich experiences at home are at greater risk for language and communication delays, and acquire language much more slowly than those children who are in homes rich in language and communication. Through their work and the added research of Warren and Walker (2005) we have also learned some effective strategies for promoting communication in the home and preschool settings. Hart and Risley’s (1980, 1992, 1995) work gives the foundation for some of the critical domains of parent-child interactions that effect language development in children.
Many parent and child variables influence interactions that foster or inhibit communication development in children. Some parent variables that have been shown to influence child communication development are warmth and acceptance (Westerlund & Lagerberg, 2007), descriptive language (Paavola, Kunnari, Moilanen, & Lehtihalmes, 2005), and restrictions and intrusions (Fewell & Deutscher, 2002). Children may also play a role in how interactions with their parents affect their own communication development. Some child variables that have been shown to effect communication in children include sustained engagement (Morales et al., 2000), and follow through (Anderson & Marinac, 2007). Knowing that there are both parent and child variables that affect a child’s communication growth, it is important to assess and examine these variables often so children do not fall behind in their communication development. The Indicator of Parent-Child Interaction (IPCI) is an assessment tool that assesses many of the variables found to effect communication growth in children. However, no studies have been conducted to evaluate the IPCI’s effectiveness in assessing the critical variables that effect communication growth. If shown effective, the use of the IPCI could have significant implications for interventions in early child development and parent-child interaction.
CHAPTER 2. REVIEW OF LITERATURE

Literature Review

Maternal Warmth and Acceptance

Westerlund and Lagerberg (2007) looked at the perceptions of mothers in relation to their 18 month old child’s vocabulary. A large sample of mothers was given a questionnaire during their child’s 18 month well child check. Among other questions, mothers were asked about their communication style with their child. They were also asked additional questions regarding their child’s communication and temperament. Westerlund and Lagerberg (2007) found that mothers who felt they communicated well with their children had children with significantly larger expressive vocabularies. Expressive vocabulary was measured by the total number of words marked by the mother that the child could say. Child temperament, as perceived by the mother, had no association with expressive vocabulary. It was also found that the child’s gender (being female), and frequent reading were associated with higher expressive vocabularies. Westerlund and Lagerberg’s study shows that communication styles of the parent have an impact on their 18 month olds expressive vocabulary regardless of the child temperament. More specifically, mothers who felt they had warm, accepting communication with their child and could pick up on their child’s communication needs, had children with higher vocabularies. It could be concluded that mothers who are warm in their communication styles with their 18 month old children have children with larger vocabularies, stressing the importance of maternal warmth and acceptance on language development.

Gartstein, Crawford, and Robertson (2008) looked at the effects of sensitivity/responsiveness and reciprocity/synchrony shown by the parent during parent-child
interactions and how these affect the development of children’s attention and language skills during the first year of life. Parents of infants who were 3 months, 6 months, and 9 months were observed in a laboratory setting during free play with their child. They were then rated on a Likert scale regarding their sensitivity, responsiveness, reciprocity and synchrony with their child. Sensitivity/responsiveness was rated poorly if the mother avoided, ignored, or showed genuine disinterest toward the child. A high rating was given if the mother provided warm, prompt, contingent, and sensitive responses toward the child and appeared genuinely interested and empathetic toward the child. Reciprocity/synchrony was rated poorly if the parent and child showed low tempo similarities, low levels of smoothness with each other, and poor quality of interaction. High ratings were given if the mother showed extremely smooth flow within behaviors with her child with high levels of follow through, as well as showing high levels of tempo between her and her child. They found a positive correlation between sensitivity/responsiveness and synchrony/reciprocity during parent-child interactions. This means that parent-child dyads that were high in sensitivity and responsiveness were also high in demonstrations of synchrony and reciprocity during their interactions with one another. It could then be said that, those parents who were warm and responsive in their communication with their child had interactions with their children that involved follow through (reciprocity) and sustained engagement (synchrony) on the part of the child.

Although direct results connecting parent-child interactions and child language development were not found in this recent study, it is important to evaluate the measures and procedures used before drawing final conclusions. The parent-child interactions in this study were done in a laboratory setting and lasted for only 2 minutes. Despite the lack of
connection between parent-child interactions and child language, this study demonstrated a relationship between high sensitivity and responsiveness or warmth and acceptance and reciprocity and synchrony or follow through and sustained engagements within parent-child interactions. It can be suggested that parents with high warmth and acceptance during interactions with their children also have interactions with their children that are rich in follow through and sustained engagement on the part of the child. These findings further support the importance of warmth and acceptance given by the mother during parent-child interactions and their subsequent effects on communication skills.

Few studies have addressed the long term effects of parent-child interactions on later verbal and reading ability. However, one study addressed the issue of maternal style, including responsiveness and directiveness, and its relationship to verbal ability and later reading scores of low-birth weight children (Fewell & Deutscher, 2002). A total of 543 mother-child dyads were observed during an 8 minute free play session that took place in the child’s home. Each child was 30 months old at the time of observation. Children’s reading and verbal IQ were assessed when they were 5 and 8 years old. Responsiveness included mothers who watched their children and were sensitive to their children’s communication behaviors. These signs included smiling warmly at the child, having warm expressions, the mother’s enjoyment and acceptance of the interactions, and her ability to use exchanges with the child in a positive way to facilitate her child’s development.

Out of these indicators of responsiveness came six variables that were scored during the parent-child observation. They include expressiveness, enjoyment, warmth, sensitivity, responsivity, achievement orientation, inventiveness, praise, effectiveness, pace, acceptance, directiveness. Maternal responsiveness was positively and significantly related to all the
variables. As mothers demonstrated more responsive interactions, their children’s verbal performance scores increased. It was also found that a child’s receptive vocabulary at 36 months was the strongest predictor of verbal ability and reading at 5 and 8 years old, showing the importance of assessing receptive vocabulary at this critical age. These findings suggest that mothers who are warm and accepting have children with better communication skills.

Another study examined maternal verbal sensitivity or warmth and child language comprehension. Baumwell, Tamis-LeMonda, and Bornstein (1997) looked at different maternal behaviors thought to facilitate or constrain child language development. Forty mothers were assessed during free play with their child when the child was 9 and 13 months of age. Free play used toys familiar to the child and lasted for 10 minutes. Mothers were assessed on their responsiveness, joint topic focus with their child, focusing of toddlers attention, prohibitions/restrictions, and focus shifts. The child’s language was then assessed using extensive maternal interviews after each visit.

Baumwell, et al. (1997) found that maternal focus on the child increased between 9 and 13 months, suggesting that mothers interact differently with their children at the two ages, which may affect how the children acquire language. Maternal verbal sensitivity was also addressed in this study, which was defined as positive and meaningful verbal behaviors given by the mother. Maternal verbal sensitivity at 9 months predicted 13 month language comprehension after controlling for stability in child language comprehension. This implies that children may especially benefit from verbal maternal acceptance and warmth during this critical time in language development, the time between 9 and 13 months. It was also found that the influence of early maternal verbal sensitivity on child’s language comprehension was strongest for those children who were initially lower in language comprehension. This study
again adds maternal verbal sensitivity or warmth with a child to the list of important parent-child characteristics that benefit child language development. These findings suggest that the 9 to 13 month period is an important time for language growth and can be positively influenced by the warmth and acceptance of the mother to her child’s play and attention.

**Descriptive Language**

Maternal language responses have also been shown to have an effect on child language development (Paavola et al., 2005). One study looked at nineteen different maternal verbal responses and their subsequent effect on child language development. Some of the maternal verbal responses were descriptive language, yes/no questions, commands, and filler words. Paavola and colleagues also examined the role that infants play in eliciting maternal responses and the function their vocalizations serve. Data were collected when the infants were 10 months of age in a free play setting with their mothers. Free play was observed in the children’s home and lasted for 20 minutes using a standard set of toys.

It was found that mothers used mainly descriptions as responses to their infants, followed by filler words such as “uh-oh”. Maternal naming of objects was the strongest predictor of early receptive language skills. Vocabulary comprehension was inversely predicted by mother’s use of attention statements such as “look”. Vocabulary production was also predicted by maternal use of yes/no questions. Infants were more likely to produce communicative acts such as gestures and vocalizations when their mothers used naming of objects and people. They were less likely to communicate when the mothers’ used displaced speech which is defined as descriptions about things or events not present in the infant’s current environment. Infants were more likely to respond to a mother’s communication if she was naming objects or interacting in social play like peek-a-boo.
Through the work of Paavola et al. (2005) it can be concluded that mothers who interact in appropriate social play with their children and use descriptive language, such as labeling, have children who have higher receptive communication skills and vocabularies. Through this study, we learn that the use of descriptive language by the mother is an essential component to communication development in children.

Huttenlocher, Vasilyeva, Cyerman, and Levine (2002) used a multi-study approach with slightly older children to evaluate the effects of maternal descriptive language input on children’s language development. Thirty-four children between the ages of 54 and 60 months were recorded during daily activities including arriving home from preschool, meal preparation, meal time, before bed, and during transitions. During each situation, the mother’s use of sentences was evaluated. In this study, sentences were defined as an utterance that contained both a subject and a verb. Simple sentences contained one clause and complex sentences contained two or more clauses. Huttenlocker and colleagues also examined the role preschool may play in language development to insure accuracy in their findings.

The results showed that the proportion of multiclause sentences in parent’s speech was by far the best predictor of multiclause sentences in children’s speech. Further examination revealed that the amount or frequency of words used by the parent was not a significant predictor of children’s complex speech, but the complexity of the mother’s speech was. These findings suggest that the quality of speech mothers used with children has a significant impact on children’s advanced speech. This study shows that when mothers use descriptive language and expand on their child’s interests in conversations in a more complex manner than simple statements alone, their children also produce more complex speech.
To further examine their findings, the authors completed an additional study to better understand the relationship between maternal language input and child language development. Forty-eight mother-child dyads were visited in their homes for two hours during typical activities. Children were between the ages of 54 and 60 months. Children in this study were also given a comprehension assessment using simple pictures that illustrated the speech given with each picture. Results of this study were similar to the original study. Children who had mothers who used more complex speech or multclause sentences were more likely to use complex speech themselves. In addition, children’s comprehension of sentences was also related to the proportion of complex sentences their mothers used with them. Mothers who used more complex sentences had children with better comprehension skills. Both studies further support the idea that maternal use of descriptive language during conversations with the child positively relates to children’s communication development (Huttenlocher et al., 2002).

**Following Child’s Lead**

Maternal vocabulary and responsiveness during unstructured speech activities in the second year of life has been found to have positive effects on child language development as well (Bornstein, Tamis-LeMonda, & Haynes, 1999). Mothers and their 13 month old infants were observed in their homes during two common activities, free play and meal time. The same thirty mother-child dyads were visited again at 20 months to evaluate consistence and growth. Free play and meal time were videotaped for 15 minutes each. Productive vocabulary in this study referred to the total number of different root words the child and mother produced. Maternal verbal responsiveness was defined as the mother verbally responding appropriately and contingently to her child’s exploratory or vocal behavior within
5 seconds of the child’s act. In other words, maternal verbal responsiveness is the mother’s ability to follow the child’s interest and comment appropriately.

The study found that mothers responded verbally more to their children at 20 months than at 13 months. Suggesting, as children begin to communicate more, mothers match this increase in communication. Mother’s verbal responses at 20 months related to their child’s vocabulary at 20 months in both mealtime and play. In play, mothers’ responsiveness at 13 months predicted their child’s vocabulary at 20 months. Maternal verbal responsiveness was far more predictive of child vocabulary than maternal productive vocabulary. An increase in maternal responsiveness between 13 and 20 months predicted children’s vocabulary at 20 months in both contexts. These findings suggest that mothers who use communication to follow their child’s lead and comment on the child’s interests further promote language development in their children. Being responsive in this way is more effective in promoting children’s vocabulary than high maternal vocabulary alone.

A study by Fewell and Deutscher (2002) adds to the research linking maternal verbal responsiveness to a child’s interests on language development in children. Mothers who watched their children more and were more responsive to their child’s communication interests had children with higher verbal performance scores. This study stresses the importance of following the child’s lead and maternal responsiveness in what interests the child and its subsequent effects on language development.

Hoff-Ginsberg (1991) also examined maternal ability to follow the child’s lead. Hoff-Ginsberg (1991) defined topic-continuing replies or following the child’s lead as maternal speech that immediately followed the child’s speech and referred to the child’s prior speech. It was found that mothers who used more continuing replies also spoke more to their children
and elicited more conversation with their children. Mothers performed highest in topic continuing replies while reading with their children. Mothers who follow their child’s lead in daily interactions tend to talk more with their children, which has been shown to have positive effects on language development (Hart & Risley, 1995). This study further supports the importance of maternal ability to follow the child’s lead on subsequent language development in children.

**Maintaining and Extending Child’s Interest**

Anderson and Marinac (2007) took a different approach to studying the relationship between maternal speech and child language development. Anderson and Marinac (2007) investigated how maternal language input influences and is influenced by children’s language development. Thirty-six children between the ages of 23 months and 25 months were classified to have either advanced, typical, or delayed speech. Speech was classified by word counts and mean length of utterances. Each child was then observed interacting with their mother during a free play session. Each session was done in the child’s home and lasted for 15 minutes. Each mother’s response was observed along with the child’s response to the mother’s communication. The study found that the mother’s response did not change depending on their child’s language development. It was also found that as the child’s language developed, they were more likely to give an appropriate response to the mother’s initiation, with advanced talkers responding more appropriately than delayed talkers. This may suggest the importance of maternal responses that maintain and expand the child’s interest as the child’s communication develops.

Bornstein, Tamis-LeMonda, and Haynes (1999) found that when mothers maintained the interest of the child by commenting or behaving in a way that related to the child’s
behavior, it had predictive effects on child vocabulary development. Moreover, mother’s commenting in this way during typical activities with her 13 month old had a predictive effect on her child’s language development at 20 months of age. These findings suggest that mothers who use communication to maintain and extend their children’s interest promote language development in their children. This further illustrates the importance of maintaining and expanding on the child’s interest as a predictor to language development in children.

Caregiver Interrupters

In addition to positive parent-child interactions that affect children’s language development, there are parent-child variables that inhibit children’s language development. Hart and Risley (1995) found that children who heard more prohibitions such as “no” and “don’t” heard far fewer words than those children who heard fewer prohibitions. Parents who used fewer prohibitions and spoke more to their children also asked their children more questions, following the children’s interests. These parents also tended to use more frequent repetition and elaboration when speaking with their children, which has been shown to be an effective strategy in promoting communication skills. Children who heard fewer words and more prohibitions were at increased risk for language delays. Restrictions and intrusions such as these are considered an interrupter in facilitating language development, which have negative consequences on child communication skills.

In another study, Hoff-Ginsberg (1991) looked at how mothers’ interaction with their children differs depending on social class and communicative setting. Two social classes were evaluated, working-class, and upper-middle-class. Each was observed engaging in toy play, book reading, meal time, and dressing. Properties of maternal speech addressed included: number of utterances, utterances per minute, number of roots, mean length of
utterance, percent of utterances given for reply, rate of conversation-eliciting utterances, rate of behavior directives, duration of non-verbal, and percent time in joint attention during toy play.

Hoff-Ginsberg (1991) found that mothers whose speech was less directive or restrictive also used speech that depended more on their child’s speech in comparison to mothers whose speech was more directive. Mothers who used more directive speech also used communication more often to direct the behavior of their child than less directive mothers. Less directive mothers provided continuing replies to a greater proportion of their children’s utterances than did more directive mothers. In sum, when mothers were less directive in their speech they also tended to produce more utterances, produce longer utterances, and use a richer vocabulary in comparison to mothers who used more directive speech with their children. Less directive mothers tended to be from middle to upper incomes while mothers who used more directive speech with their children tended to be from working class households. From the work of Hoff-Ginsberg (1991) it is clear that mothers who use more directive speech such as restrictions and intrusions talk less to their children and have a vocabulary less rich in language. Therefore, maternal use of restrictions has a negative effect on child language development.

Fewell and Deutscher (2002) looked at the directive behavior of mothers controlling style and its subsequent effect on verbal ability of children. This included incidences where the mother told the child what to do versus following the child’s lead, and acted at a tempo that was too fast for the child to think or respond. This restrictive behavior was significantly correlated with variables such as sensitivity, responsivity, achievement orientation, inventiveness, effectiveness, and acceptance in a negative fashion. It was also found that as
mothers became more directive in their interactions, their children’s verbal ability decreased. Consequently, findings also suggest that mothers who are restrictive and intrusive have children with lower communication skills. This finding further adds to the negative implications of restrictions and intrusions on child language development.

Paavola, and colleagues (2005) have also shown restrictions and intrusions to have a negative effect on child language development. In their study, it was noted that commands and warnings given by mothers during their interactions with their children such as “no” or “don’t touch that” may have inverse effects on language development. It was also suggested that mothers who communicate more commands or restrictions to their children have children who communicate less and are less reciprocal in their speech with mothers. Through this work and the work of others (Paavola et al., 2005; Fewell & Deutscher, 2002; Hart & Risley, 1995) it becomes clear that restrictions and intrusions hinder a child’s language development and are important components to be evaluated when assessing the effects of parent-child interactions on language development.

*Child Engagement*

In addition to maternal factors that contribute to parent-child interactions that effect language development in children, there may also be child behaviors which facilitate or inhibit interactions that effect child language development. One study demonstrated a relationship between infant’s high levels of attention and their subsequently high vocal responsiveness (Gartstein, Crawford, & Robertson, 2008). Those parents who used warm and responsive communication with their children had interactions that resulted in greater follow through (reciprocity) and sustained engagement (synchrony) by the child. It can be suggested that infants with higher sustained engagement and follow through during interactions with a
parent will also have higher communication skills, highlighting the transactional nature of early communication development.

A similar study looked at a child’s response to joint attention during the ages of 6 and 24 months and its subsequent effect on language acquisition. Morales et al. (2000) studied the response to joint attention between a mother and a child and its predictive ability for language development. Parents and their children were assessed in joint attention activities at 6, 8, 10, 12, 15, 18, 21, and 24 months and expressive language development was assessed at 24 and 30 months of age. Each joint attention activity was done in a laboratory with specific prompts to elicit gaze between the child and mother or tester.

Results showed that the child’s response to joint attention elicited by the mother or tester at the younger months positively related to joint attention responses at older ages. This suggests that there is stability of this skill between the ages of 6 and 24 months. Response to joint attention at 6, 8, and 10 months was significantly correlated with receptive vocabulary at 30 months. Children who showed a greater ability to follow adult gaze during the 6 through 18 month assessments, had larger expressive and receptive vocabularies at 30 months than those children who were not as able to follow or elicit adult gaze. Results show that there is a connection between response to joint attention between an infant and an adult and the infant’s language development. This suggests that joint attention with an adult during 6 through 24 months of age has a positive effect on child language development, emphasizing the importance of sustained engagement during play activities.

Anderson and Marinac (2007) looked at children’s follow through or response in interactions with their parents and the effect these had on language development. Children were classified as having delayed speech, typically developing speech, or advanced speech.
Delayed speech was defined as having a vocabulary less than 50 words and/or producing limited word combinations at 24 months of age. It was found that children with delayed speech were less likely to respond to verbal interactions with their mother. Findings also showed that children who use fewer words were less likely to respond to parents’ initiations to communicate. These findings stress the importance of a child’s follow through or response to communication initiated by the mother on child language development.

*Child Reactivity*

From a review of the literature it becomes clear that maternal warmth and acceptance is important to facilitating child language development (Gartstein, Crawford, & Robertson, 2008; Westerlund & Logerberg, 2007; Fewell & Deutscher, 2002). Consequently, the reverse may be true; a child with a difficult temperament may lead to negative interaction with the mother, further interfering with language development. It may be concluded then, that when a child exhibits reactive behaviors such as fussing, crying, and other external distress behaviors they elicit negative reactions from the mother (Calkins, 2002), which in turn may prohibit language growth through lack of warmth and acceptance of the mother. Therefore, child reactivity may be another important component to evaluate when addressing parent-child interactions that effect language development.

Through the work of many researchers, a number of parent and child components emerge as important to language development. Maternal characteristics that influence language development such as, acceptance and warmth, descriptive language use, following the child’s lead, and maintaining and extending on the child’s interest have all been shown to be beneficial for language development in young children. In contrast, maternal interrupters such as restricting and intruding the child’s interest have been shown to interfere with
language development in children. In addition, children play a key role in facilitating language rich interactions with their parents. Sustained engagement with the parent and follow through within conversations and activities has been shown as important child characteristics that facilitate language development. On the other hand, child reactive behaviors such as fussing, crying, and showing external distress may have negative implications on parent-child interactions, inversely affecting language development.

Assessing Parent-child Interactions and Communication Skills

The research involving parent-child interactions and child communication skills is vast. Although many studies have examined different aspects of parent-child interactions and their effects on communication skills, very few use the same procedures or focus on the same interactions. Some researchers focus on the warmth and acceptance of a parent and how that affects the child’s communication skills (Fewell & Deutscher, 2002) while others look at the effects of descriptive language used by the parent (Paavola et al., 2005). Still others examine the restrictions or intrusions a parent uses in their speech and how that affects child language development (Hoff-Ginsberg, 1991). In addition to looking at different aspects of interaction, the procedures used also vary greatly. In some research studies the family is invited to a laboratory where more structured activities occur (Morales et al., 2000). Others have visited families in their homes for anywhere between 10 minutes to one hour (Baumell et al., 1997; Hart & Risley, 1992). In addition, many measures used in these studies are made up for the purpose of the study and have not been standardized or used repeatedly (Paavola et al., 2005). After a thorough review of the research, it becomes clear that a concise tool that measures the many aspects of parent-child interactions that relate to language development is needed. The parent-child indicator used should be sensitive enough to be used repeatedly to
monitor the growth and progress of the child over time. To accomplish this we turn to General Outcome Measurements.

General Outcome Measurement

General Outcome Measurement (GOM) is a relatively new approach used in the field of early childhood. Although its use in the field is more recent, it has been used by pediatricians for several years in the form of height and weight growth charts. General Outcomes Measurement allows for the assessment of a broad range of skills related to a desired outcome (Vanderheyden, 2005). GOM can be used to monitor progress over time and have been argued to relate more to a desired outcome than other standardized assessment tools by targeting the desired behavior versus sub-skills of the behavior. General Outcome Measurements are easy to administer and interpret. Just like with the height and weight charts, children are measured as they grow in a skill area. These measurements are then compared to the average child’s performance, providing quick interpretation of the results, showing how well a child is performing in the skill area. GOM can be administered in the child’s natural environment, are quick to administer, and cost less than many standardized tests. General Outcome Measurements allow for frequent progress monitoring, allowing interventionists to make decisions based on the amount of progress seen in a skill area. This allows for the interventionist to directly monitor growth on the desired outcome or target behavior rather than growth of specific sub-skills related to the target behavior (Deno, 1997).

Individual Growth and Development Indicators

The Individual Growth and Development Indicators (IGDIs) are General Outcome Measurements designed to monitor the progress and development of young children. There are five IGDIs for infants and toddlers: the Early Communication Indicator (ECI), the Early
Movement Indicator (EMI), the Early Social Indicator (ESI), the Early Problem Solving Indicator (EPSI), and the Indicator of Parent-Child Interaction (IPCI). The ECI, EMI, ESI, and EPSI are direct assessments of child development skills and measure growth in the same way. The IPCI does not measure growth in a certain developmental skill; rather it assesses the quality of several interactions shown to affect parent-child relations. IGDIs have been determined to be psychometrically sound indicators of early childhood outcomes. IGDIs, as a General Outcome Measurement, are easy to administer and interpret, provide direct assessment of growth over time, and are adaptable (McConnell, McEvoy, & Priest, 2002). In addition, IGDIs can be used to assess growth and development at one time point or growth over time. Unlike norm or criterion referenced assessments, IGDIs can be used frequently to evaluate and plan interventions (Greenwood, Luze, & Carta, 2002). This allows interventionists to make quick decisions regarding the effectiveness of an intervention, giving the opportunity to change the course of the intervention without losing valuable time. IGDIs also identify problems and allow for validations of concerns (Greenwood, Luze, & Carta, 2002). Each assessment can be graphed and evaluated to determine a child’s rate of growth and progress in the area of concern (Cart et al., 2002). The IGDI scores can also be compared with children of similar age to get a better understanding of the target child’s progress in comparison to their same age cohort. The IGDIs are play-based and can occur in a child’s natural environment allowing the child to show his or her skill level in a developmentally appropriate way. Figure 1 shows an IGDI's decision making model used to monitor progress (Carta et al., 2002).
The two IGDI s that are key for this study are the Early Communication Indicator (ECI) and the Indicator of Parent-Child Interaction (IPCI). The ECI is used to measure a child’s expressive communication skills. The ECI has been shown to be sensitive to age and significantly correlated to the Preschool Language Scale-3, a standardized norm referenced measure of expressive communication (Luze, et al., 2001). The ECI also showed sensitivity to children with disabilities and test-retest reliability. Luze et al.’s (2001) results were also replicated with a much larger population of children (n = 1,335) with and without special needs and of low socioeconomic backgrounds who were racially diverse and differing in home languages (Greenwood, Carta, Walker, Hughes, & Weathers, 2006). The key communication elements that are measured with the ECI are gestures, vocalizations, single-word utterances, and multiple-word utterances. A frequency count is used to give a total communication score that includes weighted scores for single and multiple word utterances. The ECI, and all infant toddler IGDI s, are designed to be used with children age birth to 36 months.
The other indicator of importance for this study is the Indicator of Parent-Child Interaction (IPCI; Baggett, Carta, & Horn, 2004). The IPCI is used to provide progress monitoring of interactions between children and their caregivers. Key items are scored during typical caregiving activities and interactions that address the responsiveness of the parent and child. The domains of interest include caregiver facilitators, caregiver interrupters, child engagement, and child reactivity or distress. The IPCI is currently being reviewed for psychometric soundness with promising results (Baggett, Hughes, Carta, Kim, n.d.). The key elements are designed to reflect the interactions that are predictive of social-emotional outcomes for young children. As with all IGDI, the IPCI can be conducted in the child’s natural environment, using play-based activities.

Purpose

In order to succeed in school one of the most important skills a child must develop is communication skills (Crais & Roberts, 1996). One of the strongest predictors of children’s communication skills is adult interactions with the child (Hart & Risley, 1995). In addition, many studies have shown that responsive caregiving is essential for child communication growth (Fewell & Deuscher, 2002; Hoff-Ginsberg, 1991). Although there has been a great deal of research in this area, no two studies use the same measurements to support the connection between findings. Knowing its importance, the need for a consistent and accurate tool that measures the correlation between communication skills and parent-child interactions becomes clear. It is important that these tools are accurate, are easy to administer, and occur in the child’s natural environment. Two of the tools that meet this criterion are the ECI and IPCI. Both are General Outcomes Measurements that are easy to administer and interpret, and allow for frequent progress monitoring that can be used to measure growth and decision
making. If accurate in depicting the relationship between child communication skills and parent-child interactions, these tools could have beneficial implications for early language development and parent-child interactions. Therefore, the purpose of this study was to examine the relationship between the ECI and IPCI as indicators for the correlation between parent-child interactions and child communication skills. The following questions were addressed:

1. How related are the IPCI domain scores from time 1 to time 3 and how related are ECI total communication scores from time 1 to time 2 and from time 1 to time 3? To answer this question two separate correlation analyses will be run.

2. Are the domains of the IPCI related concurrently to ECI total communication scores? This question will be answered by running correlations between ECI total communication score and IPCI domain scores at the same time points.

3. Do IPCI domain scores at time 1 predict ECI total communication scores at times 2 and 3? To answer this question two hierarchal regression analysis will be preformed, controlling for ECI total communication scores at time 1.

4. Which IPCI domains are the most predictive of the total communication scores on the ECI? Regression models will be reviewed to determine which IPCI domains predict ECI total communication scores.
CHAPTER 3. METHODS AND PROCEDURE

Method

Participants

The study sample consisted of 23 mother-child dyads. One dyad was unable to complete the study due to illness, giving a total of 22 mother-child dyads that completed all assessments over a 3 month period. A convenience sample was used for this study. Participants were primarily middle-class with an average income of $70,000-$80,000 per year. All participants lived in a mid-western metropolitan area. Children were between the ages of 7 months and 30 months at the start of the study with an average age of 18 months. All children were considered typically developing with no identified special needs. There were 10 male children and 12 female children involved in the study. Most mothers (63.6%) had a four year degree or higher level of education. All participants were Caucasian in this preliminary study.

Design and Procedure

Each family was visited once a month for three consecutive months. All visits were conducted by the principal investigator. Visits were scheduled during convenient times for both the mother and child. During the first visit an overview of the study was given and mothers were asked to sign an informed consent. Mothers also completed a demographic questionnaire during the first visit. After the informed consent and demographic questionnaire were completed, the Early Communication Indicator (ECI) and the Indicator of Parent-Child Interaction (IPCI) were administered by the principal investigator. The first visit lasted approximately 45 minutes. The second visit consisted of just the ECI and lasted for approximately 20 minutes. The third and final visit consisted of both the ECI and the IPCI.
and lasted approximately 35 minutes. All visits were videotaped for later coding purposes. If a child or mother showed distress during a visit the session was ended and resumed another day. This occurred only once during the study. The Iowa State University Institutional Review Board approved all materials and procedures used in this study.

Measures

*Early Communication Indicator (ECI).* The ECI (Luze et al., 2001) is an assessment tool designed to measure infants’ and toddlers’ expressive communication skills. The assessment uses a familiar adult play partner, in this study the principal investigator, to interact with the child in a way that facilitates communication from the child. The adult play partner does this by following the child’s lead and commenting on the child’s play in a developmentally appropriate way. Play is facilitated by using a toy house or toy barn to encourage the child’s communication. Each month the toy form is rotated between the house or barn to keep the child’s interest. In this study, the toy house was used during visits one and three, and the toy barn was used during visit two. The play session lasts for exactly 6 minutes. During the 6 minutes, specific communication elements are observed and tallied to give a total communication score for the child. The four communication elements that are scored include gestures, vocalizations, single word utterances, and multiple word utterances. Gestures are defined as a physical movement used by the child in an attempt to communicate with the adult play partner. Gestures include movements such as nodding or shaking head, pointing, and giving or taking toys from the adult play partner. Vocalizations are defined as non-word utterances used by the child and include verbalizations that may include words, but that cannot be understood as a single word or multiple word utterance. Examples of vocalizations include laughing, babbling, and animal sounds. A single word utterance is
defined as single word made by the child that is understandable. These include words such as bye-bye, go, and daddy. Multiple word utterances are defined as two or more different words said by the child that are understandable. These include sentences or any two or more words that are said together in a meaningful way. Single word utterances are given a weighted value of 2 and multiple word utterances are given a weighted value of 3 to reflect their higher skill level. After each element has been properly weighted, all communication elements are added together to give a total communication score. For this study, each play session was videotaped using a tripod and later scored by the principal investigator. Appendix A. presents the scoring sheet used to code each ECI.

*Indicator of Parent-Child Interaction (IPCI).* The IPCI (Baggett, Carta, & Horn, 2004) is an assessment tool used to evaluate the important parent-child interactions needed to promote positive behavior in children. The IPCI does this by asking parents to engage in brief activities with their children. There are a total of four interaction activities used that last for a total of 10 minutes. These activities include, free play with the parent and child, looking at books together, a distraction task (used only with children 12 months and older), and a dressing task. A standard set of instructions is given to all parents at the start of each activity. The free play task is the first activity and lasts for 4 minutes. During this time parents were asked to spend a few minutes with their child doing something that they both enjoy. No specific toys were required during this activity. The parent was encouraged to interact with their child as they normally would. The second activity is looking at books. During this activity parents were given three children’s books and told to use the books with their child however they wished. This activity lasted for 2 minutes. The third activity done with the parent and child was the distraction task. The distraction task involved placing a small music
recorder on large blanket that both the mother and child were sitting on. The mother was asked to keep her child on the blanket while not allowing him or her to touch the recorder. The distraction task was only performed if the child was 12 months or older. This activity lasted for 2 minutes. The fourth and final task was a dressing task. During this activity parents were asked to spend a few minutes in a dressing routine with their child. Parents were encouraged to dress their child as they normally would during the two minute activity. The principal investigator read all instructions and videotaped each activity for scoring purposes.

The IPCI is evaluated using four domains, two parental domains, and two child domains. The two parental domains include parent facilitators and parent interrupters. The two child domains include child engagement and child reactivity or distress. Each IPCI domain was chosen based on the literature previously presented. Each domain includes several sub-domains. The sub-domains included in parent facilitators are: conveys acceptance and warmth, uses descriptive language, follows child’s lead, maintains and extends child’s focus, and uses stress reducing strategies. Parent interrupter consists of the following sub-domains: uses criticism or harsh voice, uses restrictions or intrusions, and rejects child’s bid. The sub-domains included in child engagement are: positive feedback, sustained engagement, and follows through. The three sub-domains included in child reactivity or distress are: irritable/fuss/cry, external distress, and frozen/watchful/withdrawn. All sub-domains are rated on a 4-point scale. Zero indicating the behavior or sub-domain was never observed, and three, indicating the behavior was observed often or consistently or at a severe level. Some sub-domains are given a score of NA if there was not an opportunity for the behavior to be observed. Sub-domains are then added together to get a total domain score. This score is then divided by the total possible points to get a domain percentage. The
IPCI was administered during the first and third visits. Appendix B presents an example of the IPCI scoring sheet used.

The principal investigator was trained using practice videos and was then certified to score the ECI and IPCI by Juniper Gardens Children’s Project, University of Kansas, the developer of both assessment tools, prior to conducting any research. An interrater reliability agreement of 85% was required for both the ECI and IPCI. Two videos for each assessment were scored or coded by the principal investigator and then checked with a Master Coder from Juniper Gardens Children’s Project. The principal investigator reached 85% interrater agreement or higher on all four master coded videos. The principal investigator was also certified to administer both assessment tools by Juniper Gardens Children’s Project before conducting any research. Every tenth video coded by the principal investigator was also viewed by a certified coder to insure continued reliability. The 85% reliability level was achieved for all videos checked.
CHAPTER 4. RESULTS

Results

Descriptive statistics for total ECI scores and IPCI domain percentage scores at time 1, 2, and 3 are presented in Table 1. Figures 2, 3, and 4 represent the range of ECI total communication scores distributed by age cohorts. Figures 5, 6, and 7 represent the range of IPCI total percentage scores at time 1 distributed by age cohorts. Figures 8, 9, and 10 represent the range of IPCI total percentage scores at time 3 distributed by age cohorts. Findings related to each research question are presented in this section.

Table 1.

Mean and Standard Deviation Values for ECI Total Communication and the IPCI Domain Percentage Scores at Times 1, 2, and 3

<table>
<thead>
<tr>
<th></th>
<th>Time 1</th>
<th>Time 2</th>
<th>Time 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECI Total Communication</td>
<td>43.50</td>
<td>45.32</td>
<td>55.64</td>
</tr>
<tr>
<td></td>
<td>(34.08)</td>
<td>(37.36)</td>
<td>(48.17)</td>
</tr>
<tr>
<td>IPCI Caregiver Facilitator %</td>
<td>43.14</td>
<td>44.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(10.84)</td>
<td>(11.24)</td>
<td></td>
</tr>
<tr>
<td>IPCI Caregiver Interrupters%</td>
<td>15.00</td>
<td>18.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(11.02)</td>
<td>(9.32)</td>
<td></td>
</tr>
<tr>
<td>IPCI Child Engagement %</td>
<td>69.00</td>
<td>71.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(10.83)</td>
<td>(8.14)</td>
<td></td>
</tr>
<tr>
<td>IPCI Child Reactivity %</td>
<td>10.50</td>
<td>12.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(10.99)</td>
<td>(9.55)</td>
<td></td>
</tr>
</tbody>
</table>
Figure 2. Raw ECI Total Communication Scores for Children 0-11 Months

Figure 3. Raw ECI Total Communication Scores for Children 12-23 Months
Figure 4. Raw ECI Total Communication Scores for Children 24-30 Months

![ECI Communication Scores for Children 24-30 Months](image)

Figure 5. Raw Time 1 IPCI Total Percentage Scores for Children 0-11 Months

![Time 1 IPCI Percentage Scores for Children 0-11 months](image)
Figure 6. Raw Time 1 IPCI Total Percentage Scores for Children 12-23 Months

Table 7. Raw Time 1 IPCI Total Percentage Scores for Children 24-30 Months
Figure 8. Raw Time 3 IPCI Total Percentage Scores for Children 0-11 Months

![Time 3 IPCI Percentage Scores for Children 0-11 months](image)

Figure 9. Raw Time 3 IPCI Total Percentage Scores for Children 12-23 Months

![Time 3 IPCI Percentage Scores for Children 12-23 Months](image)
Stability of the ECI and IPCI Scores

**Research Question 1.** How related are the IPCI domain scores from time 1 to time 3 and how related are the ECI total communication scores from time 1 to time 2 and from time 1 to time 3? ECI total communication scores at time 1 were correlated to those at time 2 and time 3. Results show that there was a significant correlation between ECI total communication scores at time 1 and ECI total communication scores at time 2, \( r = .68, p = .001 \). There was also a significant correlation between ECI total communication scores at time 1 and ECI total communication scores at time 3, \( r = .56, p = .007 \). This means children who scored higher on the initial ECI assessment also tended to score higher on the second and third ECI assessment.

A second correlation was then run between IPCI domain percentage scores at time 1 and IPCI domain percentage scores at time 3. Results show that IPCI caregiver facilitator percentage scores at time 1 were significantly correlated to IPCI caregiver facilitator percentage scores at time 3, \( r = .46, p = .032 \). There was also a significant relationship
between IPCI child engagement percentage scores at time 1 and IPCI child engagement percentage scores at time 3, $r = .59, p = .004$. There was not a significant correlation found between IPCI caregiver interrupter percentage scores at time 1 in relation to those at time 3, nor was there a significant correlation found between IPCI child distress and reactivity percentage scores at time 1 compared to those at time 3.

**Concurrent Relationships between the ECI and IPCI**

*Research Question 2.* Are the domains of the IPCI related to concurrent assessment with ECI total communication scores? This question was examined by running correlations between ECI total communication scores and IPCI domain scores at the same time points. First, a correlation between ECI total communication scores at time 1 were correlated with IPCI domain percentage scores at time 1. Then, a correlation between ECI total communication scores at time 3 and IPCI domain percentage scores at time 3 was conducted (see Table 2). There was a significant relationship between ECI total communication scores and child engagement percentage scores at both time 1 and 3. This means that children who were more engaged in interactions with their parents had higher communication scores. There was also a significant negative relationship between ECI total communication scores at time 1 and child distress and reactivity percentage scores at time 1. As child distress and reactivity scores increased, there was a significant decrease in ECI total communication scores. No other significant relationships were found between the ECI total communication scores and the IPCI domain percentage scores at time 1 and 3.
Table 2.

Correlations Between ECI Total Communication Scores and IPCI Domain Percentage Scores Concurrently

<table>
<thead>
<tr>
<th>Measures</th>
<th>ECI Total Communication Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
</tr>
<tr>
<td>IPCI Caregiver Facilitator</td>
<td>-.01</td>
</tr>
<tr>
<td>IPCI Caregiver Interrupters</td>
<td>.14</td>
</tr>
<tr>
<td>IPCI Child Engagement</td>
<td>.44*</td>
</tr>
<tr>
<td>IPCI Child Reactivity</td>
<td>-.49*</td>
</tr>
</tbody>
</table>

*p < .05.

Predictive Relationships between the IPCI and ECI

Research Question 3. Do the IPCI domain scores at time 1 predict ECI total communication scores at time 2 and do the IPCI domain scores at time 1 predict ECI total communication scores at time 3? Initially, unrestricted regression analyses were conducted predicting time 2 and time 3 ECI total communication scores from IPCI domain scores at time 1. It was found that IPCI domain scores at time 1 did not significantly predict ECI total communication scores at time 2 or time 3. Results are presented in Table 3 and Table 4.

Since no significant relationships were found in the unrestricted model there was no valid reason to conduct further theoretical models controlling for ECI total communication scores at time 1.

Table 3.

Regression Analysis Summary for IPCI Domains Predicting ECI Total Communication Scores at Time 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SEB</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPCI Caregiver Facilitator % Score Time 1</td>
<td>-.77</td>
<td>.87</td>
<td>-.22</td>
</tr>
<tr>
<td>IPCI Caregiver Interrupter % Score Time 1</td>
<td>-.17</td>
<td>.83</td>
<td>-.05</td>
</tr>
<tr>
<td>IPCI Child Engagement % Score Time 1</td>
<td>.95</td>
<td>.97</td>
<td>.28</td>
</tr>
<tr>
<td>IPCI Child Reactivity/Distress % Score Time 1</td>
<td>-.83</td>
<td>.85</td>
<td>-.24</td>
</tr>
</tbody>
</table>

Note. $R^2 = .16$ ($N = 22$, $p = .54$).
Table 4.

**Regression Analysis Summary for IPCI Domains Predicting ECI Total Communication Scores at Time 3**

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SEB</th>
<th>( \beta )</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPCI Caregiver Facilitator % Score Time 1</td>
<td>-2.06</td>
<td>1.07</td>
<td>-.47</td>
</tr>
<tr>
<td>IPCI Caregiver Interrupter % Score Time 1</td>
<td>-.45</td>
<td>1.01</td>
<td>-.10</td>
</tr>
<tr>
<td>IPCI Child Engagement % Score Time 1</td>
<td>2.10</td>
<td>1.19</td>
<td>.47</td>
</tr>
<tr>
<td>IPCI Child Reactivity/Distress % Score Time 1</td>
<td>-.07</td>
<td>1.04</td>
<td>-.02</td>
</tr>
</tbody>
</table>

*Note. \( R^2 = .24 \) (N = 22, \( p = .29 \)).

**Predictive Relationship between IPCI domains and ECI**

*Research Question 4.* Which IPCI domains are the most predictive of ECI total communication scores? Using the regression models shown in Table 3 and 4 no predictive relationship was found between the IPCI domains and the ECI total communication scores. However, some of the domain percentage scores were related to the ECI total communication scores concurrently. This relationship will be discussed further in the next section.
CHAPTER 5. SUMMARY AND DISCUSSION

Discussion

This study examined the relationship between parent-child interactions and child communication skills using the Early Communication Indicator (ECI) and the Indicator of Parent-Child Interactions (IPCI). It appears that although there was no predictive relationship between parent-child interactions and later communication skills, a relationship does exist between parent-child interactions and communication skills in children.

Result of this study confirm previous findings that the ECI appears to be a stable and related indicator of communication skills over time (Luze, et al., 2001). That is children who scored higher on the initial ECI assessment also tended to score higher on the second and third ECI assessment. The same is true for those children who scored lower on the ECI. The ECI may also be a good indicator of communication growth. Results showed a mean increase in total communication scores from time 1 to time 2 and from time 2 to time 3.

The results of this study also showed that the IPCI caregiver facilitator score remained related to one another across time. Parents who showed more warmth, used more descriptive language, and followed their children’s leads more often during the first visit also tended to show these same behaviors when assessed again at the end of the study. This same pattern of results was also the case for child engagement. Children who showed positive feedback to their mothers were engaged, and followed through with their mother’s requests during the first visit. They also tended to show these behaviors again at the last visit or assessment.

Perhaps the most interesting findings of this study are the relationship between the ECI total communication scores and IPCI domains. During the first visit, time 1, those
children who were more engaged, showed more positive feedback and showed high levels of follow through with their mothers, also had higher total communication scores. This was again the case during the third and final visit. These findings support the work of Morales et al. (2000) who found that children who were more engaged with their parent also had subsequently higher vocabulary skills. Just as interesting are the findings on child reactivity during the first visit. As children showed more irritability, including fussiness and crying, and showed more external distress, such as tantrums, their total communication scores were lower. This means that during the first visit those children who had higher reactivity and distress also had significantly lower total communication skills. The explanation for this is unclear and will need additional research. Perhaps, when children are showing distress it is harder for mothers to respond in a positive way that facilitates communication skills of the child. Although this study revealed no significant predictive relationships between the IPCI domains and the ECI total communication scores, relationships were found between the two concurrently. High child engagement was significantly related to higher total communication scores at both visit 1 and visit 3. High child reactivity and distress was significantly related to low total communication scores at the first visit.

Limitations

There are limitations within this study that should be noted. First, the sample used was relatively small. All participants were Caucasian and came from the same metropolitan area. Most participants lived in middle to upper income households and had similar educational backgrounds. The homogeneousness of the sample limited the variability and restricts the generalizability of the study. Including a more ethnically diverse population and participants from lower income households would enhance the variability and the validity of
the study. The timeframe of the study may also be considered a limitation. Perhaps, if more time points over a greater number of months were evaluated, predictive relationships may have occurred. Also, it is unclear what the role of videotaping played on the parent-child interactions. This could be considered a limitation to the study.

Implications

It is important to understand the role parent-child interactions play on child communication skills. Communication skills have been linked to later school readiness (Crais & Roberts, 1996) and are important for children’s language development. Parents play a large role in the development of language in their children (Hart & Risley, 1995) and should be considered very influential in their child’s communication development. Because of this, it is important to assess parent-child interactions and the child’s subsequent communication skills. When interactions are assessed, interventionists can identify specific domains that may put the child at risk for communication delays. As found in this study, if a child is showing distress and reactivity their concurrent communication skills may be lagging. Knowing this allows the interventionist to tailor assistance to better meet this particular family’s needs. The IPCI is an assessment tool that can be administered quickly and often, allowing for continued use by the family and interventionist. The IPCI also contains many of the parent characteristics that foster or hinder communication growth in children such as parental warmth and acceptance and use of restrictions and intrusions. With the use of the IPCI and ECI to monitor parent-child interactions that effect child communication skills, interventionists can better work with families to ensure positive interactions are occurring that positively affect communication development. By doing this, children may be at greater advantage for school and life success.
Future Research

Further research is needed to better examine the predictive validity of the IPCI domain scores and ECI total communication scores. A larger sample using a more diverse population needs to be used to better examine the reliability and generalizability of this study. Further research is also needed to examine the relationship between child reactivity and distress and subsequent lower communication skills in children. Although further research is needed, this preliminary study lays the foundation for future research to be had.

Conclusion

This study highlights the importance parents play in their child’s communication skill development. It was shown that children, who had sustained engagement, follow through, and positive interactions with their parents also had higher communication skills as measured by the ECI and IPCI. It was also shown that child reactivity and distress negatively affects children’s communication skills. With further research, additional predictive relationships may also be found. Together, with further research, this study may help interventionists’ better work with families on positive ways to effect communication skills in children. This, and future studies like it, will ensure children are entering school ready to learn with the communication skills needed to thrive.
## APPENDIX A. ECI SCORING SHEET

**Early Communication Indicator (ECI)**

<table>
<thead>
<tr>
<th></th>
<th>Gestures</th>
<th>Vocalizations</th>
<th>Single Words</th>
<th>Multiple Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begin</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>0:00</td>
<td>G</td>
<td>V</td>
<td>W</td>
<td>M</td>
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<td>1:00</td>
<td>G</td>
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<td>W</td>
<td>M</td>
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<td>W</td>
<td>M</td>
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<td>W</td>
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<td>Sec.</td>
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<td>4:00</td>
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<tr>
<td>Sec.</td>
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<tr>
<td>5:00</td>
<td>G</td>
<td>V</td>
<td>W</td>
<td>M</td>
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<td>Sec.</td>
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<tr>
<td>Total</td>
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</tr>
</tbody>
</table>

**Child ID #_____  Test Date______ (MM/DD/YYYY)  Test Duration:_____ Min Sec
Form: House or Barn  Primary Recorder:____
Assessor:__________  Location: _____ (Home/Center/Other)
Language of Administration:__________
If Reliability, Reliability Recorder’s Name:__________________
Note:____________________
## APPENDIX B. IPCI SCORING SHEET

### Indicator of Parent-Child Interaction (IPCI)

<table>
<thead>
<tr>
<th></th>
<th>Free Play</th>
<th>Looking at Books</th>
<th>Distraction</th>
<th>Dressing</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never = Never observed</td>
<td></td>
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<td></td>
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<tr>
<td>Rarely = Observed once; Mild</td>
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<tr>
<td>Sometimes = Observed more than once but not consistently</td>
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<tr>
<td>Often = Observed consistently and given nearly every opportunity; Severe</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>No Opportunity was available</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Caregiver Facilitators

- Acceptance/ Warmth: No Opportunity
- Descriptive Language: No Opportunity
- Follows Child’s Lead: No Opportunity
- Maintains/ Extends: No Opportunity
- Stress Reducing Strategies: No Opportunity

### Caregiver Interrupters

- Criticism/ Harsh Voice: No Opportunity
- Restrictions/ Intrusions: No Opportunity
- Rejects Child’s Bid: No Opportunity

### Child Engagement

- Positive Feedback: No Opportunity
- Sustained Engagement: No Opportunity
- Follow Through: No Opportunity

### Child Reactivity/ Distress

- Irritable/Fuss/ Cry: No Opportunity
- External Distress: No Opportunity
- Frozen/ Watchful/ Withdrawn: No Opportunity

Scoring:

- **Never**: 0
- **Rarely/Mild**: 1
- **Sometimes**: 2
- **Often/Severe**: 3
APPENDIX C. IRB APPROVAL NOTIFICATION

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

DATE: 9 May 2008

TO: Meredith Scott
63 LeBaron Hall

CC: Kare Hughes
4380 Palmer Bldg.

FROM: Jan Cann, IRB Administrator
Office of Research Assurances

TITLE: The Effects of Parent-Child Interaction on Child Communication Skills

IRB ID: 08-171

Approval Date: 8 May 2008
Date for Continuing Review: 29 April 2009

The Institutional Review Board of Iowa State University has reviewed and approved this project. Please refer to the IRB ID number shown above in all correspondence regarding this study.

Your study has been approved according to the dates shown above. To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- Use the documents with the IRB approval stamp in your research

- Obtain IRB approval prior to implementing any changes to the study by completing the "Continuing Review and/or Modification" form.

- Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.

- Stop all research activity if IRB approval lapses, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.

- Complete a new continuing review form at least three to four weeks prior to the date for continuing review as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Research investigators are expected to comply with the principles of the Belmont Report, and state and federal regulations regarding the involvement of humans in research. These documents are located on the Office of Research Assurances website [www.compliance.iastate.edu] or available by calling (515) 294-4586.

Upon completion of the project, please submit a Project Closure Form to the Office of Research Assurances, 1138 Pearson Hall, to officially close the project.


