2014

# Pragmatics, Prosody, and Social Skills of School-Age Children with Language-Learning Differences

Janet Lynn Bradshaw
*Louisiana State University and Agricultural and Mechanical College*

# PRAGMATICS, PROSODY, AND SOCIAL SKILLS OF SCHOOL-AGE CHILDREN WITH LANGUAGE-LEARNING DIFFERENCES

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements of the degree of
Doctor of Philosophy

in

The Department of Communication Sciences and Disorders

by
Janet Lynn Bradshaw
B.S., University of South Alabama, 2004
M.C.D., Louisiana State University Health Sciences Center, 2007
May 2014

This is dedicated to my parents, Earl and Dianne Bradshaw, who instilled in me the value of hard work and never letting go of your dreams. It is because of your sacrifices that I have been able to pursue all endeavors. Thank you for giving me a life full of opportunities.

## ACKNOWLEDGEMENTS

This journey would not have been possible without the support and mentorship from many individuals.

To my parents, please know that I have only made it this far because of you. Every accomplishment I have was due to your unfaltering support and determination that my life would be filled with opportunities to accomplish many dreams. I will never forget the sacrifices you made or the values you taught.

To Dr. Hoffman, I valued your mentorship and appreciated your humor during the past years. During this time, I gained a wealth of knowledge in clinical research from your lectures and discussions. Thank you for embracing my research ideas and guiding me during this academic journey, especially during our morning meetings in the union.

Thank you to my committee members, Dr. Yunjung Kim, Dr. Janet Norris, and Dr. Frank Gresham for their constructive guidance during my dissertation. Dr. Kim, your skills as a researcher and compassion as a professor are an inspiration to me. Dr. Norris, I valued your clinical knowledge during my program and dissertation. Dr. Gresham, thank you for your supportive feedback during this process.

There are numerous people to recognize for their support during this process. First, I must acknowledge a dear friend, Dr. Katherine Mooney. I consider our friendship, from our early days at ASH to graduate school, a blessing in my life. Jeanne Fisher, your friendship and belief in me has been invaluable. Mona Alkadi, your friendship has been a true source of positivity. Kyomi Gregory, you and I are kindred spirits in both faith and research. I would be remiss if I did not mention Drs. Crystal Randolph, Christina Seidel, Christina Tausch, Brandi

Newkirk, and Anesha Virani. Thank you for your guidance in research and in life. You all have made me a better researcher and friend.

I extend gratitude to many colleagues for their assistance with my dissertation. Andre Duhon, I cannot thank you enough for your help and enthusiasm with my research. Thank you to Wendy Jumonville and the second-year graduate students for their help with data collection. Lastly, I would like to thank all of the teachers, families, and children who participated in this study.

## TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## ABSTRACT

Social skills are an important aspect of child development that continues to have influences in adolescence and adulthood (Hart, Olsen, Robinson, & Mandleco, 1997). Interacting in a social world requires an integration of many abilities that include social skills and emotional understanding of oneself and other persons. Children who have difficulties with interpreting social cues (e.g., identifying basic emotions and responding to cues in speech) have immediate and progressive consequences in both academics and social living.

Children with typical language skills are successfully interacting with peers and acknowledging social rules for different environments (e.g., playing at school vs. playing at home). In contrast, children with language impairments struggle with using social skills that result in negative experiences in peer interactions (Horowitz, Jansson, Ljungberg, & Hedenbro, 2006). This study explored the social profiles of second grade children with a range of language abilities (e.g., children with low and high levels of language) as they interpret emotions in speech and narrative tasks. Multiple informants (i.e., parents, teachers, speech-language pathologist, and peers) evaluated social skills from different perspectives. A multi-interactional approach explained children's social-emotional development from three theoretical perspectives: pragmatics, cognition, and emotional understanding.

Forty-one second grade children completed a battery of tests that evaluated cognitive measures, language ability, and social skills. Each participant completed three experimental tasks (perception, imitation, and narrative) that examined how children process emotional cues in speech and narratives. A sociometric classification profiled children's social skills and peer relationships.

Results indicated that children with a range of language abilities (i.e., children with low and high levels of language skills) processed emotional cues in speech. Four acoustic patterns significantly related to how children differentiate emotions in speech. Additionally, language ability was a significant factor in the ability to infer emotions in narratives and judge social skills. Children with high language scores were more liked by peers and received better ratings on the teacher questionnaires. This study provides preliminary evidence that children with low and high levels of language abilities are able to interpret emotional cues in speech but differed in the ability to infer emotions in narratives.

# INTRODUCTION

The social-emotional development of young children is a well-established aspect of child development and deficits in this area have both immediate and long-term consequences (Hart, Olsen, Robinson, & Mandleco, 1997). As defined by the Center on the Social Emotional Foundations for Early Learning (CSEFEL), social-emotional development is the capacity of young children to establish close relationships with families and peers, and to experience and process emotions within interactions that promote learning in a social world (CSEFEL, 2008). One area that needs further consideration is the social profile of children with varying language abilities. Three theoretical perspectives are discussed to establish the connections among children's language ability, social skills, and emotional understanding.

Social skills refer to the abilities to detect, analyze, and regulate actions that aid goal-directed behaviors (Bedell & Lennox, 1997). Social skills help children to establish friendships and relationships within the community (e.g., playground and school). It is critical for children to understand that people's emotions influence social interactions. In general, emotional understanding is the ability to recognize and understand that one's emotions are separate from another's emotions and that how one expresses emotions will vary by situational and cultural contexts (Saarni, 1999). Collectively, competent social skills and emotion understanding foster social communications skills, which are a collection of verbal and nonverbal behaviors that one uses to produce a social goal (Weiss & Theadore, 2011).

Children's ability to interpret emotions, their own and others, during social interactions is indicative of emotional competence (Denham et al., 2003). Emotional competence refers to a set of skills that enables the perception, production and regulation of emotions (Denham, 1998) and is considered a critical aspect of social competence (Denham, 2006). As defined by McCabe and

Altamura (2011), "Social competence is the ability to integrate cognitive, affective, and behavioral states to achieve goals in a social context" (p. 515). Taken together, successful social skills include both emotional and social competencies.

Children experience and process emotions in social environments early in childhood and develop skills rapidly. Three-year-olds are able to identify basic emotions (e.g., happy and sad) from facial expressions and vocal cues in speech (Boone & Cunningham, 1998). Four-year-olds begin to understand that emotions relate to a person's individual experiences (Denham, 1998). Preschool children demonstrate an increased ability to better perceive and produce emotions (Colwell & Hart, 2006) that have positive effects on peer relationships (e.g., making friends; Bierman, 2004). Regulating how one expresses emotions requires a complex skill set that allows for emotional understanding, assessing the social situation, and acknowledging the communicative intent of the other person (Denham, Bouril, & Belouad, 1994; Denham, McKinley, Couchoud, & Holt, 1990).

The ability to detect emotions, and ultimately people's communicative intent, requires a relatively complex level of language ability. A crucial part of pragmatics, the aspect of language that emphasizes the use of language in social interactions, is the ability to perceive a speaker's emotion and respond with an appropriate social behavior (Gleason, 2001). Thus, children with well-developed emotional competence will understand the emotional intent of a speaker and use language skills to promote appropriate social interactions (e.g., encouraging a friend who received a poor grade on a test) for different social purposes (Ninio & Snow, 1996).

However, children with language impairment (LI) are at an increased risk for demonstrating pragmatic difficulties in social interactions, such as joining established social conversations (Brinton, Fujiki, Spencer, & Robinson, 1997) and negotiating peer conflicts

(Horowitz, Jansson, Ljungberg, & Hedenbro, 2006). Immature patterns of social behavior are noted early in the development of children with LI (Paul, Looney, & Dahm, 1991) and this social immaturity further perpetuates rejection by peers (Bierman, 2004; Gertner, Rice, & Hadley, 1994). During the school-age years, children with LI exhibit many difficulties in the perception and production of social communication tasks (Brinton, Fujiki, & Higbee, 1998; Brinton, Fujiki, & McKee, 1998; Brinton, Fujiki, Montague, & Hanton, 2000; Brinton, Fujiki, Spencer, & Robinson, 1997; Craig & Washington, 1993). Fujiki, Spackman, Brinton, and Illig (2008) found that eight to ten year old children with LI were not proficient in using speech acoustic cues to identify different emotions (e.g., angry voice vs. sad voice) and struggled to interpret emotions from oral narratives.

Consequently, it is not surprising that children with LI who struggle with understanding emotions also have difficulties with social competence. Denham et al. (1990) found that 3-year-old children's ability to infer emotions directly predicted peer status (e.g., peer accepted vs. peer rejected). As a result, children who confused the different types of emotion (e.g., happy and sad) had lower scores of likeability by peers. Spackman, Fujiki, and Brinton (2006) found that when compared to typical language peers, five to 12-year-old children with LI had significant difficulty inferring emotions from a storybook task. Poor emotional understanding could potentially undermine successful social interactions and peer acceptance.

This study examined the connection between children's language ability and their social and emotional competencies. The purpose of this study was to determine if there are differences in children with varying language abilities in their interpretation of emotions implied in text, perception and imitation of vocal cues expressing emotion, and social acceptance by classroom peers. Investigating the links between social communication skills and emotions will provide

researchers, clinicians, and educators with a better understanding of children's social patterns and the skills to target during intervention.

## LITERATURE REVIEW

The following summarizes literature and highlights studies that explain aspects of social-emotional development that influences children with typical language development and those with language impairment as representing endpoints of a range of language abilities. This section begins with an explanation of various peer relationships and their relation to social competence. Next, the three theoretical perspectives that describe the connections between language, social skills, and emotional understanding are discussed. Lastly, the social consequences that children with LI receive due to poor emotional understanding are addressed.

### Peer Relationships

Peer relationships serve as a foundation for socialization that provide a child with practice to develop mastery of social skills (Rubin, Bukowski & Parker, 1998). Understanding the social rules needed for peer acceptance versus peer rejection is imperative for positive social interactions. Children with poor social skills have unsuccessful peer relationships and are at risk for both current problems and long-term challenges in adjustment (Coie et al., 1990; Parker & Asher, 1987). Consequently, peer-rejected children demonstrate aggressive behaviors with peers (Coie et al., 1982; 1990) that can include intentional acts of emotional, verbal, and physical harm or attempts to embarrass other individuals (Coie & Dodge, 1998; Crick et al., 1999; Underwood, 2003). Four distinct behaviors have been empirically associated with peer rejection: low rates of prosocial behavior, high rates of combative behavior, high rates of inattention/immaturity, and high rates of social anxiety/avoidance with a majority of rejected children exhibiting one or more of these behaviors (Bierman, Smoot, & Aumiller, 1993; Ledingham, 1981).

Conversely, prosocial behaviors are those that support kindness, cooperativeness and peer acceptance (Newcomb, Bukowski, & Pattee, 1993). Popular children who exhibited non-threatening interactions were more likely to work as supportive leaders in the class (Coie et al., 1990) and had better language skills (Black & Logan, 1995; Kemple, Speranza & Hazen, 1992). Four distinct classifications of children's peer relationships -- peer accepted, peer rejected, peer neglected, and the controversial child are reviewed in the following.

**Peer accepted children.** Four aspects of social behavior contribute to higher rates of peer acceptance: cooperative play, emotional expression, language skill and social awareness/sensitivity (Bierman, 2004). First, play behavior is a natural part of social interaction between children that facilitates peer relationships and influences peer status (Farver, Kim, & Lee, 1995; Rubin & Rose- Krasnor, 1992). Children who are cooperative, share toys, and facilitate turn-taking are considered more appealing as playmates (Coie et al., 1990). Walker (2009) examined play behaviors of popular, rejected, and neglected preschool children. Results indicated that popular children were more likely to engage in cooperative play and verbal interaction while displaying affective emotions than both rejected and neglected children (Walker, 2009).

Second, emotional understanding is a desirable trait in a playmate. Children who are more emotionally positive have a higher frequency of choosing prosocial behaviors in peer conflict situations (Denham, Bouril, & Beloud, 1994) and react more appropriately to another's display of emotions (Denham, Mckinley, Couchoud, & Holt, 1990). During stressful interactions, well-liked children are communicatively effective and offer alternative solutions (Eisenberg & Fabes, 1992).

Third, language ability is a critical aspect of the initiation and maintenance of peer interactions (Gottman, 1983; Parkhurst & Gottman, 1986). In cooperative play, children's connected discourse includes turn-taking skills, topic maintenance, and emotional empathy (Black, 1992; Black & Hazen, 1990). Rice, Sell, and Hadley (1991) analyzed preschool children's communicative abilities and social behaviors and found that children with LI were less likely to initiate and maintain conversations with peers. As a result, they were the least preferred playmates during social interactions (Gertner, Rice, & Hadley, 1994; Hadley & Rice, 1991).

Lastly, social awareness facilitates positive social interactions. Knowing when to join a conversation with peers or how to utilize turn-taking during a game involves a high level of social competence. Putallaz (1983) found that less-skilled children more often experienced abrupt and failed attempts at social inclusion by rushing into group activities or remaining on the outskirts of social groups. Peer accepted children were more aware of others' emotions and of social situations, which improved their rate of peer acceptance (Dodge, Pettit, McClaskey, & Brown, 1986).

**Peer rejected children.** The behaviors of socially isolated children are well documented in the literature. Peer rejected children demonstrate notable behavioral concerns (e.g., disruption, physical aggression, and negative behaviors) and do not use prosocial behaviors or conflict resolution strategies to balance aggressive social interactions (Newcomb, Bukowski, & Pattee, 1993). Dodge and colleagues (1983) suggest that rejected children struggle to read important social cues (e.g., facial expression and vocal cues) which results in abrupt attempts in joining group activities.

Children who miss opportunities for social play and positive social interactions are missing crucial learning opportunities. Many rejected children have playmates that are usually

younger and unpopular (Ladd & Asher, 1985). Furthermore, rejected children will congregate with one another, forming low quality friendships that include high levels of aggression, low emotional support, and few positive interactions (Cairns, Neckerman, & Cairns, 1989; Connelly, Geller, Marton, & Kutcher, 1992). Long-term consequences of peer rejection include higher rates of psychological disorders (e.g., including anxiety and depression (Ladd, 2006), substance abuse (Prinstein & LaGreca, 2004) and poor academic scholarship (Ialongo, Vaden-Kiernan, & Kellam, 1998).

**Peer neglected children.** Peer neglected children are more likely to experience social isolation and withdrawal from peers, but not demonstrate the hostile behaviors of rejected children (Bierman, 2004). Both rejected and neglected groups demonstrate higher risks for anxiety and academic concerns (Coie, Dodge & Kupersmidt, 1990).

In a pivotal study, Coie and Kupersmidt (1983) studied the play behaviors of children from different sociometric groups during a summer program. They found that rejected children quickly gained their rejected status with aggressive peer interactions and remained actively disliked in social rankings by both familiar and unfamiliar playmates. Similarly, when paired with familiar children from the neighborhood, neglected children continued to be ignored in social interactions. However, when paired with unfamiliar children, neglected children often improved their social status among playmates (Coie & Kupersmidt, 1983). The results suggest that neglected children's social status may be related to familiarity with peers and specific social contexts (e.g., social bias) and not solely to poor social skills. Bierman (2004) proposed that neglected children do not have severe deficits in social competence but need assistance to increase positive peer relationships.

**Controversial child.** The last peer classification, controversial children, represents a social group of children that exhibits both prosocial and aggressive behaviors. Coie et al. (1990) described controversial children as very active, easily angered, and noted for amusing peers with class disruptions. In slight contrast, Newcomb et al. (1993) defined controversial children as having both positive social behaviors (e.g., being friendly) and antisocial behaviors (e.g., exhibiting aggression). Unlike peer accepted and rejected children who have clearer sociometric definitions and behavioral characteristics, controversial children are challenging to categorize due to the broad range of social behaviors they exhibit (Hill & Merrell, 2004). Controversial children utilize both prosocial behaviors (e.g., being friendly and empathic) and aggressive actions (e.g., hitting and yelling) at various times in different social contexts.

**Parent, teacher, and peer reports of social skills.** In peer relation studies, it is common for both peers and teachers to evaluate children's social skills and social status as part of a sociometric assessment. Questionnaire-based literature provides support for a moderate correlation between peers and teachers' ratings of children's social skills (Landau, Milich, & Whitten, 1984; Wu, Hart, Draper, & Olsen, 2001). Peers serve as valuable informants in sociometric assessment due to their direct contact and immediate interactions with other children. Peers have opportunities to observe and evaluate other children's social skills (Masten, Morison, & Pellegrini, 1985). Similarly, teachers provide valuable information regarding students' social competence. Teachers often have direct contact with students individually and can indirectly observe students' interactions with their peers. Taken together, both peer and teacher evaluations provide crucial information for understanding children's social behaviors and may be important when planning treatment.

Additionally, parental input provides an important interpretation of children's social skills. Considering that young children first experience social interactions in the context of family, parents have personal knowledge of their children's social strengths and weaknesses (Little, 2003; Simpson, McKee, Teeter, & Beytien, 2007). Murray, Ruble, Willis, and Molloy (2009) found a moderate agreement between parent and teacher questionnaire ratings for social skills rating scores. However, other studies have found only modest congruency between different raters (Achenbach, McConaughy, & Howell, 1987; Rapin, Steinberg, & Waterhouse, 1999).

One method used to combat the possible low congruence among raters is to have multiple individuals (e.g., parent, teacher, and peer) score a child's behavior. The use of multiple informants lends support to the development of a complete understanding of a child's abilities in different environments and from different perspectives (Bishop & Baird, 2001; Renk & Phares, 2004). Although it is possible for a rater to observe and evaluate a child's social skills in every setting (e.g., home, school, neighborhood playground), often circumstances do not often allow for those opportunities. Taken together, the studies provide support for the use of multi-informant questionnaires to gain a complete understanding of a child's social functioning.

**Pragmatics and Social Competence**

Social competence is a foundational skill set that is crucial for positive social interactions, developing peer relationships, and making friendships (Windsor, 1995). Children with LI have noted difficulties with using language in a socially appropriate manner and are at risk for adverse social effects (Hart, Fujiki, Brinton, & Hart, 2004). Rice, Sell, and Hadley (1991) studied preschool children's communicative patterns and the relationships between these patterns and social competence and peer acceptance. Results indicated that preschool children identified

peers with poor communication skills and would often avoid interacting with them during playtime. Similarly, four year olds with language comprehension delays were identified as "least liked" by classmates (Gertner, Rice, & Hadley, 1994). Furthermore, poor social understanding continues throughout elementary to high school, where long-term consequences are evidenced in the arenas of academics, self-esteem, and close relationships (Blalock, 1982; Jerome, Fujiki, Brinton, & James, 2002; Wadman, Durkin, Conti-Ramsden, 2011).

**Theory**

The exact relationship between children's language impairment and social skills deficits remains ambiguous. A number of explanations may account for this dynamic relationship from linguistic, cognitive, and emotional perspectives.

From a linguistic perspective, one account of the social skills deficits of children with LI includes an inability to grasp the content and form of language. Redmond and Rice (1998) suggest in the Social Adaptation Model (SAM) that children with LI adapt to social situations by demonstrating withdrawal or avoidance behaviors to accommodate the high linguistic demands required in an interaction. According to the SAM, the success of children's social interactions develops from an integration of three factors: a) communicative demands of the situation b) child's language ability, and c) social biases and behaviors from individuals in the social environment (Redmond & Rice, 1998). Children with LI fail to process the linguistic information in social interactions resulting in poor social communication skills, such as lower rates of initiating conversational discourse, difficulty using conflict resolution strategies, and a greater reliance on interaction with adults then peers (Craig & Washington, 1993; Hadley & Rice, 1991; Rice, Sell, & Hadley, 1991). This in turn promotes further social isolation and decreased opportunities for social engagement (Bishop, 1997; Rice, 1993).

From a cognitive perspective, Bishop suggests two models that assign a deficiency in cognitive resources as the basis for children's social skills deficits. Bishop's (1997) first model highlights limited processing ability. Social communication tasks placing high loads on working memory interact with the child's low processing capacities resulting in difficulties in social communicative tasks. In an extension of the first model, Bishop's second model proposes that children with LI's poor understanding of pragmatic language are due to a social cognitive deficit. Social cognition emphasizes the way a person processes social information, beliefs, and attitudes (Bandura, 1992). These processes influence the individual as well as others in the interaction. As seen in children with LI, children who do not perceive vocal or emotional cues in social interactions often miss the pragmatic intent of social communication (Boucher, Lewis, & Collis, 2000; Ford & Milosky, 2003; Fujiki, Brinton, & Clarke, 2002). The resources needed for both cognitive skills (e.g., joint attention and short term memory) and language use (e.g., receptive and expressive language skills) are impaired in children with LI resulting in an accumulation of poor social communication skills (e.g., inability to examine the social situation; Bishop, 1997).

The third theoretical perspective incorporates a pairing of cognitive capacities and language processing that is founded on emotional, or affective, understanding. The Functional/Emotional approach (F/E) to language development, is characterized by six fundamental themes (Shanker & Greenspan, 2005). In the first theme, the authors discard the perspective that language acquisition is solely a mental process and that language is used only as a tool for describing thoughts (e.g., Cartesian view). In the second theme, language is considered too multifaceted, in both development and use, to be attributed only to a nativist view. In the third theme, the F/E approach emphasized a developmental perspective in language acquisition in that cognitive and linguistic skills must evolve in a progressive pattern. For the fourth theme,

the authors proposed that there is a critical connection between pre-linguistic communication and language development. Regarding the fifth theme, language development is not simply a controlled system of internal functions but involves a collection of experiences (e.g., dynamic systems). Finally in the sixth theme, the authors address the importance of affect in both cognitive and language development; they emphasize affect as the core structure in both developments.

In the F/E approach, language skills develop from a series of affective transformations that allow infants to take interest in themselves and their surroundings (e.g., joint attention and intentional communication). For example, during vocal play between a mother and baby, the mother smiles in response to an infant's coo. The infant perceives and processes the mother's smile as a meaningful, social behavior. In turn, the infant purposefully continues the vocal pattern and social interaction. This sensitivity to the emotional, or affective, responses in a social world combines with an accumulation of additional transformations. As emotional awareness develops, the child is able to participate in complex, social interactions that involve multiple people and problem solving. From these social experiences, based in affective interactions, the child learns the importance of social and communicative patterns.

If children did not establish the necessary affective transformations in infancy and early childhood, and ultimately do not develop a cognitive understanding of a social world, then their ability to perceive emotional cues in social interactions would be impaired. As a result, a lack of social-emotional understanding would negatively influence peer acceptance and successful social interactions.

In sum, all three theoretical constructs (pragmatics, cognition, and emotional processing) exert critical influences on the development of children's social-emotional understanding. There

is a multi-interactional relationship among each construct so that each may influence one another. This dynamic relationship will affect children's interpretation of linguistic and nonlinguistic behaviors in social interactions. Figure 1 shows potential interactions among a variety of processors that are involved in using emotional information in communication. Three large processors at the top represent the main theoretical perspectives of Pragmatic Processing, Cognitive Processing, and Emotional Processing. These main processors interact with other processors including other aspects of language processing as shown by the smaller, light colored processors. The processors reach an input and output level in which the person perceives and produces the vocal aspects of emotion in speech.

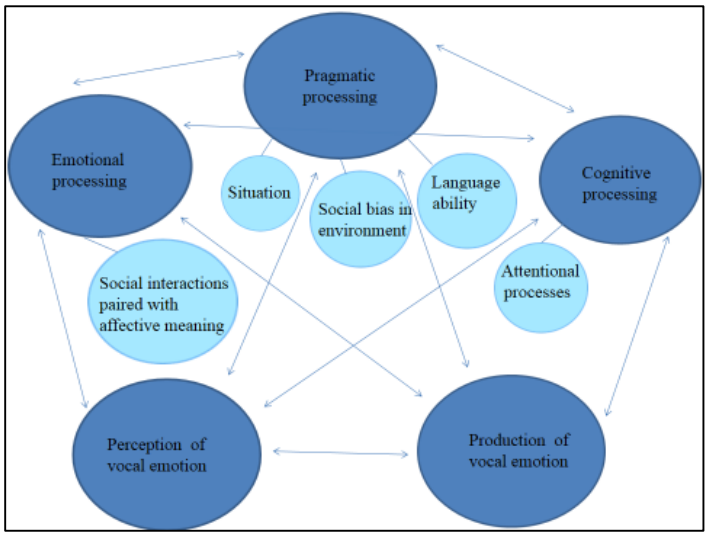



Figure 1. Multi-interactional model of emotional processing

**Emotional prosody.** Children's use of prosody to express emotion is another area in social-emotional development that remains unclear. Prosody, defined as the rhythm of sounds noted in connected speech (Kent & Read, 2002), can include changes in vocal intonation, syllabic stress, pauses, and loudness (Hixon, Weismer & Holt, 2008). Thus, emotional prosody involves the use of these acoustic cues to express and interpret emotions (Trimmer & Cuddy, 2008). The role of prosody in social interactions is a vital aspect of emotional understanding.

Social interaction includes use of both verbal and nonverbal behaviors (e.g., facial expressions or angry tone in a voice) to convey attitudes, emotions, and mental states of the speaker (e.g., sarcasm or approval) (DePaulo & Friedman, 1998). A listener's perception of emotions in conversational speech can greatly affect pragmatic understanding of the social interaction (Caffi & Janney, 1994; Mahl & Schulze, 1964; Pittenger et al., 1960). For example, speech perception researchers have documented the effect of salient vocal cues on infants' increased attention and exploration in their environment (Moses, Baldwin, Rosicky, & Tidball, 2001; Parise, Cleveland, Costabile, & Striano, 2007).

Vocal emotion studies are grouped in three categories: natural vocal expression, induced emotional expression, and simulated emotional expression. Natural vocal expression studies include audio recordings of naturally occurring emotional states in various activities (e.g., police officers radioing for help, reporting emotion-based stories, and game or talk shows). This is a limited methodology because natural recordings of vocal emotions are limited in number, brief, and often poorly recorded.

Induced emotional expression involves stimuli intended to elicit specific emotional states in speakers who then record speech samples. Induction studies utilize an array of emotion-inducing stimuli, such as stress induction tasks and presentation of emotion-laden pictures or imagery methods (Alpert et al., 1963; Bachorowski & Owen, 1995; Scherer, 1979; Scherer, 1985). Although this methodological practice attempts to create a high degree of control, the researcher cannot assume the stimuli will elicit similar emotional states in all individuals.

Simulated vocal expressions involve actors who produce various portrayals of vocal emotions. This constitutes the favored recording method (Banse & Scherer, 1996; Klasmeyer &

Meier, 1999; Whiteside, 1999). A drawback to this method is the reliance on cues that may not be present in natural expressions of emotions (Scherer, 2003).

The literature concerning children's acoustic patterns of emotional expressions is sparse but there are several studies suggesting specific prosodic variations across emotions in adults. Additionally, the range of acoustic variables analyzed is not always consistent among studies. The acoustic parameters utilized in emotional expression studies include fundamental frequency (F0), speech rate, and intensity (Banse & Scherer, 1996; Scherer, 2003). Fundamental frequency is the average rate of vocal fold vibration (Hixon, Weismer, & Holt, 2008), speech rate is a measure of the rate of production of speech sounds (Hixon, Weisner, & Holt, 2008). Intensity relates to the amplitude of the speech signal (Colton, Casper, & Leonard, 2006). The basic emotions (e.g., happy, sad, angry, fear, and disgust) in adult populations have been studied and the acoustic patterns documented by Pittam and Scherer (1993) are summarized. For the purposes of this study, the acoustic characteristics of happy, sad, and angry emotions are reviewed.

**Happy.** The prosodic cues include an increase in F0, F0 range, F0 variability, rate of speech, and mean intensity.

**Sad.** Acoustic analysis across multiple studies have shown a marked decrease in F0, F0 range, a downward-slope of F0 contours, speech rate, and a decrease in intensity.

**Angry.** Depending on the type of anger vocally expressed, prosodic cues can vary. In certain studies, a difference between "hot anger" and "cold anger" relates to distinct acoustic differences, in which "hot anger" results in increased F0 range and variability. "Cold anger" relates to a decrease in F0 and intensity. In general, an increase in mean F0, mean intensity, speech rate, high-frequency energy and a downward slope of F0 contours are noted.

In sum, suprasegmental features, such as F0, duration, and intensity are associated with expression of emotion. Fundamental frequency averages and variability are larger in expression of happy or angry utterances compared to neutral utterances (Davitz, 1964; Iida et al., 2003; Murray and Arnott, 1993). Utterances spoken with a sad emotional tone have smaller F0 fluctuations and less inflection (Davitz, 1964; Iida et al., 2003).

**Prosody and Literacy.** Various language researchers reported the significance of prosodic characteristics of children's discourse. From a global perspective, links between prosodic cues in speech and reading development are apparent. For example, reading aloud requires the ability to join a variety of weak and strong syllables into words, which are combined into phrase segments while maintaining a rhythmic speech pattern (Wade-Woolley & Wood, 2006). Further, reading connected text requires the combination words, phrases, and clauses with the awareness of punctuation to facilitate reading fluency and comprehension (NICHD, 2000). One proposal for the link between prosody and reading development suggest that an awareness of speech prosody may promote phonological awareness (Goswami, 2003; Wood, 2006; Wood & Terrell, 1998).

Despite the robust literature, there are only a few studies regarding acoustic influences of prosody in reading development. Wood and Terrell (1998) examined both typical and poor readers' sensitivity to rhythmic awareness in a variety of tasks (e.g., phoneme deletion, rhyme detection, syllable segmentation, letter-sound knowledge, rapid speech perception, and rhythmic matching). Results indicated that poor readers had a significantly more difficult time with both spoken word recognition and sentence-matching tasks as compared to age-matched peers, which suggests a delay in rhythmic awareness in speech. Wood and Terrell (1998) suggest that poor readers demonstrate a lack of prosodic sensitivity in speech, which has underlying consequences

in reading development. Similarly, Wood (2006) examined four and five year-olds' ability to recognize words mispronounced in various ways (e.g. reversal of stress in words, reversal of vowels in words, and removing certain vowels). Wood found that altering the stress on a word most affected aural word recognition in the younger children.

If children use prosodic sensitivity in speech as a tool to facilitate literacy development, then is it possible for children to utilize prosodic cues in speech to promote social-emotional development? Similar to good literacy skills, children with good social skills should detect the vocal cues in peer interactions, which allow them to "read" the social intent of the speaker and respond in a socially appropriate manner.

**Social Skills and Communication Impairments**

Positive social interactions are dependent upon appropriate communication skills (Craig, 1993). The precise relationship between language impairment and social-emotional behaviors is complex and heterogeneous in nature (Rapin, Allen, & Dunn, 1992). Poor receptive and expressive language skills can present in various ways. Children with communication disorders exhibit more difficulties with social understanding and use of pragmatic language skills, such as initiating peer interactions, maintaining social conversations, and analyzing appropriate social behaviors (Guralnick, Connor, Hammond, Gottman, & Kinnish, 1996; Horwitz et al., 2003). Brinton and Fujiki (1994) suggest that children with LI develop a set of negative social cycles. Children with LI struggle to initiate and maintain conversations with peers, and as a result, are often not included in social gatherings. The resulting lack of opportunities to practice social communication promotes decreased social understanding and poor execution of social skills (Rice, 1993). Adolescents with language impairments are at a higher risk for social ncompetence

(Beitchman et al., 1996), peer rejection and bullying (Conti-Ramsden & Botting, 2004), delinquent behavior and anxiety disorders (Beitchman et al., 2001).

If language ability were a significant factor in the severity of social deficits, then it would be logical to ascertain a connection between subtypes of language disorders and social-behavioral concerns. Baker & Cantwell (1982) found only a 25% comorbidity rate in children with speech disorders and behavioral disorders, whereas, a 63% comorbidity rate was established for children with both speech and language deficits. In a longitudinal study, Beitchman et al. (1996) found that the type of language impairment diagnosed at 5 years of age was a significant factor in the severity of social difficulties. The comorbidity rate demonstrates the importance language ability plays in successful social interactions.

**Emotional Prosody in Children with Language Impairments**

Detecting emotion portrayed in communicative interactions is a critical aspect for social interaction (Leppanen & Hietanen, 2001; Norwicki & Duke 1992). Emotional understanding includes the "ability to discern and understand others' emotions, using situational and expressive cues that have some degree of cultural consensus as to their emotional meaning" (Saarni, 1999, p. 106). Prosodic features (e.g., pitch, stress, duration) can be important components when deciphering linguistic meaning or conveying emotion. Individuals with LI may not perceive the prosodic cues in speech that are important for social communication. In general, children with LI have difficulties in receptive and expressive language (Leonard, 1998) and poor social interactions among peers (Izard et al., 2001). Children with LI are at an increased risk for missing the emotional content of message by not detecting the prosodic cues in speech (Boucher et al, 2000).

Few studies examined the relationship between children's language ability and prosody. Fujiki, Spackman, Brinton, & Illig (2008) designed a prosody task that examined the connection between prosody and language impairment in the context of a spoken narrative passage. All participants listened to a semantically neutral narrative that conveyed different emotions-- anger, fear, happiness, or sadness-- and were asked to identify the specific emotion. The typical language group performed better than the group with LI across all four emotions. ANCOVA analysis revealed that the group with LI often confused the emotion of "fear" with "sadness" and misidentified "anger" with "happiness" 11.84% of time (Fujiki et al., 2008).

Regarding prosody and grammatical understanding, Fisher et al. (2007) studied 30 preschool children with LI's ability to identify pairs of sentences that were matched or mis-matched with syntax and word/syllable length (lexical stress). The group with LI performed significantly worse than the typical language group and were less accurate in judging prosodic cues between sentences. Furthermore, reports suggested that children with LI have difficulty in producing prosodic elements in connected speech (Crary & Tallman, 1993; Samuelsson, Scocco, & Nettelbladt, 2003; Wells & Peppe, 2003). However, other studies found that children with LI use prosodic cues as well as their typically developing peers (Snow, 1998; Van Der Meulen & Janssen, 1997). Taken together, children with LI may not always utilize prosody in determining the appropriate meaning (e.g., linguistic or emotional) in verbal interactions.

**Summary**

The connection between language ability and social difficulties in children is established but not completely understood. Children with LI display difficulties in social skills and behavior management when compared to children with typical language skills (Baker & Cantwell, 1987). The comorbidity of social deficits and behavioral concerns in children with LI was as high as 50

to 70 percent (Hummel & Prizant, 1993). Children with LI have greater difficulties with social skills, peer relationships, and communicative interactions than children with typical language development (Beitchman et al., 1996; Fujiki, Brinton, Morgan, & Hart, 1999; McCabe & Meller, 2004; Redmond & Rice, 1998). Further, children with LI have significant difficulty in interpreting emotions (e.g., making references and interpreting vocal emotion; Boucher, Lewis & Collis, 2000; Ford & Milosky, 2003; 2008) which negatively affects social interactions (Hart et al., 2004). Research regarding children's interpretation of emotional prosody (e.g., vocal inflection during emotional interactions) is sparse, especially involving children with LI. A more comprehensive understanding of children's social skills will allow interventionists to provide functional and appropriate clinical services that pertain to social-emotional development.

This study will examine the ability of children, with a range of language abilities, to produce and infer emotions within various tasks. In addition, children's social skills will be judged by multiple informants (e.g., peers, parents, teacher and speech-language pathologist) to assess how they engage in various social interactions. It is hypothesized that children with lower levels of language ability will not infer or produce a range of emotional cues as well as those with higher language abilities. Furthermore, children with lower language ability are expected to be ranked lower in social status by their peers due to their poor emotional understanding. The questions of this study are:

1. Is there a relationship between perception of vocal emotion and language ability in children?
2. Is there a relationship between production of vocal emotion and language ability in children?
3. Is there a relationship between the recognition of emotion in narratives and language ability in children?

4. Does children's ability to interpret prosody correlate with sociometric ranking classifications from peers?

5. Do children's performance scores from a pragmatic assessment correlate with sociometric ranking classifications from peers?

6. Do parent and teacher questionnaires correlate with sociometric ranking classifications from peers?

7. Does nonverbal intelligence correlate with children's sociometric ranking classifications from peers?

## METHODS

This study examined whether children's language ability is related to their ability to interpret emotions implied in text, to interpret and produce vocal cues expressing emotion and in their social acceptance by classroom peers. The following section describes the setting of the study, participant characteristics, diagnostic and experimental measures, procedures, and reliability calculations.

### Setting

**School.** The researcher recruited children in a Title I elementary school in an urban area of a metropolitan city in southeastern Louisiana. The student population is considered low socioeconomic status (SES) based on 95% of students receiving free or reduced lunch. The school is of average size with a population of 393 students. Due to academic performance, the school has a 2013-2014 School Improvement Plan implemented by the Louisiana Department of Education. The neighborhood surrounding the school has a high crime rate according to Baton Rouge crime statistics (Baton Rouge Crime Statistics, 2012).

**Classrooms.** Three 2nd grade classrooms participated in this study (Class A with 15 students, Class B with 20 students, and Class C with 6 students). Two teachers held a Master's degree in Education and had taught for 15 and 25 years in elementary education. The third teacher held a Bachelor's degree in education, was enrolled in a Master's program, and had taught at the elementary level for four years. Teachers reported a range of 0 to 9 hours of training in children's social skills development (Teacher A= 0 to 3 hours, Teacher B= 3 to 6 hours, Teacher C= over 9 hours). Observations of Teacher A and Teacher B's class revealed assertive teaching styles that incorporated collaboration among students and a plan to facilitate independent thinking with assignments. Teacher C demonstrated a very structured and assertive

teaching style that mainly used directed questions and answers to specific content. All three teachers incorporated audio-visual media during instruction (e.g., Smart Board). Seating arrangements were similar in that students sat in groups of four to five desks per group (e.g., Group 1, Group 2, Group 3). In each group, the desks faced interiorly so that students faced each other while sitting. Teachers' educational background and training is profiled in Table 1.

Table 1. Characteristics of teachers' education

| Teacher | Gender | Highest Degree | Years of Experience | Hours of Social Skills Training |
|---|---|---|---|---|
| A | F | BA | 4 | 0-3 |
| B | F | MA | 15 | 3-6 |
| C | F | MA | 25 | 9+ hours |

*Note*. F= Female; BA= Bachelor's degree; MA= Master's Degree

**Participants**

The child participants consisted of 41 students ranging in age from 84 to 106 months, with a mean age of 91.24 months. Based on the number of signed consent forms collected, the researcher recruited 15 participants in Teacher A's class (Class A), 20 participants in Teacher B's class (Class B), and six participants in Teacher C's class (Class C). One student had an Individual Education Plan (IEP) for Developmental Delay. The remaining participants did not have IEPs during the implementation of the study. The teachers collected signed parental consent forms and the participants gave assent for participation in the study using the Internal Review Board procedures (See Appendix A). Parents completed a student information form that concerned the participants' developmental milestones, medical history, and academic success (See Appendix B). At the completion of the study, the researcher gave gift cards to all

participating families. All participants were initially assessed to determine their current level of cognitive and language abilities, including semantic, syntactic, and pragmatic abilities.

**Language groups**. All participants were assigned to language groups (high performance, mid-range performance, low performance) based on his or her scaled scores on the three language measures of the Test of Language Development- Primary 4 : Relational Vocabulary, Syntactic Understanding, and Sentence Imitation (TOLD: P 4; Newcomer & Hammill, 2008). In the low language group, 12 participants scored below average (score of seven or less) on two of three measures. For the midrange performance group, 15 participants scored below average (score of seven or less) on one of the three measures. Fourteen participants in the high performance group scored average or above on all three measures (score of eight or higher).

The language groups (high performance, mid-range performance, low performance) reflect a range of language abilities of the 41 participants. Despite only one participant with documented language impairment, participants in the low performance group warrant clinical concern based on scores from the language measures. Due to the difficulty with interpreting language in various tests, participants in the low performance group would benefit from an official referral for speech and language services.

**Measures**

All participants completed a battery of diagnostic tests consisting of questionnaires, structured observations, standardized measures, and experimental tasks. These assessments measured language ability, cognition, and social-emotional skills to evaluate hypothesized relationship variables. The researcher administered the battery of tests and tasks to children

individually in the classroom. The participant's language and cognitive scores are profiled in Tables 2 through 4.

Table 2. Participant demographics and assessment scores of cognitive and language measures: Class A

| Pt[a] | Gdr[b] | Age | IEP | Rep | Ptoni | Prag[g] | RV[h] | SU[h] | SI[h]* | Grp[i] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | F | 87 | No | No | 120 | 26 | 10 | 10 | 8 | High |
| 2 | M | 94 | No | No | 110 | 26 | 6 | 8 | 7 | Low |
| 3 | F | 87 | No | No | 106 | 26 | 15 | 8 | 14 | High |
| 4 | F | 91 | No | No | 106 | 26 | 4 | 10 | 6 | Low |
| 5 | F | 87 | No | No | 104 | 26 | 9 | 10 | 11 | High |
| 6 | F | 90 | No | No | 82 | 22 | 10 | 9 | 12 | High |
| 7 | F | 85 | No | No | 82 | 26 | 6 | 6 | 10 | Low |
| 8 | F | 85 | No | No | 80 | 26 | 7 | 10 | 9 | Mid |
| 9 | F | 92 | No | No | 80 | 26 | 4 | 5 | 8 | Low |
| 10 | F | 89 | No | No | 77 | 26 | 11 | 10 | 6 | Mid |
| 11 | F | 100 | DD[j] | No | 68 | 8 | 3 | 8 | 4 | Low |
| 12 | F | 95 | No | No | 66 | 26 | 8 | 10 | 6 | Mid |
| 13 | M | 96 | No | No | 65 | 26 | 5 | 6 | 8 | Low |
| 14 | F | 96 | No | No | 62 | 26 | 5 | 11 | 9 | Mid |
| 15 | F | 100 | No | No | 59 | 26 | 8 | 5 | 8 | Mid |
| Mean | | | | | 84.47 | 23.60 | 7.40 | 8.40 | 8.40 | |
| SD[k] | | | | | 12.97 | 5.04 | 1.96 | 1.43 | 3.17 | |

*Note*. * = scored for dialect.
[a]Participants. [b]Gender. [c]Age in months. [d]Individualized Education Program. [e]Repeating 2nd grade. [f]Primary Test of Nonverbal Intelligence. [g]Clinical Evaluation of Language Fundamentals-Primary 4th: Pragmatic Profile. [h]Test of Language Development-Primary 4: Relational Vocabulary subtest, Syntactic Understanding subtest, Sentence Imitation subtest. [i]Language groups: High, Mid-range, Low. [j]Developmental Delay. [k]Standard Deviation.

**Language assessment**. The Test of Language Development: Primary 4 (TOLD: P 4; Newcomer & Hammill, 2008) is a standardized diagnostic test used to assess children's language skills. The TOLD-P: 4 was normed on a sample of 1,108 children from diverse ethnicities and geographic locations in 16 states from the winter of 2006 to fall of 2007. There was strong

internal consistency (i.e., little content sampling error) with alpha coefficients ranging from .85 to .92 for the three subtests. Test-Retest reliability for the subtests indicated little time sampling error with coefficients from .81 to .87.

Table 3. Participant demographics and assessment scores of cognitive and language measures: Class B

| Pt[a] | Gdr[b] | Age[c] | IEP[d] | Rep[e] | Ptoni[f] | Prag[g] | RV[h] | SU[h] | SI[h*] | Grp[i] |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | F | 85 | No | No | 116 | 26 | 9 | 7 | 4 | Low |
| 17 | F | 84 | No | No | 111 | 26 | 9 | 10 | 13 | High |
| 18 | F | 91 | No | No | 102 | 26 | 7 | 11 | 10 | Mid |
| 19 | F | 85 | No | No | 91 | 26 | 8 | 8 | 8 | High |
| 20 | M | 85 | No | No | 87 | 26 | 9 | 10 | 9 | High |
| 21 | M | 86 | No | No | 85 | 26 | 10 | 10 | 9 | High |
| 22 | F | 86 | No | No | 85 | 26 | 8 | 10 | 8 | High |
| 23 | F | 95 | No | No | 84 | 26 | 11 | 8 | 9 | High |
| 24 | F | 85 | No | No | 84 | 26 | 5 | 10 | 2 | Low |
| 25 | F | 88 | No | No | 83 | 26 | 8 | 8 | 12 | High |
| 26 | F | 94 | No | No | 80 | 26 | 10 | 7 | 10 | Mid |
| 27 | M | 90 | No | No | 78 | 24 | 10 | 10 | 8 | High |
| 28 | F | 93 | No | No | 78 | 26 | 10 | 12 | 7 | High |
| 29 | F | 84 | No | No | 78 | 20 | 7 | 8 | 4 | Low |
| 30 | F | 94 | No | No | 76 | 26 | 7 | 8 | 11 | Mid |
| 31 | M | 88 | No | No | 75 | 26 | 6 | 10 | 9 | Mid |
| 32 | F | 90 | No | No | 72 | 20 | 4 | 8 | 7 | Low |
| 33 | M | 86 | No | No | 70 | 26 | 7 | 10 | 9 | Mid |
| 34 | M | 106 | No | Yes | 70 | 26 | 6 | 8 | 8 | Mid |
| 35 | M | 101 | No | Yes | 68 | 10 | 5 | 7 | 7 | Low |
| Mean | | | | | 83.65 | 23.70 | 7.80 | 8.95 | 8.55 | |
| SD[j] | | | | | 12.97 | 5.04 | 1.96 | 1.43 | 3.17 | |

*Note*. * = scored for dialect.
[a]Participants. [b]Gender. [c]Age in months. [d]Individualized Education Program. [e] Repeating 2nd grade. [f]Primary Test of Nonverbal Intelligence. [g]Clinical Evaluation of Language Fundamentals-Primary 4th: Pragmatic Profile. [h]Test of Language Development-Primary 4: Relational Vocabulary subtest, Syntactic Understanding subtest, Sentence Imitation subtest. [i]Language Groups: High, Mid-range, Low. [j]Standard Deviation.

Table 4. Participant demographics and assessment scores of cognitive and language measures: Class C

| Pt[a] | Gdr[b] | Age[c] | IEP[d] | Rep[e] | Ptoni[f] | Prag[g] | RV[h] | SU[h] | SI[h*] | Grp[i] |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | M | 93 | No | No | 134 | 26 | 8 | 10 | 10 | High |
| 37 | F | 95 | No | No | 114 | 26 | 8 | 12 | 7 | Mid |
| 38 | F | 93 | No | No | 79 | 20 | 8 | 14 | 9 | High |
| 39 | F | 93 | No | No | 79 | 14 | 7 | 9 | 11 | Mid |
| 40 | F | 95 | No | No | 68 | 8 | 7 | 8 | 13 | Mid |
| 41 | M | 102 | No | No | 46 | 18 | 2 | 6 | 7 | Low |
| Mean | | | | | 86.50 | 18.67 | 6.67 | 9.83 | 9.50 | |
| SD[j] | | | | | 32.16 | 7.01 | 2.34 | 2.86 | 2.35 | |

*Note*. * = scored for dialect.
[a]Participants. [b]Gender. [c]Age in months. [d]Individualized Education Program. [e]Repeating 2nd grade. [f]Primary Test of Nonverbal Intelligence. [g]Clinical Evaluation of Language Fundamentals-Primary 4th: Pragmatic Profile. [h]Test of Language Development-Primary 4: Relational Vocabulary subtest, Syntactic Understanding subtest, Sentence Imitation Subtest. [I]Language groups: High, Mid-range, Low. [j]Standard Deviation.

Three subtests were administered: Relational Vocabulary, Syntactic Understanding, and Sentence Imitation. Table 5 profiles the descriptive statistics of the three language groups' performance scores on the language subtests. The resulting groups show increasing average performance from 5.0 to 7.6 to 9.5 on Relational Vocabulary, from 7.42 to 9.40 to 9.57 on Syntactic Understanding, and 6.17 to 8.87 to 10.50 for Sentence Imitation.

**Relational vocabulary (RV) subtest**. The RV subtest employs a linguistic task in which the child is asked to explain how two words are similar (e.g., How are a pen and a pencil alike?). An understanding of how two different words are connected requires the cognitive and linguistic skills of identifying each object and then systematically expressing in language the similarities among aspects of each word (e.g., form, function, attribution, and meaning). Similar abilities are

Table 5. Descriptive statistics for performance scores on language measures across groups

| Language Group | RV[a] | SU[b] | SI[c] |
|---|---|---|---|
| Low performance | | | |
| M (SD)[d] | 5.0 (1.86) | 7.42 (1.56) | 6.17 (2.25) |
| Min[e] | 2 | 5 | 2 |
| Max[f] | 9 | 10 | 10 |
| *n*[g]= 12 | | | |
| Mid-range performance | | | |
| M (SD) | 7.60 (1.64) | 9.40 (1.92) | 8.87 (1.96) |
| Min | 5 | 5 | 6 |
| Max | 11 | 12 | 13 |
| *n* = 15 | | | |
| High performance | | | |
| M (SD) | 9.50 (1.87) | 9.57 (1.56) | 10.50 (2.57) |
| Min | 8 | 8 | 8 |
| Max | 15 | 14 | 16 |
| *n* = 14 | | | |
| Total | | | |
| M (SD) | 7.49 (2.51) | 8.88 (1.91) | 8.63 (2.82) |
| Min | 2 | 5 | 2 |
| Max | 15 | 14 | 16 |
| *n* = 41 | | | |

[a]= Relational Vocabulary. [b]= Syntactic Understanding. [c]= Sentence Imitation. [d]= Mean (Standard Deviation). [e]= Minimum value. [f]= Maximum value. [g]= sample size.

needed when interpreting social interactions, such as finding the connection between content of a message and how that message is delivered (e.g., "You are great" said in happy voice vs "You are great" said in a sarcastic voice).

**Syntactic understanding (SU) subtest**. The SU subtest examined the participant's ability to interpret sentence meaning while highlighting the syntactic structure of the sentence. This picture-based task required the participant to select one of three pictures that most accurately depicts the meaning of the target sentence. For example, a picture of a man leaving

his saddled horse as opposed to pictures in which a man is riding or approaching a horse would represent the meaning of the target sentence "He had ridden." Syntax, or grammar, is an integral part of the English language system that is used to express and understand meaning. The difference in time of an action's occurrence in the sentences "I walk home" versus "I walked home" is cued by the morpheme –ed, which signals the past tense of the action verb. Complex sentence structures are used to express motives and emotions related to actions as in "We were running so that we would be on time" and "Mom was unhappy that you came home late last night."

**Sentence imitation (SI) subtest**. The SI subtest is an expressive language task that measured the participant's ability to imitate English sentences of increasing syntactic complexity. The participant's sentence imitations are thought to be consistent with his own grammatical rules or patterns. An inability to repeat a complex sentence or the morphological components of a sentence is taken as evidence that the child's language system has not developed those particular patterns.

**Cognitive test**. The Primary Test of Nonverbal Intelligence (PTONI; Ehrler & McGhee, 2008) is a diagnostic test that measures children's nonverbal intelligence, including logical, spatial, and abstract relationships that affect problem solving and making inferences. The PTONI was normed on a sample of 1,010 children from diverse ethnicities and geographic locations in the United States from the fall of 2005 through the fall of 2006. Cronbach's alpha statistics showed strong internal consistency among test items with an alpha coefficient of .93 for the Nonverbal Index score. Test-Retest reliability indicated little time sampling error with a coefficient of .97. The child is presented with sets of pictures and must decide which picture

does not fit the pattern organizing the remaining pictures. For example, the picture of a shark does not fit the group of three ships.

**Social skills checklist**. The Pragmatic Profile, a supplemental subtest of the Clinical Evaluation of Language Fundamentals 4 (CELF 4; Semel, Wiig, & Secord, 2003), is a checklist that evaluates a child's social skills and communicative behaviors in three areas: 1) rituals and conversational skills, 2) asking for, giving, and responding to information, and 3) nonverbal communication skills. The CELF 4 was normed on a sample of more than 4,500 individuals (i.e., age five to 21) from diverse ethnicities and geographic locations in the United States from spring 2002 through summer 2002. For the Pragmatic Profile, Cronbach's alpha statistics specified strong internal consistency with an alpha coefficient of .98. Test-Retest reliability coefficients showed little time sampling error with a coefficient of .96. The researcher adapted the Pragmatic Profile for this study by choosing 14 items that included observations in the classroom, recess, and lunch situations.

**Social skills questionnaire**. The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) is a screening tool consisting of 25 items that examine social skills and behavior problems on five scales (i.e., emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behaviors). Both parents and teachers completed the SDQ for the participants. As part of The National Health Interview Survey, the SDQ was normed on a sample of 9,878 children between four and 17 years old in the United States in 2001. Parents reported for 92% and grandparents reported for 4.4% of the sample. Regarding reliability, Palmieri and Smith (2007) found moderate to strong internal consistency across the five scales, with only the peer relationships problems scale having a low alpha coefficient of .62. Many studies from various countries reported good reliability and

construct validity with the SDQ (Becker et al., 2004; Bjornsdotter, Enebrink, & Ghaderi, 2013; Marzocchi et al., 2004).

**Sociometric ranking**. A sociometric ranking procedure was adapted from Coie, Dodge, & Coppotelli (1982) to classify each participant according to social groups of peer accepted, peer rejected, peer neglected, controversial or average. The researcher presented to each child individually a poster board displaying pictures of his or her classmates. She asked each participant to name three peers they enjoy playing with and three peers they do not consider playmates. She then asked the child to nominate peers based on a set of six behavioral descriptions 1) gets into trouble with teacher, 2) starts fights, 3) is shy/quiet, 4) plays alone, 5) is friendly/helper, and 6) protects from a bully.

The total tally for both positive and negative nominations for each participant was calculated and standardized, resulting in standard scores for liked (L) and not liked (NL). The standardized liked and not liked scores are the basis for the social preference and the social impact scores (Peery, 1979). The social preference score, which measures children's likability, equals L minus NL. The social impact score, which measures children's social visibility, equals L plus NL. Table 6 profiles the specific criteria for classifying peer groups based on the Coie and Dodge (1983) approach. Further, the researcher calculated the number of nominations in all six behavioral descriptions for each participant.

Table 6. Criteria for peer group classifications

| Groups | Definitions |
|---|---|
| Popular | -standardized preference score higher than 1<br>-standardized liked score higher than 0<br>-standardized not liked score lower than 0 |

Table 6 (Continued). Criteria for peer group classifications

| Groups | Definitions |
|---|---|
| Rejected | -standardized preference score less than -1<br>-standardized liked score less than 0<br>-standardized not like score higher than 0 |
| Neglected | -standardized impact score less than -1<br>-standardized liked score less than 0<br>-standardized not liked score less than 0 |
| Controversial | -standardized impact score higher than 1<br>-standardized liked score higher than 1<br>-standardized not liked score higher than 0 |
| Average | -remaining children not classified |

**Teacher survey**. Teachers completed a survey that examined various demographic areas of educational background (e.g., highest educational level and years teaching in primary education). The survey was an adaptation of the Teacher Questionnaire: Schools and Staffing Survey (U.S. Department of Education, 2011).

**Emotional Interpretation Tasks**

Participants completed three tasks that examined their ability to interpret emotions.

**Perception task**. The perception task examined how accurately a participant could identify a voice as "happy," "sad," or "angry." The task is comprised of a one three-sentence scenario presented auditorily for each target emotion. For each presentation, the participant identified the primary emotion expressed by the speaker based on vocal cues. The participants used a headset to maximize the acoustic quality of the audio clips. The researcher presented the audio clips in PowerPoint (Microsoft, 2013) on a laptop computer at a comfortable sound level.

Participants verbally identified the emotions or pointed to pictures that represented the different emotions through facial expressions and related symbols (See Appendix C). The passage consisted of three sentences of neutral content, "Today is the first game. I came to the park early to see who was playing. I walked to the gym and waited for the coach." This task was developed and piloted using three children, two with typical language development and one with language impairment. The task development occurred as follows:

**Part a**. After collection of signed consent forms, four undergraduate students (women between 18-21 years old) recorded three sentences in four different emotional tones (happy, sad, angry, and scared) using a Zoom H2N digital recorder in an audiometric booth. The researcher explained the purpose of the recordings and its relation to the study using the following script:

> In social interactions, individuals listen to and perceive many different social cues that help them understand and relate to other people. These social cues can be verbal or nonverbal cues, such as facial expression and vocal quality. For example, you are walking in the quad and you see a friend. You say hello to the friend and ask how she is doing. The friend replies that she is fine, but something in her voice makes you not believe her statement. The change in her vocal quality and sad facial expression are social cues that helped you to look beyond her words. A key aspect of positive social interactions is the ability to perceive verbal and nonverbal social cues, such as vocal changes.

To elicit authentic vocal tones, students observed pictures that depicted individuals with different facial expressions that corresponded to the target emotions. An online program randomized the order of emotion presentations so that no student started with the same emotion. Each student produced two recordings for each emotion, totaling 32 recordings from all four students. The researcher listened to all recordings and chose the best recording for each emotion of all four students; totaling four recordings per student (16 recordings total: 4 happy; 4 sad, 4 angry, and 4 scared).

**Part b**. Thirty undergraduate students (28 women; 2 men) rated the 16 recordings. The researcher explained the purpose of the recordings and its relation to the study using the same script. Students listened to and rated each recording as expressing one of the following emotions: happy, sad, angry, scared, or neutral. The researcher presented the 16 audio clips in PowerPoint (Microsoft, 2013) on a laptop computer with headphones at a comfortable sound level. An online program was used to randomize the sequence of clips into three different orders of presentation. Audio clips selected for the perception task included the most often nominated happy, sad, and angry clips. Because of wide disagreement in perceived emotion, the audio clips for the emotion "scared" were not included in the study.

**Imitation task**. The imitation task examined the participants' ability to imitate a sentence in three different emotional voices (happy, sad, and angry). After listening to audio clips through a set of headphones, participants repeated the sentence in the targeted emotional voice. A Zoom H2N digital recorder recorded the participants' speech samples. The target sentence was a simple declarative sentence of neutral content: "Today was the first game." The audio clips were selected from the corpus of recorded stimuli previously gathered. Selection for the imitation task included the second highest nominated happy, sad, and angry clips.

**Narrative task**. Phonic Faces Alphabet Story Books (Norris, 2002) are short stories that elicit specific sounds associated with alphabet letters during storybook reading. The narrative task included three Phonic Faces Story books (Norris, 2002) that were adapted in both content and readability. Each story introduced a character who experienced a series of events that implied a specific emotion (i.e., Dawn = Happy, Queen Q = Sad, and Ben = Angry). Readability calculations confirmed that all three narratives were below a second grade reading level. For each story, the participant read aloud the narrative and identified the target emotion at the end of

the storybook. The researcher gave phonemic cues when needed to aid in the participant's reading of the words in the text. The task was recorded with a Zoom H2N digital recorder.

**Description of text**. Each story consisted of 11 to 12 sentences on six to seven pages. The first page of each story introduced the character and a key statement (e.g., "Dawn likes to drum. She wants to be in the band."). The storyline describes three specific events that each character experiences. These events were written to build knowledge of the character's dominant desire to accomplish something. In the end, the character's desire is either achieved or not leading to an expected emotional reaction (happy, sad, or angry).

**Acoustic measures**

Acoustic variables measured during the imitation task included speech rate, fundamental frequency, and intensity. The researcher analyzed acoustic measures with TF32 computer software (Milenkovic, 2001). Speech rate is defined as the number of syllables per second. A pitch trace analysis measured the fundamental frequency (F0) of the participants' speech: mean, minimum, maximum, and standard deviation in hertz (Hz). An RMS trace analyzed the fluctuations in vocal intensity including the mean, minimum, maximum and standard deviations in decibels (dB). In sum, nine acoustic variables per emotion were measured.

**Procedures**

**Tests and questionnaires.** The participants completed the TOLD: P 4 subtests and PTONI during the classroom's ancillary time, which did not interfere with reading and math instruction. The researcher completed the Pragmatic Profile during times of social interactions (i.e., recess, lunch, or classroom). Parents completed the SDQs and student information forms and returned them to the teacher in the homework folder. The teachers finished the Teacher

Demographic Survey and the SDQs by the end of data collection. The researcher collected 41 SDQs from the teachers and 24 SDQs from parents.

**Experimental tasks**. After completion of the diagnostic tests, the researcher administered all tasks (perception, imitation, and narrative) individually to the participants in a randomized order. Administration of tasks took place during ancillary period in a classroom.

**Perception task**. The participant listened as the researcher orally read the directions via script (See Appendix D). The directions also appeared on a laptop computer. After fitting the headphones to the participant, the researcher started the task. After each presentation of an audio clip, the participant identified (verbal answer or pointing) the emotional voice he or she perceived (happy, angry, sad, or I don't know).

**Imitation task**. The participant listened as the researcher orally read the directions and visually presented the directions on the computer using a script (See Appendix D). After fitting the headphones, the researcher started the task. After presentation of each clip, the participant imitated the sentence. Placed near the participant's mouth, a Zoom H2N digital recorder recorded the acoustic samples. Before the start of the task, participants practiced with a trial item.

**Narrative task**. The participant listened as the researcher explained the directions via script (See Appendix D). The participant read aloud each story and answered questions regarding the character's feelings (i.e., How does ___ feel? How do you know?). To aid oral reading, the researcher gave phonemic cues during the task. The researcher recorded the task with a Zoom H2N recorder and documented the participants' answers on a rubric (See Appendix E).

**Sociometric ranking.** After administration of tests and experimental tasks, the researcher gave the sociometric ranking task individually to participants. The researcher read aloud a script that explained the directions and recorded the participants' choices on a form (See Appendices F and G). Each participant identified three peers that he or she considers friends and three peers that are not friends. Peers not chosen for either group were classified in the 'neglected' category. Additionally, participants nominated peers based on a set of six behavioral descriptions (i.e., gets into trouble with teacher, starts fights, is shy/quiet, plays alone, is friendly/helper, and protects from a bully) that the researcher recorded. Participants used a poster board, containing pictures of all students, to help with the identification of peers in the classroom.

**Reliability Measures**

Second-year graduate students administered the language and cognitive tests to 15 participants (~36% of the sample). The researcher re-scored this selection of tests. Thirteen of the fifteen scores were correct with two participants having incorrect scores, which relates to agreement of 87%. The incorrect items were corrected on the test protocol and in the data set. Two undergraduate researchers verified the matching of scores between the test protocol and data set with nine randomly selected participants with 100% accuracy. Further, the researcher re-measured nine randomly selected acoustic samples (20% of sample) from the imitation task using TF32 software (Milenkovic, 2001). Pearson-Product Correlations confirmed the reliability between both sets of measurements. Profiled in Table 7, all 27 variables (nine variables per emotion) had a correlation of .89 or higher, $p < .01$.

Table 7. Correlations among speech rate (syllables per second), fundamental frequency (Hz), and intensity (dB) across emotions

| Variables | Happy | Angry | Sad |
|---|---|---|---|
| Speech rate | .99 | .98 | .99 |
| F0 mean[a] | 1.0 | .99 | .99 |
| F0 min[b] | 1.0 | 1.0 | .89 |
| F0 max[c] | 1.0 | 1.0 | 1.0 |
| F0 sd[d] | .99 | .99 | .99 |
| Int mean[e] | .99 | .99 | .99 |
| Int min[f] | 1.0 | .99 | .1.0 |
| Int max[g] | 1.0 | 1.0 | .1.0 |
| Int sd[h] | .99 | .99 | .99 |

[a]= Fundamental frequency mean. [b]= Fundamental frequency minimum. [c]= Fundamental frequency maximum. [d]= Fundamental frequency standard deviation. [e]= Intensity mean. [f]= Intensity minimum. [g]= Intensity maximum. [h]= Intensity standard deviation.

**Summary of Measures**

Figure 2 depicts all assessments and tasks administered during the study and their relation to the three constructs for social-emotional understanding (pragmatic processing, cognitive processing, and emotional processing). The researcher evaluated the relationships among various measures with respect to group performance scores or correlation and regression analyses among those measures. Further, the research questions examined in this study are noted in the diagram (e.g., Q1 = research question 1).

Questions 1 through 3 examined the relationships among the participants' interpretation of emotions and language skills. Questions 4 through 7 examined variables potentially related to children's peer acceptance. Question 4 investigated the relationship between participants' ability to interpret prosodic cues in speech and their sociometric classification by peers. Questions 5 through 6 examined the judgment of participant's social skills from different observers (parents,

teachers, peers, and speech-language pathologist). Question 7 investigated the participant's nonverbal intelligence as it relates to sociometric classifications by peers.

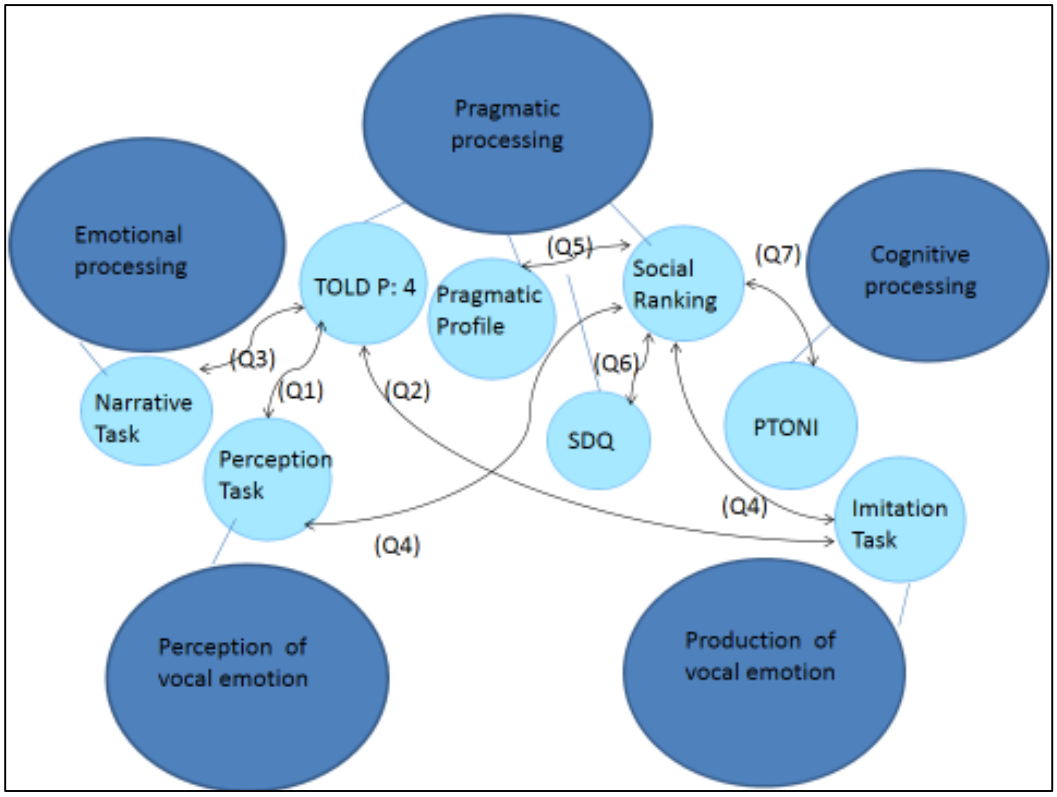



Figure 2. Graphic of research questions and measures

## RESULTS

The results are presented in the following text, organized by the questions listed here:

1. Is there a relationship between perception of vocal emotion and language ability in children?

2. Is there a relationship between production of vocal emotion and language ability in children?

3. Is there a relationship between the recognition of emotion in narratives and language ability in children?

4. Does children's ability to interpret prosody correlate with sociometric ranking classifications from peers?

5. Do children's performance scores from a pragmatic assessment correlate with sociometric ranking classifications from peers?

6. Do parent and teacher questionnaires correlate with sociometric ranking classifications from peers?

7. Does nonverbal intelligence correlate with children's sociometric ranking classifications from peers?

### Question 1: Relationship between Perception of Vocal Emotion and Language Ability

In the perception task, participants identified emotions (verbally or by pointing) when presented with audio clips of happy, sad, and angry voices. The auditory stimulus included three sentences of neutral content that imitated the different emotional voices.

A significant negative correlation was found between language groups and ability to identify emotions presented in the perception task, $r = -.348$, $p < .05$. As language ability increased, the ability to identify emotions decreased. Although significant, the correlation indicates that language ability predicts only 12% of the variability in the perception of emotion task. A one-way ANOVA indicated no significant differences on performance scores of the

perception task between language groups ($F(2,38) = 2.776$, $p > .05$) with an associated R value of .357. A regression analysis predicting perception task scores using RV, SU, and SI scores fell short of reaching significance ($F(3, 37) = 2.331$, $p > .05$). In summary, language ability does not appear to be related to the ability to interpret emotion as measured here. Table 8 displays means and standard deviations for the performance scores across the language groups.

Table 8. Means and standard deviations for percentage correct on perception task

| Language groups | Percentage correct on perception task | |
|---|---|---|
| | M[a] | SD[b] |
| Low performance | 86 | .17 |
| Mid-range performance | 71 | .25 |
| High performance | 64 | .28 |

[a]Mean. [b]Standard deviation

**Question 2: Relationship between Production of Vocal Emotion and Language Ability**

In the production task, participants imitated a sentence in three different emotional voices (happy, sad, and angry). The researcher recorded participants' speech and conducted acoustical analyses of suprasegmental features.

The relationship between language ability and production of acoustic cues to express vocal emotion was explored with a two-step process. First the data were explored to determine which acoustic cues were utilized to express emotions. This was done by using a series of repeated measures ANOVAs in which the acoustic measures served as dependent variables and the three emotions served as an independent factor. If Mauchly's test revealed that the assumption of sphericity had been violated for a particular dependent variable, the Greenhouse-Geismer correction of degrees of freedom was used. Having identified patterns of significant

differences in acoustic variables as a function of emotion produced by the children as a group, the language groups were compared for how many times each participant used these patterns to express emotions.

Table 9 displays the means and standard deviations for each emotion for the nine acoustic measures. Measures include speech rate, mean value of F0 (F0 mean), minimum value of F0 (F0 min), maximum value of F0 (F0max), standard deviation of F0 (F0 sd), mean value of intensity (intensity mean), minimum value of intensity (intensity min), maximum value of intensity (intensity max), and standard deviation of intensity (intensity sd). Significant differences among the emotions were found for F0 mean ($F(1.675, 67.018) = 14.153$, $p < .01$), F0 max ($F(1.638, 65.535 = 12.465$, $p < .01$), F0 sd ($F(2, 80) = 8.139$, $p < .01$), and intensity max ($F( 1.686, 67.436) = 8.805$, $p < .01$).

Table 9. Means and standard deviations for speech rate (syllables per second), fundamental frequency (Hz) and intensity (dB) across emotions

| Measures | Emotions | | | | | |
|---|---|---|---|---|---|---|
| | Happy | | Angry | | Sad | |
| | Mean | SD[a] | Mean | SD | Mean | SD |
| Speech rate | 3.622 | .53 | 4.093 | .46 | 3.551 | .42 |
| F0 mean[b]* | 232.3 | 33.0 | 219.2 | 26.8 | 240.5 | 22.2 |
| F0 min[c] | 110.4 | 52.3 | 121.2 | 56.7 | 129.9 | 59.1 |
| F0 max[d]* | 328.7 | 58.7 | 291.5 | 36.5 | 321.4 | 46.6 |
| F0 sd[e]* | 40.6 | 13.0 | 31.1 | 12.0 | 35.5 | 16.4 |
| Intensity mean[f] | -25.4 | 11.1 | -27.2 | 9.8 | -28.7 | 4.0 |
| Intensity min[g] | -47.4 | 5.7 | -47.4 | 5.7 | -47.6 | 5.9 |
| Intensity max[h]* | -13.0 | 5.7 | -15.7 | 4.9 | -15.8 | 4.9 |
| Intensity sd[i] | 8.5 | 1.4 | 7.2 | 3.9 | 8.2 | 1.9 |

*Note* * = significant differences across emotions
[a]Standard deviation. [b]Fundamental frequency mean. [c]Fundamental frequency minimum. [d]Fundamental frequency maximum. [e]Fundamental frequency standard deviation. [f]Intensity mean. [g]Intensity minimum. [h]Intensity maximum. [i]Intensity standard deviation.

A repeated measures ANOVA comparing the speech rate values across the emotions revealed no significant differences ($F(1, 40) = 1.098$, $p > .05$). Non-significant differences were also found for F0 min ($F(2, 80) = 1.848$, $p > .05$), intensity mean ($F(1.566, 62.635) = 1.711$, $p > .05$), intensity min ($F(2, 80) = .212$, $p > .05$), and intensity sd ($F(1.164, 46.547) = 3.583$, $p > .05$).

Table 10 shows patterns of use of the four acoustic measures to express emotions. Fifty-one percent of the participants produced their highest mean in fundamental frequencies to express Sad followed by Happy followed by Angry. Thirty-seven to thirty-nine percent produced the highest fundamental frequency and most variable fundamental frequencies for the sequence Happy to Sad to Angry. Intensity was highest for Happy followed by Angry followed by Sad. Next, the participants' production of the four acoustic patterns were compared to the adult voices presented in the imitation task. Both the participants' and adult voices displayed matching acoustic patterns across the emotions.

Table 10. Four significant acoustic patterns: fundamental frequency (Hz) and intensity (dB) measured across emotions in descending value

| Measures | Emotions | % of participants[e] |
|---|---|---|
| F0 mean[a] | Sad → Happy → Angry | 51 |
| F0 max[b] | Happy → Sad → Angry | 39 |
| F0 sd[c] | Happy → Sad → Angry | 37 |
| Intensity max[d] | Happy → Angry → Sad | 34 |

[a]Fundamental frequency mean. [b]Fundamental frequency maximum. [c]Fundamental frequency standard deviation. [d]Intensity maximum. [e]Percentage of participants that matched acoustic patterns

Each participant was assigned a score indicating the number of these patterns (1 to 4) that he or she used in the expression of emotions. A one-way ANOVA indicated no significant

difference among language groups in their use of the four acoustic patterns ($F(2, 38) = .302$, $p > .05$) with associated R value of .125. As a second measure of the relationship between language ability and vocal expression of emotion, a regression analysis was conducted in which the number of patterns utilized was predicted from the participant's scores on the RV, SU, and SI subtests. This resulted in a non-significant regression, $F(3, 37) = 1.136$, $p > .05$.

The results of these first two sets of analyses indicate that language ability is not strongly related to either interpretation or expression of vocal cues to emotion. Thus, any differences in the use of vocal expression in reading should not be caused by low level ability to control parameters of voice used in expression of emotion.

**Question 3: Relationship between the Recognition of Emotion in Narratives and Language Ability**

In the narrative task, participants read aloud three short stories and explained the characters' feelings. The researcher used a rubric to measure students' ability to identify emotions and provide details from the narratives.

To examine the relationship between language ability and the ability to infer emotions in narratives, each participant was given a score indicating accuracy of emotional interpretation and ability to explain the character's feelings. There was a significant difference in mean scores across language groups ($F(2, 38) = 6.286$, $p < .01$) with an associated R value of .499. The high performance group having the largest narrative total score (M = 14.29, SD = 2.02), followed by the mid-range performance group (M = 12.47, SD = 2.70), and the low performance group (M = 10.83, SD = 2.70) having the lowest narrative performance scores.

In addition, there were significant differences in how well the participants interpreted the narratives across groups for happy ($F(2,38) = 5.137$, $p < .05$) and sad ($F(2,38) = 4.942$, $p < .05$). Narrative scores in the low and high performance groups were significantly different, $p = .003$,

as measured using the Bonferroni correction method. Furthermore, narrative performance scores were highest for the happy narrative (M = 4.54, SD = 1.08), followed by the angry narrative (M = 4.32, SD = 1.17), followed by the sad narrative (M = 3.76, SD = 1.20). Table 11 profiles the means and standard deviations for narrative performance scores across the language groups.

Table 11. Means and standard deviations for narrative performance scores across language groups

| Language groups | Happy M[a](SD[b]) | Angry M(SD) | Sad M(SD) | Narrative Total |
|---|---|---|---|---|
| Low performance* | 3.92(.90) | 3.75(1.36) | 3.08(1.17) | 10.83(2.70) |
| Mid-range peformance | 4.47(.99) | 4.40(.91) | 3.67(1.29) | 12.47(2.70) |
| High performacne* | 5.14(1.03) | 4.71(1.14) | 4.43(.76) | 14.29(2.01) |
| Total | 4.54(1.08) | 4.32(1.17) | 3.76(1.20) | |

*Note** = Bonferroni correction indicated significant difference during comparison at .01 level.
[a]Mean. [b]Standard deviation.

These results indicate that the participant's syntactic ability has a strong effect on the child's ability to interpret emotion in narratives. As noted earlier, emotional content is often directly expressed in complex syntax (e.g., Ben is sad because he did not make the team). When not directly expressed, the child must infer the reasons for character emotions across sentences in a narrative (e.g., Sorry Ben, you cannot join the team. Ben said, "That's not fair.")

**Question 4: Relationship between Children's Ability to Interpret Prosody and Sociometric Classifications**

All participants were assigned to peer groups based on their standardized scores from the sociometric ranking task (Popular = 5, Average = 4, Controversial = 3, Neglected = 2, Rejected =1). Figure 3 displays the distribution of participants as classified by peer groups. This

classification resulted in a U-shaped distribution. A total of 12 participants classified as popular, nine participants in the average group, one participant in the controversial group, eight participants in the neglected group, and 11 participants in the rejected group. Roughly one-half of the participants ranked in the peer accepted groups (i.e., popular and average, 21 participants) with the other participants ranking in the peer rejected, neglected and controversial groups.

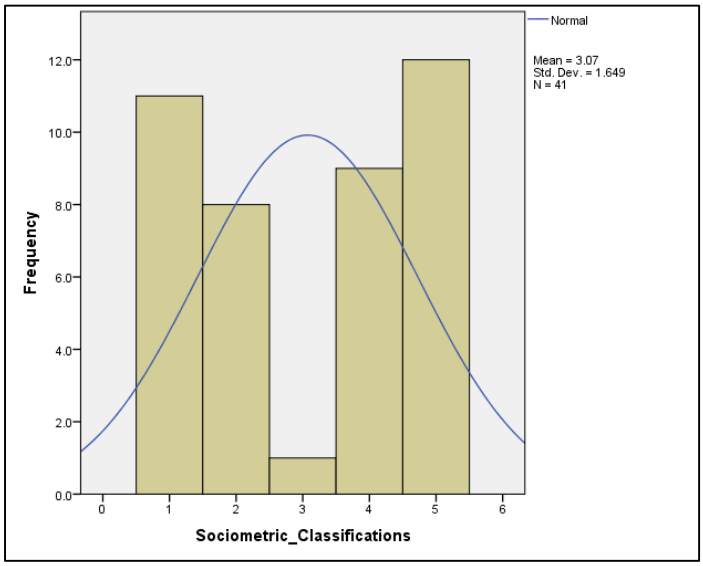



Figure 3. Distribution of sociometric classifications

There was no significant correlation between the participants' ability to perceive emotions in the perception task and sociometric classifications, $r = .008$, $p > .05$). As seen in Figure 4, participants in all peer accepted groups (popular = 5, average = 4 , controversial = 3, neglected = 2, rejected = 1) demonstrated a range of poor to good performance scores on the perception task which highlights the lack of relationship between these two measures.

There was also no significant correlation between the participants' ability to produce the four acoustic patterns and sociometric classifications, $r = .227$, $p > .05$. Figure 5 depicts the non-significant relationship between these two measures.

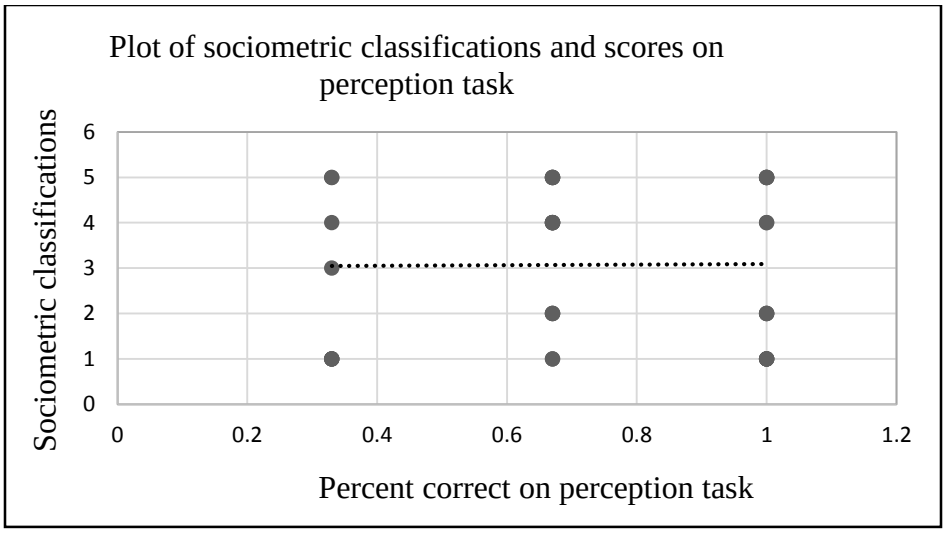



Figure 4. Plot of sociometric classifications and perception task

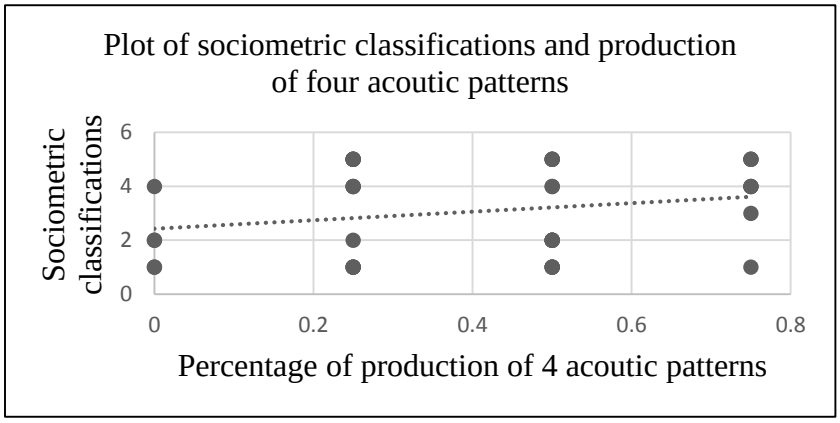



Figure 5. Plot of sociometric classifications and production of four acoustic patterns

**Question 5: Relationship between the Performance on Pragmatic and Language Assessments and Sociometric Classifications**

The researcher gave an adaptation of the Pragmatic Profile of the CELF to assess participants' social skills during times of social interaction (e.g., lunch and recess). Participants could receive a score of up to 28 points, with larger total points indicating functional social skills. The mean for this performance score was 22.93 with a standard deviation of 5.71. The Shapiro-Wilk test indicated a significant deviation from a normal distribution ($W(41) = .597$, $p < .01$) which was confirmed on a visual inspection of the histogram in Figure 6. A correlational

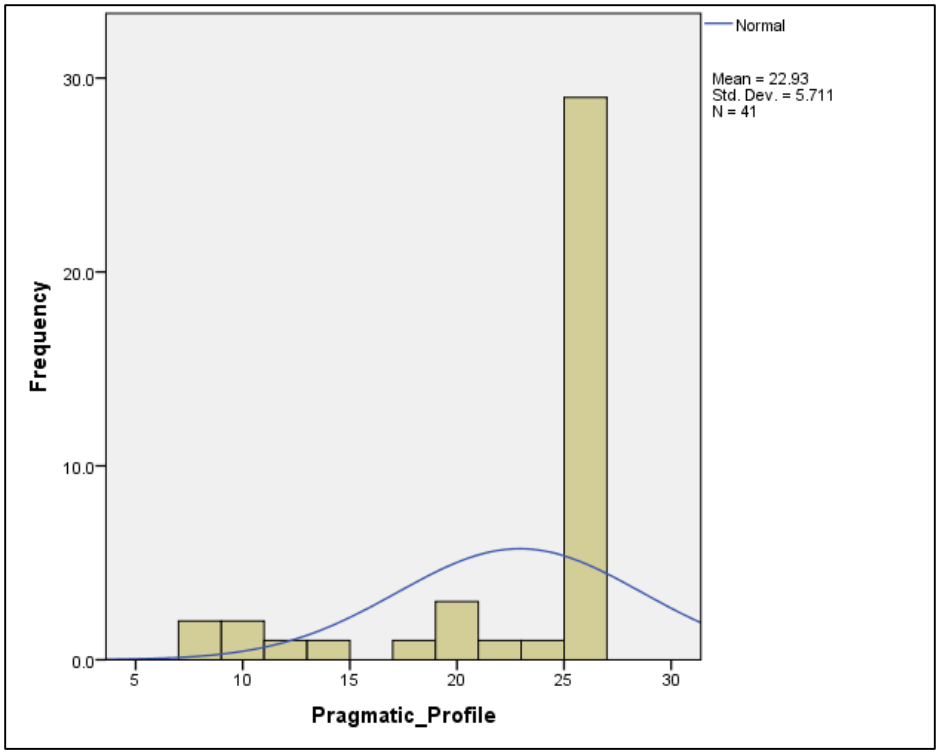



Figure 6. Distribution of scores on the Pragmatic Profile

analysis did not reveal a significant relationship between participants' scores on the Pragmatic Profile and their sociometric classifications, $r = .178$, $p > .05$ (See Figure 7).

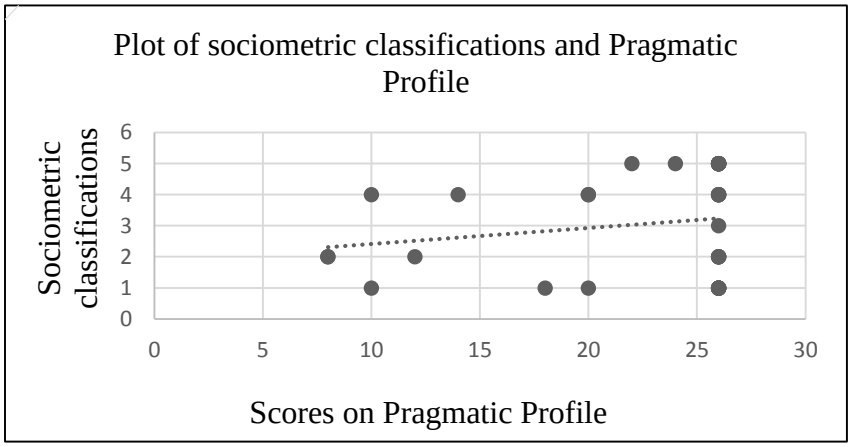



Figure 7. Plot of sociometric classifications and Pragmatic Profile

**Sociometric classifications and language ability. S**uccessful social interactions are partially based on competent language skills. A significant positive correlation was found

between language groups and sociometric classifications, $r = .506$, $p < .01$. In Figure 8, participants with higher language skills (poor language = 1, low language = 2, typical language = 3) were rated better by peers in social classifications (rejected = 1, neglected = 2, controversial = 3, average = 4, popular = 5).

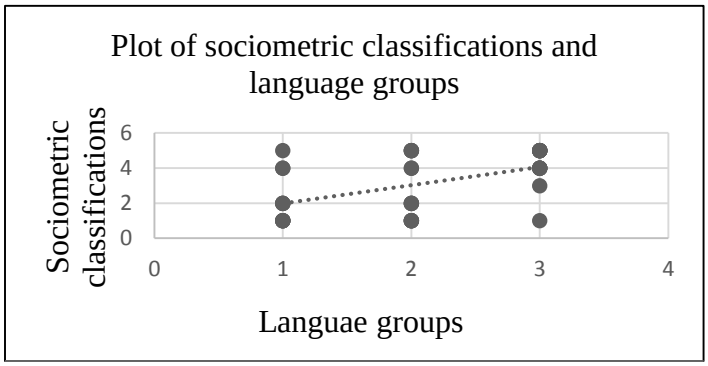



Figure 8. Plot of sociometric classifications and language groups

As seen in Table 12, participants in the high performance group had the largest mean score for positive social behaviors (i.e., friendly and protects from a bully). The low performance group had the highest mean scores for negative social behaviors (i.e., gets into trouble with the teacher and starts fights).

Table 12. Descriptive statistics: nominations in six behavioral descriptions across language groups

| Language groups | TwT[a] | Fights | Shy/Quiet | Plays Alone | Friendly | Protects[b] |
|---|---|---|---|---|---|---|
| Low performance | | | | | | |
| M[c] | 5.42 | 4.75 | 3.08 | 3.33 | 1.67 | 1.83 |
| (SD)[d] | 5.50 | 4.75 | 2.88 | 1.97 | 1.88 | 1.34 |
| Mid-range performance | | | | | | |
| M | 2.40 | 1.93 | 2.93 | 2.87 | 2.47 | 1.60 |
| (SD) | 2.17 | 1.94 | 2.19 | 1.96 | 2.45 | 1.88 |
| High performance | | | | | | |
| M | 1.64 | 1.79 | 2.71 | 1.50 | 4.64 | 5.21 |
| (SD) | 1.90 | 1.76 | 1.98 | 1.16 | 2.56 | 2.69 |

[a]Gets into trouble with teacher. [b]Protects from a bully. [c]Mean. [d]Standard Deviation

**Question 6: Relationship between Social Skills Questionnaires and Sociometric Classifications**

The teacher and parent forms of the SDQ were used to assess the participant's social skills. The Total Difficulties score is related to the participant's overall social behavior. Participants classified as exhibiting abnormal social behaviors received a score of 1; those with borderline social behaviors received a 2; and those with normal social behaviors received a 3. The low performance group had a mean of 2.42 with a standard deviation of .79, the mid-range performance group had a mean of 2.47 with standard deviation of .83 and the high performance group had mean of 2.79 with a standard deviation of .58). The Shapiro-Wilk test indicated a significant deviation from a normal distribution ($W(41) = .611$, $p < .01$) which was confirmed on a visual inspection of the histogram in Figure 9.

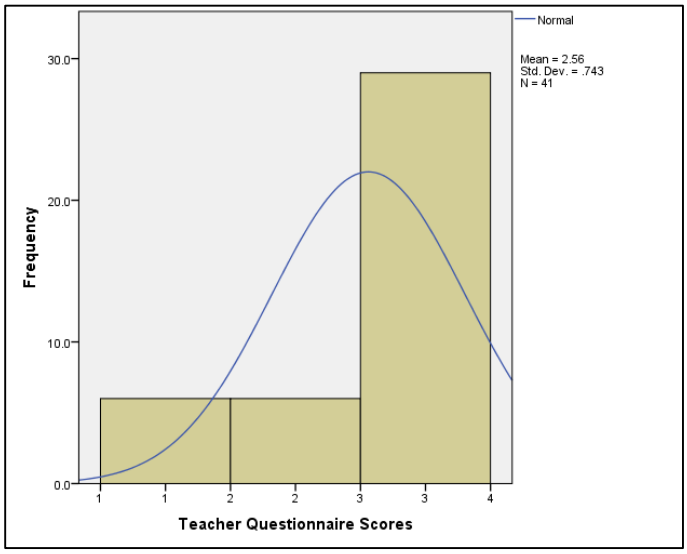



Figure 9. Distribution of scores from the teacher questionnaires

The distribution of scores on the 24 parent forms of the SDQ significantly deviated from a normal distribution ($W(24) = .571$, $p < .01$) and is confirmed with a visual inspection of a histogram (See Figure 10). The scoring procedure for the teacher SDQs is applied here with the low performance group having a mean of 2.50 with standard deviation of .84, the mid-range

performance group having a mean of 2.62 with a standard deviation of .74, and high performance group had a mean of 2.7 with standard deviation of .68.

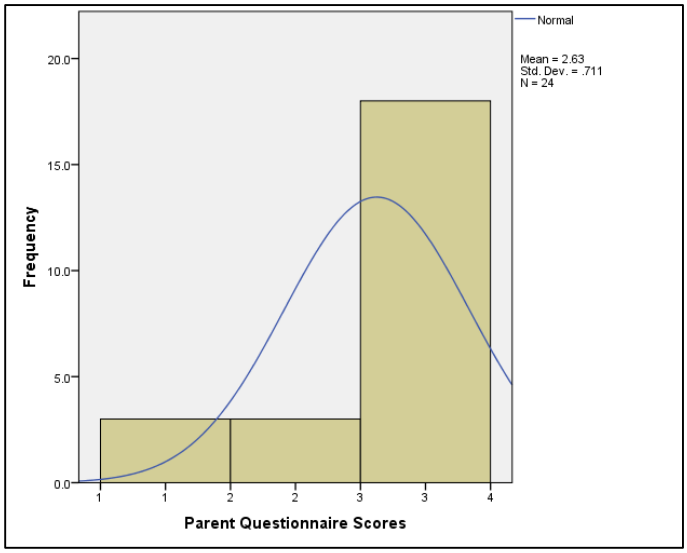



Figure 10. Distribution of scores from the parent questionnaires

In Figure 11, the total difficulties score of teacher questionnaires significantly correlated with sociometric classifications, $r = .516$, $p < .01$. Children with better social skills, as judged by their teachers, were rated higher by peers in sociometric classifications (e.g., popular). Only 24 parent questionnaires were completed and returned for analysis. Figure 12 depicts the non-significant relationship between the total difficulties score of parent questionnaires and sociometric classifications of those 24 participants ($r = .310$, $p > .05$).

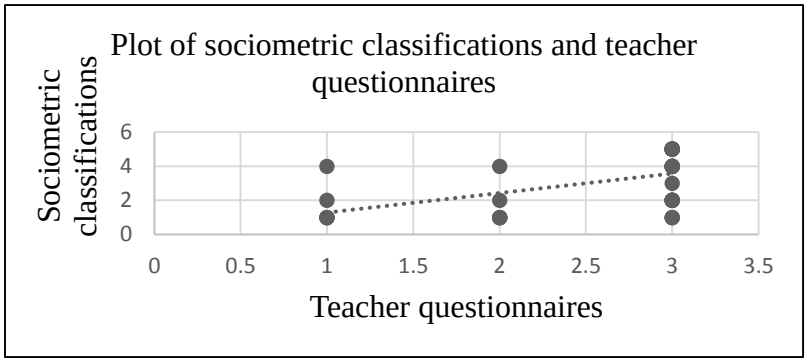



Figure 11. Plot of sociometric classifications and teacher questionnaires

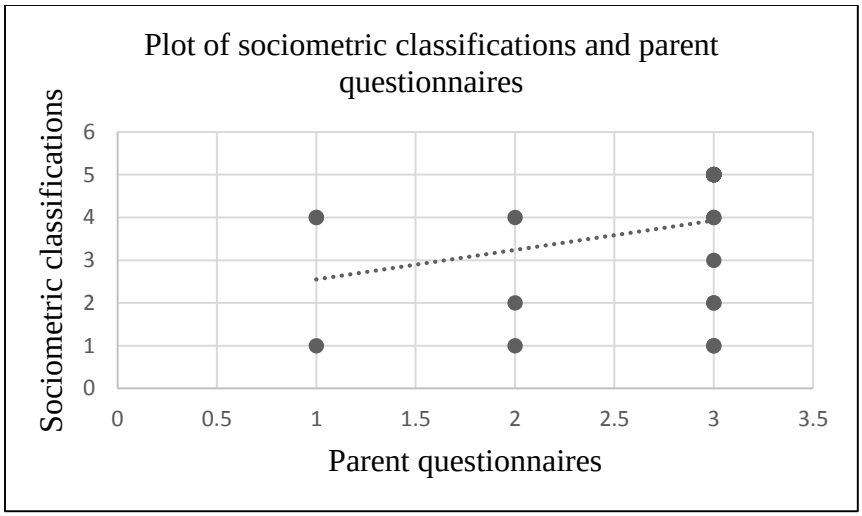



Figure 12. Plot of sociometric classifications and parent questionnaires

**Question 7: Relationship between Nonverbal Intelligence and Sociometric Classifications**

The PTONI was used to measure non-verbal intelligence by the participant's ability to identify logical and abstract relationships between multiple objects. The Shapiro-Wilk Test of Normality indicated a non-normal distribution of scores ($W(41) = .939$, $p < .05$ that included a mean of 84.37 with a standard deviation of 18.64. In Figure 13, a visual inspection confirmed the non-normal distribution. The scores on the PTONI significantly correlated with participants' sociometric classifications, $r = .399$, $p < .01$ (See Figure 14). Participants with higher scores on the PTONI were rated better in sociometric classifications.

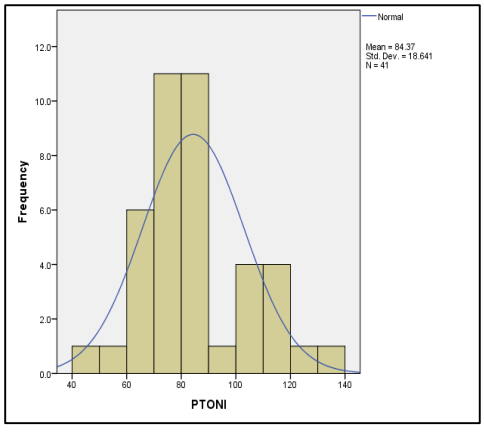



Figure 13. Distribution of scores on the PTONI

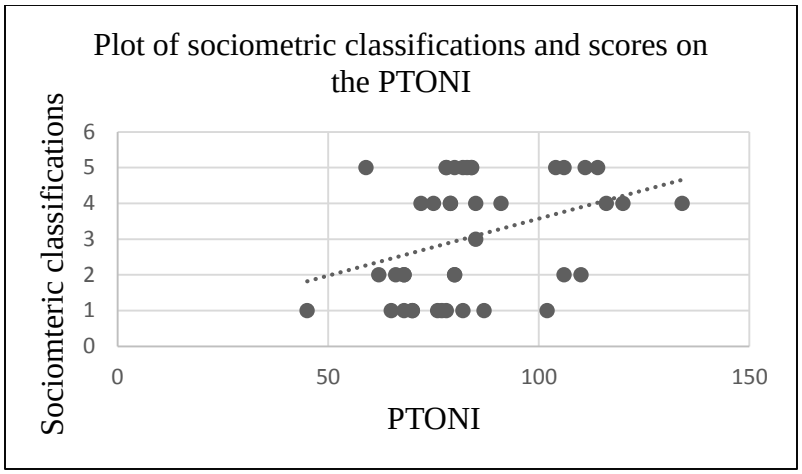



Figure 14. Plot of sociometric classifications and scores on the PTONI

**Summary of Relationships between Measures**

Figure 15 depicts the significant and non-significant relationships among measures in the model assessed in this study. Of the seven questions investigated in this study, three showed significant relationships between various measures. Language ability was only a significant factor when interpreting emotions in narratives. Although, there was a significant negative correlation between language ability and performance on the perception task, the performance scores on the language subtests did not predict the participant's ability to perceive emotion. Further, there was no significant difference in the production of the four acoustic patterns among language groups. The perception and production of vocal emotion was not related to children's sociometric classifications.

Language ability was significantly correlated with participant's sociometric classifications. Participants with good language skills (i.e., high performance group) had the most nominations for positive social behaviors (e.g., being friendly and protecting from a bully). Further, participants with good nonverbal intelligence were rated better in sociometric

classifications. There was strong agreement between participant's sociometric classifications (peer accepted, peer neglected, peer rejected and controversial) and teacher's judgment of social skills.

Common factors in the significant relationships involve aspects of language skill and nonverbal intelligence as they relate to specific tasks. Good language skills and nonverbal intelligence contributed to children's peer acceptance. Further, when interpreting emotions in narratives, understanding syntactic structures and relationships within the text contributed to the participant's ability to infer the correct emotion and provide detailed explanations.

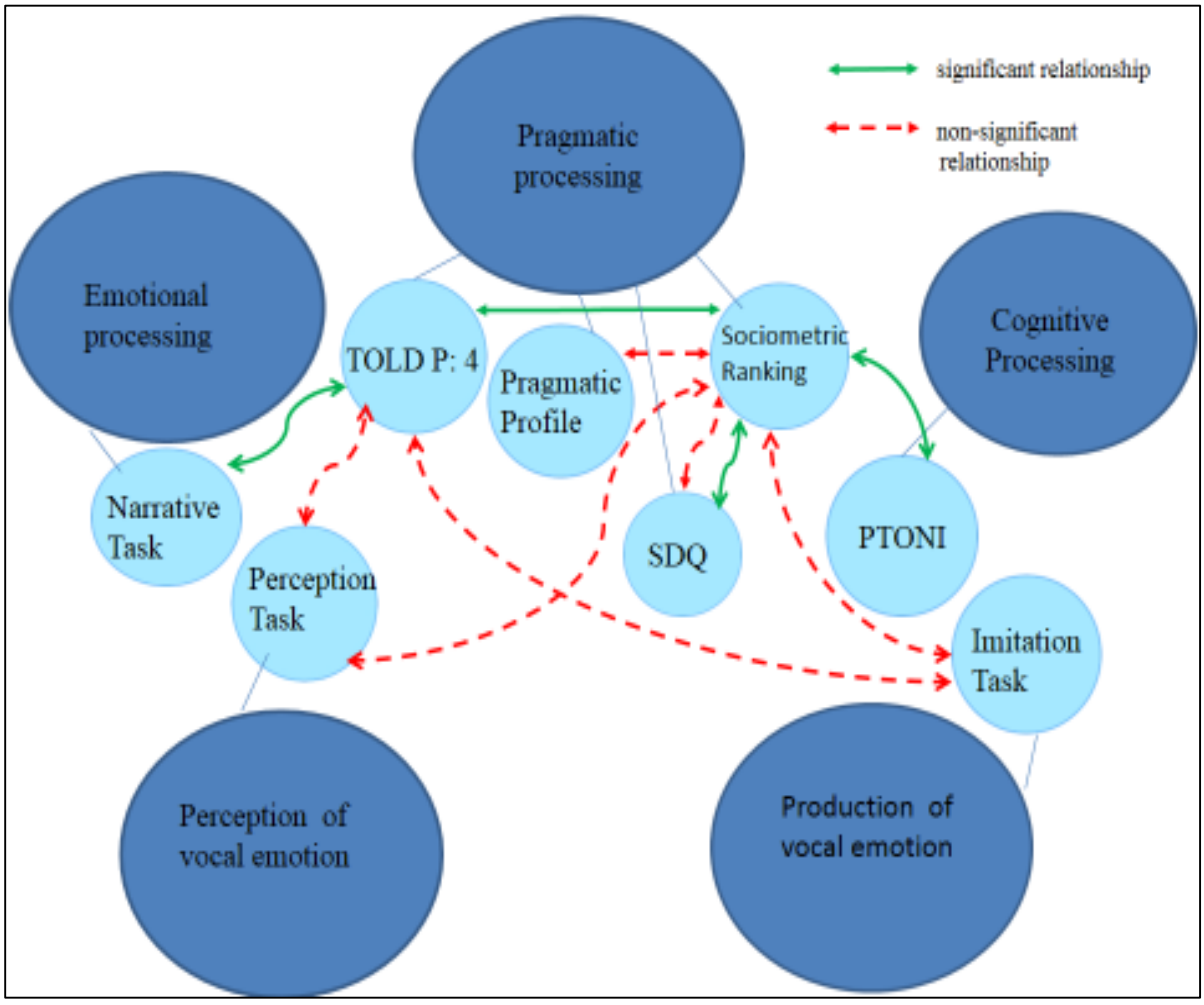



Figure 15. Graphic of relationships between measures

# DISCUSSION

Understanding emotions is a critical aspect of children's social development. The ability to process emotional cues in speech aids in development of successful social interactions (Denham, Bouril, & Belouad, 1994; Denham, McKinley, Couchoud, & Holt, 1990). The interpretation of these social cues in linguistic contexts (e.g., turn taking during a game or reading a story) influences children's peer relationships (Denham, 2006). Children with poor language skills have fewer positive social interactions that lead to negative consequences in their peer relationships (Bierman, 2004; Gertner, Rice, & Hadley, 1994). The purpose of this study was to examine the relationships among social profiles of second grade children, their language abilities, their abilities to process emotional cues, and their social skills rankings. A summary of current research findings and the results of this study are profiled in Table 13.

## Pragmatics

Children's language skills significantly correlate with their social standing. In this study, peers rated children with good language skills as better in social skills. This finding is consistent with previous literature that suggests linguistic competency positively influences children's social skills and ultimately sociometric ranking among peers (Black & Logan, 1995; Kemple, Speranza, & Hazen, 1992). Further, participants with good nonverbal intelligence skills were rated better in sociometric classifications. Peers who observe, identify, and respond to the emotional aspects of social interactions (e.g., acknowledge social beliefs) have successful peer relationships (Bishop, 1997; Dodge, Pettit, McClaskey, & Brown, 1986). Further, children with good nonverbal intelligence may also perceive facial expressions during social interactions that support emotion understanding. Aspects of problem solving (e.g., identifying logical and abstract relationships) are necessary for social interactions.

Table 13. Summary of research findings and results of this study

| | **Perception of Vocal Emotion** | **Imitation of Vocal Emotion** | **Narrative of Emotion** | **Sociometric Ranking** |
|---|---|---|---|---|
| **Language measures** | literature:<br>-Some overlap of scores between groups in 7-10 year-olds with typical group having higher performance scores (Fujiki et al., 2008)<br><br>*study:*<br>*negative correlation between language ability and performance scores* | literature:<br>unknown<br><br>*study:*<br>*-no difference between language groups across 4 acoustic patterns*<br><br>*-language skills did not predict acoustic patterns* | literature:<br>-language skills relate to narrative comprehension (NICHD, 2000)<br><br>*study:*<br>*language skills predicted performance on narratives* | literature:<br>-higher language, better social standings (Black & Logan, 1995; Kemple, Speranza, & Hazen, 1992)<br><br>*study:*<br>*- higher language, better social standings* |
| **Cognition measure** | literature:<br>unknown<br><br>*study:*<br>*not examined* | literature:<br>unknown<br><br>*study:*<br>*not examined* | literature:<br>unknown<br><br>*study:*<br>*not examined* | literature:<br>-higher cognition, better social standings (Bishop, 1997; Dodge, Pettit, McClaskey, & Brown, 1986)<br><br>*study:*<br>*-higher cognition, better social standings* |
| **Pragmatics measures** | literature:<br>unknown<br><br>*study:*<br>*no correlation between performance on perception task and sociometric rankings* | literature:<br>unknown<br><br>*study:*<br>*no correlation between production of 4 acoustic patterns and sociometric rankings* | literature:<br>unknown<br><br>*study:*<br>*difference in interpretation of emotion across written narratives:*<br>*-happy narrative with highest score, then angry, followed by sad* | literature:<br>-moderate correlation between peer & teacher ratings (Wu, Hart, Draper, & Olsen, 2001)<br>- modest to moderate agreement between parent & teacher (Murray, & Rubin, Willis, & Molloy, 2009; Rapin, Steinberg, & Waterhouse, 1999)<br><br>*study:*<br>*-both peers & teachers agreed on social standings*<br>*-parents & peers did not agree on ratings*<br>*-SLP's assessment did not correlate with social standings* |

Similarly, both peers and teachers agreed when judging children's social skills. Participants who ranked high in sociometric classifications by peers were also considered to have good social skills by teachers. This finding is consistent with current literature. Scores from the parent questionnaires did not relate to peers' judgment of social skills. This incongruity may result from situational contexts. Parents see interactions that are more positive because they observe their children playing with friends.

Participants' scores on the Pragmatic Profile (Semel, Wiig, & Secord, 2008) were not related to social ranking classifications. This could be due to the limited time available for observation in this study. The researcher observed the participants for approximately 20 minutes during lunch or recess, which may not have been a sufficient amount of time to observe social skills. However, children and teachers are able to observe social behaviors of peers throughout the day and judge their behaviors accordingly.

**Narratives**

Aspects of language ability correlated with the recognition of emotions in narratives. Participants with higher scores on the language subtests also received higher scores on the narratives. In the RV subtest, it is necessary to identify the relationship between two objects, which could be logical or abstract, and express a verbal explanation of their similarities (e.g., How is a bird and a kite alike? How are a refrigerator and an air conditioner alike?). This problem solving skill is very useful when reading emotion-laden narratives. To infer the emotions in each narrative, the participant must identify the key sentences in the story that relate to specific emotions and make connections between the key statements and the characters' feelings. In the story *Bouncing Ben*, Ben loves sports and he practices every day. He plays baseball and soccer. However, the Coach told him that he could not join the team this year

because he is too young. Ben says, "That's not fair." Participants with higher-level language skills conclude that Ben is angry because he not able to play the sports that he loves. Consistent with literacy research, children's understanding of grammatical structure and semantic relationships is significantly related to the comprehension of narratives (NICHD, 2000) and predicted performance scores on the narrative task.

There was a significant difference in the interpretation of narratives. The happy narrative was the easiest to interpret with the highest total score, which was followed by the angry narrative and then the sad narrative. Many participants confused the angry and sad emotions. Spackman, Fujiki, and Brinton (2006) found similar results in their investigation of children with LI's ability to make emotional inferences in orally presented narratives from five to twelve years of age. In their study, the happy emotion was the most accurately identified with many participants confusing sad with fearful/angry (Spackman, Fujiki, & Brinton, 2006). This miss-interpretation of angry and sad emotions may be due to semantic similarities. Events that suggest a sad or angry emotion are tied to specific past-personal events. Actions that warrant sad emotions in some children may suggest angry emotions in others. This finding highlights the importance that past experiences may have when interpreting emotions in social contexts.

**Language Ability**

Language ability was not related to the participants' ability to perceive and produce emotional cues in speech. There was a significant negative correlation between participant's language ability and their performance on the perception task. As language skill increased, the performance scores on the perception task decreased. This relationship could be due to a language bias on words in the task. The structure of words can, and often, does have meaning that influence social communication. However, in the perception task, the three sentences were

purposefully formulated to be semantically neutral. The words would not determine the speaker's emotions. Thus, the participants had to focus solely on the prosodic variations of the speakers' voices to determine emotion.

Children with lower language abilities may typically not pay attention to the language forms they do not comprehend. They then focus on the most salient cue to determine the speakers' emotion: prosody. Therefore, the low performance group achieved the highest scores and the high performance group had the lowest scores on the perception task. In contrast, Fujiki et al. (2008) found some overlap of performance scores between children with typical language skills and LI from seven to ten years of age. This overlap of scores could be related to the different age groups assessed. Older children have had more experience in social interactions and thus more practice with interpreting emotional cues in speech resulting in better accuracy in identifying emotions.

In accord with the literature, children with higher language skills were judged to have better social skills. Performance scores on the language measures significantly predicted participants' sociometric classifications. Similar to narrative comprehension, the ability to make connections between objects and verbally explain relationships would be a valuable skill in social interactions. To identify a sarcastic tone, a listener must compare the semantics of the message with the speaker's voice and facial expression (e.g., "She is amazing" said in a flat tone as the speaker rolls her eyes).

**Prosody**

Acoustic variables associated with emotional prosody were analyzed. Participants used four of the nine variables to produce different emotional voices (i.e., happy, angry, and sad voices). To highlight different prosodic features of emotional voices, the participants focused on

different aspects fundamental frequency (F0) and intensity. As reported in the literature, F0 is an important feature used to differentiate emotional tones in speech (Murray & Arnott, 1993; Scherer, 2003). The participants specifically used F0 mean, F0 maximum, and F0 standard deviation to distinguish between the three emotions. The ability to modify F0 would be a valuable tool to use when producing emotional prosody in speech. Further, the participants utilized vocal intensity to discriminate between emotions in speech. As reported in the literature, the increase or decrease, of loudness in a person's voice is a salient cue for producing different emotional tones (Pittam & Scherer, 1993). The participants systematically used the fluctuations in vocal intensity, specifically increasing loudness, to signal different emotions. Although not directly instructed, the participants were able to mimic the adult acoustic patterns across emotions. It seems that acoustic cues in emotional speech are salient to children with a range language abilities.

**Conclusion and Clinical Implications**

There is a critical need for empirical research concerning children's emotional understanding and pragmatic language skills. This study systemically examined the ability of children with varying levels of language ability to interpret emotional cues. The results provided preliminary findings that language ability does not exert a strong influence on emotional cues in speech at a low language level (e.g., perception and imitation task). However, there was a relatively weak correlation showing that the low performance group had the highest percentage of correct scores when identifying different emotional voices in the perception task. Whereas, the high performance group had the lowest percentage of correct scores. Inasmuch, children with lower levels of language ability continue to struggle with positive peer relationships. It

seems that children with poor language skills may not always utilize emotional cues to their advantage in social situations.

Results from the imitation task demonstrate that children of all levels of language ability are interpreting prosodic cues in speech and are able to modify vocal cues to highlight emotions in speech (i.e., emotional prosody). Manipulation of acoustics features (i.e., fundamental frequency and intensity) could be a potentially valuable cue in facilitating children's social skills. For children with poor language skills, treatment methods should highlight vocal cues to promote emotional understanding and social awareness in children's social interactions.

Additionally, children's language skills significantly influenced their ability to infer emotions when reading narratives. Children with low levels of language struggle to infer the appropriate emotion in each story, as well as, provide detailed explanations for their answers. These children would benefit from more tasks that included emotional cues in different language-based contexts (e.g., reading, writing, and telling emotion-laden stories). Teachers and clinicians could use these opportunities to facilitate personal evaluations and peer discussions about emotions and social behaviors.

Children with poor language skills are continually struggling to develop positive peer interactions and relationships. The connection between language skills, emotional understanding, and social awareness is a complex development that is to be experienced and discussed over repeated experiences. It is important for children with low-level language skills to improve their language ability and social skills in tasks that are inter-related rather than in isolated events.

## Limitations

This study offered insight in to children's interpretation of emotional cues in various tasks. However, there are limitations of the study that include its design and implementation of methods. First, there was a small sample size of participants. A larger sample size of children, with a large group of clinically diagnosed children, would make the generalization to the population of children with LI stronger. Second, the researcher did not observe the participants' social skills during unstructured free time (i.e., recess) on a regular basis. Many days the participants did not receive recess and returned to the class to finish assignments. The opportunity to observe unstructured social time would give valuable insight to children's peer interactions (e.g., cooperative play).

Regarding methods, participants did not identify or produce voices that had a neutral voice. In everyday interactions, individuals do not always speak with an emotional tone in speech. For acoustic analysis, comparisons between participant's interpretation of prosodic cues in emotional and neutral voices could be valuable information. Further, using a headset with a microphone attachment to record speech would provide better acoustic data. Lastly, roughly half of the parent questionnaires were completed. To promote parental involvement, a second method of collection would have possibly generated more completed questionnaires (e.g., completing the questionnaires over the phone or sending questionnaires home with a stamped envelope).

## Future Directions

This study systemically examined children with varying levels of language ability as they interpret emotional cues in various task and relationships with social competence. Despite the aforementioned limitations, the results provided preliminary findings that suggest children

process emotional cues in speech and that there are negative consequences in peer relationships when deficits in language and social skills are present.

Future studies should include variations in clinical populations, age range, and complexity of emotions. Examining different clinical populations (e.g., children with hearing loss or Attentive Deficit Hyperactivity Disorder) would provide a better description of social profiles for different linguistic populations. Observing social behaviors (i.e. perceiving and producing emotional prosody) in different age ranges would give insight to children's social-emotional development. Are patterns in children's emotional understanding constant, progressive, or divergent? Lastly, investigating the interpretation of basic and complex emotions (e.g., jealousy or shame) in children with LI would give insight to the developmental processes and provide more information on skills to target during intervention.

## REFERENCES


Achenbach, T. M., McConaughy, S. H., & Howell, C. T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin*, 101(2), 213–232.

Alpert, M., Kurtzberg, R. L., & Friedhoff, A. J. (1963). Transient voice changes associated with emotional stimuli. *Archives of General Psychiatry*, 8, 362-365.

Bachorowski, J. A.,& Owren, M. J. (1995). Vocal expression of emotion: Acoustic properties of speech are associated with emotional intensity and context. *Psychological Science, 6*(4), 219-224.

Baker, L., & Cantwell, D. P. (1987). A prospective psychiatric follow-up of children with speech/language disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 26, 546-553.

Bandura, A. (1992). Social Cognitive Theory. London, England: Jessica Kingsley Publishers.

Banse, R., & Scherer, K. R. (1996). Acoustic profiles in vocal emotion expression. *Journal of Personality and Social Psychology, 70*, 614-636.

Baton Rouge Crime Statitistics. (2012). Baton Rouge crime statistics for 2012. Retrieved from http://brgov.com/dept/brpd/csr.

Becker, A., Woerner, W., Hasselhorn, M., Banaschewski, T., & Rothenberger, A. (2004). Validation of the parent and teacher SDQ in a clinical sample. *European Child and Adolescent Psychiatry*, 13(2), 11-16.

Bedell, J. R., & Lennox S. S (1997). *Handbook for communication and problem-solving skills training: A cognitive-behavioral approach*. New York, NY: John Wiley.

Beitchman, J. H., Brownlie, E. B., Inglis, A., Ferguson, B., Schachter, D., Lancee, W., et al. (1996). Seven-year follow-up of speech/language impaired and control children: Psychiatric outcome. *Journal of Child Psychology and Psychiatry*, 37, 961-970.

Beitchman, J. H., Wilson, B., Johnson, C. J., Atkinson, L., Young, A., Adalf, E., et al. (2001). Fourteen year follow-up of speech/language impaired and control children: Psychiatric outcome. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40, 75-82.

Bierman, K. L. (2004). *Peer Rejection: Developmental processes and intervention strategies*. New York: Guilford Press.

Bierman, K. L., Smoot, D. L., & Aumiller, K., (1993). Characteristics of aggressive-rejected, aggressive (non-rejected), and rejected (nonaggressive) boys. *Child Development*, 64(1), 139-151.

Bishop, D. V. M. (1997). Uncommon understanding: Development and disorders of language comprehension in children. East Sussex, U. K.: Psychology Press.

Bishop, D. V., & Baird, G. (2001). Parent and teacher report of pragmatic aspects of communication: Use of the Children's Communication Checklist in a clinical setting. *Developmental Medicine & Child Neurology*, 43(12), 809–818.

Bjornsdotter, A., Enebrink, P., & Ghaderi, A. (2013). Psychometric properties of online administered parental strengths and difficulties questionnaire (SDQ), and normative data based on combined online and paper-and-pencil administration. *Child and Adolescent Psychiatry and Mental Health*, 7(1), 1-17.

Black, B. (1992). Negotiating social pretend play: Communication differences related to social status and sex. *Merrill-Palmer Quarterly*, 38, 212-232.

Black, B., & Hazen, N. L. (1990). Social status and patterns of communication in acquainted and unacquainted preschool children. *Developmental Psychology*, 26, 379-387.

Black, B., & Logan, A. (1995). Links between communication patterns in mother-child, father-child, and child-peer interactions and children's social status. *Child Development*, 66, 255-271.

Blalock, J. W. (1982). Residual learning disabilities in young adults: Implications for rehabilitation. *Journal of Applied Rehabilitation Counseling*, 13, 9–13.

Boone, T. R., & Cunningham, J. G. (1998). Children's decoding of emotion in expressive body movement: The development of cue attunement. *Developmental Psychology*, 34, 1007-1016.

Boucher, J., Lewis, V., & Collis, G. M. (2000). Voice processing abilities in children with autism, children with specific language impairments, and young typically developing children. *The Journal of Child Psychology and Psychiatry*, 41, 847–857.

Brinton, B., & Fujiki, M. (1994). Social competence and language impairment in children. In R. V. Watkins, & M. L. Rice (Eds.), *Specific language impairment in children* (pp. 123-143). Baltimore, MD: Paul H. Brookes.

Brinton, B., Fujiki, M., & Higbee, L. M. (1998). Participation in cooperative learning activities by children with specific language impairment. *Journal of Speech, Language, & Hearing Research*, 41, 1193-1206.

Brinton, B., Fujiki, M., & McKee, L. (1998). Negotiation skills of children with specific language impairment. *Journal of Speech, Language, and Hearing Research*, 41, 927-940.

Brinton, B., Fujiki, M., Montague, E. C., & Hanton, J. L. (2000). Children with language impairment in cooperative work groups: A pilot study. *Language, Speech, and Hearing Services in Schools*, 31, 252-264.

Brinton, B., Fujiki, M., Spencer, J. C., & Robinson, L. A. (1997). The ability of children with specific language impairment to access and participate in an ongoing interaction. *Journal of Speech, Language, and Hearing Research*, 40, 1011-1025.

Caffi, C., & Janney, R. W. (1994). Toward a pragmatics of emotive communication. *Journal of Pragmatics*, 22, 325-373.

Cairns, R. B., Neckerman, H. J., & Cairns, B. D. (1989). *Social networks and the shadows of synchrony*. In G. R. Adams, T. P. Gulotta, & R. Montemayor (Eds.), Advances in adolescent development (Vol. 1, pp. 275-305). Beverly Hiss, CA: Sage.

Center on the Social Emotional Foundations for Early Learning (2008). Handout 1.7 Definition of Social Emotional Development. *CSEFELInfant-Toddler Module 1*. Retrieved from http://csefel.vanderbilt.edu/resources/training_infant.html#mod1.

Coie, J. D., & Dodge, K. A. (1983). Continuities and changes in children's social status: A five-year longitudinal study. *Merill-Palmer Quarterly*, 29(3), 261-282.

Coie, J. D., & Dodge, K. A. (1998). Aggression and antisocial behavior. In N. Eisenberg (Ed.), Handbook of child psychology: *Vol. 3. Social, emotional and personality development* (5th ed., pp. 779-862). New York: Wiley.

Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions of social status: A cross age perspective. *Developmental Psychology*, 17, 550-570.

Coie, J. D., Dodge, K. A., & Kupersmidt, J. (1990). Peer group behavior and social status. In S. R. Asher & J. D. Coie (Eds.), *Peer rejection in childhood* (pp. 17-59). New York: Cambridge University Press.

Coie, J. D., & Kupersmidt, J. B. (1983). A behavioral analysis of emerging social status in boys' groups. *Child Development*, 54, 1400-1416.

Colton, R. H., Casper, J. K., & Leonard, R. (2006). *Understanding Voice Problems: A Physiological Persspective for Diagnosis and Treatment* (3rd ed.). Baltimore, MD: Lippincott, Williams, & Wilkins.

Colwell, M., & Hart, S. (2006). Emotion framing: Does it relate to children's emotion knowledge and social behavior? *Early Childhood Development and Care*, 176, 591 – 603.

Connolly, J., Gellar, S., Marton, P., & Kutcher, S. (1992). Peer responses to social interaction with depressed adolescents. *Journal of Clinical Psychology*, 21, 365-370.

Conti-Ramsden, G., & Botting, N. (2004). Social difficulties and victimization in children with SLI at 11 years of age. *Journal of Speech, Language, and Hearing Research*, 47, 145-161.

Craig, H. K. (1993). Social skills of children with specific language impairment: Peer relationships. *Language, Speech, and Hearing Services in Schools*, 24, 206-215.

Craig, H. K., & Washington, J. A. (1993). Access behaviors of children with specific language impairment. *Journal of Speech and Hearing Research*, 36, 322-337.

Crary, M. A., & Tallman, V. L. (1993). Production of linguistic prosody by normal and speech disordered children. *Journal of Communication Disorders*, 26, 245-262.

Crick, N. R., Werner, N., E., Casas, J. F., O'Brien, K. M., Nelson, D. A., Grotpeter, J. K., & Markon, K. (1999). Childhood aggression and gender: A new look at an old problem. In D. Berstein (Eds.), *Nebraska Symposium on Motivation* (Vol. 45, pp. 75-141). Lincoln: University of Nebraska Press.

Davitz, J. R. (1964). *The Communication of Emotional Meaning*. New York, NY: McGraw-Hill.

Denham, S. A. (1998). *Emotional Development in Young Children*. New York, NY: The Guilford Press.

Denham, S. A. (2006). Emotional Competence: Implications for Social Functioning. In Luby, Joan L. (Ed.), *Handbook of preschool mental health: Development, disorder, and treatment* (pp. 23-44). New York, NY: Guilford Press.

Denham, S., Blair, K., DeMulder, E., Levitas, J., Sawyer, K., Auerbach-Major, S., et al. (2003). Preschool emotional competence: Pathway to social competence? *Child Development*, 74, 238 – 256.

Denham, S. A., Bouril, B., & Beloud, F. (1994). Preschoolers' affect and cognition about challenging peer situations. *Child Study Journal*, 24(1), 1-21.

Denham, S. A., McKinley, M., Couchoud, E. A., & Holt, R. (1990). Emotional and behavioral predictors of peer status in young preschoolers. *Child Development*, 61, 1145- 1152.

Dodge, K. A., Coie, J. D., Pettit, G. S., & Price, J. M. (1990). Peer Status and aggression in boys' groups: Developmental and contextual analyses. *Child Development*, 61, 1289-1309.

Dodge, K. A., Pettit, G. S., McClaskey, C. L., & Brown, M. M. (1986). Social competence in children. *Monographs of the Society for Research in Child Development*, 44(2, Serial No. 213).

Dodge, K. A., Schlundt, D. C., Schocken, I., & Delugach, J. D. (1983). Social Competence and children's sociometric status: The role of peer group entry strategies. *Merrill-Palmer Quarterly*, 29, 309-336.

DePaulo, B. M., & Friedman, H. (1998). Nonverbal communication. In D. T. Gilbert, S. T. Fiske, & L. Gardner (Eds.), *The handbook of social psychology* (Vols. 1-2; pp. 3-40). New York, NY: McGraw-Hill

Ehrler, D. J., & McGhee, R. L. (2008). *Primary Test of Nonverbal Intelligence*. Austin, TX: Pro- ed.

Eisenberg, N., & Fables, R. A. (1992). Emotion, regulation, and the development of social competence. In M. S. Clark (Ed.), *Review of personality and social psychology: Vol. 14. emotion and social behavior* (pp. 119-150). Newbury Park, CA: Sage.

Farver, J. M., Kim, Y. K., & Lee, Y. (1995). Cultural differences in Korean and Anglo-American preschoolers' social interaction and play behaviors. *Child Development*, 66, 1089-1099.

Fisher, J., Plante, E., Vance, R., Gerken, L., & Glattke, T. J. (2007). Do children and adults with language impairment recognize prosodic cues? *Journal of Speech, Language, and Hearing Research*, 50, 746-758.

Ford, J. A., & Milosky, L. M. (2003). Inferring emotional reactions in social situations: Differences in children with language impairment. *Journal of Speech, Language, and Hearing Research*, 46, 21-30.

Ford, J. A., & Milosky, L. M. (2008). Inference Generation During Discourse and Its Relation to Social Competence: An Online Investigation of Abilities of Children With and Without Language Impairment. *Journal of Speech, Language, and Hearing Research*, 51, 367-380.

Fujiki, M., Brinton, B., & Clarke, D. (2002). Emotion regulation in children with specific language impairment. *Language, Speech, and Hearing Services in Schools*, 33, 102–111.

Fujiki, M., Brinton, B., Morgan, M., & Hart, C. H. (1999). Withdrawn and sociable behavior of children with specific language impairment. *Language, Speech, and Hearing Services in Schools*, 30, 183-195.

Fujiki, M., Spackman, M. P., Brinton, B., & Illig T. (2008). Abilities of children with language impairments to understand emotion conveyed by prosody in a narrative passage. *International Journal of Language and Communication Disorders*, 43(3), 330-345.

Gertner, B. L., Rice, M. L., & Hadley, P. A. (1994). Influence of communicative competence on peer preferences in a preschool classroom. *Journal of Speech and Hearing Research*, 37, 913-923.

Gleason, J. B. (2001). *The development of language*. Needham Heights, MA: Allyn and Bacon.

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: a research note. *Journal of Child Psychology and Psychiatry*, 38(5), 581–586.

Goswami, U. (2003). How to beat dyslexia. *The Psychologist*, 16, 462–465.

Gottman, J. M. (1983). How children become friends. *Monographs of the Society for Research in Child Development*, 48(2, Serial No. 201).

Guralnick, M. J., Connor, R. T., Hammond, M. A., Gottman, J. M., & Kinnish, K. (1996). The peer relations of preschool children with communication disorders. *Child Development*, 67(2), 471-489.

Hadley, P. A., & Rice, M. L. (1991). Conversational responsiveness of speech- and language-impaired preschoolers. *Journal of Speech and Hearing Research*, 34, 1308–1317.

Hart, C. H., Olsen, S. F., Robinson, C. C., & Mandleco, B. L. (1997). The development of social and communicative competence in childhood: Review and a model of personal, familial, and extrafamilial processes. In B. R. Burleson (Ed.), *Communication yearbook* (Vol. 20, pp. 305-373). Thousand Oaks, CA: Sage.

Hart, K. I., Fujiki, M., Brinton, B., & Hart, C. (2004). The Relationship Between Social Behavior and Severity of language Impairment. *Journal of Speech, Language, and Hearing Research*, 47, 647-662.

Hill, D. K., & Merrell, K. W. (2004). Characteristics of "controversial" children: An exploration of teacher and parent social behavior rating scale datasets. *Psychology in Schools*, 41(5), 497-507.

Hixon, T. J., Weismer, G., & Hoit, J. D. (2008). *Preclinical Speech Science: Anatomy, Physiology Acoustics Perception. San Diego, Ca*: Plural Publishing Inc.

Horowitz, S. M., Irwin, J. R., Briggs-Gowan, M. J., Heenan, J. M. B., Mendoza, J., & Carter, A. S. (2003). Language delay in a community cohort of young children. *Journal of the American Academy of Child and Academic Psychiatry*, 42(8), 932-940.

Horowitz, L., Jansson, L., Ljungberg, T., & Hedenbro, M. (2006). Interaction before conflict and conflict resolution strategies in preschool boys with language impairment. *International Journal of Language and Communication Disorders*, 41(4), 441-466.

Hummel, L. J., & Prizant, B. M. (1993). A socioemotional perspective for understanding social difficulties of school-age children with language disorders. *Language, Speech, and Hearing Services in Schools*, 24, 216-224.

Ialongo, N. S., Vaden-Kiernan, N., & Kellam, S. (1998). Early peer rejection and aggression: Longitudinal relations with adolescent behavior. *Journal of Development and Physical Disabilities*, 10, 199-213.

Iida, A., Campbell, N., Higuchi, F., and Yasumura, M. (2003). A corpus-based speech synthesis system with emotion. *Speech Communication*, 40, 161–187.

Izard, C., Fine, S., Shultz, D., Mostow, A., Ackerman, B., & Youngstrom, E. (2001). Emotion knowledge as a predictor of social behavior and academic competence in children at risk. *Psychology Science*, 12(1), 18-23.

Jerome, A. C., Fujiki, M., Brinton, B., & James, S. L.(2002). Self-esteem in children with specific language impairment. *Journal of Speech, Language, and Hearing Research*, 45, 700–715.

Kemple, K., Speranza, H., & Hazen, N. (1992). Cohesive discourse and peer acceptance: Longitudinal relations in the preschool years. *Merrill-Palmer Quarterly: Journal of Developmental Psychology*, 38(3), 364-381.

Kent, R. D., & Read, C. (2002). *Acoustic Analysis of Speech* (2nd ed.). Australia: Singular/Thomson Learning.

Klasmeyer, G., & Meier, T. (1999). Rhythmn in Emotional Speech, DAGA-Tag der ASA-Tagung 99 in Berlin, CD-Rom zur ASA-EAA-DEGA Gemeinschaftstagung Berlin 99.

Ladd, G. W. (2006). Peer rejection, aggressive or withdrawn behavior, and psychological maladjustment from ages 5 to 12: An examination of four predictive models. *Child Development*, 77, 822-846.

Ladd, G. W., & Asher, S. R. (1985). Social skill training and children's peer relations: Current issues in research and practice. In L. L'Abate & M. Milan (Eds.), *Handbook of social skill training* (pp. 219-244). New York: Wiley.

Landau, S., Milich, R., & Whitten, P. (1984). A comparison of teacher and peer assessment of social status. *Journal of Clinical Child Psychology, 13,* 44–49.

Ledingham, J. E. (1981). Developmental patterns of aggressive and withdrawn behavior in childhood: A possible method for identifying preschizophrenics. *Journal of Abnormal Child Psychology*, 9, 1-22.

Leonard, L. B. (1998). *Children with specific language impairment*. Cambridge, MA: The MIT Press.

Leppanen, J. M., & Hietnanen, J. K. (2001). Emotion recognition and social adjustment in school-aged girls and boys. *Scandinavian Journal of Psychology*, 42(5), 429-435.

Little, L. (2003). Maternal perceptions of the importance of needs and resources for children with Asperger Syndrome and nonverbal learning disorders. *Focus on Autism and other developmental disabilities*, 18(4), 257-266.

Mahl, G. F., & Schulze, G. (1964). Psychological research in the extralinguistic area. In T. A. Sebeok, A. S. Hayes, M. C. Bateson (Eds.), *Approaches to Semiotics* (pp. 51-124). Mouton, The Hague.

Marzocchi, G., Capron, C., Di Pietro, M., Tauleria, E., Duyme, M., Frigerio, A., et al. (2004). The use of the Strengths and Difficulties Questionnaire (SDQ) in Southern European countries. *European Child and Adolescent Psychiatry*, 13(2), 40-46.

Masten, A. S., Morison, P., & Pellegrini, D. S. (1985). A revised class play method of peer assessment. *Developmental Psychology, 21,* 523-533.

McCabe, P. C., & Altamura, M. (2011). Empirically valid strategies to improve social and emotional competence of preschool children. *Psychology in the Schools*, 48(5), 513-540.

McCabe, P. C., & Meller, P. J. (2004). The relationship between language and social competence: How language impairment affects social growth. *Psychology in the School*, 41(3), 313-321.

Microsoft (2013). PowerPoint [Computer Program]. Redmond, WA: Microsoft Corporation.

Milenkovic, P. (2001). TF32 [Computer Program]. Madison, WI: University of Wisconsin-Madison.

Moses, L., Baldwin, D. A., Rosicky, J. G., & Tidball, G. (2001). Evidence for referential understanding in the emotions domain at twelve and eighteen months. *Child Development*, 72(3), 718-735.

Murray, I. R., & Arnott, J. L. (1993). Toward a simulation of emotion in synthetic speech: A review of the literature on human vocal emotion. *Journal of the Acoustical Society of America*, *93*, 1097-1108.

Murray, D. S., Ruble, L. A., Willis, H., & Molloy, C. A. (2009). Parent and teacher report of social skills in children with autism spectrum disorders. *Language, Speech, and Hearing Services in Schools*, 40, 109-115.

National Institute of Child Health & Development (NICHD) (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. Reports of the sub-groups (NIH Publication No. 00-4754). Washington, DC: US Government Printing Office.

Newcomb, A. F., Bukowski, W. M., & Pattee, L. (1993). Children's peer relations: A meta-analytic review of popular, rejected, neglected, controversial, and average sociometric status. *Psychological Bulletin*, 113(1), 99-128.

Newcomer, P., & Hammil, D. (2008). *Test of Language Development-Primary, 4th ed*. Austin, TX: Pro-ed.

Ninio, A., & Snow, C. E. (1996). *Pragmatic Development: Essays in Developmental Science* (p. 1-222). Boulder, CO: Westview Press.

Norris, J. (2002). *Phonic Faces Alphabet Storybooks*. Baton Rouge, LA: Elementory.

Nowicki, S., & Duke, M. P. (1992). The association of children's nonverbal decoding abilities with their popularity, locus of control, and academic achievement. *The Journal of Genetic Psychology: Research and Theory on Human Development*, 153(4), 385-393.

Palmieri, P. A., & Smith, G. C. (2007). Examining the structural Validity of the Strengths and Difficulties Questionnaire (SDQ) in a U.S. sample of custodial grandmothers. *Psychological Assessment*, 19(2), 189-198.

Parise, E., Cleveland, A., Costabile, A., & Striano, T. (2007). Influence of vocal cues on learning about objects in joint attention contexts. *Infant Behavior and Development*, 30(2), 380-384.

Parkhurst, J., & Gottman, J. M. (1986). How young children get what they want. In J. M. Gottman & J. J. Parker (Eds.), *Conversations of friends: Speculations on affective development. Studies in emotion and social interaction* (pp. 315-345). Cambridge, MA: Cambridge University Press.

Parker, J. G., & Asher, S. R. (1987). Peer relations and later personal adjustment: Are low-accepted children "at risk"? *Psychological Bulletin*, 102, 357-389.

Paul, R., Looney, S. S., & Dahm, P. S. (1991). Communication and socialization skills at ages 2 and 3 in 'late talking' young children. *Journal of Speech and Hearing Research*, 34, 858-865.

Peery, J. C. (1979). Popular, amiable, isolated, rejected: A reconceptualization of sociometric status in preschool children. *Child Development*, 50, 1231-1234.

Pittam, J., & Scherer, K. R. (1993).Vocal expression and communication of emotion. In M. Lewis&J. M. Haviland (Eds.), *Handbook of emotions* (pp. 185-198). New York: Guilford.

Pittenger, R. E., Hockett, C. F., & Danehy, J. J. (1960). *The First Five Minutes: A sample of Microscopic Interview Analysis*. Ithaca, NY: Martineau.

Prinstein, M. J., & La Greca, A. M. (2004). Childhood peer rejection and aggressive as predictors of adolescent girls' externalizing and health risk behaviors: A 6-year longitudinal study. *Journal of Counseling and Clinical Psychology*, 72, 103-112.

Putallaz, M. (1983). Predicting children's sociometric status from their behavior. *Child Development*, 54, 1417-1426.

Rapin, I., Allen, D. A., & Dunn, M. A. (1992). Developmental language disorders. In S. J. Segalowitz, & I. Rapin (Eds.), *Handbook of neuropsychology* (Vol. 7, pp. 111-137). New York, NY: Elsevier Science.

Rapin, I., Steinberg, M., & Waterhouse, L. (1999). Consistency in the ratings of behaviors of communicatively impaired autistic and non-autistic preschool children. *European Child & Adolescent Psychiatry*, 8(3), 214–224.

Redmond, S. M., & Rice, M. L. (1998). The socioemotional behaviors of children with SLI: Social adaptation or social deviance? *Journal of Speech, Language, and Hearing Research*, 41, 688–700.

Renk, K., & Phares, V. (2004). Cross-informant ratings of social competence in children and adolescents. *Clinical Psychology Review*, 24(2), 239–254

Rice, M. L. (1993). Don't talk to him; he's weird: A social consquences account of language and social interactions. In A. P. Kaiser & D. B. Gray (Eds.), *Enhancing children's communication: Research foundations for intervention* (pp. 139-158). Baltimore, MD: Brookes Publishing Company.

Rice, M. L., Sell, M. A., & Hadley, P. A. (1991). Conversational responsiveness of speech and language-impaired preschoolers. *Journal of Speech and Hearing Research*, 34, 1308–1317.

Rubin, K. H., Bukowski, W., & Parker, J. G. (1998). Peer interactions, relationships, and groups. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed., pp.619-700). New York: Wiley.

Rubin, K. H., & Rose-Krasnor, L. (1992). Interpersonal problem solving and social competence in children. In V. B. Hasset & M. Herson (Eds.), *Handbook of social development: A lifespan perspective* (pp. 283-324). New York: Plenum Press.

Saarni, C. (1999). *Developing emotional competence*. New York, NY: Guilford.

Samuelsson, C., Scocco, C., & Nettelbladt, U. (2003). Towards assessment of prosodic abilities in Swedish children with language impairment. *Logopedics Phoniatrics Vocology*, 28, 156-166.

Scherer, K. R. (1979). Nonlinguistic vocal indicators of emotion and psychopathology. In C. E. Izard (Ed.), *Emotions in personality and psychopathology* (pp. 493-529). New York: Plenum.

Scherer, K. R. (1985).Vocal affect signaling: A comparative approach. In J. Rosenblatt, C. Beer, M. Busnel, & P. J. B. Slater (Eds.), *Advances in the study of behavior* (pp. 189-244). New York: Academic Press.

Scherer, K. R. (2003).Vocal communication of emotion: A review of research paradigms. *Speech Communication*, 40, 227-256.

Semel, E., Wiig, E. H., & Secord, W. A. (2003). *Clinical Evaluation of Language Fundamental, 4th ed*. San Antonio, TX: Pearson.

Shanker, S. G. & Greenspan, S. I. (2005). The Role of Affect in Language Development. *Theoria*, 54, 329-343.

Simpson, R. L., Mckee, M., Teeter, D., & Beytien, A. (2007). Evidence-based methods for children and youth with autism spectrum disorders: Stakeholder issues and perspectives. *Exceptionality*, 15(4), 203-217.

Snow, D. (1998). Prosodic markers of syntactic boundaries in the speech of 4-year-old children with normal and disordered language development. *Journal of Speech, Language, and Hearing Research*, 41(5), 1158-1170.

Spackman, M. P., Fujiki, M., & Brinton, B. (2006). Understanding emotions in context: the effects of language impairment on children's ability to infer emotional reactions. *International Journal of Language & Communication Disorders*, 41 (2), 173-188.

Trimmer, C. G., & Cuddy, L. L. (2008). Emotional intelligence, not music training, predicts recognition of emotional speech prosody. *Emotion*, 8(6), 838-849.

Underwood, M. K. (2003). *Social aggression among girls*. New York: Guilford Press.

U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2011). *Teacher Questionnaire: Schools and Staffing Survey*. Retrieved from https://nces.ed.gov/surveys/sass/.

Van der Meulen, S., & Janssen, P. (1997). Prosodic abilities in children with specific language impairment. *Journal of Communication Disorders*, 30, 155-170.

Wade-Woolley, L., & Wood, C. (2006). Editorial: Prosodic sensitivity and reading development. *Journal of Research in Reading*, 29(3), 253-257.

Wadman, R., Durkin, K., & Conti-Ramsden, G. (2011). Social Stress in young people with specific language impairment (SLI). J*ournal of Communication Disorders*, 44(2), 186-199.

Walker, S. (2009). Sociometric stability and the behavioral correlates of peer acceptance in early childhood. *The Journal of Genetic Psychology*, 2009, 170(4), 339-358.

Weiss, A. L. & Theadore, G. (2011). Forward: Caregiver-directed approaches for facilitating social communication competencies in children on and off the Autism Spectrum. *Topics in Language Disorders*, 31(3), 193-194.

Wells, B., & Peppe, S. (2003). Intonation abilities of children with speech and language impairments. *Journal of Speech, Language, and Hearing Research*, 46(1), 5-20.

Windsor, J. (1995). Language impairment and social competence. In M. E. Fey, J. Windsor, & S. F. Warren (Eds.), *Language intervention: Preschool through the elementary years* ( pp. 213–38). Baltimore: Paul H. Brookes.

Whiteside, S. P. (1999). Acoustic characteristics of vocal emotions simulated by actors. *Perceptual and Motor Skills*, 89(3, Part 2), 1195-1208.

Wood, C. (2006). Metrical stress sensitivity in young children and its relationship to phonological awareness and reading. *Journal of Research in Reading*, 29(3), 270-287.

Wood, C., & Terrell, C. (1998). Poor readers' ability to detect rhythm and perceive rapid speech. *British Journal of Developmental Psychology*, 16, 397–413.

Wu, X., Hart, C. H., Draper, T. W., & Olsen, J. A. (2001). Peer and teacher sociometrics for preschool children: Cross-informant concordance, temporal stability, and reliability. *Merrill-Palmer Quarterly*, 47, 416–443.

# APPENDIX A IRB FORMS

Institutional Review Board
Dr. Robert Mathews, Chair
131 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.6792
irb@lsu.edu | lsu.edu/irb

**ACTION ON PROTOCOL APPROVAL REQUEST**

**TO:** Paul Hoffman
Communication Science and Disorders

**FROM:** Robert C. Mathews
Chair, Institutional Review Board

**DATE:** May 15, 2013
**RE:** **IRB#** 3361
**TITLE:** Pragmatics, Prosody, and Social Skills in School-Age Children

**New Protocol/Modification/Continuation:** Modification

**Brief Modification Description:** Start date changed to Fall 2013; Number of participants increased from 30 to 40; Added Primary Test of Nonverbal Intelligence and teacher demographic questionnaire

**Review type:** Full ___ Expedited __X__ **Review date:** 5/15/2013

**Risk Factor:** Minimal ___X___ Uncertain _____ Greater Than Minimal_____

**Approved**___X___ **Disapproved** _____

**Approval Date:** 5/16/2013 **Approval Expiration Date:** 2/4/2014

**Re-review frequency:** (annual unless otherwise stated)

**Number of subjects approved:** 40

**Protocol Matches Scope of Work in Grant proposal:** (if applicable) _____

**By**: Robert C. Mathews, Chairman _____

**PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –**
**Continuing approval is CONDITIONAL on:**

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. SPECIAL NOTE:

**All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at http://www.lsu.edu/irb*

Parent Consent Form

Parent informed consent to participate in clinical investigation

**Project Title:** Pragmatics, Prosody, and Social Skills in School-Age Children.

**Performance Site:** Public School Setting

**Investigators:**

Janet Bradshaw, ABD, CCC/SLP
LSU
Department of Communication Disorders
(504) 228-3941

Paul Hoffman, PhD, CCC/SLP
LSU
Department of Communication Disorders
(225) 578-3937

**Purpose of Study:**
The purpose of this pilot study is to determine if children's social skills are related to their ability to recognize emotions in the voices of other speakers.

Description of Study:

This project will examine the link between speech, social skills, and feelings in children. The researcher will give tests from the Test of Language Development and Primary Test of Nonverbal Intelligence. Three tasks, described below, will be given to your child that will look at his/her ability to understand emotions. Parent/ Teacher questionnaires will be sent home to gather information on your child's social skills. The entire project will be completed in 3 thirty minute sessions during regular school hours.

Digital pictures will be taken in order for children to identify other students in the classroom. At the end of the project, all pictures will be given to the classroom teacher.

3 tasks:
1. Perception task: Your child will listen to a short story told in three different voices (happy, sad, & angry). After each story, your child will identify the emotion they heard.

2. Imitation task: Your child will listen and repeat a sentence in three different voices (happy, sad, & angry)

3. Story book task: The researcher will help your child read three short stories. At the end of story, your child will be asked which emotion (happy, sad, or angry) the character experienced.

**Inclusion Criteria:**
The children chosen for this study will include 7-8 year olds in the second grade.

**Exclusion Criteria:** No children will be excluded from the study.

Benefits:
Benefits of this project include teachers and other professionals understanding more about children's ability to recognize & express emotions as a first step in identifying children who made need help.

**Risks:**
There are no known risks.

**Right to Refuse:**
Participation is voluntary, and a child will become part of the study only if both child and parent agree to the child's participation. At any time, either the child may withdraw from the study or parents may withdraw the child from the study without penalty or loss of any benefit to which they might otherwise be entitled.

**Confidentiality:**
The school records of participants in this study may be reviewed by investigators. Results of the study may be published, but no names or identifying information will be included for publication. Participant identity will remain confidential unless disclosure is required by law.

**Financial Information:**
To reward your child's participation in the study, each family will receive a $25 gift card upon a full completion of the study.

**Signatures:**
The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigator. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Chairman, LSU Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb.

I agree to allow my child to participate in the study described above and acknowledge the investigator's obligation to provide me with a signed copy of this consent form.

Parent's Signature:_____ Date:_____

The parent/guardian has indicated to me that he/she is unable to read. I certify that I have read this consent from to the parent/guardian and explained that by completing the signature line above he/she has given permission for the child to participate in the study.

Signature of Reader:_____ Date:_____

Study Approved By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 | www.lsu.edu/irb
Approval Expires: 2/4/2014

Child Assent Form

I, _____, agree to be in a study that will find ways to help children make friends. I will listen to recordings and repeat sentences. I will read three stories with the teacher. I can decide to stop being in the study any time.

Child's Signature:_____ Age:_____ Date:_____

Witness*_____ Date:_____

(N.B. Witness must be present for the assent process, not just the signature by the minor.)

Study Approved By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 I www.lsu.edu/irb
Approval Expires: 2/4/2014

## APPENDIX B STUDENT INFORMATION FORM

Student's Name _____ Age_____ Birthdate _____
Address_____ _____Email: _____
City _____ Zip_____ Phone_____

Student's Birth History:
Mother's health during pregnancy (note special conditions such as mumps, measles, x-rays, serious accidents, etc.) _____
_____
_____

Anything unusual about the condition of the infant at birth: Blue Baby____ Lack of Oxygen____
Convulsions_____ Rh Problems___ Breathing Difficulties___ Head Injuries____
Other (describe) _____
Length of pregnancy_____ Birth weight of infant_____

Student's Academic History:
The student's performance (grades) is: ____ below average _____ average _____ above average
The student's reading ability is: ____ below average _____ average _____ above average
History of speech, language, or hearing problems: _____ Yes _____ No
If "yes" please explain._____
_____

Family History:
Mother _____ Age_____ Occupation_____
Highest grade completed (high school, college, graduate school) _____
History of speech, language, or hearing problems: _____ Yes _____ No
If "yes" please explain._____
_____
_____

Father _____Age_____ Occupation _____
Highest grade completed (high school, college, graduate school) _____
History of speech, language, or hearing problems: _____ Yes _____ No
If "yes" please explain. _____
_____
_____

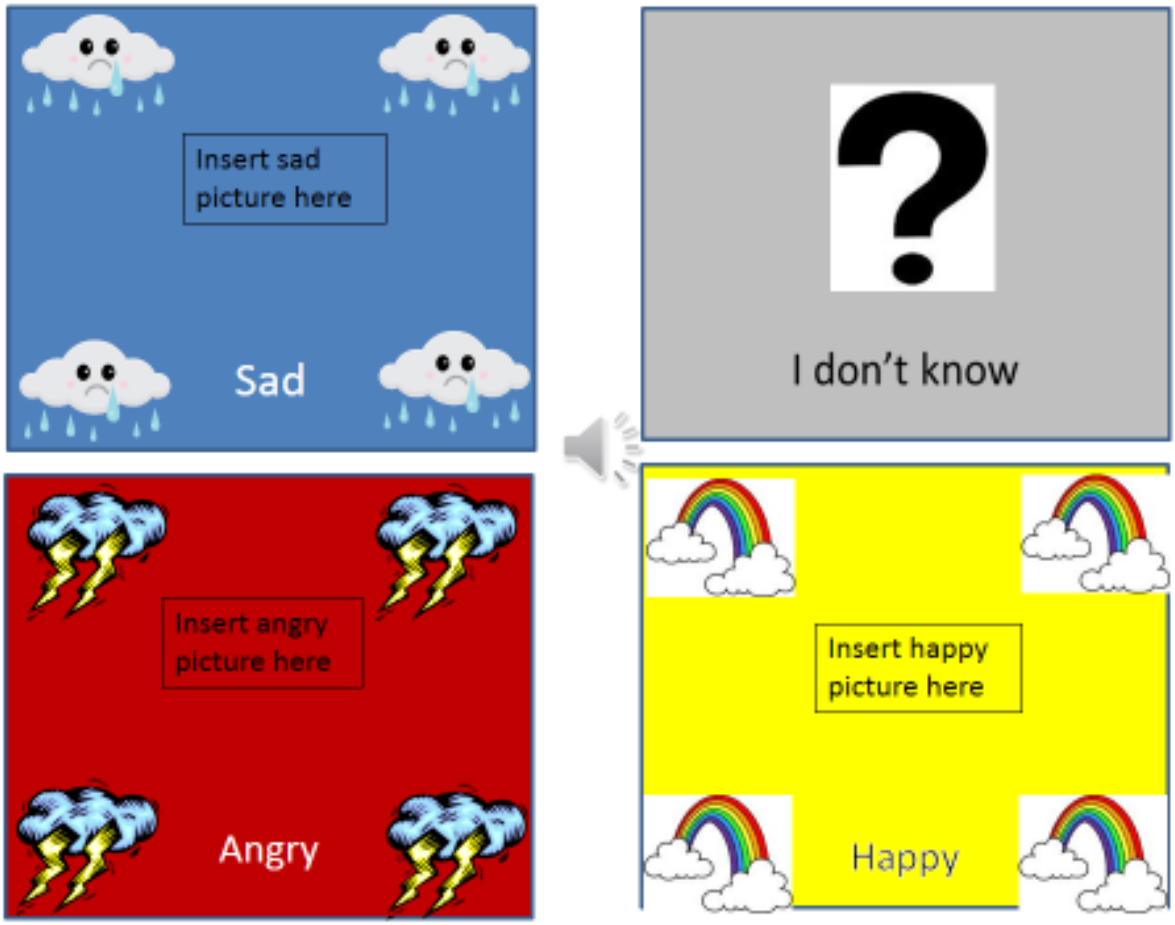
Siblings
Brother/Sister _____Age_____
Brother/Sister_____Age_____
Brother/Sister_____Age_____
History of speech, language, or hearing problems: _____ Yes _____ No
If "yes" please explain.
_____
_____
_____

## APPENDIX C DESCRIPTION OF PERCEPTION TASK

In the perception task, participants identified emotions (verbally or by pointing) when presented on Powerpoint with audio clips of happy, sad, and angry voices. The auditory stimulus included three sentences of neutral content that imitated the different emotional voices.

Target sentence:

"Today is the first game. I came to the park early to see who was playing. I walked to the gym and waited for the coach."



## APPENDIX D SCRIPTS FOR EXPERIMENTAL TASKS

Script for perception probe:

-"We are going to play a game. You will hear three people speak. After you hear their voice, tell me how they sound."

-(As I point to the picture card) :

"This little boy is sad, see how he is crying and his lips are pouting, he looks sad.

This little boy is angry, see how his eyes are squinting and his mouth is frowning, he looks angry.

This little girl is happy, see how she is smiling and her eyes are bright, she looks happy.

This is a question mark. It means you do not know how the person sounds.

-(After clip) "How did she sound?"

Script for imitation probe:

-"We are going to play a game. I want you to listen to the person's voice and say it the same way. When you speak, the microphone will pick up your voice.

-First, let us practice. This is the sentence "I walked to the gym." Let's read it together.

-Listen to the voice. Now it's your turn

-Good job! Now let's begin."

Script for narrative probe:

-"We will read three short stories. Each story is about a different person and their feelings.

-We will read aloud the story and answer the question at the end.

-now, let's read.

-(after reading the story & stating the emotion) How do you know?

## APPENDIX E NARRATIVE RUBRIC

Happy:

_____
_____
_____

Angry:

_____
_____
_____

Sad:

_____
_____
_____

| | Happy: | Angry: | Sad: |
|---|---|---|---|
| A. Correct emotion _____ | + 1 / 0 | + 1 / 0 | + 1 / 0 |
| B. Complex sentence_____ ex: He is ____ because……. | + 1 / 0 | + 1 / 0 | + 1 / 0 |
| C. Uses multiple sentences in explanation _____ | + 1 / 0 | + 1 / 0 | + 1 / 0 |
| D. Details_____ | | | |
| Happy: Teacher said, "Good drumming.. you are in the band" & Hurray! | + 1 / 0 | | |
| Angry: Coach said, "… You are too young. You cannot join the team" & That's not fair | | + 1 / 0 | |
| Sad: She can't sew, bake or count (includes at least 1) | | | + 1 / 0 |
| Describes the pictures | + 1 / 0 | + 1 / 0 | + 1 / 0 |
| Discusses the punctuation | + 1 / 0 | + 1 / 0 | + 1 / 0 |
| E. Number of cues (phonemic & semantic) | | | |
| 0 – 3_____ | + 2 | + 2 | + 2 |
| 4-6_____ | + 1 | + 1 | + 1 |
| 7- >_____ | 0 | 0 | 0 |

| | Happy | Angry | Sad |
|---|---|---|---|
| Total Score: | _____/ 8 | _____/ 8 | _____/ 8 |

## APPENDIX F SCRIPT FOR SOCIOMETRIC RANKING

"Here are all the kids in your class (researcher points to the pictures of each classmate while reading their names).

Some of the kids in your class may be your best friends. You like talking with them and playing together. These kids are best friends (researcher points to a picture of kids smiling/playing/hugging).

There might be some kids in your class that you do not like to talk and play with. These kids are not friends (researcher points to a picture of two angry children).

Think about your classmates. Name three of your classmates that are your best friends. (researcher points to visual display)
Now, name three classmates that are not your friends. (researcher points to visual display)

Look at this list. (researcher points to the table of six behavioral descriptions). I want you to name three people that fit into each group.

Name three classmates that get into trouble with the teacher.

Name three classmates that start fights.

Name three classmates that are shy and quiet

Name three classmates that play alone.

Name three classmates that are friendly.

Name three classmates that protect you from a bully

## APPENDIX G SOCIOMETRIC RANKING RESPONSE SHEET

Code: _____ Date: _____

Part A:
**Chosen as "friends":**

1._____ 2._____ 3._____

**Chosen as "not friends":**

1._____ 2._____ 3._____

**Classmates not selected**:

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

Part B.
**Gets in to trouble with teacher:** 1._____ 2._____ 3._____

**Start fights:** 1._____ 2._____ 3._____

**Shy and quiet:** 1._____ 2._____ 3._____

**Play alone:** 1._____ 2._____3._____

**Friendly:** 1._____ 2._____ 3._____

**Protects from harm:** 1._____ 2._____ 3._____

## VITA

Janet completed her Bachelor of Science degree in Speech and Hearing Sciences in 2004 at the University of South Alabama. She earned a Master of Communication Disorders degree at Louisiana State University Health Sciences Center in 2007. After graduation, Janet worked as a school-based speech-language pathologist in New Orleans, Louisiana. After completing her clinical fellowship year, she remained in the public school sector for an additional year providing speech and language services to elementary, middle, and high school students. In 2009, Janet began her doctoral program at Louisiana State University in the Department of Communication Sciences and Disorders. During the doctoral program, she pursued her interest in children's social-emotional development and pragmatic language skills. Janet anticipates graduating with a Doctorate of Philosophy in May of 2014.