

RECOGNITION OF EMOTION IN FACIAL EXPRESSIONS BY CHILDREN WITH  
LANGUAGE IMPAIRMENT

by

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## ABSTRACT

# RECOGNITION OF EMOTION IN FACIAL EXPRESSIONS BY CHILDREN WITH LANGUAGE IMPAIRMENT

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Recent research has shown that children with language impairment (LI) have increased social difficulties. This study examined the relationship between language skills and emotion understanding through recognition of facial expressions of emotion in children with LI and their typically developing peers. It is a replication of the research of Spackman, Fujiki, Brinton, Nelson, and Allen (2005) and Atwood (2006). Participants consisted of 22 children with LI and 22 age- and gender-matched peers with typically developing language, from the age range of 7:0 to 10:11 years. They were shown photographs of faces conveying one of the following emotions: *happiness*, *sadness*, *anger*, *fear*, *surprise*, and *disgust*; they were then asked to indicate which emotion was being expressed. Group performance was then compared for each of the emotions in question.

This study found significant differences between the groups (LI vs. Typical), with the children without LI recognizing each emotion more accurately than those with LI. There was also a significant main effect found for gender and emotion. These differences were qualified by a significant interaction between gender and emotion, which indicated that some emotions were identified by females more correctly than males. Specifically, females identified the emotion *disgust* more accurately than males. This may provide support for the idea that children with LI may have difficulties with emotion understanding, of which facial expression recognition is a specific and basic aspect; this deficit could negatively impact their social interactions.

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## Introduction

Children with language impairment (LI) exhibit a deficit that affects language development, both comprehension and production, in isolation from other abilities. This deficit cannot be attributed to impairments in cognitive functioning, hearing, or structure and function of speech mechanisms; these systems also remain relatively unaffected by the deficit in language (Leonard, 1998). However, recent studies have also shown that children with LI often demonstrate problems in social situations that are detrimental to establishing and maintaining social interactions, especially with peers. They are often rejected by their peers and unable to establish reciprocal relationships (Brinton & Fujiki, 2002).

In determining a cause for these social difficulties, it seems reasonable that deficits in language impact a child's social competence because language ability plays a central role in most social interactions. Although there is little question that social competence is influenced by language skills, recent research has provided evidence that some of the social problems of these children may reflect additional difficulties. For example, Fujiki, Brinton, and Clarke (2002) found that children with LI were rated by teachers as demonstrating higher lability and negativity than typical peers. Together these behavioral domains formed a general construct labeled as emotion regulation. In another study, Fujiki, Spackman, Brinton, and Hall (2004) found that language and emotion regulation skills were both related to reticent behavior in children with LI.

An aspect of development that has been found to be problematic in children with LI in various studies is emotion understanding (Ford & Milosky, 2003; Spackman, Fujiki, & Brinton, 2006). Emotion understanding, the ability to correctly interpret others' and one's own emotions, is an integral part of emotional competence. Denham (1998) defined

emotion understanding as the knowledge of the causes and consequences of emotions. This general construct has many important implications in child development. For example, emotion understanding is a key component in the development of theory of mind and self-control (Dunn & Cutting, 1999; Saarni & Harris, 1989).

Emotion understanding is an umbrella term that includes a range of behaviors. One of the most basic is recognition of facial expressions of emotion. Denham (1998) proposed that “comprehension of emotional expressions can be seen as the perceptual bedrock for further understanding of emotions” (p. 61); that is to say, the basis or foundation for more developed emotion understanding. Indicative of the importance of this ability is the fact that measures of emotional intelligence often include facial expression of emotion recognition tasks (Mayer & Geher, 1996).

This study examined the relationship between language skills and the recognition of facial expressions of emotion in children with LI and their typically developing peers. It is a replication of the study done by Spackman, Fujiki, Brinton, Nelson, and Allen (2005); this study was also replicated in an unpublished thesis (Atwood, 2006). The present study differed from previous work by including a wider IQ range (down to 70) than previous studies. Children with LI and their age- and gender-matched peers were shown photographs of faces conveying one of the following emotions: *happiness*, *sadness*, *anger*, *fear*, *surprise*, and *disgust*; they were then asked to indicate what emotion was being expressed in each facial expression. The group with LI was compared to the typically developing group to determine whether there was a difference in performance. Additionally, each of the emotions tested were compared to see if some emotions were more difficult to identify for one or both groups. Children with LI had significantly more

difficulty than their typical peers in recognizing *surprise* and *disgust*. In replicating previous work, the present study attempted to answer the following questions:

1. Do children with LI differ from typically developing peers in their ability to identify emotion by facial expression?
2. Are some emotions more difficult to accurately identify in facial expressions than others?
3. Do males and females differ in their ability to identify emotions conveyed by facial expression?
4. Is there a difference in the patterns of errors children with LI make in comparison to their typically developing peers?

## Review of Literature

An important factor in appropriate social behavior is emotional competence, of which emotion understanding is a basic component. Similarly, discrimination of facial expressions of emotion is a foundational aspect of emotion understanding (Denham, 1998). This ability is impaired in children with certain disabilities, such as learning disabilities (LD) and Autism Spectrum Disorders; research shows that children with LI may also have difficulty with recognition of facial expressions.

### *Emotional Competence and Emotion Understanding*

Emotional competence is the “demonstration of self-efficacy in the context of emotion-eliciting social transactions” (Saarni, 1990, p.116). The author notes that this definition represents the idea that people “respond emotionally, yet simultaneously and strategically apply their knowledge about emotions and their expression to relationships with others so that they can negotiate interpersonal exchanges and regulate their emotional experiences” (p. 116). Saarni lists the following 11 aspects of emotional competence:

1. Awareness of one’s emotional state
2. Ability to discern others’ emotions
3. Ability to use the vocabulary of emotion and expression
4. Capacity for empathic involvement in others’ emotional experiences
5. Ability to realize that inner emotional state need not correspond to outer expression
6. Awareness of cultural display rules
7. Ability to take into account unique personal information about individuals and apply it when inferring their emotional state

8. Ability to understand that one's emotional-expressive behavior may affect another
9. Capacity for coping adaptively with aversive or distressing emotions by using self-regulatory strategies
10. Awareness that the structure or nature of relationships is in part defined by both the emotional immediacy and genuineness of expressive display
11. Capacity for emotional self-efficacy

Emotional competence is comprised of many complex skills. However, Denham, von Salisch, Olthof, Kochanoff, & Caverly, (2002) broke emotional competence down into three general areas: the experiencing of emotion, the expressing of emotion, and the understanding of emotion. The experiencing of emotion is the awareness and recognition of a person's own emotions and the regulation of the expression of emotion within a current social context. The valence of an emotion, either positive or negative, is recognized at this level. In the expression of emotion, one must know that not only should an affective signal be sent in a given context, but, more importantly, what kind of signal should be sent for a smooth interaction. Both experiencing and expressing emotions contribute to emotion understanding, and, similarly, emotion understanding contributes to both other aspects. Denham et al. (2002) suggested that of these three interdependent areas, emotion understanding is the core of emotional competence.

*Nature of emotion understanding.* Emotion understanding is "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). Denham (1998) defined emotion understanding as the knowledge of the causes and

consequences of emotions. This has many important implications in child development. Emotion understanding is a key component in the development of theory of mind and self-control (Dunn & Cutting, 1999; Saarni & Harris, 1989). Emotion understanding also helps children integrate emotional experiences from situations, subjective emotional states, and expressive signals (Denham, 1998).

Emotion understanding, as outlined by Denham (1998), includes the following behaviors and abilities:

1. Labeling emotional expressions
2. Identifying emotion-eliciting situations
3. Inferring the causes and consequences of emotion-eliciting situations
4. Using emotion language to describe their own emotional experiences and clarify those of others
5. Recognizing that their own emotional experiences can differ from others' emotional experiences
6. Awareness of emotion regulation strategies
7. Knowledge of emotion display rules
8. Knowledge that more than one emotion can be felt at the same time, even if they conflict
9. Understanding of complex social and self-conscious emotions, such as guilt

This study will focus on the first of these competencies, the labeling of emotions through facial expressions. The labeling of an emotion relies on the ability to recognize that an emotional signal is being sent, and then to accurately interpret the message.

Research suggests a human's first recognitions of emotion are based on facial expressions (Saarni & Harris, 1989). Therefore, the recognition of facial expressions of emotion provides a foundation upon which is built a greater understanding of emotions (Denham, 1998).

*Development of emotion understanding.* Children face a complicated task in development when learning to understand emotions. Knowledge about a person's background, personality, and situation must be integrated in order to effectively gather information about another's state of emotion. A child must also realize when more information is necessary, how to integrate multiple sources of information, and how to differentiate between relevant and irrelevant messages (Gnepp, 1989). The following is a brief overview of the development of emotion understanding.

The development of emotion understanding begins in infancy. A 7 month-old infant is able to recognize happy faces despite variations in the face demonstrating the emotion, including gender of the model or the intensity of the emotion displayed (Ludemann & Nelson, 1988). However, infants are not able to recognize or categorize faces displaying emotions of a different valence (e.g. fear) until after 12 months of age (Nelson, 1987). A more in-depth description of this is included in the section below on the recognition of facial expressions of emotion.

By the ages of 3-5 years, a child has the ability to recognize both live facial expressions (Felleman, Barden, Carlson, Rosenberg, & Masters, 1993) and facial expressions presented pictorially (Camras & Allison, 1985; Field & Walden, 1982). A child is also able to infer basic emotions from simple and familiar situations (Gnepp, 1989).

As children enter school, their understanding of emotion broadens. Children begin to gain more awareness of how personal information, such as age or gender, affects emotion between 5-8 years of age. They also have the ability to understand that people can feel different ways in unclear emotional situations. However, children have trouble understanding that one person might feel either of two ways about an unclear situation. Also at this age, children are able to make assumptions about another person's judgment based on that person's past reactions, but they have difficulty using that knowledge to predict emotional reactions to later situations (Gnepp, 1989).

A child's understanding of complex emotions and situations continues to increase from 8-12 years of age. When facial cues differ from situational cues, children become more dependent on situational cues, and are better able to reconcile the conflicting signals. They also continue to develop their understanding of how and why a person may feel a certain way, and why a person may feel more than one emotion at the same time (Gnepp, 1989).

*Influence of family relationships.* A child's earliest experiences with emotion most often occur in the family setting. Consequently, the family plays an influential role in the development of emotion understanding. For example, it has been found that the quality of interactions between parents and children influences the development of emotion understanding. Children who possess secure attachments to their parents show greater understanding of emotion than those children who do not possess secure attachments (Laible & Thompson, 1998).

Denham, Zoller, and Couchoud (1994) examined family relationships and discourse about emotions. Maternal emotion discourse was especially important in a

child's development of emotion understanding. Mothers who talked about and explained their emotions had children who were more proficient in understanding emotion.

Furthermore, children who were exposed to negative maternal emotions, such as anger, appeared to be at a disadvantage in understanding emotion.

*Influence of peer relationships.* Peers also have a great impact on children's emotional development. As children interact with their peers, they create peer cultures in which they carry out the complex processes of making friends, gaining access to play groups, and maintaining joint action (Cosaro & Eder, 1990). Because of the intimate nature of friendship, emotional competence is attained as peers share their emotions with one another (Denham et al., 1994). Additionally, peers often share roles and face the same transitions and life events, so they are in a better position to understand one another's emotional lives better than parents or other age groups.

Recent research supports the notion that peer interactions are essential in developing emotional competence. For example, Dunn and Cutting (1999) found that 4-year-olds who showed understanding of emotions had more positive interaction with their friends, including cooperative shared pretend play, low frequency of conflict, and successful communication. Another recent study found that friends who engaged in conversation about emotion with each other also had more cooperative interactions (Brown, Donelan-McCall, & Dunn, 1996). On the other hand, children who missed important emotional messages or misinterpreted them were at a disadvantage in social situations. This led to disrupted social interactions, negative social relationships, and possibly inappropriate behavior (Holder & Kirkpatrick, 1991).

A child's emotion understanding is developed and enhanced in interaction with family members and in peer groups. These social interactions and negotiations help children to establish understanding that will provide the foundation for the knowledge and skills that will allow them to participate effectively as adults.

#### *Development of Recognition of Facial Expressions*

As previously stated, Denham (1998) proposed that "comprehension of emotional expressions can be seen as the perceptual bedrock for further understanding of emotions" (p. 61). In recognition of this fact, measures of emotional intelligence often include items examining the ability of children to recognize facial expressions of emotion (Mayer & Geher, 1996).

According to Russell, Bachorowski, and Fernandez-Dols (2003) the emotions of *happiness, sadness, anger, fear*, and possibly *disgust* and *surprise* have recognizably unique facial expressions. Recognition of facial expressions begins in early infancy (Grossmann, Striano, & Friederici, 2007). For example, Darwin (1965) proposed that recognition of facial expressions begins with a mother's smile of approval or frown of disapproval, at which point an infant begins to understand the basic associations with nonverbal cues and emotions. Infants cannot use language to express understanding of emotion, as adults or older children do; however, it is believed that the first sign of the perception of nonverbal emotional cues appears at 3-5 weeks of age when the infant's first social smiles occur (Izard, 1993).

Infants recognize the difference among facial expressions as young as 3 months of age. Young-Browne, Rosenfeld and Horowitz (1977) found that 3 month-old infants could discriminate between *happy* and *surprised* faces. Between the ages of 4-8 months, an infant's abilities to differentiate among facial expressions expand further (Michalson

& Lewis, 1984). For example, LaBarbera, Izard, Vietze, and Parisi (1976) found that 4 month-old infants preferred to look at faces exhibiting *happiness* rather than faces exhibiting *anger* or a neutral expression. Bertenthal and Campos (1990) found that infants smile when they see happy faces and frown when they see angry faces. By 9 months of age, infants look towards their caregiver's faces for emotional cues when they are faced with uncertain situations. This behavior is referred to as social referencing (Feinman, 1982).

Between the ages of 2-5 years, children begin to understand the link between situations and emotional reactions elicited by those situations; for example, children can predict whether a specific event will make them feel *happy* or *sad*. Around this time, children also begin to consider both expressive and contextual cues to determine what another person might be feeling. By age 5, children can correctly identify *happy*, *sad*, and *angry* with 80% accuracy (Michalson & Lewis, 1984; Tremblay, Kirouac, & Dore, 2001).

Children's emotion understanding becomes more complex between 5-6 years of age, at which time they may demonstrate understanding that emotions are caused by beliefs. The development of dissemblance of emotion, another important milestone in emotional development, becomes apparent at this time (Banerjee, 1997; Gosselin, Warren, & Diotte, 2002; Underwood, Coie, & Herbsman 1992). Banerjee (1997), studying children between the ages of 3-5 years, presented simplified scenarios in which characters were motivated to hide an experienced emotion. The children were then asked whether real and expressed emotion could differ. Although there were developmental

differences, the children showed some understanding of the difference between real and displayed emotions.

Denham (1998) observed that younger children receive important social cues from emotions. These cues are important because other sources of social information, such as language, are still maturing. As Denham noted, emotion cues provide “immediate, salient, and important” (p. 59) social information. This information may be particularly important for children with LI, whose language production and comprehension is even more limited than typically developing children.

#### *Recognition of Facial Expressions of Emotion in Populations with Impairments*

The ability to recognize and identify facial expressions of emotion can be compromised in individuals with one of a variety of disorders. Research indicates that individuals with LD (Holder & Kirkpatrick, 1991), dyslexia (Whiting & Robinson, 2001), Down Syndrome (Kasari, Freeman, & Huges, 2001; Williams, Wishart, Pitcairn, & Willis, 2005; Wishart & Pitcairn, 2000), and Autism Spectrum Disorders (Begeer, Rieffe, Terwogt, & Stockmann, 2006; Boucher, Lewis, & Collis, 2000; Celani, Battacchi, & Arcidiacono, 1999; Lindner & Rosen, 2006) all have difficulty with recognizing facial expressions of emotion. Although there is a significant amount of literature across these categories of impairment, only samples of the research involving LD and dyslexia will be presented as these disorders are often language-based.

*Learning Disabilities.* Holder and Kirkpatrick (1991) studied the ability of 48 children with LD, ages 8-10 and 11-15 years, to recognize facial expression of the emotions *happiness, sadness, anger, fear, surprise, and disgust*; the group scores were then compared to group scores of 48 typically developing peers. Children with LD were chosen through formal identification by their school districts as having “an average to

above average range of intellectual functioning, lower achievement levels than those commensurate with age and ability level, and a discrepancy between intellectual ability and achievement level” (p. 171). Each child was read scenarios involving the expression of emotion. The child was then presented with two photographs showing different emotions from Ekman and Friesen’s Pictures of Facial Affect (1976) and asked to choose which facial expression was most appropriate to the given scenario. There were significant differences between the group with LD and typically developing group. On the whole, children with LD were less accurate in identifying the appropriate facial expressions of emotion than the typically developing children. These children had particular difficulty with the emotions of *surprise* and *disgust*, which usually develop later in typical children than the other four emotions studied.

In another study (Dimitrovsky, Spector, Levy-Shiff, & Vakil, 1998), 76 children with LD, aged 9-12, and 48 typically developing children were asked to interpret facial expressions of emotion from a shortened version of Ekman and Friesen’s Pictures of Facial Affect (1976). The group with LD was further divided into three groups: those with verbal deficits, nonverbal deficits, and both verbal and nonverbal deficits. The typically developing children interpreted emotions in facial expressions more accurately than all three of the groups of children with LD; however, the performance of the children with verbal deficits was comparable to the typically developing children in identification of all emotions except for *surprise*, which the children with verbal deficits identified more poorly than their peers. The children with verbal deficits more accurately identified facial expressions than those with nonverbal deficits and those with both verbal

and nonverbal deficits. Older children, regardless of group (LD vs. typical), recognized the emotions *fear* and *disgust* more accurately than younger children.

One subset of LD that has been studied independently is dyslexia. While most research in dyslexia is related to areas such as academics, motivation, and self-image, Whiting and Robinson (2001) investigated dyslexia's possible effects on social skills, namely the interpretation of emotion from facial expressions. This study assessed 38 children, ages 8-12 years, with visual dyslexia, and compared them to 31 typically developing peers of the same age group. The children were asked to identify the six basic emotions of *happiness*, *sadness*, *anger*, *fear*, *surprise*, and *disgust* from Ekman and Friesen's Pictures of Facial Affect (1976). Data showed that the children with dyslexia performed as poorly at interpreting facial expression of emotion as they did at word identification.

*Language impairment.* Of most interest to the current work are studies examining the general emotion understanding of children with LI, as well as research focusing specifically on the ability of these children to interpret emotion from facial expressions. Ford and Milosky (2003) studied the emotion understanding of kindergarten children with LI and typically developing peers, examining the ability of these children to infer the causes of emotions. The children listened to a short scenario and were then asked to infer the emotional reaction of the main character. The children with LI had more difficulty identifying the characters' emotional reaction than the typically developing children. It was interesting to note that the children with LI were more likely, when making an error, to provide an emotion of a different valence (e.g. substituting *happy* for *anger*) than the typically developing children.

Spackman, Fujiki, and Brinton (2006) replicated the work of Ford and Milosky (2003). Children between the ages of 5 to 8 or between 9 to 12 were presented with stories in which the main character, Chris, was in a situation that would be expected to elicit a certain emotion, either *anger*, *fear*, *happiness*, or *sadness*. The children were asked why the character would feel a particular emotion (e.g. Why did Chris feel happy?) and then asked for a description of how the emotion would feel (e.g. How does it feel inside to be happy?). The children in the older group were significantly more accurate than the children in the younger group, and typically developing children were significantly more accurate, and more sophisticated in their descriptions of emotion, than children with LI.

The ability of children with LI to identify the emotion conveyed by voice was compared to both children with Autism Spectrum Disorders and typically developing children in a study by Boucher et al. (2000). Although four experiments were conducted, the one of most interest to this study was an experiment of vocal affect naming and vocal-facial affect matching. Typical children named and matched emotions with facial expressions better than both the children with LI and the children with autism. Surprisingly, the children with autism performed better than the children with LI on both affect matching and affect naming. The authors suggested that the poor affect matching by children with LI may have stemmed from a combination of impaired ability to identify vocally expressed emotions, impaired cross-modal processing, and more wide-ranging impairments in processing social stimuli; this would involve some degree of impairment of face processing, in processing meaning rather than the encoding of material.

Processing emotion conveyed by voice was also examined by Fujiki, Spackman, Brinton, and Illig (2008). Children with LI from the ages of 8 to 10 years and age-matched typically developing peers were presented with a seven-sentence-long narrative that was read by actors to express one of the following emotions: *happiness*, *anger*, *sadness*, and *fear*. The children with LI had significantly more difficulty than the typical children identifying the emotion expressed in the passage. It was of note that there were no demands on the children to understand the literal meaning of the passage or to verbally label the emotion. As actors read the narrative to convey a single emotion in each of the seven sentences, a great deal of redundancy was built into the task to compensate for both processing and linguistic comprehension deficits. Therefore, the authors concluded that children with LI had impairments in emotion understanding.

Relatively few studies have been done studying the ability of children with LI to recognize facial expressions of emotion. Ford and Milosky (2003) asked kindergarten children with LI and their typically developing peers to verbally label the emotion being expressed in a line drawing of a face and point to the appropriate drawing as emotions were named. These line drawings were stereotypic and thus much easier to decipher than real faces. No significant differences were found on the four basic emotions of *happy*, *sad*, *mad*, and *surprise*.

Trauner, Ballantyne, Chase, and Tallal (1993) examined the ability of children with LI ages 9 to 13 years to recognize facial expressions of emotion. There was no significant difference between the children with LI and the controls; however, these data must be interpreted with caution as the sample size was small (8 children with LI) and only the emotions of *happy*, *sad*, and *mad* were tested.

Spackman, Fujiki, Brinton, Nelson, and Allen (2005) conducted the most recent study of the recognition of facial expression of emotion in children with LI. The sample was comprised of 43 children with LI and 43 age-matched, typically developing peers. All participants ranged in age from 5 to 8 and 9 to 12 years of age. To decrease the verbal demands, the participants had to point to cards with pictures representing an emotion when they were showed a photograph of a facial expression. The photographs, cards, and methods used in the research by Spackman et al. (2005) were also used in the current study, which replicated this work.

Spackman et al. (2005) found a significant difference between children with LI and their typically developing peers in their ability to recognize emotions. Children with LI were able to identify facial expressions of *happiness*, *sadness*, *anger*, and *fear* with the same accuracy as their peers; however, there was a significant decrease in their ability to identify the emotions *surprise* and *disgust* as compared to their peers. In both groups, *surprise* was most often misinterpreted as *scared* and *disgust* as *anger*. There were also differences between the age groups for the emotions *anger* and *surprise*; the younger group did not correctly identify these emotions as well as the older group.

An unpublished thesis by Atwood (2006) also replicated the work of Spackman et al. (2005). Participants included 19 children with LI and 19 age- and gender-matched peers. The findings of this study were similar to those in the original study, with children with LI recognizing emotions in facial expressions significantly less accurately than their peers. There was also a significant difference found for emotion, which indicated that some emotions (*fear*, *surprise*, and *disgust*) were not identified as accurately as other emotions (*happiness*, *sadness*, and *anger*). However, a limitation of this study was that

intelligence was not considered in the statistical analysis. This limitation is corrected in the current study, with nonverbal intelligence being used as a co-variate. It is hoped that considering intelligence will provide some additional explanatory power.

The current study examined the ability of children with LI to recognize emotions in facial expressions. The task required little verbal language skills to reduce the influence of language deficits on performance of the task. This study replicated the research by Spackman et al. (2005) and Atwood (2006) to provide further information as to whether children with LI differ from typical peers in their ability to identify emotion conveyed by facial expression.

## Method

### *Participants*

Study participants were chosen from seven elementary schools from three local school districts. The participants included 44 children, 28 males and 16 females. The participants' ages ranged from 7;0 to 10;11 years of age. The sample consisted of 22 children with LI, 8 females and 14 males. Two of the children with LI were African-American, one was Hispanic, and 19 were Caucasian. The children with LI were paired with 22 children with normally developing language, 8 females and 14 males; two of the typically developing children were Hispanic and 20 were Caucasian. Prior to beginning the study, the application for protection of human subjects was approved by the Institutional Review Board of Brigham Young University. Permission was obtained from the school districts from which the children were selected. Parent or guardian written permission was also obtained for each child involved in the study (See Appendix C). See Table 1 for a summary of the percent of the population below the poverty line from the census block group around each school participating in the study.

Children with LI were identified by certified speech-language pathologists in three school districts. These clinicians were asked to recommend children with LI from their caseloads. These children were required to meet the following criteria:

1. Diagnosis of language impairment by a certified speech-language pathologist
2. Nonverbal IQ score of 70 or more on standardized intelligence test, in order to rule out mental retardation as a basis for language difficulties
3. No history of emotional or behavioral problems, cognitive deficits, or neurological problems (i.e. autism, ADHD, etc.) requiring special services, as indicated by school records and placement

Table 1

*Socio-economic Status Data for Census Block Groups in which Participating Schools  
Were Located*

School	Number of participants	% of population below the poverty line
1	4	3.62
2	8	0.89
3	8	2.76
4	4	3.79
5	4	11.02
6	10	5.18
7	4	1.40
8	4	0.00

4. Standard score on standardized language test below 85 (one standard deviation below the mean)
5. Native English speaker

Nonverbal intelligence was measured using the Universal Nonverbal Intelligence Test (UNIT; Bracken & McCallum, 1998). Language ability was assessed using the Comprehensive Assessment of Spoken Language (CASL; Carrow-Woolfolk, 1998). These tests were given to the children in order to confirm qualification for the study and to provide consistent measures of IQ and language for all participants.

Each child with LI was paired with a typically developing child from the same classroom. Classroom teachers were asked to submit names of children who met the following criteria:

1. Same gender and age (within 6 months) of the child with LI
2. Not enrolled in any special services (i.e., resource, speech therapy)
3. No diagnosis of emotional, behavioral, cognitive, or neurological deficits
4. Typically developing (as reported by the teacher) in language, behavior, and academics
5. Native English speaker

The typically developing children of the same gender and chronological age (within 6 months) as the child with LI were identified. Permission slips were sent to the parents of each of these children (See Appendix C), and a participant was randomly selected from the children whose parents gave consent for their children to participate. The selected participants were also given the UNIT and CASL to provide consistent

measures across all children of language and IQ and to ensure appropriate group assignment; a minimum score of 85 was required for the UNIT and the CASL.

### *Materials*

To assess each child's recognition of facial expression, Matsumoto and Ekman's (1988) 24 standardized photographs of facial expressions of emotion were used, which were the same pictures used by Spackman et al. (2005). Each photograph contained either a male or female adult expressing one of the following facial expressions of emotion: *happiness, sadness, anger, fear, disgust, or surprise*. The order of the emotions (and thus the gender of the person in the photographs) was randomized.

Each child responded to the pictures of emotions nonverbally by pointing to cards that represented each of the emotions; however, if the child elected to vocally name the emotion this was also considered as an acceptable response. Each card contained a hand-drawn picture representing the emotion as well as the name of the emotion. The card representing *happy* had a drawing of the sun, *sad* was represented by a tear, *mad* was represented by lightning, *scared* was represented by a ghost, *disgusted* was represented by worms, and *surprised* was represented by a firecracker. An additional card represented *I don't know*, and contained a drawing of a question mark. These cards were designed and used by Spackman et al. (2005) and Brinton, Spackman, Fujiki, and Ricks (2007). The use of these cards was piloted for the previous mentioned studies to ensure that their use did not make the task more difficult. Procedures are described in detail in Spackman et al. (2005) and Brinton et al. (2007).

### *Procedure*

All testing took place in a quiet room in the child's school. The facial expression recognition task was individually administered by the same examiner. The facial

expression recognition task was given in combination with three other emotion tasks. Task order was systematically varied to control for order effects.

At the beginning of the four tasks, the examiner instructed the child in the use of the response cards, and trained them to answer by pointing to one of seven different cards (six emotion cards and an “I don’t know” card). (See Appendix A for exact training instructions and cards).

At the beginning of the facial expression recognition task, each child was given the following instructions:

I am going to show you some faces. I want you to tell me how each person feels by pointing to our cards. Remember that: This card means happy.

This card means sad. This card means mad. This card means scared. This card means disgusted. This card means surprised. This card means “I don’t know” (See Appendix A).

The examiner then presented the 24 pictures, one at a time. Before each picture, the examiner would say, “How does this person feel? Point to the card that shows how the person feels.” If it was clear that the child understood the task after five items, these directions were omitted as the remaining pictures were presented. Each of the child’s responses was recorded on an answer form immediately following the response (See appendix B for scoring sheet). The task administration was also videotape recorded to ensure treatment fidelity. During the task, the child was asked once for each emotion, “I wonder why he/she feels that way. Can you make up a story to tell me why he feels that way? Can you think about a time when you felt that way?” The responses to these questions were recorded but not analyzed for this project.

*Data Analysis*

In order to assess the data, several analyses were calculated. First, a three-way analysis of covariance (ANCOVA) was computed, with gender and group (LI vs. typical) as between subjects measures, and emotion (*happiness, sadness, anger, fear, disgust and surprise*) as the repeated measure factor. Each child's overall facial recognition score served as the dependent variable. Nonverbal intelligence scores from the UNIT served as the covariate. All comparisons were made at the .05 alpha level. Next, confusion matrices were created in order to examine the types of errors made by the subjects. No statistical analyses were computed on the matrices; rather, they were used for descriptive purposes.

## Results

### *Statistical Analysis*

The mean accuracy scores (and *SD*) for the group with LI and the typical group are presented in Table 2. Accuracy scores by gender and emotion are presented in Table 3. Inferential analysis revealed that there was a significant difference between groups for recognition of emotion  $F(1, 39) = 4.131, p = .049, \eta = .096$ . The typical children identified emotion more accurately than the children with LI (typical mean = 3.233, LI mean = 2.896). The analysis also revealed a significant main effect for gender  $F(1, 39) = 6.336, p = .022, \eta = .128$  and for emotion  $F(1, 39) = 4.121, p = .049, \eta = .096$ . These differences were qualified by a significant interaction between gender and emotion  $F(1, 39) = 5.718, p = .038, \eta = .106$ . Males and females identified most emotions with similar accuracy, with the exception of *disgust*. Regardless of group (LI vs. Typical), females identified *disgust* with a mean of 2.19 while the mean for males was 0.96.

### *Error Patterns in Responses*

*Group with LI.* Tables 4 and 5 present the confusion matrices for each subject group. Results of the confusion matrix for the children with LI revealed that *happiness*, *sadness*, and *anger* were the most accurately identified of the six emotions. *Surprise*, *fear*, and *disgust*, respectively, were the least accurately identified of the six emotions. The most common error response given for *surprise* was *fear*. *Fear* was most often confused with *disgust*, and *disgust* was most often confused with *anger*. It is interesting to note that in the group with LI, more *anger* responses were given for the emotion *disgust* than correct *disgust* answers.

Table 2

*Mean Facial Recognition Scores for Each Group (with Standard Deviations) for Each Emotion Examined*

Emotion	LI	Typical
Happy	3.77 (.75)	4.00 (.00)
Sad	3.59 (.59)	3.73 (.55)
Anger	3.14 (.99)	3.50 (.80)
Disgust	1.00 (1.23)	1.82 (1.40)
Surprise	2.75 (1.04)	3.25 (.89)
Fear	2.45 (1.37)	3.32 (.72)

Table 3

*Mean Facial Recognition Scores for Gender (with Standard Deviations) for Each Emotion Examined*

Emotion	Male	Female
Happy	3.89 (.57)	3.88 (.50)
Sad	3.61 (.63)	3.75 (.45)
Anger	3.32 (.91)	3.31 (.95)
Disgust	.96 (1.17)	2.19 (1.38)
Surprise	2.93 (1.07)	3.00 (.97)
Fear	2.82 (1.25)	3.00 (1.03)

Table 4

*Error Patterns in Responses (Confusion Matrix) for Children with LI by Percentage*

	Child's Response							
	Happy	Sad	Anger	Disgust	Surprise	Fear	DK	Other <sup>a</sup>
Target Emotion								
Happy	95	0	0	0	5	0	0	0
Sad	0	90	1	0	0	5	4	0
Anger	0	5	76	5	0	1	13	0
Disgust	0	5	62	27	1	1	4	0
Surprise	3	0	1	3	64	22	7	0
Fear	0	2	3	18	13	62	2	0

<sup>a</sup>Includes no response and a mixture of responses.

Note: The total number of responses for each group for each emotion was 88

Table 5

*Error Patterns in Responses (Confusion Matrix) for Typical Children by Percentage*

	Child's Response							
	Happy	Sad	Anger	Disgust	Surprise	Fear	DK	Other <sup>a</sup>
Target Emotion								
Happy	100	0	0	0	0	0	0	0
Sad	0	93	1	2	0	0	4	0
Anger	0	1	87	5	0	0	7	0
Disgust	0	0	45	48	0	0	7	0
Surprise	0	0	0	1	82	10	7	0
Fear	0	0	0	6	10	83	1	0

<sup>a</sup>Includes no response and a mixture of responses.

Note: The total number of responses for each group for each emotion was 88.

*Typical group.* The typical group showed similar error patterns to their counterparts with LI, but at a higher level of appropriate performance. As with the subjects with LI, *happiness*, *sadness*, and *anger* were the most accurately identified emotions for the typical group. *Fear*, *surprise*, and *disgust* were the least accurately identified emotions. The error patterns for the typical group are as follows: *surprise* was most commonly substituted for *fear*; *fear* was most commonly substituted for *surprise*; and *anger* was most commonly substituted for *disgust*. There were almost as many *anger* responses given for the emotion *disgust* as correct *disgust* answers given.

## Discussion

### *Impact of Variables on Emotion Detection*

This study examined the ability of children with LI and their typically developing peers to identify six facial expressions of emotion: *happiness*, *sadness*, *anger*, *fear*, *surprise*, and *disgust*. A significant difference was found between the two language groups (LI vs. Typical) in the recognition of facial expressions of emotion. Significant differences were also observed for emotion and gender. Finally, there was a significant interaction between gender and emotion.

*Differences between language groups.* The children in both groups had relatively high scores for *happiness*, *sadness*, and *anger*. Additionally, although both groups of children scored somewhat low on the emotion *fear*, the difference between the two groups was small. However, the typical children produced notably higher scores than the children with LI for *surprise* and *disgust*. These findings replicated earlier work by Spackman et al. (2005), and also supported work in the literature that has demonstrated that *surprise* and *disgust* are more difficult facial expressions of emotion to identify (Camras & Allison, 1985; Holder & Kirkpatrick, 1991). However, the differences were not as large in this study as in the Spackman et al. (2005) study, as indicated by the measure of effect size. This finding indicates that including children with LI in the sample with IQ scores within the 84 to 70 range produce similar findings to previous work in which only children with LI with IQ scores above 85 were studied. The wider IQ range may have reduced the size of the difference between the two groups, however. In the current study, nonverbal IQ was used as a covariate, which was not done in the previous analyses.

Although the definition of LI is quite specific in excluding those with diagnosed emotional or behavioral problems, recent research has nevertheless shown that children with LI often have social difficulties. These difficulties, documented by numerous studies, are extensive, ranging from children being less likely to be chosen as playmates by their peers (Gertner, Rice, & Hadley, 1994), to being more likely to be rated as having behavior problems by teachers (Fujiki, Brinton, & Todd, 1996), to using more threats and physical activities to resolve conflicts (Craig, 1993). Given the fact that successful social interactions depend on good communication skills, and that children with LI have a significant deficit in language, these social struggles are to be expected.

Recently, however, several researchers (Craig, 1993; Fujiki et al., 2004) have speculated as to whether or not the social difficulties exhibited by those with LI are a result of language difficulties alone. Several studies have suggested that children with LI may have limitations that extend beyond their deficits in language. These limitations may include the involvement of underlying cognitive and social cognitive processes, such as self-regulation, executive function, emotion regulation, and attention; all of these behaviors influence emotion understanding skills. In some cases, these problems are likely to impact social functioning. For example, Ford and Milosky (2003) found that children with LI were less able than their peers to infer emotional states based on situational information, which, according to the authors, may contribute to the social difficulty experienced by this population. Additionally, Spackman et al. (2005) found that children with LI performed significantly worse than typically developing children in interpreting some facial expressions of emotion. Again it was suggested by the authors

that this impairment may affect the social problems demonstrated by this group of children.

The fact that the children with LI in the current study were less able to identify *surprise* and *disgust* than their typical peers provides support for the hypothesis that children with LI have difficulties with emotion understanding. It is possible that these difficulties make an important contribution to the social problems often observed in children with LI. It seems likely that impairment in emotion understanding would negatively affect social interactions and relationships with others. Social exchanges necessitate accurate decoding of a variety of signals, whether they be emotional, physical, or verbal. Additionally, these signals may conflict, requiring one to infer and interpret the message being sent. The crucial abilities needed to decode social exchanges allow a person to understand the emotional reactions of others, and to then respond appropriately. However, if one is not able to accurately understand emotion, that person will be at a disadvantage in social situations. For instance, if in response to the simple question, “How are you doing today?” a peer responds positively but exhibits a sad facial expression, an appropriate reply might be, “What’s wrong?” However, if one is not able to infer that the friend is not really “fine,” an opportunity would be to inquire, listen, and respond appropriately, and the social interaction would be negatively affected. As stated by Holder and Kirkpatrick (1991), this misinterpretation of emotional signals may lead to disrupted social interactions, negative social relationships, and possible inappropriate behavior.

*Differences among emotions.* The finding that there was a significant main effect for emotion is not surprising. These results support past research indicating that some

emotions are recognized more accurately than others (Atwood, 2006; Spackman et al., 2005). *Happy* was the most accurately identified emotion for both groups in this study. In the group with LI, *happy* was followed by *sad*, *anger*, *surprise*, *fear*, and *disgust*. The typically developing group in this study identified emotions in the same order (with the exception that *fear* was identified more accurately than *surprise*); however all emotions were identified at a higher accuracy by these children than by the children with LI.

*Differences between genders.* The significant interaction between gender and emotion is different from previous work (Atwood, 2006; Spackman et al, 2005). In general, females were more accurate in correctly identifying facial expressions. The average scores of males and females were very close for the emotions *happy*, *sad*, *anger*, *fear*, and *surprise*; average scores of both gender groups were within .02 of each other. The main difference, however, was seen in the scores for the emotion *disgust*. The average score for males was .96 while the average score for females was 2.19. Although the finding was statistically significant, the significance is not strong as indicated by the measure of effect size. It is difficult to determine if this result is specific to the present study or indicative of a reliable difference.

### *Conclusions*

Researchers studying children with LI over the past several years have documented the fact that these children often have difficulties in social skills. These social difficulties include being socially withdrawn (Brinton & Fujiki, 1999; Fujiki, Brinton, Morgan, & Hart, 1999; Redmond & Rice, 1998), having limited social interactions (Brinton, Fujiki, Spencer, & Robinson, 1997), and having poorer quality social interactions (Craig, 1993) than children without LI. Children with LI are also less

likely to be chosen as playmates by their peers (Gertner et al., 1994), more likely to interact with fewer peers in social activities, and more likely to be rated as having behavior problems by their teachers (Fujiki et al, 1996).

However, there are indications that not all of these social difficulties are based in the child's language deficits. For example, Hart, Fujiki, Brinton, and Hart (2004) found that some social problems were linked to the severity of LI while others were not. This variability leads one to wonder if the social deficits manifested by children with LI are influenced by other deficits, perhaps interacting with LI. Spackman et al. (2005) proposed that a factor that may affect the social problems of children with LI is reduced emotional competence. The current study examined the ability of children with LI to recognize facial expressions of emotion, which is a specific and basic aspect of emotional competence.

The primary finding of this study replicated the work done by Spackman et al. (2005), indicating that children with LI do not perform as well as their typically developing peers in recognizing some facial expressions of emotion. This difficulty is likely to have important social implications in naturalistic peer interaction, which requires the online processing of a range of social cues, of which facial expression recognition is only one.

Facial expressions of emotion are one of the fundamental components that normally developing individuals use to understand the emotions of others (Grossman, Klin, Carter, & Volkmar 2002). In this study, it has been documented that children with LI do not interpret facial expressions of emotion as accurately as their typically developing peers. Individuals who are not able to accurately perform this basic task will

be at a disadvantage in social situations. Indeed, it also stands to reason that this population might have difficulties with more subtle, complex emotion tasks such as interpreting conflicting verbal and nonverbal signals of emotion. Thus, the consequences of this difficulty for social interaction could be severe.

### *Suggestions for Future Research*

Given that children with LI have been found to present diverse social difficulties and, in the current study, children with LI displayed decreased competence in one specific aspect of emotion understanding, it is crucial that further research be conducted to explore the emotion understanding skills of children with LI. The children in this study were shown still photographs representing emotions. It would be of interest to observe how these children process live expressions of emotions, not only of adults, but of children as well. Additionally, it would be helpful to investigate how children with LI interpret emotions in realistic contexts, where verbal messages, body language, and facial expressions all come into play. Furthermore, it must be acknowledged that there are several aspects of emotion understanding (in addition to the recognition of facial expressions) that, if examined in children with LI, could provide valuable information for speech-language pathologists, teachers, and parents alike. It is suggested, then, that more research be conducted to gain a better understanding of children with LI and their ability to understand emotions.

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## Appendix A

## Emotion Training Instructions and Response Cards

**“Here are some cards. These cards show some feelings. Each card shows a different feeling. Look at these cards.**

(Examiner lays out cards one at a time as she reads the corresponding description. Cards are put out in random order for each child.)

Look at this card. This means happy. Look at the sun. It means happy.

Look at this card. It means mad. See the lightening? It means mad.

Look at this card. It means scared. See the ghost? It means scared.

Look at this card. It means sad. See the tear? It means sad.

Look at this card. It means surprised. See the firecracker. It means surprised.

Look at this card. It means disgusted. See the yucky worms. It means disgusted.

Look at this card. It means, I don't know or I'm not sure. See the question mark? It means I don't know.”

*(Examiner puts out all the cards in a line, random order, before the child.)*

**“Show me happy. Show me mad. Show me scared. Show me sad. Show me surprised. Show me disgusted. Show me I don't know.”**

(Repeat this training if there was any interruption during the testing, and if the child cannot point to each label correctly.)

Appendix A (cont.)

 <p>happy</p>	 <p>mad</p>
 <p>sad</p>	 <p>scared</p>

## Appendix A (cont.)



disgusted



Surprised



I don't know

## Appendix A (cont.)

## Training Instructions for Recognition of Emotion of Facial Expressions in Pictures

**“I am going to show you some faces. I want you to tell me how each person feels by pointing to our cards. Remember that:**

**This card means happy.**

**This card means mad.**

**This card means scared.**

**This card means sad.**

**This card means surprised.**

**This card means disgusted.**

**This card means “I don’t know.”** (*Examiner has all cards out*)

The examiner presents the photographs one at a time and asks:

**How does this person feel? Point to the card that shows how the person feels.**

(Repeat before each item – can discontinue the directions before each item after 5 items if it is clear that the child understands the task.)

## Appendix B

## Sample Scoring Sheet for Recognition of Emotion in Facial Expressions in Pictures

1. E26(M) happy mad scared sad disgusted surprised DK

2. E41(M) happy mad scared sad disgusted surprised DK

3. E20(F) happy mad scared sad disgusted surprised DK

**“I wonder why she feels that way. Can you make up a story to tell me why she feels that way?”**

**“Can you think about a time when you felt that way?”**

4. E49(M) happy mad scared sad disgusted surprised DK

5. E33(M) happy mad scared sad disgusted surprised DK

6. E28(F) happy mad scared sad disgusted surprised DK

7. E1 (M) happy mad scared sad disgusted surprised DK

**“I wonder why he feels that way. Can you make up a story to tell me why she feels that way?”**

**“Can you think about a time when you felt that way?”**

8. E35(F) happy mad scared sad disgusted surprised DK

9. E3 (F) happy mad scared sad disgusted surprised DK

10. E18(M) happy mad scared sad disgusted surprised DK

11. E50(M) happy mad scared sad disgusted surprised DK

**“I wonder why he feels that way. Can you make up a story to tell me why she feels that way?”**

**“Can you think about a time when you felt that way?”**

12. E43(F) happy mad scared sad disgusted surprised DK

13. E52(F) happy mad scared sad disgusted surprised DK

14. E52(M) happy mad scared sad disgusted surprised DK

15. E34(M) happy mad scared sad disgusted surprised DK

**”I wonder why he feels that way. Can you make up a story to tell me why she feels that way?”**

**“Can you think of a time when you felt that way?”**

16. E2 (M) happy mad scared sad disgusted surprised DK

17. E36(F) happy mad scared sad disgusted surprised DK

**“I wonder why she feels that way. Can you make up a story to tell me why she feels that way?”**

**“Can you think of a time when you felt that way?”**

18. E44(F) happy mad scared sad disgusted surprised DK

19. E4 (F) happy mad scared sad disgusted surprised DK

20. E25(M) happy mad scared sad disgusted surprised DK

21. E17(M) happy mad scared sad disgusted surprised DK

22. E27(F) happy mad scared sad disgusted surprised DK

**“I wonder why she feels that way. Can you make up a story to tell me why she feels that way?”**

**“Can you think about a time when you felt that way?”**

23. E51(F) happy mad scared sad disgusted surprised DK

24. E19(F) happy mad scared sad disgusted surprised DK

## Appendix C

### Informed Consent

#### **Consent to Take Part in Research (for parents of children with LI)**

##### **Introduction**

This research study is being conducted by Dr. Martin Fujiki, Brigham Young University, to study the ability of children with language impairment to correctly interpret the emotions of other people. Your child was selected because he/she is currently receiving language intervention.

##### **Procedures**

I will ask your child to complete the following tasks: (1) listen to a short paragraph read with various emotional tones of voice and judge what emotion is being conveyed, (2) listen to a short story and tell how the main character feels and what he/she should do, (3) look at pictures of facial expressions and tell what emotion is conveyed, and (4) make judgments about how emotion should be expressed in social situations. These tasks will be videotaped. Your child will also be asked to complete a test of nonverbal intelligence, a standardized language test, and a short memory test. Your child's teacher will complete a questionnaire focusing on social skills. This work will take about 2 to 2.5 hours (divided into shorter segments) of your child's time and 10 minutes of your child's teacher's time. All testing will take place in your child's school.

##### **Risks/Discomforts**

Your child will miss some class time. I will work closely with your child's teacher to make sure that research activities do not conflict with normal educational activities.

##### **Benefits**

There are no direct benefits to participants. It is hoped, however, that the research will help educators work with the social problems experienced by most children with language problems.

##### **Confidentiality**

Be assured that your child's participation will be confidential. All materials will be stored in a locked cabinet at BYU. Names will be removed from research materials and neither your name nor your child's name will ever be used in connection with any presentation of this research. All videotapes will be erased.

##### **Compensation**

At the end of each segment of work, your child will be offered a small toy, treat, or school supply to keep.

**Participation**

Participation is voluntary. If you give permission to include your child in the study, he/she will also be asked if he/she would like to participate. Even if you give consent, your child may withdraw at any time without penalty. Also, you may withdraw him/her at any time.

**Questions about the Research**

If you have any questions concerning the study, please contact me. My phone number and email address are (801) 422-5994, martin\_fujiki@byu.edu.

**Questions about your Rights as a Research Participant**

If you would like to discuss this study with a person not involved in the research, you may contact Dr. Renea Beckstrand, Brigham Young University, 120 B RB, (801) 422-3873 (renea\_beckstrand@byu.edu).

I have read, understand, and received a copy of the above consent and of my own free will allow my child to participate in the study.

Signature \_\_\_\_\_ Date \_\_\_\_\_

## **Consent to Take Part in Research (for parents of typical children)**

### **Introduction**

This research is being conducted by Dr. Martin Fujiki, Brigham Young University, to study the ability of children with language impairment to correctly interpret the emotions of other people. Your child was selected because I need children without language problems to serve as a comparison group.

### **Procedures**

I will ask your child to complete the following tasks: (1) listen to a short paragraph read with various emotional tones of voice and judge what emotion is being conveyed, (2) listen to a short story and tell how the main character feels and what he/she should do, (3) look at pictures of facial expressions and tell what emotion is conveyed, and (4) make judgments about how emotion should be expressed in social situations. These tasks will be videotaped. Your child will also be asked to complete a test of nonverbal intelligence, a standardized language test, and a short memory test. Your child's teacher will complete a questionnaire focusing on social skills. This work will take about 2 to 2.5 hours (divided into shorter segments) of your child's time and 10 minutes of your child's teacher's time. All testing will take place in your child's school.

### **Risks/Discomforts**

Your child will miss some class time. I will work closely with your child's teacher to make sure that research activities do not conflict with normal educational activities.

### **Benefits**

There are no direct benefits to participants. It is hoped, however, that the research will help educators work with the social problems experienced by most children with language problems.

### **Confidentiality**

Be assured that your child's participation will be confidential. All materials will be stored in a locked cabinet at BYU. Names will be removed from research materials and neither your name or your child's name will ever be used in connection with any presentation of this research. All videotapes will be erased.

### **Compensation**

At the end of each segment of work, your child will be offered a small toy, treat, or school supply to keep.

### **Participation**

Participation is voluntary. If you give permission to include your child in the study, he/she will also be asked if he/she would like to participate. Even if you give consent, your child may withdraw at any time without penalty. Also, you may withdraw him/her at any time.

**Questions about the Research**

If you have any questions concerning the study, please contact me. My phone number and email address are (801) 422-5994, martin\_fujiki@byu.edu.

**Questions about your Rights as a Research Participant**

If you would like to discuss this study with a person not involved in the research, you may contact Dr. Renea Beckstrand, Brigham Young University, 120 B RB, (801) 422-3873 (renea\_beckstrand@byu.edu).

I have read, understand, and received a copy of the above consent and of my own free will allow my child to participate in the study.

Signature \_\_\_\_\_ Date \_\_\_\_\_

## **Child's Assent**

### **Introduction**

My name is Martin Fujiki. I work at Brigham Young University. I study the way that children learn to tell what other people are feeling. I am working with children in Mrs./Ms/Mr. \_\_\_\_\_'s class. I would like your help.

### **What Will Happen (Procedures)**

I will ask you to do several things. I will ask you to listen to a story and tell me how a person in the story feels. I will ask you to listen to another story and tell me how a person in the story feels and what he/she should do. I will ask you to look at some pictures of people and tell me how the people feel. I will ask you to tell me what a person should say when certain things happen. I will ask you some questions about things you like. I will videotape you doing some of these things. I will also ask you to take some tests. You will need to point to pictures, answer questions, follow directions, repeat some words, and solve some puzzles on these tests. Your teacher will answer some questions about how you work with others at school. You will do all the work at school. You will work with us two or three times. It will take an hour or less each time.

### **Possible Problems (Risks)**

You will miss some class time. I will work with Mrs./Ms/Mr. \_\_\_\_\_ to make sure than you do not miss things in class that are really important or really fun.

### **Good things that will happen (Benefits)**

You will get to pick a small toy or prize every time you work with us.

### **Who will know about this work (Confidentiality)**

You, your parents, and your teacher will know that you are working with us. No one else at your school will know. We will not put your name on any of our papers. We will not put your parents' names or your teacher's names on any of our papers. We will keep all of our papers and work locked up in a cabinet at BYU.

### **What you will get (Compensation)**

Every time you work with us, you will get to pick out a small toy or prize.

### **Working with us (Participation)**

You do not have to work with us if you don't want to. You may quit this work any time you want to. You will still get your prize.

### **Questions**

If you have any questions, please ask me. You can also ask your parents or your teacher. If you want to ask someone else questions about this work, you may call Dr. Renea Beckstead. Dr. Beckstead is a professor at BYU. Her number is (801) 422-3873.

I want to take part in this study.

Signature \_\_\_\_\_ Date \_\_\_\_\_