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# The Ability of Children with Developmental Language Disorder (DLD) to Infer Emotions from Pictures: Where's the Breakdown?

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The Ability of Children with Developmental Language Disorder (DLD)  
to Infer Emotions from Pictures: Where's the Breakdown?

Mary Rebekah Forbes

A thesis submitted to the faculty of  
Brigham Young University  
in partial fulfillment of the requirements for the degree of  
Master of Science

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## ABSTRACT

### The Ability of Children with Developmental Language Disorder (DLD) to Infer Emotions from Pictures: Where's the Breakdown?

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Master of Science

Children with Developmental Language Disorder (DLD) often have difficulties with social and emotional learning, including emotion understanding and inferencing. Five children with DLD, ages 6;4 to 11;9, identified emotions depicted in pictured scenarios over a period of 10 weeks. Emotion categories included *happy*, *sad*, *anger*, *fear*, *surprise*, and *disgust*. Each child's responses were analyzed and plotted on a confusion matrix. In a few cases, children did not interpret the scenario accurately. Even when they interpreted the scenario accurately, all of the children misapplied, overgeneralized, or confused emotion labels in some cases. These errors represented limitations in social and emotional learning that could negatively impact the ability to interact with others, to establish and maintain relationships, and to succeed academically.

Keywords: language impairment, developmental language disorder, social communication intervention, emotion understanding, emotion inferencing, school-age children

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## TABLE OF CONTENTS

ABSTRACT.....	ii
ACKNOWLEDGMENTS .....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES .....	vi
DESCRIPTION OF THESIS STRUCTURE.....	vii
Introduction.....	1
Difficulties in Developmental Language Disorder .....	1
SEL Difficulties that Affect Quality of Life .....	1
Emotion regulation.....	2
Recognition of facial expressions. ....	2
Recognition of emotions conveyed through prosody .....	3
Emotion dissemblance .....	3
Emotion inferencing.....	4
Method .....	6
Overview .....	6
Participants.....	6
DD (7;10 years;months).....	8
JJ (11;3).....	8
KK (11;9).....	9
PP (11;7).....	10
WW (6;4).....	11
Procedure .....	11

Analysis.....	12
Interjudge Agreement .....	13
Results.....	13
DD (7;10 years;months).....	13
JJ (11;3).....	14
KK (11;9).....	15
PP (11;7) .....	16
WW (6;4).....	17
Discussion.....	18
Findings.....	18
Implications for Future Research.....	20
Conclusion .....	21
References.....	22
APPENDIX A: Annotated Bibliography .....	26
APPENDIX B: IRB Memorandum.....	47
APPENDIX C: Parental Permission Form .....	48
APPENDIX D: Teacher Permission Form .....	50
APPENDIX E: Child’s Assent.....	52

## LIST OF TABLES

Table 1	<i>DD Target Emotion vs. Actual Production</i> .....	14
Table 2	<i>JJ Target Emotion vs. Actual Production</i> .....	15
Table 3	<i>KK Target Emotion vs. Actual Production</i> .....	16
Table 4	<i>PP Target Emotion vs. Actual Production</i> .....	17
Table 5	<i>WW Target Emotion vs. Actual Production</i> .....	18

## DESCRIPTION OF THESIS STRUCTURE

This thesis, *The Ability of Children with Developmental Language Disorder (DLD) to Infer Emotions from Pictures: Where's the Breakdown?* is a portion of a larger research study. The initial pages conform to university style requirements. The thesis itself is written in a journal article style. An annotated bibliography is presented in Appendix A. The IRB Memorandum is included in Appendix B. A stamped copy of the parent permission form is in Appendix C. A stamped copy of the teacher permission form is in Appendix D. A stamped copy of the child's assent form is in Appendix E.

## **Introduction**

### **Difficulties in Developmental Language Disorder**

It has long been recognized that children with Developmental Language Disorder (DLD) have difficulties with language processing, including receptive and expressive language production and comprehension. More recently, research has suggested that children with DLD also have deficits in areas of social and emotional learning. Collaborative for Academic, Social, and Emotional Learning (CASEL, 2018) defines social and emotional learning as “the process through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to understand and manage emotions...feel and show empathy for others, [and] establish and maintain positive relationships” (CASEL, 2018).

There is increasing evidence that many children with DLD experience difficulties with SEL that negatively affect their interactions with peers. For example, Timler (2008) investigated the social knowledge of children with DLD in the context of interacting and resolving conflicts with their peers. The children with DLD demonstrated difficulties with SEL in choosing prosocial strategies in a forced-choice condition, as well as generating prosocial strategies (Timler, 2008). Conti-Ramsden and Botting (2004) documented the social and behavioral difficulties in children with DLD through student, parent, and teacher report. The authors concluded that the difficulties these children have with behavior and their social interactions are long-term problems that may increase over time (Conti-Ramsden & Botting, 2004).

### **SEL Difficulties that Affect Quality of Life**

A number of studies have shown that children with DLD have difficulties with specific areas of SEL including emotion regulation, recognition of facial expressions, recognition of emotions conveyed through prosody, emotion dissemblance, and emotion inferencing. These

difficulties may lead to poor social outcomes and diminished quality of life (Brinton & Fujiki, 2006). In an attempt to address the difficulties with SEL that children with DLD experience, researchers have advocated for and implemented interventions to facilitate social communication abilities such as positive social behaviors and attitudes, conversational quality, and emotion inferencing and comprehension abilities (Adams et al., 2012; Desmarais, Nadeau, Trudeau, Filiatrault-Veilleux, & Maxes-Fournier, 2013; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Fujiki & Brinton, 2017). Specific areas of difficulty in SEL will be individually addressed in the following sections.

**Emotion regulation.** Children with DLD demonstrate more difficulty in regulating their behavior and emotions when compared with their typically developing peers (Joffe & Black, 2012). These difficulties may manifest themselves in the ability to calm oneself when needed, as well as in the ability to gear oneself up to perform difficult tasks. Fujiki, Brinton, and Clarke (2002) reported that both older and younger children with DLD had difficulty with aspects of emotion regulation. This was a concern, considering that the older children with DLD had more time to mature and have life experiences. These researchers suggested that as the children with DLD mature, their emotion regulation skills may remain impaired, even after time and experience (Fujiki et al., 2002). Corroborating these observations, a meta-analysis conducted by Yew and O’Kearney (2013) showed that children with DLD demonstrated more severe and more frequent emotional, behavioral, and ADHD-like behaviors compared to their typically developing peers (Yew & O’Kearney, 2013).

**Recognition of facial expressions.** Children with DLD may have difficulty recognizing emotions conveyed in facial expressions, a basic aspect of SEL (Spackman, Fujiki, Brinton, Nelson, & Allen, 2006). Taylor, Maybery, Grayndler, and Whitehouse (2015) found that

children with DLD were slower to recognize and identify emotions expressed on faces than were their typically developing peers. These emotions included basic emotions: happy, sad, scared, and angry, as well as more complex emotions: surprised and disgusted. Merckenschlager, Amorosa, Kiefl, and Martinius (2012) studied the ability of children with DLD to recognize facial expressions by having children watch a portion of a movie and then choose a line drawing to match the actor's emotional expression. The children with DLD made more errors in accurately identifying the facial expression than did their typically developing peers. The children with DLD more often accurately identified positive emotions conveyed by facial expressions than they did negative emotions. Typically developing children improved in accuracy with age, while children with DLD did not. The authors suggested that the children with DLD had maturational delays and/or difficulties in recognizing nonverbal emotions.

**Recognition of emotions conveyed through prosody.** Fujiki, Spackman, Brinton, and Illig (2008) investigated the abilities of children with DLD to accurately identify emotions conveyed through prosody while they listened to a narrative passage. The children listened to a passage read with different emotion or affect and were asked to select a card indicating the emotion conveyed by the speaker. Overall, the children with DLD did not perform as well on this task as their typically developing peers. Taylor et al. (2015) reported similar findings in which all clinical groups, including a group with DLD, identified fewer emotions correctly from prosody than typically developing peers. The children with DLD required a longer time to identify emotions and demonstrated difficulties in accurately identifying both simple and complex emotions.

**Emotion dissemblance.** The ability to choose whether or not one should hide an experienced emotion within a social situation is called emotion dissemblance. Brinton, Fujiki,

Hurst, Jones, and Spackman (2015) gave hypothetical situations requiring dissemblance to both typically developing children and children with DLD. The pictured situations about a gender-neutral character targeted five emotions: happiness, sadness, fear, disgust, or anger. In each scenario, the character experienced an emotion that should be dissembled in order to preserve a social relationship. The children were asked questions probing how the character felt and what the character should do following each situation. Children with DLD did not recommend that the character dissemble experienced emotion as often as their typically developing peers did. Following the hypothetical scenarios, a naturalistic situation was presented in which the children's abilities to dissemble were observed and analyzed. The children with DLD dissembled negative emotions only half as often as typically developing children in high cost situations. Specifically, children with DLD dissembled emotion less frequently when they had something to lose by doing so (e.g., receiving a disappointing prize; Brinton et al., 2015). Thus, the ability of children with DLD to conceal emotion for social purposes seemed less mature than that of their typically developing peers. Similar results were seen in Brinton, Spackman, Fujiki, and Ricks (2007), in which a similar protocol was followed. Children with DLD indicated the character should dissemble emotion less often than the typical children did, but significant differences were not observed in their recognition of social display rules.

**Emotion inferencing.** One important aspect of social and emotional learning is the ability to recognize and anticipate the emotions that a particular situation might elicit. Children with DLD experience difficulty accurately identifying and inferring emotions. For example, Ford and Milosky (2003) probed the ability of children with DLD and their typically developing peers to identify facial expressions as well as to use this identification to make a social inference. They also considered whether or not the inferencing abilities of children with DLD were specific

to a certain modality (such as verbal only, visual only, or a combination of verbal and visual). The children were presented with 36 stories targeting the emotions: happy, mad, surprised, and sad, with nine stories per emotion. Each emotion was presented in three different modalities: verbal only, visual only, or a combination of verbal and visual. The children were asked to produce the emotion, point to an emotion when the stimulus was presented, and then infer how the character felt in each story. Overall, children with DLD responded less accurately in all conditions as compared to their typically developing peers. Children with DLD performed more poorly in integrating their emotional knowledge to make accurate inferences. They made valence errors where they confused positive and negative emotions (Ford & Milosky, 2003). Spackman, Fujiki, and Brinton (2006) extended this work and found that both older and younger children with DLD were less accurate than their typically developing peers in inferring the emotions that a character would experience in a given situation.

If children cannot infer the emotions that events elicit, their abilities to establish and maintain healthy relationships with other people, and to interact in play and work with others will be negatively affected (Spackman, Fujiki, & Brinton, 2006). As indicated earlier, interventions have been designed to focus on improving emotion inferencing and comprehension abilities (Adams et al., 2012; Desmarais et al., 2013). For example, Adams and colleagues designed and implemented a social communication treatment program that included an emphasis on emotion understanding.

Although research has shown that children with DLD experience difficulty inferring emotion in given scenarios, the source of their difficulty is less clear. It has been shown that limited emotion vocabulary may impact the ability of children with DLD to interpret their own emotions as well as the feelings of others (Elias, 2004). For example, children with DLD might

make an error by confusing the valence of an emotion. In addition, children might overgeneralize emotion terms and/or confuse one term for another. The current study investigates the nature of the errors that children with DLD make. The following questions were posed:

- Within a 10-week intervention period, how accurately would five children with DLD identify the emotions: *happy*, *sad*, *anger*, *fear*, *surprise*, and *disgust*, in pictured scenarios?
- What would be the nature of the children's errors – to what extent would they overgeneralize or confuse emotion labels?
- How often were emotion errors due to a misinterpretation of the picture?

## **Method**

### **Overview**

The current study was part of a larger project investigating a social communication approach to intervention with five children with DLD. All procedures were approved by the Brigham Young University Institutional Review Board, and are included in Appendices B, C, D, and E. The current project focused on one of the tasks conducted as part of the larger study. The task involved presenting each participant with six pictures of individuals in situations that would evoke specific emotions. Participants were then asked to identify the emotion the pictured individual would be experiencing and then to explain why the situation would elicit that emotion.

### **Participants**

Five boys identified with DLD participated in this study. Their ages ranged from 6;4 to 11;9 years (years;months). They were identified with DLD by school district personnel through standardized and informal test measures. Each child attended the same school and was receiving speech and language intervention at his school during the study. Initially, all children who all

met the general criteria were identified within the school. Their families were then contacted to determine if they were interested in allowing the child to participate in the general intervention. Parents who allowed their child to participate in the intervention gave permission through written consent, allowing the child to be pulled out of class at least one extra time per week. They also gave consent to complete a questionnaire about their child. Teachers provided written consent for completing questionnaires about each participant. The children provided written assent to participate in the study. As part of the larger project, each child received two intervention sessions per week over a 10-week period. Sessions lasted approximately 20 minutes each. A social communication approach was implemented in a plan-do-review format. Storybook sharing, story enactment, and journaling activities were used to simultaneously emphasize pragmatics, language processing, and social and emotional learning, including teaching emotions (Fujiki & Brinton, 2017).

As stated previously, each child had received a diagnosis of DLD through standardized and informal test measures administered in the school district. In addition, the examiners administered the Clinical Evaluation of Language Fundamentals (CELF-5; Wiig, Semel, Secord, 2013) to document DLD. All five of the students in the study passed a hearing screening by a school district audiologist or speech language pathologist. A diagnosis of intellectual disability was ruled out for all participants by a school district psychologist. As part of the larger intervention project, additional measures were administered including the Children's Communication Checklist-2 (CCC-2; Bishop, 2006), the Teacher Behavior Rating Scale (TBRS; Hart & Robinson, 1996), a language sample, and informal measures probing emotion understanding. Individual participants are described as follows:

**DD (7;10 years;months).** DD was a Caucasian male who qualified for speech and language services due to deficits in his social interaction and structural language skills. At the time of initial testing, DD was 7;0. His Core Language Percentile on the CELF-5 was in the 1st percentile. Areas of weakness included syntax, formulating sentences, sentence comprehension, and recalling phrases.

The parent- and teacher-completed General Composite Scores on the CCC-2 placed DD below the 1st percentile. The parent reported that DD omitted prefixes and suffixes, did not talk about abstract concepts, confused sequences of events, and had trouble remembering vocabulary words. The teacher reported similar findings and also noted that DD confused pronouns, was vague in his choice of words, was inattentive, and exhibited an expressionless demeanor at times when most other children would convey emotion. The teacher completed the TBRS and indicated that DD was reserved around his peers, was afraid to approach other children, and often played by himself.

**JJ (11;3).** JJ was a Caucasian male who qualified for special education services due to deficits in his social communication skills, including language processing and SEL. JJ received continuous resource services while in his mainstream sixth grade class. His speech and language services primarily focused on articulation and language. JJ's teacher and clinician noted that JJ exhibited little to no facial affect. His Core Language Percentile on the CELF-5 was in the 6th percentile. His areas of weakness were in understanding relationships between vocabulary words, sentence repetition, and syntax.

The parent-completed General Composite Score on the CCC-2 placed JJ in the 1st percentile. The parent reported that JJ did not convey clear facial expressions of emotion and often could not stop talking. It was also noted that JJ's ability to communicate varied depending

on the setting. JJ's teacher also responded to the prompts on the form for the CCC-2, but not every prompt was completed. The teacher reported that she was unable to complete all prompts because she did not know JJ well enough due to the form being administered at the beginning of the school year. Despite this, the General Composite Score on the teacher form indicated that JJ was in the 1st percentile. The teacher reported that JJ often unintentionally hurt or upset his peers, and that his communication skills varied depending on his audience. The TBRS demonstrated that JJ exhibited restlessness and could not sit still, wandered aimlessly, and did not verbally express his feelings.

**KK (11;9).** KK was a Caucasian male who initially qualified for special education services at the age of 6;2. He had a diagnosis of DLD. At age 6;6, KK was also diagnosed with specific learning disability (SLD) and then began to receive special education services in math, writing, and reading. KK attended a mainstream sixth grade class and had continuous resource services. He received speech and language services focused on articulation and language. KK was 11;9 at the time of initial testing. His Core Language Score on the CELF-5 was in the 3rd percentile. His areas of low performance were in repetition tasks, syntax, and vocabulary.

Teacher- and parent-completed General Composite Scores on the CCC-2 placed KK below the 1st percentile. The parent reported that KK frequently misinterpreted instructions, talked about topics that only interested him and not others, was left out of peer-directed activities, and presented with a developmentally immature lexicon. The teacher indicated that KK often introduced topics of conversation that others did not appear to be interested in, upset other children unintentionally, and did not recognize when others were upset or angry. The teacher-completed checklist also demonstrated that KK had difficulty with figurative language and made syntactical errors. KK's teacher also completed the TBRS, which revealed that KK

had areas of difficulty in the following areas: controlling feelings of excitement, presenting with overly-sensitive emotions, exhibiting physically aggressive behavior, displaying disruptive behavior, and transitioning between tasks. The teacher also specifically commented on the form that KK “talks about his cats all the time.”

**PP (11;7).** PP was a Caucasian male diagnosed with DLD. When he was younger, he had also been identified with Attention Deficit Disorder (ADD). At the age of 9;1, PP was assessed at his school and diagnosed with DLD. He began receiving special education services in math and reading. He attended a sixth grade mainstream class, and received pull-out math and reading services. His speech and language services included articulation, language, and resonance goals. At the time of testing for the current study, PP was 11;0. His Core Language Score on the CELF-5 was in the 10th percentile. His areas of weakness were in vocabulary and syntax.

The parent-completed General Composite Score of the CCC-2 indicated that PP was in the 1st percentile. Areas of weakness included rarely smiling appropriately when talking to others, asking questions although the answer had already been given, and appearing expressionless when most children would exhibit a clear facial expression. The teacher-completed General Composite Score of the CCC-2 placed P in the 15th percentile. The teacher reported similar findings as the parent, but specifically indicated that PP had difficulty talking about abstract concepts and that he rarely talked about topics that others were interested in. PP’s teacher completed the TBRS which demonstrated that PP preferred to play alone, build things rather than play with his peers, and would occasionally stare at peers without having an interaction with them. PP’s clinician also noted that PP often spoke at length on topics that were

not of interest to his conversational partner and that in these cases, he struggled to read facial expressions to ascertain when his conversational partner became uninterested or bored.

**WW (6;4).** WW was a Caucasian male attending a mainstream first grade class. He received pull-out resource services. His speech and language services focused on semantics, syntax, and pragmatics. At the time of testing, WW was 6;4. His Core Language Percentile on the CELF-5 was in the 37th percentile. It is important to note that in December of 2016, WW's Composite Language Score was in the 8th percentile. It was reported that his linguistic performance was improving, and was kept on the school speech language pathologist's caseload for monitoring.

The parent-completed General Composite Score of the CCC-2 indicated that WW was below the 1st percentile. The parent reported that WW rarely reacted positively to new activities, was inattentive, and continued talking despite being asked to stop. The teacher rated WW's communication skills on the CCC-2, but did not complete every prompt on the form. She reported she did not know WW well enough, due to the form being administered at the beginning of the school year. Because of this, the data were insufficient to score the CCC-2. However, the teacher reported that WW was often distant and inattentive. The teacher completed the TBRS and indicated that WW had difficulty sitting still, was often fidgety and restless, responded angrily to any restrictions set by adults, and was disruptively active. The teacher also noted that WW took pleasure in the distress of others.

### **Procedure**

During the 10-week intervention period, an emotion understanding task was administered each week. Each child was presented with a sequence of six pictures portraying individuals within situations that would evoke one of the following emotions: happiness, sadness, fear,

anger, disgust, and surprise. The facial expression of the character was not visible in any of the pictures. As each picture was presented, the examiner briefly described the context and presented a cloze procedure prompt probing the emotion the character was experiencing. For example, a picture of a boy with a birthday cake was presented with the prompt, “This is Tom. Tom is celebrating his birthday. Tom feels \_\_\_\_\_” (happy). Following the child’s response, the examiner asked, “Why?”

### **Analysis**

Each participant’s responses to the six weekly probes were transcribed and analyzed. Each answer that children produced in response to the cloze probe (e.g., Tom feels \_\_\_\_\_) was analyzed according to how well the emotion that the child named aligned with the target emotion that the picture illustrated. Synonyms for basic emotion words were considered appropriate (e.g., happy/glad). Children’s responses to the “Why?” questions were analyzed to determine if the child correctly identified the source of the emotion the pictured individual experienced (e.g., “It’s his birthday”). This was done to assess if each child had a basic understanding of the scenario from each picture probe. Each participant’s responses to the initial probe were calculated and presented in a confusion matrix that illustrates the number of correct responses in cells along the diagonal. The matrix also illustrates instances in which participants substituted or confused emotion words in errors in emotion words. Thus, the confusion matrices depict both the numbers and types of errors that children produced. In addition, participants’ responses to the “Why?” question were analyzed and the number of times they accurately explained the source of the emotion was calculated.

### **Interjudge Agreement**

Two research assistants coded emotion words; one performed the coding during the intervention session, and the other coded emotion words using video and audio recordings of the session. To establish interjudge agreement, the emotion words identified during the intervention session were compared with those identified from the video and audio tapes of the sessions. There was 100% agreement on identification of emotion words. Likewise, the reasons each child gave for the identification of emotion was compared. An agreement of 88% was reached. A third research assistant checked the transcriptions from the video and audio recordings, to assess if the answers each participant gave from the recording matched what was transcribed, with 100% agreement.

### **Results**

Each participant's responses to the weekly probes were analyzed. Correct responses for each of the six emotions (*happy, sad, anger, disgust* and *surprise*) were calculated and analyzed on a confusion matrix. Incorrect responses were also calculated and plotted for each emotion. Results were analyzed for each participant individually and are presented in the tables that follow. Participants' responses to the "Why?" questions are also described.

#### **DD (7;10 years;months)**

Table 1 illustrates DD's identification of emotion pictures. Overall, he identified 69% of emotions accurately. He identified 100% of the scenarios picturing *happy* accurately. However, in three instances, he identified *sad* or *disgust* as *happy*. These instances represented errors in valence. DD made some errors in the identification of *fear, sad, anger, disgust, and surprise*. He sometimes identified *fear* as *sad, anger, or disgust*. Likewise, he sometimes identified *sad* as

*happy* or *anger*. He identified *anger* as *sad*; and *disgust* as *anger* or *happy*. DD identified *surprise* as *anger* or *disgust*.

Table 1

*DD Target Emotion vs. Actual Production*

Target	Actual						
	Happy	Fear	Sad	Anger	Disgust	Surprise	Other
Happy	9/9						
Fear		6/10	2	1	1		
Sad	2*		6/10	2			
Anger			3	7/10			
Disgust	1*			3	5/9		
Surprise				1*	3	6/10	

*Note.* Overall accuracy: 69%; Blue cells indicate correct production. Other numbers are errors.  
\*Valence error.

Analysis of DD's response to the "Why?" questions showed that DD did not accurately interpret the picture in one instance for *disgust*, in two instances for *sad*, and in one instance for *surprise*. For example, when DD was shown a picture of a moldy tomato, and given the prompt, "This is Tom. Tom wants to eat a tomato. Tom feels \_\_\_\_." DD responded with the emotion *happy*. When asked, "Why?" He responded, "Because he likes to eat." DD failed to interpret that the tomato was inedible.

**JJ (11;3)**

Table 2 illustrates JJ's identification of emotion pictures in which he identified 83% of emotions accurately. JJ identified 100% of the scenarios picturing *fear* accurately. However, in one instance he identified *disgust* as *fear*. JJ made some errors in the identification of *happy*, *sad*, *anger*, *disgust*, and *surprise*. He occasionally identified *anger* as *sad*; and similarly, *sad* as *anger*. Likewise, he sometimes identified *disgust* as *fear* or *anger*. He identified *surprise* as *happy* or *disgust*. JJ made one valence error in misidentifying a picture targeting *happy* as *sad*.

Table 2

*JJ Target Emotion vs. Actual Production*

Target	Actual						
	Happy	Fear	Sad	Anger	Disgust	Surprise	Other
Happy	8/9		1*				
Fear		10/10					
Sad			8/10	2			
Anger			2	8/10			
Disgust		1		1	7/9		
Surprise	1				1	8/10	

*Note.* Overall accuracy: 83%; Blue cells indicate correct production. Other numbers are errors.  
\*Valence error.

In response to the “Why?” question, JJ did not accurately interpret the picture in one instance for *surprise*. When JJ was shown a picture of a flying pig, and given the prompt, “This is Anna. Anna lives on a farm. Anna looks up. Anna feels \_\_\_\_\_.” JJ responded with the emotion *happy*. When asked, “Why?” He responded, “Cuz she likes her farm.” JJ failed to interpret the impact of the pig’s flying.

**KK (11;9)**

Table 3 illustrates KK’s identification of emotion pictures. In general, KK identified 76% of emotions accurately. KK identified 100% of the pictures portraying *happy* and *fear* accurately. However, in two instances he identified *sad* or *surprise* as *happy*. The instance in which KK identified *sad* as *happy* represents an error in valence. KK made some errors in the identification of *sad*, *anger*, *disgust*, and *surprise*. He identified *sad* as *happy* or *anger*, similarly identifying *anger* as *sad*. He often identified *disgust* as *sad*. Likewise, he sometimes identified *anger* as *sad*. He identified *surprise* as *happy*, *disgust*, or gave a vague answer.

Table 3

*KK Target Emotion vs. Actual Production*

Target	Actual						
	Happy	Fear	Sad	Anger	Disgust	Surprise	Other
Happy	9/9						
Fear		10/10					
Sad	1*		8/10	1			
Anger			2	8/10			
Disgust			5		4/9		
Surprise	1				1	6/10	2

*Note.* Overall accuracy: 76%; Blue cells indicate correct production. Other numbers are errors.  
\*Valence error.

In response to the “Why?” question, KK did not accurately interpret the picture in one instance each for *sad* and *surprise*. For example, when KK was shown a picture of a balloon flying in the air, and given the prompt, “This is Anna. Anna just bought a balloon to hold. Anna feels \_\_\_\_\_.” KK responded with the emotion *happy*. When asked, “Why?” He responded, “Cuz she has a balloon.” KK failed to interpret that the girl had lost the balloon.

**PP (11;7)**

Table 4 illustrates PP’s identification of emotion pictures. In general, PP identified 88% of emotions accurately. He correctly identified 100% of the emotions picturing *happy*. However, in three instances, he identified *sad* or *surprise* as *happy*. PP exhibited errors in the identification of *fear*, *sad*, *anger*, *disgust*, and *surprise*. He identified *fear* as *sad*. PP gave a vague answer for *sad* once; and in two instances labeled *sad* as *happy*, representing errors in valence. He sometimes identified *anger* as *sad*. He identified *disgust* as *surprise*, and *surprise* as *happy*.

Table 4

*PP Target Emotion vs. Actual Production*

Target	Actual						
	Happy	Fear	Sad	Anger	Disgust	Surprise	Other
Happy	9/9						
Fear		9/10	1				
Sad	2*		7/10				1
Anger			2	8/10			
Disgust					8/9	1	
Surprise	1					9/10	

*Note.* Overall accuracy: 88%; Blue cells indicate correct production. Other numbers are errors.  
\*Valence error.

In response to the “Why?” question, PP did not accurately interpret the picture in one instance for *mad*, and in two instances for *sad*. For example, when PP was shown a picture of a baseball, and given the prompt, “This is Anna. Anna wants to play baseball at recess. None of her friends will play with her. Anna feels \_\_\_\_\_.” PP responded with the emotion *happy*. When asked, “Why?” He responded, “Because her and her friends can play baseball.” PP failed to interpret that the none of her friends wanted to play with her.

**WW (6;4)**

Table 5 illustrates WW’s identification of emotion pictures. In general, WW identified 78% of emotions accurately. He identified 100% of the emotions picturing *happy* and *fear* accurately. However, in one instance he identified *sad* as *happy*. This represents an error in valence. In another instance, WW identified *anger* as *fear*. WW made some errors in the identification of *sad*, *anger*, *disgust*, and *surprise*. He occasionally identified *sad* as *anger* or *happy*. Likewise, he sometimes identified *anger* as *sad* or *fear*. He identified *disgust* as *surprise*, *sad*, or *anger*. He labeled *surprise* as *disgust*, or gave a vague answer.

Table 5

*WW Target Emotion vs. Actual Production*

Target	Actual						
	Happy	Fear	Sad	Anger	Disgust	Surprise	Other
Happy	9/9						
Fear		10/10					
Sad	1*		6/10	3			
Anger		1	3	6/10			
Disgust			1	1	6/9	1	
Surprise					1	8/10	1

*Note.* Overall accuracy: 78%; Blue cells indicate correct production. Other numbers are errors.  
\*Valence error.

In response to the “Why?” question, WW did not accurately interpret the picture in one instance for *sad*. Like KK, on the picture portraying the lost balloon, WW failed to interpret that the balloon was not in the girl’s hand, but instead was flying away.

### Discussion

The current investigation examined the ability of five boys with DLD (CA; 6;4 to 11;9) to recognize and label six different emotions (*happy, sad, anger, fear, surprise, disgust*) portrayed in pictured scenarios. The analysis considered how accurately the children recognized and labeled each emotion. In addition, the study considered the instances in which the children misapplied or confused emotion words when describing the pictures. The study also probed whether errors could be attributed to a misinterpretation of the pictured scenario or to more general difficulty recognizing and labeling emotions accurately.

### Findings

Even though all five participants identified the majority of the emotion pictures correctly, not one did so with complete accuracy. Even the older children had some difficulty identifying the emotions. As expected, some emotions tended to be easier for the children to identify. For example, except in one instance, all of the participants identified pictures depicting happiness

accurately. However, it was not uncommon for all five boys to incorrectly label at least one other emotion as happy. Most of these responses represented errors of valence. That is, children described a picture depicting a negative emotion such as *sad* or *disgust*, as a positive emotion such as happiness. It may have been the case that the children overgeneralized the word *happy*, incorrectly applying it to other emotions, because they did not fully grasp the limited range of application of *happy*. In a few cases, children did not seem to infer the meaning of the pictured scenario correctly. For example, the child may not have understood the consequence of the pictured event (e.g., the balloon was floating away, therefore, it was lost). In other cases, a child simply may not have understood the emotion that the event could be expected to elicit. Each of these instances represented valence errors. In other words, children not only failed to understand the emotion depicted, they did not even comprehend if the targeted emotion was positive or negative. These errors were particularly concerning, because they reflected significant immaturity. Such errors inferring emotional valence have been noted in some kindergarten children with DLD, but not in older elementary school children with DLD (Ford & Milosky, 2003; Spackman, Fujiki & Brinton, 2006).

With the exception of 7-year-old DD, the children often identified pictures depicting *fear* accurately. However, they made more frequent errors in identifying *sad* and *anger*. In fact, all children confused sadness and anger in some instances. This was the most common error pattern noted. In addition, the children seemed to struggle with *disgust* and *surprise*, making a variety of errors. In most of these instances, the children seemed to interpret the pictured scenario appropriately, but did not identify the elicited emotion accurately.

It is notable that all the children were able to produce and apply each of the emotion words, and they did so accurately in some instances. At the same time, they did not use any

emotion word entirely accurately. Even if they identified all pictures of an emotion such as *happy* correctly, they overgeneralized that emotion word to describe pictures showing different emotions. These findings suggest that their knowledge of common emotion labels, and perhaps their understanding of emotion concepts, was incomplete. This was the case for the 11-year-olds as well as for the 6- and 7-year-olds. This finding was particularly concerning, considering that with age, we could expect improvement. Additionally, all five children were receiving explicit intervention focused on labeling and inferring emotions. Despite the fact that their intervention targeted understanding and identifying emotions experienced in various situations, the children still struggled with these emotion concepts. It is concerning to consider the ramifications of these apparent gaps in emotion understanding. The children's incomplete understanding of emotion could be expected to impact their comprehension of stories, literature, and events; their interaction in social situations; and their formation of interpersonal relationships and friendships.

### **Implications for Future Research**

This study suggested that additional research in this area is warranted. Considering that only five boys participated in this study, it will be important to investigate the extent to which the behavior of these children reflects the abilities of a wider population of children with DLD. In addition, it would be helpful to consider the influence of the pictures and materials employed in this study. It was challenging to devise a large variety of pictures that were suitable for each emotion, and it could be important to determine if different pictures would elicit the same behaviors. In addition, further investigations involving typically developing control participants, as well as other populations of children (such as those with ASD) would be enlightening. Such studies would be useful in describing differences and delays that might contribute to our understanding of the nature of DLD.

**Conclusion**

The findings from this study indicated that all the participants with DLD, both the younger and older children, had notable difficulties in labeling and inferring a variety of emotions. The five children observed in this study demonstrated an incomplete knowledge of basic and complex emotions, despite concurrently receiving targeted intervention in this area. All of the children misapplied, overgeneralized, or confused emotion labels. These errors represent limitations in social and emotional learning that could negatively impact their ability to interact with others, to establish and maintain relationships, and to succeed academically (Spackman, Fujiki, & Brinton, 2006). It is clear that further investigation is warranted to design assessment and intervention methods to better fortify social and emotional learning in children with DLD.

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## APPENDIX A

**Annotated Bibliography**

Adams, C., Lockton, E., Freed, J., Gaile, J., Earl, G., McBean, K., . . . Law, J. (2012). The Social Communication Intervention Project: a randomized controlled trial of the effectiveness of speech and language therapy for school-age children who have pragmatic and social communication problems with or without autism spectrum disorder. *International Journal of Language & Communication Disorders*, 47, 233–244. doi:10.1111/j.1460-6984.2011.00146.x

**Purpose of the study:**

The purpose of this study was to investigate the effectiveness of a social communication intervention program for children with pragmatic language deficits.

**Method:**

Speech-language pathologists in England and Scotland referred the participants in this study. The 87 participants ranged in age from 6;0 years to 10;11. They had pragmatic and social communication deficits without a diagnosis of ASD and were currently receiving speech and language services.

The study was a two-arm parallel group randomized controlled trial. The participants were divided into two groups, by age (6;0-8;11 and 9;0-10;11). Each group was then further divided into a 2:1 ratio of children in the social communication intervention, and treatment as usual (59 in the social communication intervention and 28 in the treatment as usual).

The following measures were conducted pre- and post-intervention: *CELF-4, Core Language Standard Score (CLSS)*, Targeted Observation of Pragmatics in Children's Conversation, a pragmatics rating scale, the *Expression, Reception and Recall of Narrative Instrument (ERRNI)*, parent-reported outcome, and teacher-reported outcome.

**Results:**

The data were analyzed using linear regression. There was no significant treatment effect 2 weeks post-intervention. Thirty-six percent of participants performed at the normal range of the *CELF-4 CLSS*. Secondary outcomes from 2 weeks post-intervention for children who scored low in the language ability range of the *CELF-4 CLSS* showed that no significant treatment effects were found from the *CCC-PRAG/AUT* or *ERRNI*. However, the parent and teacher ratings showed a significant difference by favoring the social communication intervention post-intervention. It is clear that the parents and teachers detected difficulties with aspects of social communication that these standardized tests could not. It was noted that skills learned in intensive therapy take time to be consolidated and generalized into more contexts.

**Conclusions:**

The social communication intervention showed significant effects between the baseline data, and the 6-month follow-up. "It might therefore be that skills learned in an intensive period of therapy take time to be consolidated in broader contexts, which would contribute to a possible

‘sleeper effect’” (Adams et al., 2012). The authors also concluded that providing intervention in social communication was effective at improving overall conversational quality. In the future, cost-effectiveness and resources should be estimated to support alternative models of delivery looking at the balance between intensive, mixed direct/indirect, specialist-led provision.

**Relevance to the current work:**

The intervention approach described in this study was similar to the one employed in the current study.

Brinton, B., & Fujiki, M. (2006). Social intervention for children with language impairment: Factors affecting efficacy. *Communication Disorders Quarterly*, 28, 39-41, 62. Retrieved from <https://search.proquest.com/docview/213790560?accountid=4488>. doi: 10.1177/15257401060280010501

**Purpose of the article:**

This article discusses the importance of providing social communication intervention for children with language impairment (LI).

**Factors Affecting Efficacy of Social Communication Intervention:**

**Accessibility of Treatment:**

Children with LI have difficulties comprehending abstract language, and therefore intervention must be tailored to the child’s abilities in order to best improve their social communication.

**Social Goals:**

Many children with LI may not have positive social goals for interaction. Intervention can be used to teach these children that interactions with peers and others “can be fun and rewarding.”

**Treatment Focus:**

It is important that what is taught in intervention is concepts that can be applied in multiple situations such as: reading facial expressions, emotion understanding, and anticipating how one’s words and actions may affect another person.

**Time and Intensity of Treatment:**

Repetition and many exposures over a significant amount of time may be what children with LI need in order to develop the skills to improve their social communication, and therefore intervention focused on social communication should begin early and be ongoing.

**Relevance to the current work:**

The current work uses social communication intervention for children with LI, specifically teaching and tracking their ability to infer emotions in stories.

Brinton, B., Fujiki, M., Hurst, N. Q., Jones, E. R., & Spackman, M. P. (2015). The ability of children with language impairment to dissemble emotions in hypothetical scenarios and natural situations. *Language, Speech, and Hearing Services in Schools*, 46(4), 325-336. Retrieved from <https://search.proquest.com/docview/1773229832?accountid=4488>

### **Purpose:**

This study investigated the abilities of children with language impairment (LI) to dissemble (hide) their emotions in socially appropriate ways. The authors quoted Salovey, Detweiler-Bedell, Detweiler-Bedell, & Mayer, 2008, p. 535, “Emotional intelligence is ‘the ability to perceive and express emotions, to understand and use them, and to manage emotions so as to foster personal growth.’”

### **Method:**

Twenty-two children with LI, 8 girls and 14 boys, between the ages of 7;1-10;11 were age and gender-matched with typically developing peers. They were selected based on existing tests, which indicated deficits in language form and content. All participants passed a pure-tone hearing screening and were then administered the *Comprehensive Assessment of Spoken Language (CASL)* and the *Universal Nonverbal Intelligence Test (UNIT)*.

The children participated in two tasks to analyze their dissemblance abilities. The first was in hypothetical situations that required dissemblance of emotions for appropriate social purposes. Each task was designed to elicit one of the five target emotions: happiness, sadness, fear, disgust, or anger. A hypothetical story was read about a gender-neutral character, and the children answered questions to determine what emotion they thought the character felt, and other questions regarding emotional dissemblance, such as “What should Chris say to Mrs. Smith?” The second was a more naturalistic situation where the children’s dissemblance abilities were observed and then analyzed. These situations involved the examiner asking questions about something, such as a drawing or perfume, and giving the child an opportunity to respond, and dissemble their emotions.

### **Results:**

The children with LI scored very similarly to the typically developing children in answering comprehension questions on the hypothetical task. However, when asked an emotion dissemblance question, the children with LI did not perform at the same level as the typically developing children. Half of the questions that the children did not answer correctly were either “I don’t know” or “I’m not sure,” which is similar to wrong answers given by the typically developing children. Children with LI did not recommend that a character in a scenario dissemble emotions as often as typically developing children. Typically developing children more often indicated that the character of the story should dissemble his/her emotions. There were no differences, however, in the children’s responses regarding the character’s parents’ wishes (“What would Chris’s parents want him to do?”). In the natural situations, differences neared significance in a high cost situation, but not in more neutral scenarios. In the high cost scenario, children with LI displayed negative emotions twice as often as did the typically developing children, who either dissembled their emotions or gave noncommittal answers.

**Conclusions:**

Children with LI do not dissemble emotions as often as typically developing children, despite social rules, such as judging what the character's parents would want him/her to do. They also displayed negative emotions twice as much as the typically developing children in the natural situations.

**Relevance to the current work:**

The current work analyzes further for identification of specific emotions, where this study only looked at valence. This study provides a basis for the need to further investigate emotion inferencing.

Brinton, B., Spackman, M.P., Fujiki, M., & Ricks, J. (2007). What should Chris say? The ability of children with specific language impairment to recognize the need to dissemble emotions in social situations. *Journal of Speech, Language, and Hearing Research, 50*, pp. 798-811.

**Purpose of the study:**

This study investigated the abilities of children with specific language impairment (SLI) and typically developing children to decide when an emotion should be dissembled (hidden) based on social rules. The authors state: "Because emotion dissemblance involves both language and emotional competence, it could be particularly challenging for children with SLI. These children typically have difficulty with expressive language and may have problems with important aspects of emotion understanding such as reading facial expressions of emotion or inferring the emotional reactions of others."

**Method:**

The participants were 19 children with SLI and 19 typically developing children, with an age range of 7;9 to 10;10. The children were given 10 hypothetical (pictured) situations, which elicited the following emotions: happiness, disgust, sadness, fear, and anger. These situations involved a gender-neutral character, Chris. The children identified the emotion being targeted by naming it or choosing it from pictures. They were asked a dissemblance question, to determine if they would choose to have the character dissemble his/her emotion. They were also asked a display rule question, to see if the participant understood display rules (e.g. What Chris's parents would want her/him to do).

**Results:**

All children answered comprehension questions appropriately. When asked to identify the emotion in the situation, both groups identified the correct valence (positive or negative). Children with SLI indicated Chris should dissemble the emotion less often than did the typically developing children. There were not differences, however, in how typically developing children and children with SLI interpreted the social display rules for each situation equally.

**Conclusions:**

The results suggested that the children with SLI did not understand when to display emotion in social situation as well as their typically developing peers did. This could mean that children

with SLI do not have the same level of emotion knowledge development as their typically developing peers.

**Relevance to the current work:**

This study documented that children with SLI have difficulty in dissemblance of emotions.

Collaborative for Academic, Social, and Emotional Learning (CASEL). (2018). *What is SEL?* Retrieved May 15, 2018, from <https://casel.org/what-is-sel/>

**Purpose of the website:**

This is the website for evidence-based social and emotional learning (SEL) for education. It gives the definition of SEL: “Social and emotional learning (SEL) is the process through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions.”

**Relevance to the current work:**

This website gives a succinct definition of social and emotional learning. The website also presents a great deal of information on the importance of SEL and efficacy of SEL treatment programs.

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. doi: 10.1044/1092-4388(2004/013).

**Purpose of the study:**

The purpose of this study was to examine the developmental patterns of social and behavioral difficulties in the 11-year-old children with language impairment (LI), and to identify any relationships between social difficulties and language ability and nonverbal cognition. This study focused on external behaviors, defined as behaviors that tend to be aggressive and affect others, and internal difficulties, defined as behaviors that do not affect others.

**Method:**

The 200 participants in this study were selected from a previous study done when they were 7 years old, in their second year of school. In the current study, the children were in their sixth year of school, with an average age of 10;11. Fifty of the 200 participants were girls. The children were originally enrolled in language units due to primary speech and language difficulties. Three children had lower nonverbal IQ, but overall, there was a variety in abilities of phonological disorders to varying expressive and receptive difficulties. The authors stated that it is important to note that the majority of children who participated in the current study no longer attended the language units, thereby not influencing the teacher perception.

A comprehensive battery of questionnaires was administered to the children with SLI and their teachers. These questionnaires included: the *Rutter Behavioral Questionnaire*, the *Peer Competence Subscale: Harter Perceived Competence Scale*, the *Strengths and Difficulties Questionnaire (SDQ)*, the “*My Life in School*” *Questionnaire (MLIS)*. Also included were the

*Children's Communication Checklist (CCC)*, a short form of the *Wechsler Intelligence Scale for Children (WISC)* to assess general cognitive level. The children also answered the Basic Reading and Reading Comprehension sections of the *Wechsler Objective Reading Dimensions (WORD)*. The children's social and behavioral abilities were measured using the *Expressive Vocabulary Test (EVT)*, the *British Picture Vocabulary Scale II (BPVS)*, the *Past Tense Task (PTT)*, and the *TROG*. In a previous stage of the study, when the children were 8-years-old, they participated in the following: *Raven's matrices*, a subtest of the *British Ability Scales*, the Grammatic Closure subtask of the *Illinois Test of Psycholinguistic Abilities*, the *TROG*, and the *Goldman-Fristoe Test of Articulation*. These tests can be divided into different areas of concern: overall behavioral difficulties: *Rutter* and *SDQ*, specific social and behavioral patterns, (*SDQ*), friendship and victimization (*Harter* and *MLIS*, respectively) in relation to the children's performance on language tests (*CCC*, *EVT*, *BPVS*, *PTT*, and *TROG*), literacy (*WORD*), and cognition (*WISC*).

Response-over-time was calculated by administering the same questionnaires to the respondents at three different times.

### **Results:**

The authors reported that most of the children with LI were experiencing difficulties with social and behavioral skills at the age of 11. The number of children that fell below the clinical threshold of 9 or above, was 102 of 160. When teachers rated the children on the Strengths and Difficulties scale, 54 of 161 children had total difficulties at a score over the threshold of 12. When the children self-rated themselves, 93 of 181 scored above the threshold of 13. The Rutter behavioral questionnaire showed a significant rise in median score from 6 points, when the children were 7 years old, to 10 points at age 11.

In externalizing behaviors, the average *SDQ* score from teachers, regarding conduct problems, was similar to a nonclinical population. However, the children's self-reported *SDQ* cores were generally above the threshold. Hyperactivity was similar, in that teachers rated 27% of the children with language impairment to have difficulties in this area. The children self-rated themselves over the threshold.

In internalizing behaviors, 26 of 166 children were rated by teachers to have emotional difficulties. The number of children that self-rated themselves at a high score in this area was 55 of 182. However, these figures were not above the expected rating, therefore the authors stated that the "emotional difficulties seemed unlikely to form the basis of social impairment." For peer relationships and withdrawal, teachers rated 68 of 168 children at or below a 2. Teachers also rated 72 of 163 children below 6 on the Prosocial Behavior subscale of the *SDQ*. However, 28/183 children self-rated themselves below a 2. Teachers rated 54 of 168 children below a 3 on the Peer Problems scale, indicating an increased level of difficulties. Victimization of children with language impairment (36%) is at a higher level than typical children (12%).

### **Conclusions:**

The authors state that, "This study has shown that social and behavioral difficulties are not a short-term problem for children with SLI. To the contrary, social difficulties appear to increase."

This study corroborates other research, in indicating that children with LI demonstrate: more reticence, less time interacting, decreased popularity, and a smaller number of friendships.

**Relevance to the current work:**

This study provides detailed descriptions of the characteristics children with SLI demonstrate, and how that affects their socialization with others. The current work focuses on emotion inferencing, which is vital to socialization.

Desmarais, C., Nadeau, L., Trudeau, N., Filiatrault-Veilleux, P., & Maxes-Fournier, C. (2013). Intervention for improving comprehension in 4-6 year old children with specific language impairment: Practicing inferencing is a good thing. *Clinical Linguistics & Phonetics*, 27(6), 13. Retrieved from <https://search.proquest.com/docview/1373087448?accountid=4488>

**Purpose of the study:**

This study focused on intervention for children with specific language impairment (SLI), to improve their inferencing comprehension abilities. “It is clear that many children with SLI face challenges when placed in situations where inferencing is required to understand a message.”

**Method:**

Sixteen children diagnosed with SLI, between the ages of 4;0-6;1, participated in the study. The study was divided into three phases: a pre-intervention phase that lasted 6 weeks, a 10-week intervention phase, and a maintenance phase that lasted 6 weeks. Two probes were administered to each child before the intervention phase, and the same two probes were given after the intervention phase.

The intervention phase, 50-minute sessions one time a week, for 10 weeks, was delivered by each participant’s usual speech language pathologist. Fifteen to twenty minutes of each session were devoted to shared dialogic reading, where pre-determined questions were asked, based on the pre- and post-intervention probes. If a participant gave a wrong answer during intervention, the speech language pathologist provided scaffolding cues including rephrasing the question, giving a semantic cue, and then a phonemic cue if needed. When the participant gave the correct response, the question was asked a second time for the participant to answer correctly.

**Results:**

There was no significant difference between the two different probes administered before intervention, as well as no significant difference between the probes administered after intervention. However, there was statistical significance in the participants’ performance from the first probe that was administered to the last probe. Most of the participants improved in the quality of acceptable responses that they gave in the post-intervention probes than they did prior to intervention.

**Conclusions:**

“This study, therefore, suggests that a systematically designed and scaffolded intervention could have a positive effect on the development of SLI children’s inferential comprehension ability.” The authors stated that their quantitative results did not confirm that intervention had a

significant impact on inferencing abilities of children with SLI. However, the authors stated that they qualitatively measured each participant's response and saw improvement in the quality of acceptable answers each child gave.

**Relevance to the current work:**

This study used probes to measure improvement from intervention targeting inferencing in children with SLI.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82*, 405-432. doi: 10.1111/j.1467-8624.2010.01564.x.

**Purpose of the study:**

The purpose of this meta-analysis was to explore the effectiveness of a universal Social Emotional Learning (SEL) intervention programs in schools.

**Method:**

A comprehensive literature search was conducted of 213 studies, including 270,034 students. Studies included followed the criteria of: written in English, published or unpublished by December 31, 2007, one or more SEL skills and their development was emphasized, target population was in the age range of 5 years to 18 years with no identified adjustment or learning problems, a control group was required, and effect sizes could be calculated at post data collection time and a follow-up to intervention at least 6 months following intervention. Studies included targeted students with preexisting academic, emotional, or behavioral issues. This analysis also explored the outcomes of intervention provided by teachers as compared to intervention provided by non-school personnel, such as researchers.

Independent variables included: Sequenced, Active, Focused, Explicit (SAFE) interventions related to the development of skill, intervention format, and reported problems in the implementation of the intervention. Dependent variables were six different student outcomes including: attitudes toward self and others, conduct problems, emotional distress, positive social behaviors, social and emotional skills, and academic performance.

**Results:**

Following intervention, students showed improvement in their SEL skills, positive social behaviors, and attitudes, as compared to controls. These students also had decreased levels of emotional distress and conduct problems. Their overall academic performance was significantly improved. The results also demonstrated that interventions provided by classroom teachers were effective in four of the six student outcome areas, whereas intervention provided by non-school personnel were effective in three of the six student outcome areas.

**Conclusions:**

The findings from this meta-analysis showed that SEL programs in schools had a significant positive effect on the targeted attitudes about self, others, and school, as well as other social-

emotional competencies. It also showed that classroom teachers and other school personnel are highly effective in delivering this treatment.

**Relevance to the current work:**

These findings show that students who received specific SEL intervention improved in their social-emotional competencies.

Elias, M. J. (2004). The connection between social-emotional learning and learning disabilities: Implications for intervention. *Learning Disability Quarterly*, 27, 53-63. doi: 10.2307/1593632.

**Purpose of the study:**

This study investigated three areas of social-emotional learning in students with learning disabilities (LD): recognizing emotions, regulating and managing strong emotions, and recognizing strengths and areas of need.

**Three key areas of social-emotional learning that lead to poor social outcomes were discussed:**

**Recognizing a range of emotions in self and others:**

This discussion focused on the importance of recognizing that there are more than three main feelings (mad, sad, glad). If a child has a restricted emotion word vocabulary of three main feelings, their ability to interpret narratives or the feelings other people experience is severely disadvantaged, due to the high amounts of more nuanced emotions.

**Regulating and managing strong emotions:**

Children with LD have difficulty regulating their emotions internally. They need to be explicitly taught how to self-monitor their emotions. This is important because if a child cannot express the emotions they feel in an academic environment, their learning is compromised.

**Recognizing strengths and areas of need:**

All children need to have their strengths identified so they can use those to improve weak areas.

Three SEL principles are essential in guiding intervention: caring relationships, knowing that emotions affect how and what we learn, and goal setting and problem-solving skills give motivation, direction and focus for learning.

**Relevance to the current work:**

The current work focuses on creating an effective intervention to target three key areas of need during intervention.

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. doi: 10.1044/1092-4388(2003/002).

### **Purpose of the study:**

The purpose of this study was to answer these questions: 1. Do children with language impairment (LI) have difficulty identifying facial expressions? 2. Can they integrate facial expression knowledge with other verbally and/or visually presented information in order to make a social inference? 3. Are inferencing difficulties modality-specific (verbal only, vs. visual only, vs. combination)?

### **Method:**

A total of 24 children were divided into two groups of 12, one group was children with LI, and the other was a typically developing group (CA). They were between the ages of 5;4 and 6;2, with 6 males and 6 females in each group. Each child was administered the *Clinical Evaluation of Language Fundamentals – Preschool (CELF-P)*, to assess their language ability. In addition, the nonverbal sections of the *Kaufman Assessment Battery for Children (KABC)*, were given, to assess each child's cognitive ability

Four target emotions were selected (happy, mad, surprised, and sad). For each emotion, 3 story types were selected, and 3 individual stories per story type were created, for a total of 9 stories per emotion, and 36 in all. Each story was delivered in 3 different modalities: verbal only, visual only, and a combination of verbal and visual.

The children participated in 3 tasks: a production task, comprehension task, and an inferencing task. In the production task, the four emotions were presented to the child, and then asked, "How does this child feel?" The comprehension task required each child to point to an emotion after the stimuli was given. In the inferencing task, the children listened to instructions given about listening to a story, indicated how the character felt. There was a practice story given, and then data was collected on the stories after.

### **Results:**

In the production task, all children in both groups accurately labeled happy, mad, and sad correctly. Ten children in the CA group labeled "surprised" accurately. Eight children in the LI group labeled "surprised" accurately. The initial incorrect answers from both groups, respectively, were: "really happy," "excited," "happy," "oh my!" and "open." The children were taught to label this emotion as "surprised" in the following trials.

In the comprehension task, all children in both groups pointed to all 4 facial expressions, when given an emotion, with 100% accuracy.

The inferencing task demonstrated 3 significant effects. The first is that children with LI had more difficulty inferring emotions than the CA group. Second, modality proved to influence the results. The combination of visual and verbal presentation resulted in all children giving more accurate responses. There was no significant difference between the visual only and the verbal only presentations. However, the children with LI had poorer responses in all areas, as compared to the CA group. Third, there was a significant result in the type of emotion that was inferred.

Happy and mad ( $p < .05$ ,  $d = 1.03$ , large effect), happy and surprised: ( $p = .05$ ,  $d = 1.06$ , large effect). There was no significance in modality and emotion, and no significance between group, modality, and emotion. Overall, children with LI had more difficulty in inferring emotions, regardless of the emotion or modality.

### **Conclusions:**

Children with LI have difficulty integrating emotion knowledge, to making inferences. They sometimes make valence errors, or confusing positive and negative emotions (e.g., mad for happy).

### **Relevance to the current work:**

This study provides a foundation in the difficulties that children with language impairment have in inferring emotions in social scenarios.

Fujiki, M., & Brinton, B. (2017). Social communication intervention for children with language impairment. In R. McCauley, M. E. Fey, & R. B. Gillam (Eds.), *Treatment of Language Disorders in Children* (2nd ed., pp. 421-449). Baltimore, MD: Brookes Publishing.

### **Purpose of the chapter:**

This chapter described a social communication approach to assessment and treatment of children with language impairment (LI). The chapter addressed target populations for such an approach, as well as the theoretical and empirical underpinnings. A framework for assessment and treatment was provided.

### **Target populations:**

Children who have deficits in social communication areas including social interaction, social cognition, expressive and receptive language processing, and/or pragmatics.

### **Theoretical basis:**

This approach took a broader perspective by targeting aspects of language processing, pragmatics, and social and emotional learning simultaneously in language intervention.

### **Empirical basis:**

Much of the research that has been done into social communication interventions has been exploratory. However, individual studies that were analyzed demonstrated that there were gains in social communication abilities when it was a focus of intervention. The authors noted that despite this, there is still a need to do work in this area of research.

### **A framework for assessment:**

The authors developed a framework to assess social communication abilities. Concepts included in the framework included: stakeholders, considering the individual's communication needs, their general development. Additionally, an assessment of their social communication including: their interaction, expressive and receptive language processing, pragmatics, and social cognition; synthesizing these concepts and how they relate to the individual's current abilities, and the individual's social goals and the supports that they have. These all come together to design an intervention program to best help an individual improve in their social communication.

**Relevance to the current work:**

This chapter identifies the importance of a social communication approach and how it targets a wide variety of abilities.

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. doi: 10.1044/0161-1461(2002/008)

**Purpose of the study:**

The purpose of this study was to determine if emotion regulation is a factor in influencing outcomes for children with specific language impairment (SLI).

**Method:**

The participants in this study were selected from local school districts. The 82 participants ranged in age from 6;0 to 13;0 years. 41 of the participants were typically developing children, who were matched by age and gender to 41 children who were diagnosed with language impairment and were currently receiving speech and language services. The study was a two-arm parallel group randomized controlled trial. The participants were divided into two groups, by age (6;0-9;0 and 10;0-13;0).

The children with SLI each participated in a test of formal language development, the CELF-R. One child performed within typical range, but was included in the study due to the SLP's existing testing results for the child from the TOLD-2.

Classroom teachers completed an Emotional Regulation Checklist (ERC) for each child with SLI and their typically developing match.

**Results:**

Mean ERC scores produced from the teacher ratings of children with SLI and their typical peers were compared on a scale of 1 to 4. Overall, girls were rated higher (mean = 3.49, SD = .42) than boys (mean = 3.32, SD = .45). Six percent of the overall variability in the ERC was attributed to gender. Seventy percent of variability in the ERC was attributed to the group (children with SLI or typical). Typically developing children were rated higher (mean = 3.67, SD .28) than children with SLI (mean = 3.13, SD .42).

The Lability/Negativity and Emotion Regulation subscales were compared. Typically developing children performed in a narrow mean range on both subscales (3.49 to 3.78). Children with SLI demonstrated more in-group variability on both scales. Boys with SLI were lower in their Emotion Regulation subscale compared to their ratings on the Lability/Negativity subscale; both these ratings were lower than both subscales for the girls with SLI. The older group of children with SLI had lower ratings than the younger children with SLI.

The authors noted that lower ratings for boys with SLI could be tied to the severity of deficit.

**Conclusions:**

Overall, children with SLI were rated more poorly on emotion regulation than were typically developing children, regardless of their age or gender. Based on the data, group membership was significant on the mean ratings. Also, teachers reported that older boys with SLI had particular difficulty in the subtests, which was concerning due to the maturation and life experience that they had in comparison to the younger boys with SLI. The teacher ratings showed that girls with SLI had stronger emotional regulation abilities than the boys with SLI.

**Relevance to the current work:**

The intervention approach in this study provides a foundation to pursue the current work.

Fujiki, M., Spackman, M. P., Brinton, B., & Illig, T. (2008). The ability of children with language impairment to understand emotion conveyed by prosody in a narrative passage. *International Journal of Language and Communication Disorders, 43*, 330-345. doi: 10.1080/13682820701507377.

**Purpose of the study:**

The purpose of this study was to investigate the abilities of children with language impairment (LI) to understand emotions conveyed by prosody in a narrative passage.

**Method:**

Thirty-eight children, between the ages of 8;0-10;10, participated in this study. Nineteen children had language impairment (11 females, 8 males), and 19 were age and gender-matched, typically developing children. The children with LI performed at least one standard deviation below the mean on a standardized language assessment, such as the *Comprehensive Assessment of Spoken Language (CASL)*, and the *Test of Language Development – Primary*.

In the prosody task, actors read a seven-sentence narrative. The emotions the actors expressed were: happiness, anger, sadness, and fear. The children participated in training to perform the task, in which the emotions surprise and disgust, were also included. The children were asked to indicate the emotion they heard, by selecting a provided card with the target emotion word and a picture, as well as a card for “I don’t know.” The examiner maintained a neutral facial expression during the presentation of each task to avoid giving the children any cues. Each child listened to audio clips through headphones presenting each task and emotion, and the child indicated the emotion via the response cards.

**Results:**

A three-way, mixed model of analysis of covariance (ANCOVA) was used to analyze data. Overall, children with LI performed with less accuracy than their typically developing peers. Happiness and anger were most accurately identified, with sadness and fear less accurately identified. Children with LI often confused fear and sadness with each other, as well as anger with happiness.

**Conclusions:**

Children with language impairment have more difficulty understanding emotions conveyed by prosody in natural speech as compared to typically developing peers.

**Relevance to the current work:**

This study supports the current work in determining the difficulties children with language impairment have in interpreting emotions from other people.

Joffe, V. L., & Black, E. (2012). Social, emotional, and behavioral functioning of secondary school students with low academic and language performance: Perspectives from students, teachers, and parents. *Language, Speech, and Hearing Services in Schools, 43*, 461-473. doi: 10. 1044/0161-1461(2012/11-0088).

**Purpose of the study:**

The purpose of this study was to investigate the social, emotional, and behavioral difficulties (SEBD) of students with low levels of language and educational performance.

**Method:**

Teachers identified students who received average to below average scores on the national standardized assessment, as well as other students where were underperforming academically, or who appeared to have low language skills. The recruited students participated in various language assessments including, *the British Picture Vocabulary Scale, Second Editions*, the Formulated Sentences and Recalling Sentences subtests of the *Clinical Evaluation of Language Fundamentals – Fourth Edition*. In total, 352 mainstreamed secondary school students (CA, 12 yrs., 222 males, 130 females) completed *The Strengths and Difficulties Questionnaire (SDQ)*. Two hundred and twenty-five of their parents also completed it as well as 230 of their teachers.

These students were compared to typically developing students, from the *SDQ* bank.

**Results:**

Students with low language and educational performance showed a significantly greater amount of SEBD than the TD population, as reported by the students, their parents, and their teachers. The students, parents, and teachers reported significantly higher scores on the following scales from the *SDQ*: Emotional Symptoms, Conduct Problems, Hyperactivity, and Peer Relationship Problems, with fewer prosocial behaviors in this population when compared with the typically developing population.

There were no differences in scores on the *SDQ* between average IQ and below-average IQ groups in regard to their nonverbal ability. The population was divided into average and below-average receptive language groups, and again for expressive language. The results for these groups showed no difference. However, students with low receptive language reported more difficulty on the *SDQ*, than the average group. Students with low expressive language reported more difficulty on the *SDQ*, than the average group. Significantly, there were no differences between the parent and teacher reports.

There were discrepancies in the responses from the students as compared to their teacher and parent reports. These discrepancies were that the child with SEBD had more difficulties overall. The students and parents reported more difficulty with emotional functioning than teachers, and the students reported more difficulty with their conduct than did their parents or teachers. Parents reported more prosocial behaviors than either the students or the teachers.

**Conclusions:**

Mainstreamed secondary school students, age twelve, who were at low language and education performances, were more likely to have SEBD, than their typically developing peers. These difficulties varied based on who completed the questionnaire, showing that it is key to have multiple perspectives for the results of SEBD.

**Relevance to the current work:**

The conclusions of this study show that children with low language abilities have difficulties with their emotion regulation, which is related to difficulties with emotion inference.

Merkenschlager, A., Amorosa, H., Kiefl, H., & Martinius, J. (2012). Recognition of face identity and emotion in expressive specific language impairment. *Folia Phoniatica et Logopaedica*, 64, 73-79. doi: 10.1159/000335875.

**Purpose of the study:**

The purpose of this study was to investigate face and emotion recognition in children diagnosed with expressive specific language impairment (SLI-E).

**Method:**

The 24 participants in this study were between 7 and 11 years old, and diagnosed with SLI-E. The children were age-matched with 40 typically developing children.

The study included several language assessments including the Comprehension of Grammatical Structures subtest of the *Heidelberger Sprachentwicklungstest*, and the Imitation of Grammatical Structures subtest of the same assessment. The Understanding of Words and Matching of Pictures subtests of the *Psycholinguistischer Entwicklungstest* assessment for children between the ages of 3 to 10 were also administered.

The study was based on 13 different test movies. The children were presented one scene at a time. They were asked to identify from a picture, the actor from the movie scene. Then, in the following order, the children chose from the scene of the movie from pictures, then selected a line drawing matching the actor's emotional expression. Then children then verbal reiterated the scene or acted it out. One subtest was included twice to control for variations in the children's attention.

**Results:**

The total error score was defined as all wrong answers in each subtest. The 7- to 8-year-olds were one group, and the 9- to 11-year-olds were another. They were compared using unpaired t tests. Overall, the total error scores of the children in the SLI-E groups were significantly poorer than those of their age-matched typical group.

Comparing the older SLI-E children to the younger group of typically developing children, the older children with SLI-E scored lower on the identity recognition task. The older group of typically developing children showed improvement in decoding mimic and gestural information relative to person recognition. This maturation was lacking in the group of older children with SLI-E.

**Conclusions:**

All children with SLI-E produced more errors than the typically developing children, showing a correlation of deficits of person facial identity and affect recognition. All participants showed better recognition of positive emotions, suggesting that positive emotions increase feelings of familiarity. In typically developing children, emotion recognition improved with age. This was not the case for the children with SLI-E, suggesting a maturational delay or difficulties of recognizing nonverbal emotions. There was a connection of SLI-E and attention-deficit disorder (ADD), because children with ADD generally exhibit difficulties in understanding emotional facial expressions, and children with SLI-E tend to show deficits in attention.

**Relevance to the current work:**

The basis of this study (SLI-E and emotions) provides a foundation for the current study.

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*, pp. 173-188.

**Purpose of the study:**

This study investigated how children with language impairment (LI) inferred emotions in specific social situations.

**Method:**

The participants included 43 children with LI, and 43 age and gender-matched typically developing peers. The participants were divided into two age groups, between 5 and 8 years old, and between 9 and 12 years old. The participants were shown pictures of social situations about a gender-neutral character named Chris eliciting the emotions: anger, sadness, fear, or happiness. Following each scenario, the children were asked what emotion Chris felt in that situation. The children could either point to cards presenting each emotion or could verbally say what emotion they thought Chris felt. Sixteen scenarios were presented to each child, so that each emotion was targeted four times. After every fourth situation, the participants were asked to give a reason why they thought the character felt the emotion they stated.

**Results:**

Happiness was most often accurately identified, followed by sadness, fear, and then anger. Older children in both the typically developing group and the children with LI group performed better than younger children. Typically developing children were more accurate in their responses than the children with LI.

**Conclusions:**

Interventions for children with LI should focus on improving their emotion understanding abilities.

**Relevance to the current work:**

The children with LI in this study had difficulties with their emotion understanding.

Spackman, M. P., Fujiki, M., Brinton, B., Nelson, D., & Allen, J. (2006). The ability of children with language impairment to recognize emotion conveyed by facial expression and music. *Communication Disorders Quarterly*, 26, no. 3, pp 131-143.

**Purpose of the study:**

This study investigated how children with language impairment (LI) inferred emotions from photographs of faces, and in a second scenario, how they identified emotions when listening to excerpts of classical music.

**Method:**

Study 1. Forty-three children with LI and forty-three typically developing children (age ranges 5 to 8 and 9 to 12 years) looked at photos of faces and identified the emotion that was expressed (happiness, sadness, anger, fear, disgust, surprise); four pictures per emotion, with two male and two female subjects.

Study 2. The same groups of children listened to 12 excerpts of classical music, each one conveying either: happiness, fear, anger, or sadness. After hearing the music, they were shown the five pictures depicting emotions (happiness, sadness, anger, fear, disgust, surprise) and asked to “point to how the music sounds.”

**Results:**

Study 1. Children identified facial expressions of happiness and sadness more accurately than fear, disgust, and surprise. Group differences were not observed for happiness, anger, sadness, and fear. Children with LI performed more poorly with disgust and surprise than typical children.

Study 2. Overall, typically developing children performed better than children with LI. Older children performed better than younger. Happiness was most often identified correctly. Anger and fear were confused with each other, particularly by children with LI and by younger children.

**Conclusions:**

Language contributes to emotion understanding. Children with LI may “need intensive, repeated experiences designed to enhance their comprehension and use of emotion language as it is used to identify and understand the emotions that various situations elicit.”

**Relevance to the current work:**

The children with LI in this study had difficulties with their emotion understanding and confused basic emotions.

Taylor, L. J., Maybery, M. T., Grayndler, L., & Whitehouse, A. J. (2015). Evidence for shared deficits in identifying emotions from faces and from voices in autism spectrum disorders and specific language impairment. *International Journal of Language & Communication Disorders, 50*, 451-466. doi: 10.1159/0003335875.

**Purpose of the study:**

The purpose of this study was to investigate facial and vocal emotion recognition in children with SLI, ASD, and typically developing children (TD).

**Method:**

Twenty-nine children with ASD were divided into two subgroups: a group of 17 children (12 male, 5 female) with typical language abilities (ALN), and a group of 12 children (10 male, 2 female) with language impairment (ALI). Eighteen children participated that were diagnosed with SLI (15 male, 3 female), and 54 TD children participated (26 male, 28 female).

The children completed emotion recognition tasks using visual clues in one probe, and auditory (prosodic) cues in another. The children responded to the probes by selecting a cartoon face on a computer screen that represented the emotion they saw or heard. In the visual emotion recognition task, children viewed photographs of people, expressing one of the following emotions: happy, sad, scared, angry, surprised, and disgusted. In the auditory task, a semantically neutral sentence was read, conveying one of the previous emotions listed.

**Results:**

All clinical groups (ALI, ALN, SLI) identified significantly fewer emotions correctly from the facial expression than the TD group. The groups with ALI and SLI both scored lower than predicted on both the simple (happy, sad, scared, angry), and complex (surprised, disgusted), emotions. The group with SLI was slow in timing to respond to both simple and complex emotions, while the group with ALN group timing was slow only for the complex emotions.

Overall, the groups with ALN, ALI, and SLI were less accurate in identifying emotions conveyed through voice in the auditory probe. The groups with SLI and ASD identified emotions significantly less accurately in the auditory probe than the group with ALN and the TD group. Both the groups with ALI and SLI demonstrated difficulty in accurately identifying both simple and complex emotions. The group with ALN demonstrated difficulty with the complex emotions. The group with SLI had slow timing responses to the simple emotions expressed in the auditory probe.

**Conclusions:**

All clinical groups identified emotions expressed in facial expressions and vocal prosody less accurately than did TD children. Difficulties with emotion recognition were associated with language deficits.

**Relevance to the current work:**

This study considered the difficulty the children with ASD and children with SLI have in emotion recognition.

Timler, G. R. (2008). Social knowledge in children with language impairments: Examination of strategies, predicted consequences, and goals in peer conflict situations. *Clinical Linguistics and Phonetics*, 22, 741-763. doi: 10.1080/02699200802212470.

**Purpose of the study:**

The purpose of this study was to examine the social knowledge of children with LI, in the context of interacting with peers and conflict resolution.

**Method:**

Researchers contacted parents via phone, to exclude potential participants who had comorbid attention, behavioral, or cognitive deficits. There were two groups of 12 children, one group of children with language impairment (LI), and one typically developing group (TD); all were between the ages of 8;1 and 12;2. Children with LI that were included had a 'core language' composite score of 85 or below on the Clinical Evaluation of Language Fundamentals-4 (CELF-4), with an average score of 79.8 and a range of 70-85. Cognitive deficits were ruled out by using the Test of Nonverbal Intelligence (TONI), and mean standard score was 91.3, with a range of 83-109.

Three questions were the main focus of this study: How does task structure affect children's performance in hypothetical tasks? Do children with LI predict different consequences of their words and actions than children who are TD? What is the relationship between children's performance on a hypothetical task and parent/teacher ratings of children's social behaviors?

A hypothetical peer conflict task was presented individually to each participant, in two ways: an open-ended question in which the child must generate an answer, and a forced choice condition. The examiner read each prompt aloud, while the child read along. The prompt was repeated if the child requested it, or if the child did not stay on topic. Twelve vignettes were read to the children, about problems with friends (the friend in the story was gender-matched to the participant). The open-ended question was presented to the child first, with the forced choice question immediately following.

Each participant's mother completed the Social Skills Rating System (SSRS), and each child's teacher completed the Social Skills Rating System-Teacher Edition.

**Results:**

In the open-ended condition, the group with LI generated fewer strategies than the TD group. The group with LI generated fewer prosocial strategies than the TD group, but there were no differences in the numbers for assertive, hostile, passive, or adult-seeking strategies. The group with LI predicted fewer positive peer consequences than the TD group. Both groups equally chose self-interest goals over relationship goals. In the forced choice condition, the group with LI chose fewer prosocial strategies than the TD group. Overall, there were no significant discrepancies between in-group responses for either the open-ended or forced choice condition, for either group.

In the parent Social Skills Rating System (SSRS), there were no significant differences between Social Skills and Problem Behaviors; however, there were significant differences between these

domains in the Social Skills Rating System-Teacher Edition reports, with the scores being lower in the Social Skills domain, and higher in Problem Behaviors domain.

### **Conclusions:**

Two hypotheses of this study were that children with LI would generate fewer prosocial strategies than the TD group in the open-ended condition but would select at least the same number of prosocial strategies in the forced choice conditions as the TD group. This was not confirmed, due to the children with LI generating fewer prosocial strategies in the open-ended condition and selecting fewer prosocial strategies in the force choice condition. Overall, task structure influenced the performance for only a very small minority of the children with LI. The number of prosocial strategies the children utilized in the open-ended condition was not significantly related to either the parent or teacher ratings, but the forced choice conditions showed similarity to some of the teacher ratings.

### **Relevance to the current work:**

This study gives evidence of the difficulties children with LI have in interpreting and responding to problematic social situations.

Yew, S. G. K., & O’Kearney, R. (2013). Emotional and behavioural outcomes later in childhood and adolescence for children with specific language impairments: Meta-analyses of controlled prospective studies. *Journal of Child Psychology and Psychiatry*, 54, 516-524. doi: 10.1111/jcpp.12009.

### **Purpose of the study:**

The purpose of this study was to synthesize and evaluate existing evidence from studies about psychological outcomes of children with SLI, later in adolescence.

### **Method:**

A trained reviewer did a comprehensive literature electronic search. Studies that were included consisted of child participants, with at least one year of follow-up after the initial assessment. These studies assessed language abilities in children with SLI and typically developing children, but also needed to measure emotions or behaviors at the follow-up. All duplicate studies were removed, and then a reviewer assessed the remaining abstracts. The total number of abstracts at the end of the study was 16 published articles, and 3 unpublished reports. A second reviewer randomly sampled 10% of all the abstracts to assess, and any disagreements between the reviewers were remediated through discussion.

Meta-analyses were done by using random effects models, when at least 4 studies measured emotional or behavioral outcomes similarly. Differences across studies were measure by using the I2 statistic.

### **Results:**

The data were compared using tables. Table 1 presents a risk ratio (RR) for disordered versus not disordered, and the 95% confidence interval at follow-up data collection. Meta-analysis of this data indicates that children with SLI were nearly twice as likely as typically developing children to internalize a problem, at the collection of follow-up data. Children with SLI were

more than two times as likely to externalize a problem compared to typically developing children. Children with SLI were also over one and a half times as likely to meet the criteria of ADHD, as compared to typically developing children.

Table 2 presents pooled and individual study standardized mean differences (SMD) for the emotional and behavioral outcomes at follow-up data collection. Pooled SMD results indicated that children with SLI scored significantly higher on their severity of internalizing problems, externalizing problems, and the severity of their ADHD symptoms, overall, as compared to the typically developing children.

The meta-analysis indicated that both boys and girls with SLI have elevated levels of internalizing problems, with boys with SLI also showing elevated levels of conduct problems. Both boys and girls with SLI showed anxiety, while boys also showed depression.

**Conclusions:**

The meta-analysis indicates that as children with SLI get older, overall, their emotional, behavioral, and ADHD-like behaviors will be more severe and occur more frequently, than typically developing children. These children may also be at risk of depression. This analysis indicates that children with SLI are about twice as likely as their typically developing peers to show severity and difficulties in emotional problems, at clinical levels.

**Relevance to the current work:**

This meta-analysis informs the current work of the discrepancy of emotion understanding of children with SLI, due to the association of emotional and behavioral disorders and SLI.

## APPENDIX B

**IRB Memorandum**

To: Professor Martin Fujiki  
 Department: COMD  
 College: EDUC  
 From: Sandee Aina, MPA, IRB Administrator  
       Bob Ridge, PhD, IRB Chair  
 Date: July 28, 2017  
 IRB#: X130274

Title: *“Enhancing Social and Emotional Learning in Children with Language Impairment”*

Brigham Young University’s IRB has renewed its approval of the research study referenced in the subject heading.

The approval period is from **July 28, 2017 to August 1, 2018**.

The following is a list of all current co-investigators. Is this up-to-date? Bonnie Brinton, Allyson Roscher, Megan Bradshaw, Madeline Dixon, Emilee Longmore, Alyse Wheeler, Alexandra Smith, Minisa Harlow, Julie Vincent, Courtney Gengler, Capri Seaberg, Rebekah Forbes, Annelise Luddington

All conditions for continued approval during the prior approval period remain in effect. These include, but are not necessarily limited to the following requirements:

1. A copy of the consent forms are attached to this email. No other forms should be used. Each research subject must sign the form prior to initiation of any protocol procedures. In addition, each subject must be given a copy of the signed consent form.
2. Any modifications to the approved protocol must be submitted, reviewed, and approved by the IRB before modifications are incorporated in the study.
3. In addition, serious adverse events must be reported to the IRB immediately, with a written report by the PI within 24 hours of the PI's becoming aware of the event. Serious adverse events are (1) death of a research participant; or (2) serious injury to a research participant.
4. All other non-serious unanticipated problems should be reported to the IRB within 2 weeks of the first awareness of the problem by the PI. Prompt reporting is important, as unanticipated problems often require some modification of study procedures, protocols, and/or informed consent processes. Such modifications require the review and approval of the IRB.

IRB Secretary  
 A 285 ASB  
 Brigham Young University  
 (801)422-3606

## APPENDIX C

**Parental Permission Form**

**Introduction:** I am professor Martin Fujiki, Brigham Young University. I am doing research to develop therapy procedures to help children with communication problems improve their social interactional skills. Your child is being invited to participate because he/she is currently receiving speech language services in Alpine School District at Grovecrest Elementary School.

**Procedures:** I am asking you to enroll your child in a 12 to 14-week intervention study. During this time your child will be enrolled in intervention that will focus on teaching social communication skills that help him/her better understand the emotions of others. The goal will be to help your child interact more appropriately with peers and adults. Therapy will be provided by a combination of BYU graduate students in Communication Disorders and your child's school speech pathologist. All treatment will take place at your child's school. There will be two to three treatment sessions per week, each lasting about 30 minutes. All treatment sessions will be video recorded. These sessions will work on helping the child to understand better the emotional responses of others. All treatment sessions will take place during the regular school day. In addition, your child may be given additional testing to make sure that he/she meets the study criteria. Some of this testing may have been done already, but if not it may take up to an additional two hours of time to complete. If the testing has already been done, we would like to request your permission for the school clinician to make this information available to us. All treatment sessions will be video recorded to allow researchers to analyze the effectiveness of the treatment. The recordings will be erased following completion of the analyses.

As part of the assessment and follow up I will be asking you to complete a paper copy of a social skills questionnaire for your child before and after the intervention takes place.

**Risks/Discomforts:** There are minimal risks associated with this treatment. Your child may miss class for one extra session of therapy a week during the course of the study. Your child's school clinician will either be present or close by during all therapy sessions to handle any questions or difficulties that may arise as a result of working in the treatment conditions. Clinicians and supervisors will consult regularly to make sure that your child is not experiencing any problems in the treatment conditions. The only other discomfort is that the questionnaire I will ask you to complete will take about 20 minutes of your time.

**Benefits:** The primary benefit to your child is the potential growth resulting from receiving intensive intervention during the course of the study. There are benefits to society in general in that this study may result in more effective treatment methods for children with social communication problems.

**Compensation:** There is no compensation associated with participation in the study.



**Confidentiality:** Your child's participation will be confidential. All materials will be stored in locked cabinets in a locked lab 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. Video images will be stored on a secure hard drive in a locked lab at BYU. These images will be used to document how well your child responds to the intervention. These images will be stored for six years to allow analysis and then destroyed.

**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, you and your child have the right to withdraw at anytime or refuse to participate entirely without jeopardy to your class status, grade or standing with the school.

### 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 have questions regarding your rights as a research participant, you may contact the BYU IRB Administrator, A-285, Brigham Young University, Provo, UT 84602, 801-422-1461, irb@byu.edu

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

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

Printed name \_\_\_\_\_

### Video Release Form

As noted above, I will be making video recordings of your child during his/her participation in the research. Please indicate the uses of these video recordings you are willing to permit. Put your initial next to the uses you agree to and signing the form at the end.

1. \_\_\_\_\_ The video recordings can be studied by the research team for use in the research project.
2. \_\_\_\_\_ Short excerpts from the video recordings can be shown at scientific conferences or meetings.
3. \_\_\_\_\_ Short excerpts from the video recordings can be shown in university classes.

I have read the above descriptions and give my consent for the use of the videotapes as indicated by my initials above.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

Name \_\_\_\_\_



## APPENDIX D

**Teacher Permission Form**

**Introduction:** I am Professor Martin Fujiki, Brigham Young University. I am doing research to develop therapy procedures to help children with communication problems improve their social interactional skills. Children who are receiving speech and language services are being invited to participate in this research.

**Procedures:** Children with communication problems will be enrolled in a 12 to 14-week study. During this time intervention will focus on teaching social communication skills. Therapy will be provided by a combination of BYU graduate students in Communication Disorders and the child's school clinician. All treatment will take place at school. As part of the assessment and follow up I will be asking you to complete a social skills questionnaire for each child in the study before and after the intervention takes place.

**Risks/Discomforts**

There are no known risks/discomfort aside from the time that it will take to complete the questionnaire. It is 79 questions long and will take about 10 minutes, per child, to complete.

**Benefits**

Completing this questionnaire will help me determine if the social communication intervention is effective. Overall, this research will help educators work with the social problems experienced by most children with communication problems.

**Confidentiality**

Be assured that 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 students' names will ever be used in connection with any presentation of this research.

**Compensation**

I will compensate you \$5 for each questionnaire completed as a "thank you" for your participation. You will receive the \$5 shortly after turning in the questionnaire.

**Participation**

Participation is voluntary. You may withdraw at any time. Withdrawal or refusal to participate will not affect employment at your school or your relationship with BYU.

**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 have questions regarding your rights as a research participant, you may contact the BYU IRB Administrator, A-285, Brigham Young University, Provo, UT 84602, 801-422-1461, [irb@byu.edu](mailto:irb@byu.edu)

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

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

Printed name \_\_\_\_\_



## APPENDIX E

**Child's Assent****Introduction**

My name is \_\_\_\_\_. I work at Brigham Young University. I study the way that children talk to other people. I am working with some children in Mrs./Ms/Mr. \_\_\_\_\_'s class. I would like your help.

**What Will Happen (Procedures)**

I will ask you to do several things. We will listen to stories and then act them out. I will also show you pictures of faces to see if you can tell what emotion the person is feeling. I will also tell you stories and see if you can tell what emotion the people in the stories are feeling. You will do all the work at school. You will come to work with me during your speech time.

**Possible Problems (Risks)**

You will miss some class time. I will work with Mrs./Ms/Mr. (*Child's teacher*) \_\_\_\_\_ to make sure than you do not miss things in class that are really importan or really fun.

**Good things that will happen and what will you get (Benefits and Compensation)**

You will get to pick a sticker or small prize every time you work.

**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.

**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, pelase ask me. You can also ask your parents or your teacher. If you want to ask someone else questions about this work, you may contact the BYU IRB Administrator, A-285, Brigham Young University, Provo, UT 84602, 801-422-1461, [irb@byu.edu](mailto:irb@byu.edu)

\_\_\_\_\_ I want to take part in this study.

\_\_\_\_\_ I do not want to take part in this study.

Signature \_\_\_\_\_

Date \_\_\_\_\_

