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The Efficacy of a Social Communication Intervention to Increase
Syntactic Complexity in Narratives of Children
with Language Impairment

Alexandra Smith

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 Efficacy of a Social Communication Intervention to Increase Syntactic Complexity in Narratives of Children with Language Impairment

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Master of Science

Research has shown that children with Language Impairment (LI) struggle with social communication skills in addition to their characteristic syntactic difficulties. This pilot study analyzed the potential change in grammatical complexity in narratives of five children with LI when enrolled in a social communication intervention. The intervention itself focused on teaching emotion understanding by reading and reenacting children's stories and journaling. Grammatical limitations were indirectly addressed by clinician modeling of complex forms during the intervention sessions. Each child's productions were assessed and analyzed for grammatical complexity during retelling a book in the Mercer Mayer "a boy, a dog, and a frog" series. The children performed this task once a week during the course of the intervention. Specific measures used included the average length of terminable unit (T-unit) and the number of subordinate clauses used in each narrative. Three students' productions remained steady throughout the course of the interventions; their grammatical complexity neither increased nor decreased. One student's production showed a clear decrease in complexity but was explained by an obvious and arguably more creative change in her language output. One student's grammatical complexity increased throughout the sessions as indicated by a steady increase in the average length of T-unit. Thus, the results of this study were equivocal. There were several limitations, however, that might be addressed in future intervention studies.

Keywords: language impairment, syntactic complexity, grammatical complexity, social communication, intervention, school-age children

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DESCRIPTION OF THESIS STRUCTURE

This thesis is written in a hybrid form that integrates a current journal publication format with the traditional thesis format. This includes format requirements for submission to the university. This thesis is part of a larger collaborative project, portions of which may be submitted for publication. The first part of the thesis includes the manuscript in journal-ready format. Appendix A includes a detailed description of the intervention, Appendix B includes the rules for dividing utterances used in the data analysis, Appendix C contains the modified conventions for measuring T-unit length, and Appendix D includes an annotated bibliography.

Introduction

In recent years, there has been increasing evidence that children with language impairment (LI) experience difficulties in social communication (Brinton & Fujiki, 2014). With this recognition has come increased attention to interventions designed to treat these problems. At the same time, however, it is critical to keep in mind that children with LI, by definition, have deficits in language structure that play an important role in their ability to communicate (Adams, 2005). Thus, complete interventions for children with LI must not only address interactional problems but also syntactic limitations. The purpose of this study was to evaluate the effectiveness in increasing the syntactic abilities of children with LI with a social communication intervention designed to improve interactional skills.

Social Communication

Children with difficulties in social communication often struggle in four specific domains: social interaction, social cognition, pragmatics, and language processing (Adams, 2005). For older children, the last three areas are of greatest concern. The fourth domain, language processing, is the one that will be most referenced in this paper and involves the production and comprehension of formal grammatical structures, word meanings, and phonological forms to convey ideas and communicative events. As Adams notes, a child with LI may have problems in all these domains which blend together to hinder the ability of the child to communicate effectively and interact with others (2005). In the following section, the importance of social communication intervention is briefly explained as well as a short outline of a randomized control trial that studied the effect of a social communication intervention.

Social Communication Intervention

Because of the importance of efficient and meaningful social communication in society, interventions have been developed to improve social communication skills in children with LI, yet there are relatively few intervention studies examining the treatment of elementary school age children (Gerber, Brice, Capone, Fujiki & Timler, 2012). This limitation is beginning to be addressed, however, with several studies being published in the last five years. (e.g., Adams et al., 2012; Fujiki, Brinton, McCleve, Anderson, & Chamberlain, 2013).

Of the available work, there is only one randomized control trial, conducted by Adams et al. (2012) at the University of Manchester. Adams and colleagues studied the effect of a social communication intervention on a range of communicative abilities. A group of 88 children were randomly assigned to receive either social communication intervention or treatment as usual (TAU) where intervention followed a general framework but was individualized to the needs of each student. Although changes in structural language and narrative ability did not differentiate students in the two treatment groups, significant improvements were found in perceptions of conversational competence, parent-reported measures of pragmatic functioning and social communication, and teacher-reported ratings of classroom learning skills of the children who received the social communication intervention, thus suggesting that a social communication intervention has potential to improve overall conversational quality of children with pragmatic and social communication needs.

Because difficulty with language structure is a defining characteristic of LI, social communication interventions that could simultaneously address structural and interactional deficits would be highly useful for children with LI who have both social cognitive, pragmatic, and language production problems. In the following section, a brief discussion of the syntactic

skills of children with LI is provided, and the use of the terminable unit (T-unit) is considered as a method of quantifying complexity.

Syntactic Complexity

Typical syntax emerges around 18 months as children begin to produce two-word utterances (Nippold, Mansfield, & Billow, 2007). Development progresses rapidly during the preschool years and by age five, children are expected to use sentences that contain relative, nominal, and adverbial subordinate clauses (Nippold et al., 2007; Nippold, 2009). It is well documented, however, that children with LI do not develop syntax in the same way as typically developing children (Eisenberg, 2014). Children with LI produce more grammatical errors on simple and complex sentences in both speaking and writing than their age-matched, typically developing peers, revealing significant difficulty that can persist into their later school-age years (Gillam & Johnston, 1992).

One of the most common methods for measuring syntactic complexity after the preschool years is by using T-units (Hunt, 1970; Nippold, Hesketh, Duthie & Mansfield, 2005; Nippold, 2009). A T-unit is defined as an utterance that must contain one main clause (a subject and a verb) and may contain one or more subordinate clauses (Hunt, 1970; Nippold, 2009; Nippold et al., 2005). For example, the sentence, “We went to the store,” contains one T-unit, whereas “We went to the store after we had gone to the game” contains one T-unit with a subordinate clause. The sentence, “We went to the store and we went to the game” contains two T-units because there are two independent clauses combined with a coordinating conjunction. Nippold et al. (2005) suggested that the T-unit be used to measure syntactic complexity as it is a common marker of syntactic growth and development. It has also been well-established that measuring words per T-unit is a better indicator of syntactic maturity than measuring words per punctuated

sentence (Hunt, 1970). Given the usefulness of the T-unit in looking at subordinate clauses as well as grammatical complexity, this measure is a viable choice for the unit of analysis in the current investigation. In the following section, a review of interventions to improve syntactic complexity is presented.

Goal of the Current Study

There are many interventions for children with LI that are designed to address structural limitations (Eisenberg, 2014; Paul & Norbury, 2012). Many of these interventions rely heavily on modeling techniques (e.g., focused stimulation, milieu therapy). The principle of modeling during therapy (creating a hybrid treatment approach) is designed to have the child hear the clinician provide several examples of the correct pattern during the session. There is considerable evidence that these modeling procedures are effective (see Fey, 1986; Paul & Norbury, 2012, for review). It thus stands to reason that a social communication intervention in which there is a high level of modeling of specific syntactic targets might be able to increase both social communication and syntactic abilities. This study was part of a larger project designed to evaluate the efficacy of a social communication intervention. The primary goal of the project was to determine if the intervention resulted in an increase in the production of emotion words. The goal of this specific study was to determine if the intervention also indirectly resulted in an increase in syntactic complexity, using a multiple case study design.

Method

The data for this thesis were taken from a larger project evaluating the efficacy of a social communication intervention provided to five school-age children with LI. The project was conducted at an elementary school in Utah. A graduate student provided the intervention therapy

under the supervision of the certified school speech-language pathologist (SLP) and two doctoral level SLPs from Brigham Young University.

Participants

One boy and four girls ranging in age from 6;1 to 10;1 (years; months), participated in the study. All of the children were native English speakers, had been diagnosed with LI and were receiving services from the school SLP, among other special education services. All children had unremarkable hearing status (according to a pure tone screening) as well as IQ scores within typical limits (according to a standardized measure of intelligence administered by school personnel). Three of the students were biological sisters (MK, ADK & ALK).

At the beginning of the study, researchers administered the *Clinical Evaluation of Language Fundamentals-5* (CELF-5; Semel, Wiig, & Secord, 2013) to each participant and the *Children's Communication Checklist-2* (CCC-2; Bishop, 2003) to each child's teacher. The purpose of administering the CELF-5 was to acquire a standardized measure of language skills; the CCC-2 was administered in order to provide an understanding of each child's social communication abilities and difficulties. Table 1 provides the results of both the CELF-5 and the CCC-2. These scores provide the reader with a general overview of each child's abilities.

JS (5;11 years; months). JS was a Caucasian female initially diagnosed with developmental delay (DD)¹, LI, and attention deficit hyperactivity disorder (ADHD). At the time of the study her diagnosis involved LI and ADHD, and she was enrolled in a mainstream kindergarten classroom. She was receiving pull-out services for reading as well as speech and

¹All children diagnosed by the school district as qualifying for early intervention services received an initial diagnosis of developmental delay, which was later changed as appropriate.

language. The goals set by her school speech-language pathologist focused on improving language and articulation skills. On the original CCC-2 filled out by her teacher, her results demonstrated deficits on the nonverbal communication and social relation subtests with scores that were below the 9th percentile. She scored in the 37th percentile in the structural area of speech but scored in or below the 2nd percentile on the syntax, semantics, coherence, and context subtests. Her score on the General Communication Composite (GCC), an index of overall communicative competence, was in the 4th percentile. Her core language score on the CELF-5 was in the 7th percentile; she scored in the 9th percentile for both the word structure and formulated sentences subtests (the subtests that deal most with syntax). Notes from her clinician indicated that JS was inconsistent in her responses to comments and questions and that she had limited attention.

SS (9;9). SS was a Caucasian male who, at age five, was diagnosed with high-functioning autism; at age eight, this diagnosis was confirmed by a neuropsychologist at a local children's hospital. Based on the ongoing evaluation, however, his school's educational team did not agree with the diagnosis of autism. SS enrolled in a public elementary school for 2nd grade after being homeschooled until that time. He was identified by the school SLP with LI and received both articulation and language intervention as well as special education services for math, reading, and written language. At age 9;5 he was tested at his school and identified with specific learning disability (SLD). At the beginning of the study, he was receiving services for fluency, production of more sophisticated sentences, and appropriate topic manipulation. On the CCC-2, his scores on all subtests were below the 5th percentile. The core language score of the CELF-5 was in the 2nd percentile and he scored in the 1st percentile for the formulated sentences subtest. SS's clinician noted that he was rarely hesitant to interact socially, but often had

difficulty adapting to different settings including responses to topics introduced by others. He did not manifest repetitive or stereotypic behaviors. Additionally, SS could self-monitor. He was aware of his own personal behavior when it was inappropriate, but was often impulsive in the moment. Socially, he struggled to interpret listener expressions, voice inflections, and the nonverbal responses by the listener.

Table 1

Children's Communication Checklist-2 (CCC-2; Bishop 2006) and Clinical Evaluation of Language Fundamentals-5 (CELF-5; Semel, Wiig, & Secord, 2003) Scores

Instruments	Participants				
	ALK	SS	ADK	MK	JS
CCC-2 ¹ Subtests					
Speech	1	1	1	1	37
Syntax	9	0	1	1	2
Semantics	5	0	1	2	2
Coherence	2	1	16	2	2
Initiation	50	0	37	25	16
Scripted Language	25	1	37	50	50
Context	25	1	16	2	3
Nonverbal Communication	16	1	9	1	4
Social Relations	16	5	37	1	6
Interests	50	1	91	25	11
GCC ² - percentile	4	1	2	1	4
SIDI ³	15	5	36	12	7
CELF-5 ⁴					
FS ⁵ Subtest	9	1	50	1	9
Core percentile	8	2	23	14	7

Note. ¹Children's Communication Checklist-2 (CCC-2). ²General Communication Composite. ³Social Interaction Difference Index. ⁴Clinical Evaluation of Language Fundamentals- 5 (CELF-5). ⁵Formulating Sentences Subtest.

MK (6;7). MK was a Caucasian female who was diagnosed with LI and SLD in kindergarten. At the time of the study, she was receiving speech and language services and attending resource for services in written language and math. On the CCC-2, her scores reflected poor performance in all subtests; she was in the 3rd percentile for both nonverbal communication and social relations and scored in the 1st percentile for speech and syntax. Her overall GCC was in the 1st percentile. On the CELF-5, she scored a Core Language Score in the 14th percentile, with the subtests of formulated sentences and word structure both falling in the 1st percentile. MK's clinician noted that she spoke very softly and was quite "shy," using delayed and incomplete verbal responses to teachers and peers. She was often off topic, rarely initiated verbal interaction, and had difficulty expressing and responding to other's emotions.

ALK (10;1). ALK was a Caucasian female student who, at the time of the study, had been identified with LI and was receiving speech and language services in school addressing articulation and structural issues. In first grade, she was identified with LI as well as articulation deficits with a number of phonological processes. On the CCC-2, ALK's scores revealed difficulty with syntax (with a score in the 9th percentile) and coherence (2nd percentile). Overall, she scored in the 7th percentile on the GCC. Her core language score on the CELF-5 was in the 8th percentile, with a score in the 9th percentile on the subtest of formulating sentences. Socially, she was described by the clinician as a child who had friends and participated in social conversations. However, upon evaluation, she had difficulty inferring the emotional reactions of other people in social situations. ALK also had difficulty expressing herself because of her deficits in semantics and syntax/morphological modifications.

ADK (7;11). ADK was a Caucasian female student who, in second grade, was diagnosed with LI and SLD. At the time of the study she was receiving services for articulation and

language impairment. The results of the CCC-2 for ADK indicated a score in the 9th percentile for nonverbal communication as well as serious deficits in the subtests of speech, syntax, and semantics (all with scores at or below the 1st percentile). Her GCC was in the 4th percentile. On the CELF-5, she produced a Core Language Score in the 23rd percentile. On the subtest of word structure she scored in the 16th percentile, and in the 50th percentile for formulated sentences. As noted by her clinician, ADK was “chatty” and did not have trouble interacting with peers, but often had little to add to a conversation. Her clinician hypothesized that this might be related to her limited exposure to certain topics and her apparent difficulty with interpreting, inferring and/or predicting listeners’ responses.

General Description of Project

As noted, the data for this thesis were taken from a larger intervention project, which is briefly described below. The participants met individually with the graduate clinician in the speech classroom twice a week, for baseline, intervention, and follow-up sessions. Following baseline, a total of 20, 15-30 minute intervention sessions were provided for each child. The speech classroom was quiet and each session was recorded for analysis. Each child participated in either three or six baseline sessions before the intervention began; this was done in order to get a stable measure of the communication skills of interest. In each baseline and follow-up session (explained below), the child completed three activities. These included telling a story from a wordless picture book, identifying emotions from pictures of specific emotion-filled scenarios, and responding to a topic of conversation produced by the clinician. Once during the baseline sessions, they were given the task of identifying emotions from pictures of faces and from a scenario explained by the clinician. It is important to note that the behavior of interest in baseline sessions was a social communication behavior: the production of emotion words. Thus, each

child's mean-t-unit length during story retell was not examined to determine if these data produced a flat baseline. Syntactic behaviors were examined during the course of treatment by analyzing the use of syntactic complexity during the telling of the wordless picture books to determine the incidental impact of the social communication intervention described below. This study, then, employed a multiple case study design.

Treatment sessions. The plan for each session was consistent across sessions but also required flexibility in order to meet the individual needs of each child. Each of the 20 sessions included the following tasks and activities: (a) reading a story and discussing in detail the emotions that were experienced by the characters, (b) re-enacting the story with emphasis on the emotions and reasons for them, (c) playing card games with emotion pictures, and (d) writing a journal entry. The activities for these treatment sessions targeted social and emotion understanding, with a particular emphasis on understanding the emotions experienced by the various characters. Each activity was designed for children with limited language abilities. In order to increase the use of complex syntax, however, the clinician emphasized the modeling of complex sentence forms so that the participants heard multiple productions of these sentences. The modeling of complex sentences, however, was not controlled; rather, the clinician modeled these forms to fit within the natural flow of the lessons. The clinician spoke clearly and slowly with the intention that the child would hear the grammatically correct sentences and pick up on the syntactic patterns that were being used. In addition, after reading and exploring each story together, the clinician and the student would participate in a role-playing session in which each would take on the role of different characters from the story. The clinician would emphasize emotions and their causes by using words indicating causality, including *because*, *so*, *if*, *then*, and *since*. A more detailed description of the intervention sessions is found in Appendix A.

Approximately once a week the clinician would ask the child to retell one of the six books from the Mercer Mayer “A boy, a dog, and a frog” series. These retellings provided the data analyzed in this thesis.

Follow-up sessions. Each child participated in three follow-up sessions; activities from the baseline sessions were repeated (explained above).

Transcription Reliability

To establish transcription reliability, two graduate clinicians transcribed 20% of the frog stories from the baseline sessions (the sessions were randomly selected). The transcriptions were then compared to each other for reliability. Inter-examiner reliability was found to be 91% (using the formula $A/N \times 100$, where A is the number of word agreements and N is the total number of words). The transcripts were then combined, and the clinicians reviewed and resolved disagreements to create a standard key, which was then used to establish reliability with volunteer undergraduate students.

Five volunteer undergraduate students were trained to transcribe the remaining samples. Each student transcribed 12% of the stories from baseline sessions (these sessions were randomly selected from the stories that the graduate clinicians originally transcribed). These results were compared with the standard key and each student transcribed samples until each reached at least 90% reliability on two samples. The overall average inter-examiner reliability figures were found to be 88%, 90%, 90%, 91% and 92% for students 1-5. The students transcribed a total of 20, 17, 10, 5, and 10 samples, respectively.

Dividing Utterances in Samples

Once the transcriptions were completed, an undergraduate student checked each sample for utterance divisions. The transcriptions were divided using the “Rules for Dividing

Utterances” (Brinton & Fujiki, 1984) as found in Appendix B. Dividing the utterances consistently between samples was necessary for accurate marking of the T-units.

Data Analysis

The purpose of this study was to analyze the patterns of grammatical complexity over time as a result of a social communication intervention using the average length of complete T-units. Each transcription was analyzed by one undergraduate and one graduate student after all the video samples were transcribed. For the analysis, each transcription was marked for T-units with a slash at the end of each one. Excluded from the count were incomplete T-units (missing a subject or verb), repetitions, and unintelligible utterances. After the exclusion of each of these, the number of remaining morphemes in the sample was counted and the average length of complete T-units was calculated (total number of morphemes divided by total number of T-units). A detailed list of conventions used for analysis of the T-unit is found in Appendix C. In addition, the number of subordinate clauses used in each narrative was calculated and considered for notable trends. These data were recorded on a session-by-session basis and then analyzed graphically.

Results

The production of complex sentences was monitored during a social communication intervention that focused on the production of emotion words. As noted previously, a traditional baseline was not established, thus a multiple case study design was used (see “General Description of Project”). The mean length of T-unit per session and the number of subordinate clauses produced per session were graphed and examined for trends across the frog stories that were used in the baseline, intervention, and follow up phases of the larger study. The results for each participant were highly varied.

JS

The mean length of T-unit produced by JS per session, is presented in Figure 1. The scores for JS showed a relatively stable level of syntactic abilities as indicated by mean length of T-unit and the number of subordinate clauses; there were neither huge increases nor decreases in the length of T-units produced. Within the 12 sessions where JS was asked to tell a frog story, the average length of T-unit ranged from 5.13-6.89 morphemes/utterance and the number of subordinate clauses used in the stories ranged from 0-3 per session during all pre-intervention, intervention, and post-intervention sessions.

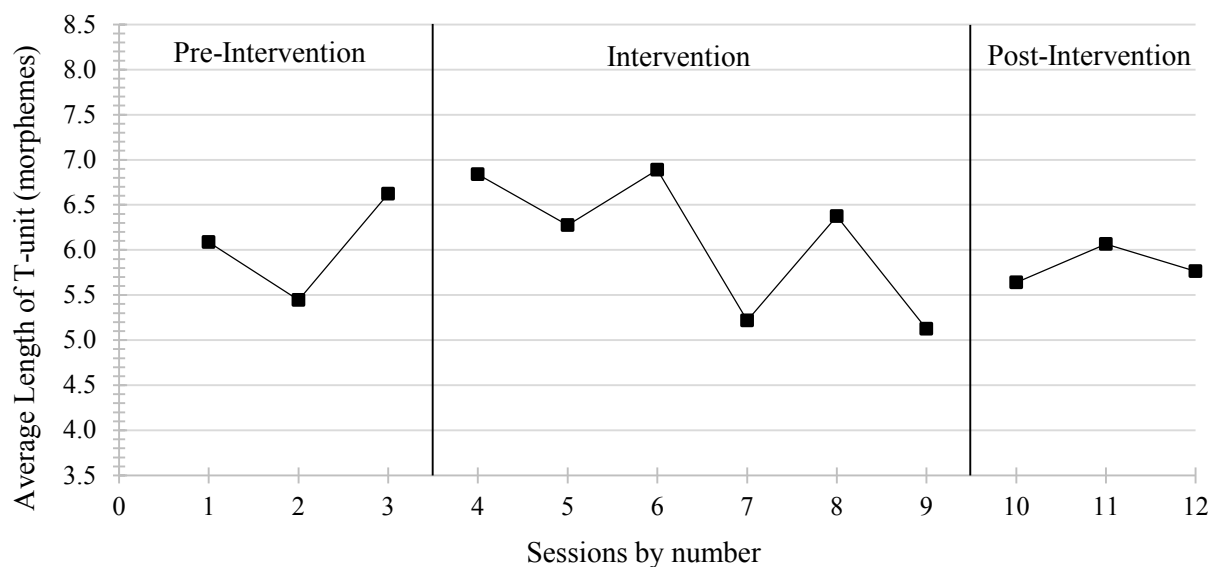


Figure 1. Mean length of T-unit, by session, produced by JS during telling of frog stories.

SS

The results for SS are presented in Figure 2. These data indicate a similar pattern to that produced by JS. The level of syntactic ability for this participant was stable, with no consistent increases or decreases in the length of T-units. Within the 17 sessions during which he was asked to tell a frog story, the average length of T-unit ranged from 6.27-9.38

morphemes/utterance ($m = 7.48$ and $SD = 0.66$); the number of subordinate clauses used in the frog stories during all sessions ranged from 0-6 per session, with no distinct pattern or trend.

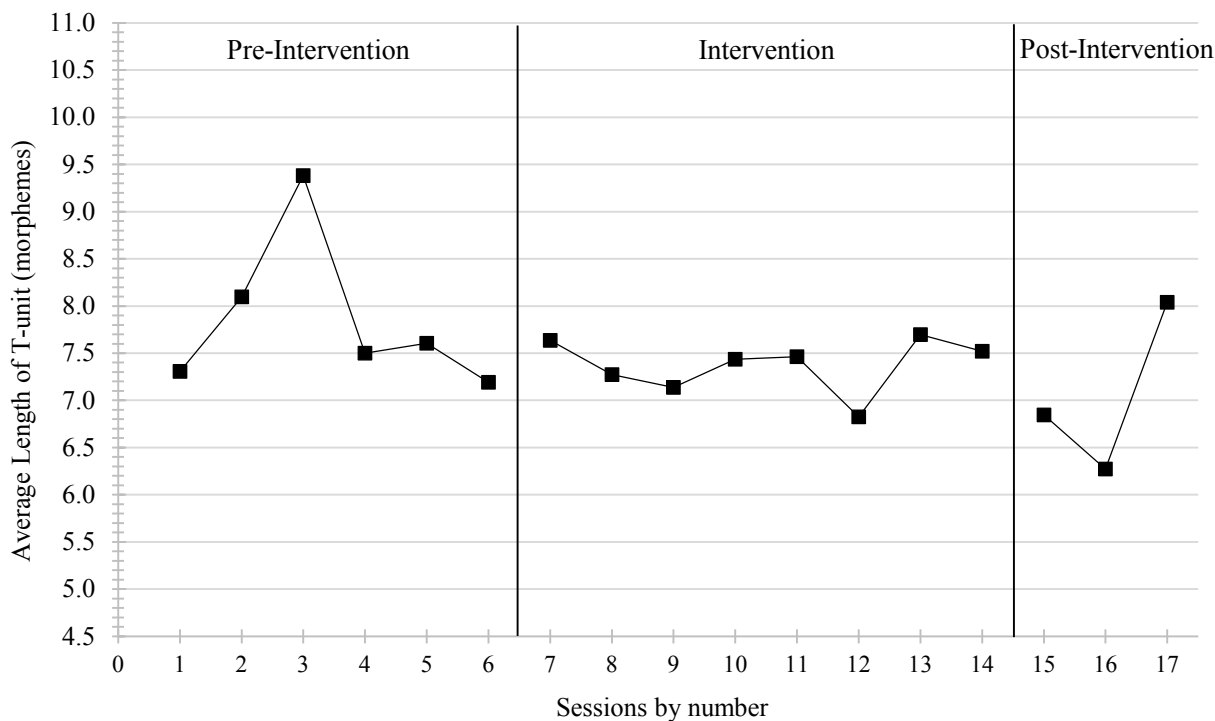


Figure 2. Mean length of T-unit, by session, produced by SS during telling of frog stories.

MK

The results for MK are presented in Figure 3. These data indicate an increase in syntactic complexity from the pre-intervention sessions to the beginning of the intervention sessions.

MK's average length of T-unit ranged from 3.67 morphemes in the first session to 6.90 in the very last session. Within the 18 sessions during which she was told a frog story, the number of subordinate clauses used ranged from 0-3 per session.

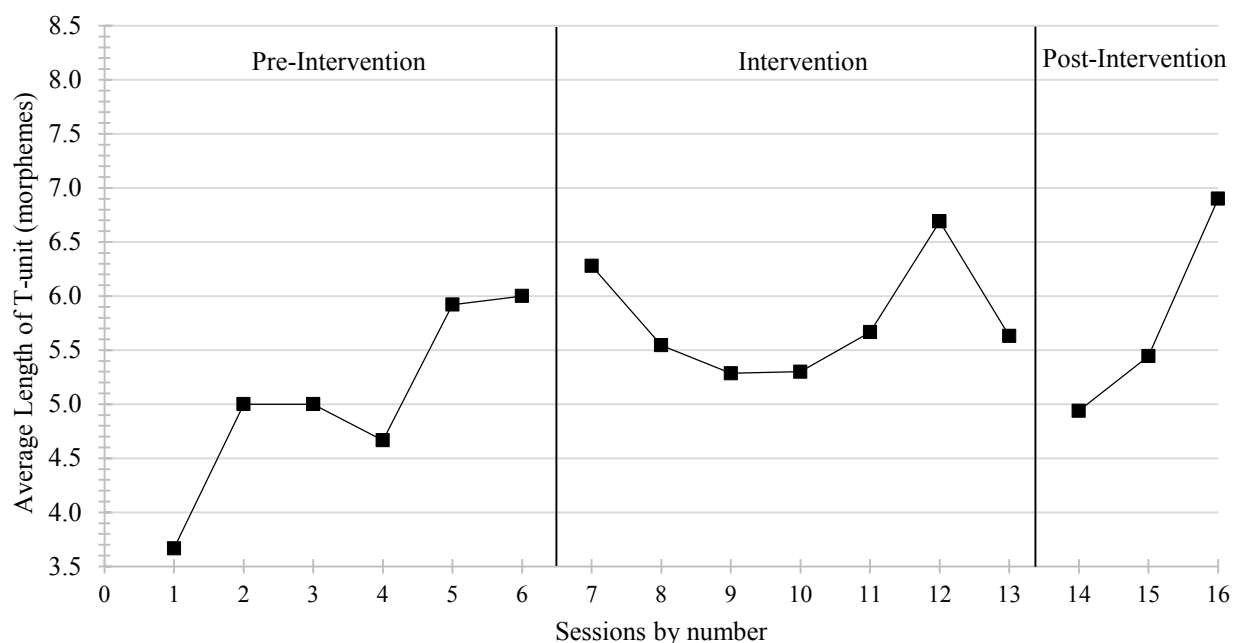


Figure 3. Mean length of T-unit, by session, produced by MK during telling of frog stories.

ALK

The results of ALK's syntactic analysis are presented in Figure 4. The overall trend in these data is decreasing; between interventions six and eight, the average length of T-unit per session decreases from 7.93 morphemes to 5.18 morphemes. There are several speculations as to why the dramatic decrease happened, and these points will be considered in the discussion section below. Within the 14 sessions where she told a frog story, the average length of T-unit ranged from 5.13-8.14 morphemes/utterance and the number of subordinate clauses used during the stories ranged from 0-3 per session.

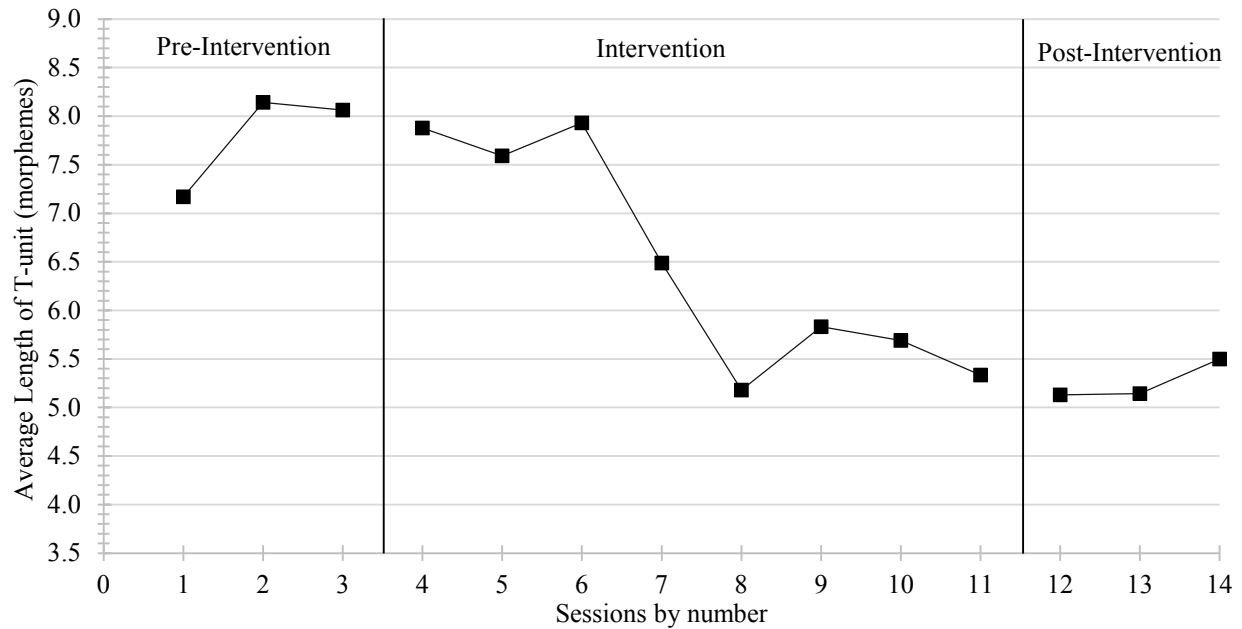


Figure 4. Mean length of T-unit, by session, produced by ALK during telling of frog stories.

ADK

The results for ADK are presented in Figure 5. These data were more variable than that produced by the other students and showed no specific trends. Within the 18 sessions during which she told a frog story, the average length of T-unit ranged from 4.67-7.47 morphemes/utterance and the number of subordinate clauses used in the stories during all sessions ranged from 0-3 per session.

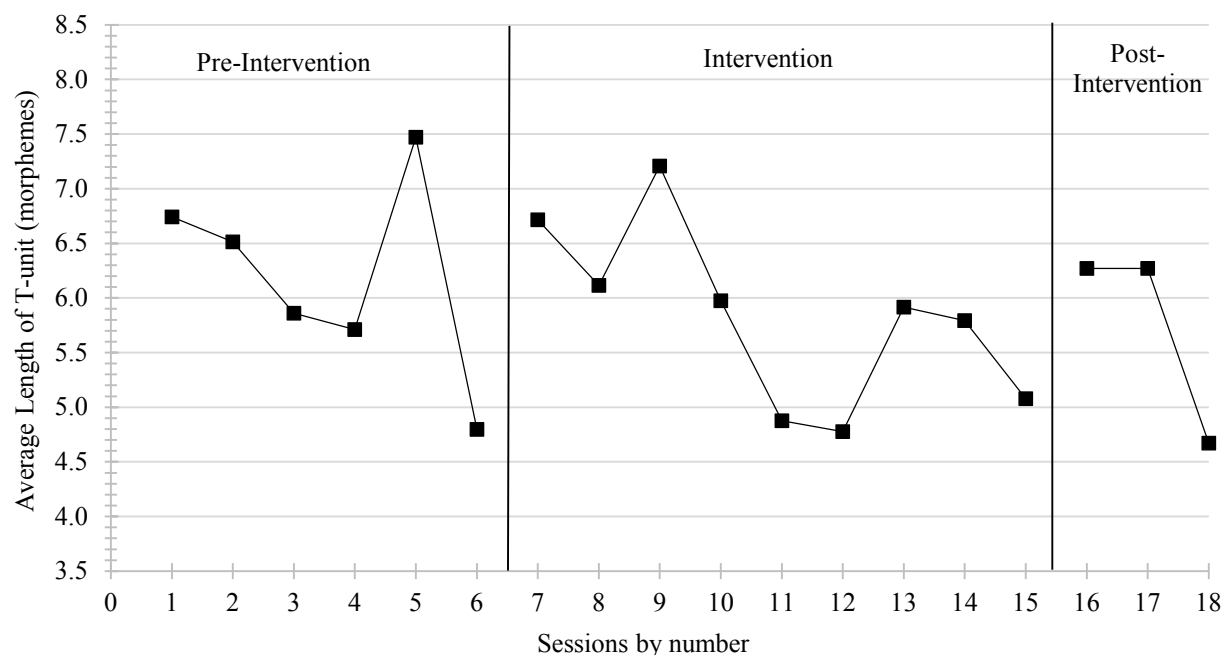


Figure 5. Mean length of T-unit, by session, produced by ADK during telling of frog stories.

Discussion

The current study investigated the efficacy of a social communication intervention to increase the use of complex sentences in narratives. In the following sections, each participant's results are reviewed and considered with respect to this investigation.

Individual Participant Findings

JS. The findings for JS are stable from the beginning of the interventions to the end. The lack of change in use of complex sentences may have been influenced, at least in part, by boredom with the frog stories. In many of the later sessions, JS went through the stories quickly in order to move through them and thus used shorter, less complex sentences. For example, in the first session, she used 46 T-units with a total of 280 morphemes. The task was new and perhaps the whole process was interesting. However, by the last session she used 21 T-units with a total of 121 morphemes. The average length of T-unit stayed relatively consistent, but it was

clear she was moving through the stories quickly. On the first sample, she spent just under four minutes telling the story; she often made eye contact with the clinician for reactions and feedback, and looked eagerly at the pictures to know what happened. By the last sample, she sped through the story in just over one minute, rarely ever stopping to look at the clinician and with a visible desire to get through it quickly. It was the impression of both the clinician and those viewing the sample for later analysis that JS was not motivated to give her best performance and thus used simpler, shorter language.

SS. The results for SS were also steady, with no notable trends. In general, SS used more complex sentences with regards to the length of T-unit and number of subordinate clauses. However, many utterances, although long, were grammatically incorrect. He produced many grammatical modifications including deletion of prepositions, deletion of past tense “-ed,” and errors on tense agreement, irregular past tense verbs, and prepositions. These problematic utterances were included in the syntactic analysis and thus provide a conflicting view of SS’s abilities. Although he had relatively long, and therefore supposedly more grammatically complex utterances, the various grammatical problems likely impacted actual complexity.

MK. Based on findings, MK seemed to get comfortable with the task as the intervention progressed. MK started with an average T-unit length of 3.67 and ended her last session with an average T-unit length of 6.90. It should be noted that MK was a reserved child; she showed obvious signs of reticent withdrawal at the beginning of the intervention. For her, the task became more clear and easy as she had practice throughout the sessions and she began to use longer, more complex sentences. This increase took place as she participated in the social communication intervention; however, it was unclear if the intervention was directly responsible for the longer utterances. Although it is not possible to draw a definite conclusion as to the cause

of her increased complexity, there are a number of possibilities. One was that as she became more comfortable with the clinician and the task that she opened up more and felt less inhibited. The fact that the increase began in the baseline phase, before receiving much modeling, would support this interpretation. It is also possible that the steady increase was attributable, at least in part, to the frequent modeling that she was exposed to during the course of the intervention.

ALK. In ALK's case, a change in strategy played a role in her decreasing average length of T-unit. Although the observed decrease in mean T-unit length would suggest less complexity, the language she actually produced could be taken as indicative of greater complexity and creativity in other aspects of language. From sessions 7 to 14, ALK started using the first person tense in narratives. This strategy altered the syntax dramatically and caused the average length of T-unit to drop dramatically. Although this caused the data to appear lower, it should be recognized that taking the characters' perspectives and speaking for them demonstrates an ability that is characteristically difficult for children with LI. For example, during one narrative, ALK stated, as the boy in the story, "Let's go before he bites one of us." This sentence is notable because it demonstrates her ability to take the boy's perspective in which she realized that he was afraid that the turtle was going to bite another character. She also demonstrated recognition that the turtle was upset and that his next move would likely be to bite. ALK, through the boy's words, provided a solution to the problem ("let's go"). Given that part of the intervention task was to role play the stories with stuffed animals, it seems that ALK was able to generalize the targeted skill by taking the perspectives of multiple characters. This was a notable accomplishment.

ADK. ADK's results showed no notable trends in performance. In her case, it seemed that no two sessions were the same and the quality and complexity of her narratives was quite

different from day to day, with no definite explanation. ADK rarely showed visible signs of either frustration or excitement during the tasks that could explain the ups and downs of the numbers representing the quality and complexity of the narratives. The data did not appear to be affected by her mood, as she was often pleasant and compliant while telling the stories.

General Implications

Generally speaking, the results of the study were equivocal. Most participants showed little change in syntactic complexity in the narrative retell task as measured by the average length of T-unit per session. Although speculative, the school speech language pathologist did state that it was her impression that she had seen a “tremendous amount” of growth in the children’s language complexity. The clinician knew each of the children well and was initially concerned that the intervention might not address structural issues. Thus, her observation suggests that the children’s structural language may have increased in ways not captured by retelling the frog stories. It was also of note that two of the children’s parents commented that they had noted their children’s increased productive language abilities. Although these impressions are anecdotal, they are encouraging and again suggest that the children may have made more progress than was reflected in their retelling of the frog stories.

Limitations of the Study

It is important to acknowledge the several limitations presented in this project which can and should be addressed in future studies. First the structure of the intervention itself contained limitations. For example, it may be the case that the intervention needed to be more intense, both in terms of the number of sessions and the duration of each individual session. Additionally, the number of models produced by the clinician was not systematically controlled or counted after the fact. It may be that more intense modeling would have produced more consistent gains. A

second limitation includes the efficacy of using the average length of T-unit during the retelling of the frog stories to adequately reflect the child's abilities. As was seen with ALK, her dramatic drop in grammatical complexity was actually caused by a more creative and arguably more complex way of narrating the story (using first person narrative and taking the characters' perspectives). Thus, it cannot be definitely concluded that an utterance with a longer T-unit was always a better indication of language growth than a shorter one. Third, the data used to assess progress was taken from a relatively small number of samples. It may be that a wider sampling of the children's productive language would have produced a better assessment of progress. This might be addressed by examining other aspects of the session. It might also be examined by analyzing more sessions. In general, more reliable results could be obtained over a longer period of time, with more intervention sessions. Fourth, a basic issue that was found in this study and that should be addressed in the future is fatigue with the books. There were only six different frog stories that the children read over a period of 12-18 sessions. A couple of the children indicated that they were tired and bored with these stories. These children seemed to hurry through the retelling of the stories, thus creating shorter T-units. It may be the case that a wider variety of more motivating stories to retell could be used in the future. Fifth and last is the limitation that some sentences, although longer, were not marked or considered for grammatical correctness. For example, a grammatically incorrect sentence that was relatively long in regards to length of T-unit could potentially illustrate a less complex production when these errors were considered. This limitation suggests that grammatical correctness should be a consideration in future studies.

Summary

The present intervention was designed to address both the production of emotion words and the structural concerns simultaneously. The mean length of T-units, produced during a story retell task, was used to determine progress in productive language.

As expected, each child's results were quite different. The results of one participant (MK) showed an increase in grammatical complexity, the results for three (JS, SS, and ADK) remained stable throughout the sessions, and the results for one (ALK) decreased. By the end of the sessions, MK had become comfortable with the task and showed more willingness to produce longer, and therefore more complex, sentences. JS, SS, and ADK seemed to become bored quickly with the task and had varying results each day. Although ALK showed a decrease in grammatical complexity as measured by T-units, upon further analysis, it was noted that she showed complex creativity in her ability to take the character's perspectives. This resulted in much shorter utterances, however.

The results of the current study are equivocal. However, based on the subjective observations of the school clinician and some of the children's parents, the idea of using a social communication intervention to address both types of goals simultaneously merits further investigation. It may be that relatively small changes in the intervention would produce the desired gains. Some of the changes might include a different measure of grammatical complexity, longer and more frequent sessions, more engaging stories for the participants to read, or consideration of grammatical correctness in scoring.

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Appendix A

Detailed Description of Intervention Session

Materials

Story Books. A variety of children's storybooks were utilized in the intervention. These books were chosen because they each contained multiple, clear illustrations that depicted animals with easily identifiable emotions using their facial expressions and body language. All of the books had a simple format of text which was read by the clinician or with help from the clinician in chorus reading as needed. After the reading of the text, the clinician discussed the meaning of what was read to assure there would not be any linguistic difficulty in story comprehension. The clinician, following a script, read each story highlighting the emotions and causal relationships as they occurred in the story. As the clinician went through the book, the dialog and activities were adapted to meet the specific needs of each child. A sample lesson plan and script are included below.

Toys for Enactment Activities. During the intervention, the participants were given many opportunities to reenact each of the stories using props. Toys such as stuffed animals depicted in the stories, balls, blankets, plastic foods, cups, spoons, and a cardboard doghouse were provided and allowed the children to explore and reenact each narrative. While following the outline of the story, each participant was encouraged to take on the different characters' thoughts, actions, and emotions while interacting with the props.

Facial Emotion Depicting Cards. Cards with photographs of faces depicting emotion and drawings of faces depicting clear and identifiable emotions were used in games to encourage identification and classification of six emotions: *happiness, sadness, anger, fear, surprise, and disgust.* The games included matching pictures depicting the same emotion, creating the facial

emotion while looking in a mirror, making the facial depiction of an emotion for the other person to identify.

Session Journal. At the conclusion of each session, the participants were presented with a three ring binder with their name on it filled with paper as their own journal. The participants were encouraged to dictate what they did in the session that day as the clinician wrote it. Any emotion words in the dictation were written by the participant in the sentence. The two oldest participants also kept a list of all emotion words and their categories on a page in their journal and added to it when new words were presented. The clinician periodically reviewed the journal with each child to revisit emotions discussed in previous sessions. The journal was read back to the child each session and the child was encouraged to make any changes or add any new dialogue to what they had already dictated. The participants were also encouraged to draw a picture in the journal depicting the story for the session.

Procedures

The following scenario was followed. At the beginning of one of the two weekly session, the clinician presented a new story book to the child while following a script which emphasized character motivation, labels for emotions, source of emotion, emotional inferences, contrasting emotions, and the cause and effect of emotions. During the following session following the story exploration, the child and the clinician would go through the story together in a role-play activity using the pictures as a guide. The child was encouraged to take on the perspective of several of the story's main characters and the clinician would take on the perspective of the remaining characters to reenact the story using props. During the reenactment, the clinician emphasized the character emotions and causal relationships while the child and clinician narrated the story actions and highlighted emotions through the use of connective words such as *because, so, if,*

then, and *since*. Mirrors were used to allow the child and clinician to mimic facial expressions and enhance visual identification of emotions.

An additional activity was introduced during the last 10 sessions of the 20 sessions. This task involved using photo and drawing face picture cards depicting facial expressions of the six target emotions. Various games were played using the cards to identify, match, and express possible source of each emotion. The clinician and the participant had mirrors that were used so the participants could observe their own facial features when mimicking the emotions observed on the face cards. Mirrors were often used during story narration and reenactment as well. The mirror was intended to enhance the participant's ability to both identify and express emotions.

Each session concluded with an opportunity for the participant to journal any key points learned during the session. Each participant was given a binder with their name on it, containing notebook paper for their journal and a pencil. The participant was encouraged to dictate while the clinician wrote what was done during the session. The clinician would prompt with questions about emotion of the characters and the source of those emotions. The participant was encouraged to write each emotion word in the sentences in the journal and the two older participants also kept a page where all emotion words talked about were listed under categories and relationships for the student to reference. The participant was then encouraged to draw a picture relating to the story. The clinician periodically reviewed the previous entry to revisit the thoughts and emotions expressed in the last session. At the end of each session, the journal entry was read to the child and the child was encouraged to make corrections. The session concluded with the clinician asking each participant what was hard to do during the session, and what each child enjoyed the most during the session.

Sample Story Book and Script

Llama Llama Red Pajama

By Anna Dewdney

Script and intervention directions by Bonnie Brinton

Concepts to stress

1. Emotions experienced
2. Anticipating an event and the emotions it elicits
3. Fear—anticipated—not justified (Llama and the mama)
4. Introduce notion of guilt
5. Tantrum behavior
6. Mixed emotions—mad, sad, scared
7. Surprise—bad surprise?
8. Prosocial behavior: trusting someone—thinking about what someone else is doing or needs to
9. Structural: complete simple sentence forms, complex sentences with causal connections (but, if, so, because)

Title Page

Look at picture on cover

I wonder what this book is about?

What do you think? (Let child look at cover.)

Now let's look at it together.

Page 1-2

Read (feel free to read the words in the book or to tell what is happening according to what engages the child more)

Here is a little llama and his mama llama.

Do you know what a llama is? (explain)

They are reading a book before bed?

Do you ever do this with your mom or dad?

How does Little Llama and Mama Llama feel?

They are happy because they like reading together.

Page 3-4

read

What is Mama Llama going to do?

How does Little Llama feel about that?

Page 5-6

Read

How does Little Llama feel?

Look at his face. He looks a little worried.

What is Mama doing? She is busy, isn't she?

Page 7-8

Read

What Little Llama doing? What does he want?

Do you think he needs a drink? Maybe. Do you think he might want something else? He feels lonely, so he might want his mama.

Mama says she'll come soon.

Little Llama is waiting.

Page 9-10

Read

Little Llama is waiting.

Little Llama starts to fuss a little.

Llama is sad because Mama did not come to his room right away.

But Mama is busy downstairs, isn't she?

What do you think Little Llama will do next?

Page 11-12

Read

What does “whimper” mean? It means to cry a little (demonstrate)

Mama needs to answer the phone.

Then Little Llama starts to moan and whine.

Little Llama is whining because he wants his mama?

Have you ever done this? (or your sibling, etc.)

Page 13-14

Read

Little Llama is waiting for Mama.

How does he feel?

He looks a little worried or scared because Mama has not come.

But what is Mama doing (talking on the phone and washing dishes)

Little Llama starts to cry because Mama has not come.

I think that Little Llama really wants his own way here.

(You can introduce the notion of Little Llama’s not thinking that Mama might be busy if you think the child would get it.)

Page 15-16

Read

Whoa. Look what Little Llama is doing now?

Llama is yelling for Mama. Little Llama is very mad because Mama has not come.

Little Llama is mad because he did not get his own way. He is mad because he did not get what he wanted.

He is crying and stomping and fussing.

Do you know what a tantrum is? (explain) Little Llama is having a tantrum.

How do you think Mama Llama will feel about that?

Page 17-18

Read

Now how does Llama feel?

Why does Little Llama feel scared?

If Llama thinks Mama is gone, then Llama would feel scared.

Do you think Mama is gone? What do you think she is doing?

Page 19-20

Read

I think Llama is having a tantrum because his mama has not come.

Llama feels mad and sad and scared all at the same time!

Page 21-22

Look at Mama.

What does she think?

Mama is surprised, not a good surprise—a shock!

She is and scared and worried.

What does she think might have happened? (Llama is hurt)

Mama is scared and worried because she thinks Little Llama is hurt. (Is Llama really hurt?)

What does she do? (Drop the phone, run upstairs)

Page 23-24

Read

What does Mama find when she gets upstairs (Little Llama is fine but he made a huge fuss)

Oh, look at Mama's face. How does she feel?

Mama is mad because Little Llama made a big fuss (tantrum) when he was not hurt at all.

Mama wanted Little Llama to be more patient. (define patient)

How does little Llama feel?

Little Llama feels guilty because he knows he made a huge fuss for nothing.

(define guilt—you know you have done something that is not good and you feel bad about it)

Little Llama feels sorry that he screamed and had a tantrum.

Page 25-26

Read

Mama tells Little Llama that she loves him.

Mama tells Little Llama that she is close by, even if she is not in his room.

How does Little Llama feel?

Little Llama feels happy because

Mama loves him and is close by.

Page 27-28

Read

When Mama kisses Little Llama, he feels calm and happy.

Page 28-29

Read

How do you think that Little Llama feels now?

Llama felt a lot of different things. First he was happy to read with Mama, and then he was lonely when she left. Then he was scared and mad and made a fuss. Then he was sorry he fussed. When Mama came back, Llama was happy again.

Has something like this ever happened to you?

Appendix B

Rules for Dividing Utterances

Brinton, B. & Fujiki, M. (1984). The development of topic manipulation skills in discourse. *Journal of Speech and Hearing Research*, 27, 350-358.

- A. Utterances are major or minor sentences:
 - Major sentences: subject-predicate structure, simple or multiple clauses
 - Minor sentences: social phrases (“hi”), interjections, and back channel responses (murmurs of agreement, brief restatements - things that keep a conversation going but don’t really add anything)
- B. Any repetition of part of a longer utterance is considered as part of that utterance (e.g., “Yesterday Bob went, Bob went home.”)
- C. A false start is part of the utterance it attempted to start (e.g., “Bob went, Bob went home later”).
- D. If the utterance is so incomplete that you can’t tell what the speaker was going to say, you would transcribe it but not count it as an utterance (count syllables- put # in parenthesis).
- E. When two or more speakers are talking at the same time, each utterance is counted separately.
- F. Utterance boundaries occur at the end of a phonemic clause also marked by
 - Drop in pitch or loudness across the entire clause or the final syllable
 - A final rise in pitch, or question inflection
 - An unfilled pause (2 seconds)
 - Lengthening of the final syllable
 - The use of a stereotyped “ending expression” (such as “you know”, “or something”)
 - The completion of a grammatical clause with a subject-predicate combination
 - The end of a word
 - Gesture

Additional conventions for utterance division

1. If a conjunction does not link topically related clauses—count each clause as a new utterance (no deletion) (all different topics stringed together with “and”).
2. By convention: “and, and...” Keep the first “and” even if no deletion, if clauses seem to go together topically. Then if the subject continues “and, and, and” count as separate utterances.
3. Stacked back channel utterances are considered separate utterances if one second separates them (all other utterances must have a 2 second pause to be divided on the basis of pause length).
4. Affirmation and negation occurring at the beginning of an utterance are considered separate utterances if there is a one-second pause or elongation of the word.
5. Tags (with upward intonation) are considered a separate utterance if at least a one second pause precedes the tag.
6. “I see” is considered a separate utterance.

7. Back channel utterances which overlap a pause within the conversational partner's utterance are considered one utterance.
8. Choice questions (if conversational partner is given less than 2 seconds to respond) are considered as part of the same utterance.
9. In cases in which the meaning suggested by intonation conflicts with syntactic information, intonation overrides syntactic formation.

Appendix C

Conventions for Measuring Length of T-unit

The basis for the following list of conventions for the grammatical analysis was Hunt (1970) and Steffani (2007), with specific modifications by the author.

1. Eliminate incomplete T-units or sentence fragments.
2. Eliminate entire T-unit if some part is unintelligible.
3. Eliminate repetitions of an utterance (e.g., only count one “when” in “when, when, when they were looking”).
4. Eliminate utterances that are not part of the narration, but are part of the child’s conversation with the clinician (e.g., “Did I miss a page?” or “I think”).
5. Eliminate fillers such as “um” or “uh.”
6. Eliminate incomplete T-units due to a missing subject or verb (e.g., “and look inside of it”).
7. Include the final version of the phrase when it is repeated or falsely started (e.g., eliminate “And he gets” in the utterance “And he gets, and he followed them in the house”).
8. Eliminate “the end” from the morpheme count.
9. Include expressions such as “ahh,” “hmm,” or “ehh” when they are used as expressions of the character being portrayed, not as fillers.

Appendix D

Annotated Bibliography

Adams, C. (2005). Social communication intervention for school-age children: Rationale and description. *Seminars in Speech and Language, 26*, 181-188. doi: 10.1055/s-2005-917123

Adams provides a framework and rationale for a social communication intervention (SCI). Social communication is defined as “using language in interpersonally appropriate ways to influence people and interpret events” (p.182). Children with social communication problems (SCP) struggle with the four domains that make up social communication, (a) social interaction (intersubjectivity and the recognition of others as social beings), (b) social cognition (the process of communication comprehension as a constructive socially contextualized activity), (c) pragmatics, and (d) language processing. Adams also outlines four principles for creating a SCI. First, interventions must be adaptable. Professionals involved must recognize stakeholders and their role in communication with child. They must also consider whether or not the child is developmentally ready for social/language demands, establish a highly adapted communication environment in school and home, adapt the school curriculum, and establish monitoring of responses. Second, interventions should be socially flexible. They should encourage empathy and understanding of emotions, introduce understanding of nonverbal and verbal inference, introduce the use and understanding of metaphors and hidden meaning, and focus on coherence as basis for understanding texts and reporting events. Third, interventions should include metapragmatic therapy. Fourth, language processing therapies should be included as part of the social communication intervention, according to the child’s individual limitations. Adams concludes by giving suggestions on future research including investigating whether there are correlations between specific pragmatic/social cognitive/language processing characteristics and the results of social communication intervention.

Relevance to the current work: Adams illustrates the idea that social communication can guide principled interventions when used to profile individual's capabilities. This work is particularly relevant because the SCI used in the current project is based on many of the principles described in this article.

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 disorders. *International Journal of Language & Communication Disorders, 47*, 233-244. doi: 10.1111/j.1460-6984.2011.00146.x

The purpose of the study was to determine the effect of a manualized social communication intervention on language skills, observed functional pragmatic ability, and broader social communication using a small-scale randomized control trial. Eighty-eight children who met specific criteria were randomly assigned to receive either social communication intervention (SCIP) or treatment as usual (TAU). Each child's intervention was individualized,

but followed a specific framework. After measures were taken, no significant effect was found for structural language ability or narrative ability. However, there were significant improvements in perceptions of conversational competence, parent-reported measures of pragmatic functioning and social communication, and teacher-reported ratings of classroom learning skills. This study shows that SCIP intervention does help improve parents' and teachers' perceptions of a child's pragmatic and social communication skills and provides a basis for future studies to be done regarding SCIP intervention.

Relevance to the current work: The current thesis is based on a project that has some similarity to the study presented in this article; both articles looked at improvements in structural and narrative ability as well as teacher and parent perceptions of the child. The data from both of these can serve as further evidence regarding social communication intervention.

Adams, C., Lockton, E., Gaile, J., Earl, G., & Freed, J. (2012). Implementation of a manualized communication intervention for school-aged children with pragmatic and social communication needs in a randomized controlled trial: The social communication intervention project. *International Journal of Language and Communication Disorders*, 47, 245-256. doi: 10.1111/j.1460-6984.2012.00147.x

The purpose of this study was to evaluate a manualized communication intervention for children with social communication needs. Researchers investigated the efficacy of such an intervention, and looked at the factors associated with its implementation. The intervention that was investigated, the Social Communication Intervention Project (SCIP), is based on the notion that therapy should be individualized based on the child's needs within three areas: language processing, pragmatics, and social understanding/social interaction. Children were referred for inclusion in the study based on their specific difficulty with pragmatics. Of these children, 57 were randomly selected to receive the SCIP intervention; 28 other children received treatment as usual. The therapy the target group received included three, one-hour sessions per week. Since one aim of the intervention protocol was to involve learning support assistants (LSAs), the children's parents, teachers, and others were invited to participate in the therapy sessions as often as possible. During the therapy sessions, goals and activities addressed the three aspects as mentioned previously, and were designed for one-to-one therapy as well as to practice in the classroom or at home. The activities included methods such as modeling, role play, and sabotage. In the intervention manual, each activity was recorded and outlined. Information contained included the component of intervention that was implemented (e.g., conversation skills, narrative construction, comprehension monitoring), the target, a description of the activity, the goal, the materials and resources needed, the specific procedure used, the methods of measuring, and suggestions for making the activity more or less demanding. This study showed that a manualized intervention (for which details of the procedures were outlined) can produce a reliable treatment. At the same time it can provide individualized treatment plans. Given how often it was necessary to address basic conversation, narrative skills, metapragmatic skills, understanding of social cues, and emotion vocabulary, researchers suggested that these core components be included in therapy as a precursor to individualized therapy.

Relevance to the current work: This study illustrates the importance of having an intervention that is outlined and consistent, but adaptable to individual needs. The intervention in the current project included components that are individualized to each child's needs and follows many of the same principles addressed in this article.

Brinton, B., & Fujiki, M. (2014). Social and affective factors in children with language impairment. In C. A. Stone, E. R. Silliman, B. J. Ehren, & K. Apel (Eds.), *Handbook of language and literacy: Development and disorders* (2nd Ed.), 173-189. New York, NY: Guilford Press.

The purpose of this chapter was to consider the social and affective factors that are associated with language impairment (LI). The authors argue the need for further research and present future research ideas. LI, social competence, and emotional intelligence are interactive and influence each other, but the relationship between them is rarely clear-cut. It is clear that many social tasks that children must undergo in order to have successful social relationships are difficult to accomplish without typical language abilities. Specifically, children with LI struggle getting into play, staying with the play, and negotiating and resolving conflicts. Children who struggle with social difficulties early on usually continue to struggle in adolescence and later life. Difficulties include problems with social competence, socioemotional behaviors, self-esteem and perceptions of well-being based on reports about self-perception.

Relevance to the current work: In order to effectively treat a child with LI, clinicians and researchers must be aware of the social difficulties these individuals face, as illustrated by this comprehensive chapter.

Eisenberg, S. (2014). What works in therapy: Further thoughts on improving clinical practice for children with language disorders. *Language, Speech, and Hearing Services in Schools*, 45, 117-126. doi: 10.1044/2014_LSHSS-14-0021

The author discusses ways to improve clinical practice for children's language interventions. One suggestion is that clinicians not disregard therapy techniques just because they don't yield immediate results. Children with LI typically have a slower acquisition rate of new grammatical structures and learn differently from typically developing children. Thus, it may take an extended amount of time to demonstrate gains. After reviewing a number of studies about therapy dose, dose frequency, and dose form (input characteristics and therapy strategies), the author came to a number of conclusions. She stated that children with LI should receive several sessions (spread out over time) that have concentrated doses of examples and instruction to learn grammatical features and that the children should be actively involved in producing the target features. She also suggested that a typical session should involve high-structured drill with immediate application in another activity in order to maximize learning and generalization. Clinicians should remember that these interventions take time and that children need plenty of exposure to the target feature before learning and generalization will occur.

Relevance to the current work: This article is helpful in understanding and explaining why the current social communication intervention may or may not work to improve grammatical complexity. The author gave several poignant principles that help clinicians, including the current researchers, understand how children with LI learn grammatical features most efficiently.

Fey, M. (1986). *Language intervention with young children*. In San Diego, CA: College-Hill Press.

In this text, the author explains the hybrid therapy approach and the benefits of using such methods. The author explains that a hybrid approach is an attempt to develop intervention activities that are natural as well as effective in speed, durability, and generalizability in teaching language. Each hybrid approach has specific goals, activities and materials that are conducive to a more natural environment. Additionally, clinicians modify their language to emphasize target forms. The chapter reviews different types of hybrid approaches including modifying the environment, focused stimulation, vertical structuring and expansion, milieu teaching, and the mand-model procedure.

The author concludes that hybrid approaches have a huge potential benefit since clinicians can work with their clients without interrupting daily routines. Intervention can be conducted in a group setting or in the classroom. The convenience of using hybrid approaches in the classroom also translates into the likelihood that certain language targets and skills will be more easily generalized into daily life.

Relevance to the current work: The project from which data were gathered for this thesis was based on similar principles to a hybrid approach in that different skills were targeted at the same time, with a lot of clinician modeling. If there is evidence that hybrid approaches are effective, the intervention described in this thesis should also have potential to be effective.

Fujiki, M., Brinton, B., McCleve, C., Anderson, V., & Chamberlain, J. (2013). A social communication intervention to increase validating comments by children with language impairment. *Language, Speech, and Hearing Services in Schools, 44*, 3-19. doi: 10.1044/0161-1461(2012/11-103)

This study examined the effects of an intervention that targeted increasing validating comments (positive statements, sharing information, etc.) of children with language impairment (LI). Researchers collected baseline data about children's social competence and cooperative learning by having four children with LI participate in activities where they worked alongside typically developing (TD) peers. Social competence was assessed using sociometric measures of peer acceptance and friendship, and the Teacher Behavior Rating Scale (TBRS). During the intervention, three treatment goals were specifically addressed: (a) increase successful access to groups of peers in ongoing play, (b) increase cooperative play or work with peers, and (c) increase validating comments to peers in play or work. The first one or two sessions of each week were instructional in order to introduce, discuss, and rehearse target behaviors. In the next session, the children had an opportunity to play with two TD peers in a game setting. In the last session of each week, the children watched selected segments of their peer interaction, received feedback and discussed their performance, and then practiced positive social behaviors with another game or activity. The researchers collected the data by looking at the number of both validating and negative comments. Performance was also examined by comparing performance to the TD peers that participated in the triads. Follow-up social measures (peer acceptance, friendship, and sociability) were compared to baseline measures. The results of the analyses varied from child to child. Three of the four children produced increases in validating comments. Three children showed little or no change in peer acceptance after intervention and one child showed a decrease. For two of the students, their teachers reported an increase in perceived

likeability and prosocial behavior. The authors concluded that although this intervention did not solve any of the children's social difficulties, it helped raise important questions for future developing social communication interventions.

Relevance to the current work: This study piloted methods to evaluate a social communication intervention.

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: 0161-1461/02/3302-0102

Emotion regulation is an umbrella term for the processes and strategies that monitor, evaluate, and modify emotions. In this study, researchers looked at emotion regulation in children with language impairment (LI) to determine whether or not their emotion regulation skills differed from those of typical children. The study examined 82 child participants (41 children with LI and 41 typically developing children). Each child with LI was matched by age and gender with one typically developing child. The main measure taken was the Emotion Regulation Checklist (ERC) which was completed by the children's classroom teachers, who did not know the purpose of the study. After analysis of the ERC, researchers found that the scores of typical children were consistently higher than their peers with LI; they also found that males with LI scored lower than their female peers. Children with LI received more varied scores than their typical peers. The authors hypothesized that emotion regulation may contribute to the social limitations experienced by children with LI.

Relevance to the current work: This study demonstrates the complex relationship of LI and emotional competence and invites researchers to explore how emotion regulation might be related to specific social behaviors in children with LI.

Gerber, S., Brice, A., Capone, N., Fujiki, M., & Timler, G. (2012). Language use in social interactions of school-age children with language impairments: An evidence-based systematic review of treatment. *Language, Speech, and Hearing Services in Schools, 43*, 235-249. doi:10.1044/0161-1461(2011/10-0047

This article summarized a project commissioned by ASHA to conduct an extensive review of studies that deal with the treatment of disorders of language use in social interactions. The authors explain the importance of targeting interactional behaviors in treatment. One reason for this is that students may have pragmatic difficulties even while their language form and content are typical; social interactions help illustrate potential pragmatic problems. The authors also argue that treatments that target form and content only are not enough to address difficulties in social interaction. This review identified eight studies (narrowed down from 836 articles initially identified); they were the only studies that examined the efficacy of interventions designed to address problems with language use in children with LI between the ages of 6 and 11 years. The studies were analyzed based on methodological quality as well as participant and treatment characteristics, and research stage. After all of these characteristics were analyzed and reported, researchers concluded that the limited number of studies made it difficult to make empirically based recommendations for changes in standard clinical practice. The authors indicated that there is still much to be done in regards to developing standards and new methods for evaluating research and treatment methods. They do suggest, however, that until a better

system is developed, clinicians should make their practice evidence-based by relying on their own clinical expertise and their own opinions about a child's past experiences and current abilities.

Relevance to the current work: This article is relevant to the current thesis as it gives evidence for why the field needs more studies examining the efficacy of social communication interventions. Also needed are refined standards and methods to evaluate those studies. The authors argue that social communication interventions should be a central part of therapy since these therapies can also address other struggles that a child may have, such as problems with content and form.

Gillam, R., & Johnston, J. (1992). Spoken and written language relationships in language/learning-impaired and normally achieving school-age children. *Journal of Speech & Hearing Research, 35*, 1303-1315. doi: 10.1044/jshr.3506.1303

These authors examined spoken and written narratives by school-age children with language impairment (LI). The researchers used the data collected to investigate whether or not there was a significant difference between the narratives of typically developing (TD) children and children with LI. Of the 40 children, 30 were TD and ten had LI. The investigators asked each child to produce two spoken and two written stories. Before each story, the children were shown three pictures and asked to choose one. They then were given a few minutes to produce a story based on that picture and were asked to tell it. After all the samples were taken, the language samples were coded and segmented into T-units. One way the authors looked at complexity was by the amount of morphemes in each T-unit, and the average length of the T-unit. The results indicated that, in general, children used more complex language in spoken than in written narratives. When comparing TD children and children with LI, there was evidence to suggest that children with LI produced more grammatical errors in general, produced more errors when using complex sentences, and produced many more errors in written rather than in spoken narratives. In conclusion, the authors affirmed that language form poses a significant problem for children with LI, a problem that does not seem to disappear with age. The authors also suggest that children with LI produced more grammatical errors in the written task because their already existent difficulty with syntax is exacerbated by the demands of the writing task.

Relevance to the current work: This study relates well to the current thesis as both deal with the narratives of children with LI.

Hadley, P. (2014). Approaching early grammatical intervention from a sentence-focused framework. *Language, Speech, and Hearing Services in Schools, 45*, 110-116. doi: 10.1044/2014_LSHSS-14-0017

The author presents a framework that focuses on sentence structure as part of early grammatical intervention. The framework contrasts with the more commonly used framework, Brown's stages of morpheme acquisition, in that it focuses on understanding and treating acquisition of tense and agreement focusing on word structure and individual morphemes. The author proposes that Brown's framework cannot be used efficiently as an intervention sequence because it does not consider the way grammatical structures work together. The purpose of the framework proposed by Hadley is to make intervention more efficient by taking advantage of the relationships between structures in order to promote the potential for more complex structures to

emerge later on in development. In order to assist clinicians in this effort, Hadley provides a comprehensive list of developmental expectations for verbs and sentences in children.

Relevance to the current work: This article provides a sentence-focused framework that could be used to select goals for grammatical interventions as opposed to individual morphemes from Brown's stages of morphological development. This idea is very similar to the method of modeling employed in the current project.

Hunt, K. (1970). Syntactic maturity in schoolchildren and adults. *Monographs of the Society for Research Development*, 35(1), iii-iv+1-67.

In this well-known and frequently-cited article, Hunt explains the evolution of current methods for measuring syntactic maturity; there have been many different measures, but each has its limitations. To address these limitations, Hunt suggests the use of the T-unit, which is defined as "one main clause plus any subordinate clause or nonclausal structure that is attached to or embedded in it" (p. 4). Hunt summarizes a number of studies that support the argument that words per T-unit is a better measure of syntactic maturity than words per sentence. The T-unit is a more accurate measure because children sometimes run their sentences together without punctuation. He states that using the coordinator "and" multiple times in between main clauses is an immature way of creating longer sentences. The purpose of the study reported in this article was to look at the differences in sentence structure of school-age children at various levels of maturity and mental ability. A principle conclusion is that linguistic maturity involves the ability to make many embedded units per clause rather than simply producing longer sentences.

Relevance to the current work: This article provides the historical basis for the use of a T-unit to measure syntactic complexity. The current work is using the average length of T-unit to determine whether or not the social communication intervention was successful in affecting grammatical complexity.

Nettelbaldt, U., Hansson, K., & Nilholm, C. (2001). Why ask questions? Contextual effects on grammatical structure in the language production. *Child Language Teaching & Therapy*, 17, 89-106. doi: 10.1177/026565900101700201

These authors investigated the effect of contextual aspects of therapy on grammatical structure in language production. The researchers examined the effects of partner type, interactional style, and type of material used for eliciting language. Five children with LI participated. Each child spoke with one of his or her parents in a comfortable setting with family photographs, toy catalogues, children's books and a picture of a house with strange details. The grammatical structure in the language produced during each interaction was then analyzed. The results of the analysis showed that two factors were in fact influential on grammatical structure: type of initiation and type of episode. The authors concluded that it is beneficial for clinicians to explore how context can affect the learning of each individual child and take that into consideration when creating treatment plans.

Relevance to the current work: This study specifically explored the effect of context on grammaticality, an aspect that the current thesis is also exploring.

Nippold, M. (2014). Language intervention at the middle school: Complex talk reflects complex thought. *Language, Speech, and Hearing Services in Schools*, 45, 153-156. doi: 10.1044/2014_LSHSS-14-0027

This article illustrates the idea that all adolescents, including those with language impairment, have the ability to produce complex sentences when given complex topics with which they are familiar. As such, according to Nippold, SLPs should concentrate on the language demands of the classroom along with using literate vocabulary and complex syntax to perform language intervention for adolescents. Nippold emphasizes her conviction that “complex language can empower a speaker or writer to communicate with clarity, precision, and efficiency” (p. 2) and that any speaker will produce complex sentences when talking about complex and familiar topics. She suggests that interventions that aim to increase the use of complex syntax should be designed to consider the topics that appear in the classroom. For example, an intervention designed around a complex story could involve the following steps, (a) breaking the assignment into manageable chunks; (b) providing students with strategies for deciphering the meanings of unfamiliar vocabulary and advanced syntactic structures; (c) offering opportunities to construct complex sentences out of simple sentences and (d) encouraging students to retell, discuss, and role-play the stories with their own words. The author suggests that when an adolescent combines simple sentences to form a complex sentence, he or she begins to understand that denser, more informational sentences can more clearly and efficiently convey an idea.

Relevance to the current work: This article is useful because it outlines a rationale and method to increase syntactic complexity in adolescents; a simple form of this intervention is likely to be clinically applicable to younger children with language impairment as well.

Nippold, M. (2009). School-age children talk about chess: Does knowledge drive syntactic complexity? *Journal of Speech, Language, and Hearing Research*, 52, 856-871. doi: 1092-4388/09/5204-0856

Nippold investigated whether children who were knowledgeable about the game of chess used more complex syntax when talking about the game. Thirty two children volunteered to take part in an interview with an adult who had limited knowledge of the game; the children were ranked as “novice” or “expert” players according to their answers and a judgment made by the adult, a U.S. Chess Federation Master. In the interview, the three speaking tasks were General Conversation (to get to know each other), Chess Conversation (casual questions about chess), and Chess Explanation (expository discourse in which the child taught the adult about chess). Each interview was recorded, transcribed, coded and divided into T-units for analysis. After an analysis of the syntactic complexity, researchers found that there was a significant and substantial increase in total T-units, mean length of T-units, clausal density, and production of various types of subordinate clause in the Chess Explanation task as compared with the Chess Conversation or General Conversation Task. The author concluded that syntactic complexity in school-age children is strongly affected by the speaking task and the child’s knowledge about the subject. Nippold concluded that language and thought are linked in that complex thought leads to complex language. Thus, to measure a child’s syntactic complexity accurately, a clinician must tap into a topic about which the child is knowledgeable and can explain in more complex ways.

Relevance to the current work: This is an article of interest as it gives evidence to the idea that if a child is more familiar with a topic, he will use more complex language. In the current study, this could be a consideration for the reason why children do or do not increase in grammatical complexity as they become more familiar with the topics.

Nippold, M., Hesketh, L., Duthie, J., & Mansfield, T. (2005). Conversational versus expository discourse: A study of syntactic development in children, adolescents, and adults. *Journal of Speech, Language, and Hearing Research*, 48, 1048-1064. doi: 1092-4388/05/4805-1048

The purpose of this study was to compare expository and conversational discourse in typically developing children, adolescents and adults. Researchers analyzed the developmental syntax in each age group and category and set out to establish normative data to be used in clinical practice. There were 120 participants, ranging in age from 7 to 49-years-old. For the conversational discourse samples, every participant discussed topics such as school, family, and friends. For the expository discourse samples, each speaker was asked to talk about the rules and strategies of a favorite game or sport. The results of the study showed that in all age groups, syntactic complexity was greater for expository discourse than for conversational discourse. Researchers also found that the two best measures for indicating growth were mean length of T-unit and relative clause production. They argued that T-units are important in measuring complexity because they have been used as a marker of syntactic development for a long time, and because they show the use of subordination in language. In conclusion, researchers discovered that the expository discourse task helped encourage the use of different types of clauses; this proved to be further evidence of the notion written by many researchers that complex thought drives complex syntax. They also were able to affirm the evidence that syntax continued to develop beyond adolescence, into early adulthood, and then remained stable into middle age.

Relevance to the current work: This article was helpful as it gave considerable background information as well as varying rationales for measuring and studying syntactic complexity, many of which are used in the current study.

Nippold, M., Mansfield, T., & Billow, J. (2007). Peer conflict explanations in children, adolescents, and adults: examining the development of complex syntax. *American Journal of Speech-Language Pathology*, 16, 179-188. doi: 1058-0360/07/1602-0179

The purpose of this study was to analyze the syntactic complexity of typically developing children, adolescents, and adults while speaking in expository discourse rather than conversation; researchers set out to establish a normative baseline with these samples. Sixty speakers were selected to participate in a task requiring them to discuss peer conflict resolution (PCR) using expository discourse. They were asked questions and spoke about this topic. The results from this task were then compared to a task they had participated in previously which required them to speak about their favorite game or sport (FGS). The results showed greater syntactic complexity in the PCR task as compared to the FGS in all three age groups. Syntactic complexity was measured by looking at mean length of T-unit as well as clausal density. Researchers concluded that the PCR task has great potential for being an effective task in examining expository discourse. This article is also very informative about ideas and implications for analyzing

syntactic complexity. In the introduction, the authors explain typical language development of complex syntax and illustrate the idea that early development is characterized by acquiring new syntactic structures whereas later development is marked by combining these structures to produce longer, embedded utterances. The authors also suggest possible nuances (e.g., the formation of the questions, the speaker's knowledge of the topic) that could affect the results of the analysis.

Relevance to the current work: This article is relevant to the current work because it outlines the typical pattern of increasing grammatical complexity in children and what could be expected from a child of a certain age regarding the complex sentences he uses.

Paul, R., & Norbury, C. (2012). *Language disorders from infancy through adolescence* (4th ed.). St. Louis: Mosby.

In this text the authors outline a number of principles of intervention for language development. The three main intervention approaches outlined in the chapter are clinician-directed, child-centered, and hybrid approaches. In clinician-directed approaches, the clinician chooses the reinforcement, specific materials to be used, and how to accept correct or incorrect responses. In child-centered approaches, the child directs the activity and the clinician follows. Hybrid approaches fall in between the clinician-directed and child-centered approaches. There are many different types of hybrid approaches, including focused stimulation, vertical structuring, milieu communication training, and script therapy. The three characteristics which define hybrid approaches are that they focus on small sets of language goals, the clinician has control of the materials and activities, but also allows the child freedom to spontaneously use targeted utterances in relatively natural contexts, and the clinician uses stimuli to model and highlight the target forms. There is a substantial body of evidence that hybrid approaches are effective in teaching language skills.

Relevance to the current work: The social communication intervention that was used in the current research project uses a hybrid approach with a large emphasis on modeling complex syntactic targets. Given the evidence found in this chapter, it should be expected that modeling of target forms will lead to improvements of syntactic complexity.

Spackman, M., Fujiki, M., & Brinton, B. (2005). Understanding emotions in context: The effects of language impairment on children's ability to infer emotional reactions. *International Journal of Language and Communication Disorders*, 41, 173-188. doi: 10.1080/13682820500224091

The purpose of this article was to investigate the ability of children with LI to infer emotions in specific social situations. In order to participate in successful social interactions, one must have the ability to infer one's own as well as others' emotions. This vital social skill is often difficult for children with LI, leading to difficulty making and maintaining friendships. In the study, 43 child with LI and 43 TD children participated. Each child was presented with a scenario in which a character named Chris was involved in a situation that would elicit anger, fear, happiness, or sadness. After the story was told (with pictures to support it), the children were asked to explain which emotion Chris was feeling. After the data were collected and analyzed, researchers were able to conclude that, in general, children with LI struggled to infer emotional responses, differing significantly from their TD peers. They suggest future research

investigating how other aspects of emotional competence are associated with LI and how treatment can address both emotion in social contexts as well as language.

Relevance to the current work: This article gives strong evidence for children with LI having difficulties with emotion understanding; a major focus of the current thesis was facilitating emotion understanding in children with LI.

Stanton-Chapman, T., Denning, C., & Jamison, K. (2012). Communication skill building in young children with and without disabilities in a preschool classroom. *Journal of Special Education, 46*, 78-93. doi: 10.1177/0022466910378044

The authors define social competence as the ability to initiate, develop, and maintain satisfying relationships with adults and peers. In the article, they lay out ideas and principles for social communication interventions including thematic play themes, naturalistic intervention strategies, social integration activities, buddy skills training, and scripts to teach turn-taking skills. The purpose of this study was to provide a social communication intervention that targeted peer-directed initiations and responses to children with and without disabilities and then evaluate the development of their turn-taking skills. Authors set out to understand how social communication interventions affect turn-taking skills, if the results can be generalized into the follow-up session, and whether teachers found the interventions to be effective and produce better social behaviors. Eight children were selected to participate. These children were split up into dyads with one child who had an IEP and one who did not. During the baseline sessions, children played with toys in a room. Once the session started, the interventionist did not prompt the children to interact with the toys or peer. During each intervention session, the children participated in, (a) the advanced play organizer (instruction of vocabulary words, roles, and social communication strategies, and play planning), (b) the play session (ten minutes of play with thematic materials with few prompts from the interventionist), and (c) the review session (review play session with interventionist). All eight participants showed increases of initiations with an immediate peer response as a result of the social communication intervention, although the skills were not generalized into the classroom. In discussing the study, the authors suggest that this explicit teaching of turn-taking strategies helped and will help children to improve the quality of their peer interactions. They also stress the important role of teachers in helping all children develop social communication skills regardless of intellectual abilities. Critical to this goal is to find teachable moments with each child that promote social competence in order to facilitate generalization in the classroom.

Relevance to the current work: This study is relevant because it illustrates a specific social communication intervention designed to improve social communication in children with disabilities. Although the number of participants was small, there was a consistent increase in turn-taking initiations across participants which suggests that the intervention was efficacious. The current thesis project also aims to illustrate the efficacy of an intervention to improve social communication skills, and more specifically, syntactic complexity.

Stanton-Chapman, T., & Snell, M. (2011). Promoting turn-taking skills in preschool children with disabilities: The effects of a peer-based social communication intervention. *Early Childhood Research Quarterly, 26*, 303-319. doi: 10.1016/j.ecresq.2010.11.00

This study examined the effectiveness of a peer-based social communication intervention on turn-taking skills of preschoolers with disabilities. The three aims of the study were to examine the effects of the social communication intervention, look at the participants' turn-taking skills, and study the generalizability of the effects of the intervention. The study included 10 children who were each paired with another child for a total of 5 dyads. For the intervention sessions, researchers used a "plan-do-review" outline, and each session was designed to teach four specific social communication skills: talk to your friend, listen then respond, use your friend's name, and take a turn and give your friend a turn. The "plan" part of the session was used to teach target vocabulary words, teach roles for the theme, read the storybook, teach social communication strategies, and plan the play. In the "do" portion the children played with the themed materials with as few clinician prompts as possible. Data were taken during this section. During the "review" session, the child and the interventionist reviewed the thematic roles, target vocabulary, and the use of social communication strategies. Regarding improvement in turn-taking skills, results showed that the intervention was highly effective for one child, moderately effective for three, mildly effective for two, and ineffective for four. However, the results also demonstrated that nine out of ten participants were able to generalize skills including increased peer play, levels of child-initiated interactions with a positive peer response, and decreased levels of solitary play. As a result, the researchers concluded that social communication interventions that target turn-taking skills help improve the quality of social interactions that children have with their peers.

Relevance to the current work: This study is important because it contains evidence that social communication interventions are effective. The current project could be another piece of evidence suggesting that certain skills that are not directly targeted can be learned as a result of a general social communication intervention.

Steffani, S. (2007). Identifying embedded and conjoined complex sentences: Making it simple. *Contemporary Issues in Communication Science and Disorders*, 34, 44-54. doi: 1092-5171/07/3401-0044

This article provided a flowchart that allowed readers to identify twelve types of complex sentences (embedded and conjoined). The author argues that using complex sentences is important in child language as they allow the child to provide information about clausal and temporal relationships as well as produce more mature narratives. The author defines a sentence as "a structure that consists of one or more clauses capable of presenting a complete thought in a manner which is grammatically acceptable" (p. 45) and a clause is a structure that contains a subject and predicate. A general complex sentence type, defined by joining one or more dependent clauses to an independent clause, generally starts to emerge into a child's language when the child has reached a mean length of utterance of 3.0. The use of complex sentences is important in that it leads to the ability to sequence events temporally and causally, improve cohesiveness of narratives and increase the sophistication of narrative language. It has also been shown that increasing the use of complex sentences can improve reading and writing in typical as well as at-risk students. Children with language impairment produce fewer complex sentences. Additionally, the sentences that they produce are often less grammatically appropriate. Steffani concludes with the idea that training clients to improve their use of complex sentences is vital because of all the implications for future academics. She cites Eisenberg (2006) who describes therapy approaches that can help increase complex sentences. Some of these approaches include

modeling, imitation drills, error detection, and sentence combining. She also considers the arguments against the effectiveness of each.

Relevance to the current work: This article considers complex sentences and their importance in child language, which is the main focus of the current thesis. The article by Steffani gives evidence that if the social communication intervention could succeed in increasing grammatical complexity in children with language impairments, it would be highly beneficial to the future academics of each child.

Tomblin, J., & Nippold, M. (2014). Features of language impairment, In Taylor & Francis (Eds.), *Understanding individual differences in language development across the school years* (pp. 94-124). Retrieved from <http://site.ebrary.com/id/10852466?ppg=96>

In this chapter, the authors explain the fundamental characteristics of LI in school-age children and outline the common subtypes of LI that are found in this population. Children with LI are a heterogeneous group, which is why there are different possible subtypes of LI. The scheme proposed by Rapin and Allen (1983) provided three categories of different subtypes: mixed expressive and receptive disorders, expressive disorders, and higher-order processing disorders. The other schemes of dividing LI into subtypes include dividing them based on modality and based on performance IQ. The authors also discussed syntactic complexity. They explain the importance of using complex sentences with subordinate clauses because it gives speakers the chance to express subtle meanings with clarity and precision. Transcription, coding and analysis using c-units (a main clause and one or more subordinate clauses) is also explained and outlined in a way that can be useful for researchers looking to analyze their own samples.

Relevance to the current work: The current study looks at length of T-unit as well as subordinate clauses; this article justifies the use of those measures to determine syntactic complexity.