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"Is it his Language?" A Neuroeducation Approach to Exploring the Connection Between Levels of Language Function and Prosocial Concepts for Elementary Students Identified with Emotional and Behavioral Disorders

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Abstract

Preparing students to acquire prosocial behaviors is of growing concern for educators. Although a connection between language *structures* and students struggling to acquire prosocial behaviors has been established, students identified with emotional and behavioral disorders (EBD) are not being consistently identified with language impairment (LI). Viewing language differently, the acquisition of language *functions* is theorized to play a role in the attainment of prosocial concepts resulting in prosocial behaviors. Currently, limited research exists that explores the connection between language *functions* and students struggling to acquire prosocial behaviors. The purpose of this study was to: (a) triangulate literature in the areas of cognitive psychology, neuroscience, and language to support a theoretical framework in neuroeducation to address the acquisition of prosocial behaviors; and, (b) apply this framework by exploring the connection between levels of language function and the acquisition of the underlying prosocial concepts through language function sampling analyses with elementary students identified with EBD and/or LI. Four methods of language sampling were used to address two main research questions: (a) What similarities and differences in language function levels and characteristics exist, if any, among varying educational levels of students with EBD, LI, and/or both? (b) Will students identified with EBD, LI and/or both make prosocial or antisocial relationships among the agents, their actions, and the context? This study of language sampling included nine participants identified with EBD and two identified with LI. Language samples were analyzed through deductive content analysis based off predefined codes from existing literature in language function. Key findings include: (a) Commensurate deficits of

language function among participants with EBD and LI indicated by pre-language levels of language function; (b) a proclivity among the students with EBD to assign antisocial meaning to oral and cartooned responses to event-based pictures; and (c) limited production of prosocial responses from all participants to event-based pictures. The results of this study suggest the current structural methods of language assessment for educational eligibility may be inadequate among elementary students identified with EBD. The inclusion of language function measures is recommended for this student population. Additionally, this study suggests that (a) current behavioral curricula that do not factor in acquisition of language function may fail to provide the concepts necessary for acquisition of prosocial behaviors; and (b) a neuroeducation approach that considers the importance of prosocial concept acquisition may result in prosocial development.

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Mitchell for all his help and support, especially when I was feeling “stuck.” Unfortunately, I cannot mention everyone, but I am forever grateful to everyone I did not mention but contributed in some fashion to the successful completion of this dissertation.

Dedication

For my husband, Brian. This dissertation would not have been possible without your continual love, encouragement, and support. I was only able to complete this work due to your unselfish nature and willingness to take on more than your share in our relationship. You held us all together during the times of this process when I was falling apart. I will be telling you “thank you” for this until we are old and gray, but that will not be enough. I love you.

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Chapter One: Introduction

As a speech and language pathologist (SLP), who has worked in a school setting for over 10 years, this researcher has interacted with hundreds of students with wide ranges of disabilities and ability levels. The Individuals with Disabilities Education Act (2004) provides 13 different disability categories and this researcher has worked with students representing every category. The students who have been the most perplexing over the past decade have been the students identified with Emotional Disturbance, also called Emotional and Behavioral Disorder (EBD). From an SLP's perspective, students identified with EBD appear to "fly under the radar" regarding consultation for language assessment or treatment. Although students identified with EBD seem to have noticeable difficulty making and maintaining relationships and are frequently engaged in antisocial behaviors at school, it has been this researcher's experience that a language referral or consult is rarely requested.

One student dominates this researcher's thoughts: Ryan. Ryan moved into the school district already eligible for special education services under the category of EBD. Ryan was one of the few students identified as EBD to have been officially on this researcher's caseload. Ryan was in fifth grade when this researcher met him. He presented with mild fluency issues, also called stuttering, a type of communication disorder treated by SLPs (Individuals with Disabilities Education Act, 2004). Ryan's evaluation report speculated that Ryan's antisocial behavior, or unconventional behavior and violent outbursts, were linked to frustration due to his fluency issues. Although Ryan was evaluated in all areas of communication including articulation, expressive language, receptive language, social communication, voice, and fluency, he

did not demonstrate deficits with enough severity to qualify for communication services other than in the area of fluency (Individuals with Disabilities Education Act, 2004).

Ryan rarely exhibited any fluency issues, but during the weekly therapy that was designed to target fluency, this researcher noticed that Ryan seemed to have other language related difficulties. For example, Ryan did not seem as though he was able to understand events that happened in the past or give logical predictions about what could happen in the near or distant future. Essentially, he did not appear to understand the concept of time with any significant depth. This made his behavior program difficult to maintain since his reinforcement schedule was time-related. Additionally, the researcher noticed he was not making logical conceptual connections that a student his age typically would make, such as the cycle and purpose of earning money. Ryan struggled to make friends, although he told the researcher that he wanted friends. When Ryan would demonstrate unconventional or violent behavior, he was unable to connect that behavior to why students did not want to be his friend.

After an antisocial outburst, Ryan would be asked by one of the EBD classroom teachers or instructional assistants to reflect upon his behavior and to then talk about what he would do the next time, in the same situation. However, with his apparent lack of understanding of time concepts and his inability to connect his behaviors to others' reactions or thoughts of him, this researcher wondered about the efficacy of this approach. Ryan experienced consequences of reinforcement or punishment within his intervention program that were connected to engaging in or not engaging in antisocial behavior. Not surprisingly, the next time Ryan was in a

comparable situation he, undoubtedly, would demonstrate the same antisocial or unconventional behavior.

This researcher has had numerous conversations with educators about students like Ryan, who continued to display antisocial behaviors despite school-based behavioral interventions. The conversations typically revolve around questions such as, “Is it motivation?” “Maybe we need to add more reinforcement?” “Is it his home life?” “Is the academic material too difficult and frustrating for him?” “Maybe we need to shorten his day?” “Is he getting enough sleep and enough to eat?” “Maybe he is just a naughty kid.” The question, “Is it his language?” is rarely mentioned.

At the time Ryan was on this researcher's caseload, she did not understand the difference between *language structures*, the surface forms of language such as words, sentences, morphology, syntax, and surface semantics (Chomsky, 1968) and, *language functions*, the thinking and deep semantics according to social (semiotics) and cultural standards (pragmatics) (Arwood, 2011; Halliday, 1975; Peirce, 1894). The *language surface structures* represent the meaning of the underlying deep semantics, or *language functions*. Without deep semantics, the surface structures are merely acoustic-motor patterns. These patterns are an echo of sounds that can be produced, but are void of the underlying language concepts, similar to an empty shell (Vygotsky, 1962). For example, a two-year-old can repeat words such as “romantic,” “unacceptable,” or “ignore.” These words can even be used with correct timing and, what seems to be, correct context, without the child understanding the concepts that shape the ideas beneath the words. Language functions underlie language structures

and the combination of both serve as language tools used to convey human thought and intention (Arwood, 2011; Bruner, 1975; Vygotsky, 1962).

In hindsight, the difficulties that Ryan exhibited appear to be related to language functions. Somehow, Ryan was able to demonstrate adequate language *structures* related to acquiring prosocial behaviors; yet his continued antisocial behaviors indicated a lack of understanding of the concepts beneath the structures. It was working with Ryan, and several other students like Ryan, that made this researcher curious about language functions and their connections to the acquisition of prosocial behaviors.

Background

Preparing students to acquire prosocial behaviors is of growing concern to educators. Specifically, students identified with EBD can create various disruptions to classrooms and to the overall school environment and climate (Walker et al., 1996). There is urgency to better prepare students to acquire prosocial behaviors due to the increased prevalence and awareness of children with mental health disorders (Data Resource Center for Child and Adolescent Health, 2009/2010) and due to the fact that most students who possess an EBD school eligibility spend 80% or more of their day in general education classrooms (Department of Education, 2016). Students identified with EBD not only have been found to be disruptive in their classroom environment, but also demonstrate difficulty achieving academic success.

Compared to students without disabilities, students identified with EBD demonstrate moderate to significant academic achievement deficits (Reid, Gonzalez, Nordness, Trout, & Epstein, 2004). In a meta-analysis that included over 2,000

students, Reid et al. (2004) found that 75% of students identified with EBD in the study scored below the mean when scores were compared to a contrast group of non-disabled students. Academic difficulties within the population of students identified with EBD is not a surprise since the phrase "inability to learn" is listed as part of the federal criteria for an emotional disturbance (Individuals with Disabilities Education Act, 2004). Even after years of behavioral and academic instruction, students identified with EBD are likely to have difficulty finding employment, difficulties with substance abuse, and a high need for mental health services after their education careers are complete (Walker, Ramsey, & Gresham, 2004). Environmental factors such as low socio-economic status (SES), abuse, and trauma have been linked to problematic behavior demonstrated by students with EBD, or mental health disorders (Bradley & Corwyn, 2002; Jaudes & Mackey-Bilaver, 2008; Milot, Ethier, St-Laurent, & Provost, 2010). In fact, children with EBD have been found to be nearly two times as likely to experience abuse and trauma than children without such conditions (Jaudes & Mackey-Bilaver, 2008). Interestingly, children from low SES families and children who are victims of abuse or neglect have also been linked to low language abilities (Hart & Risley, 2003; Sullivan & Knutson, 2000). Although areas such as low academic achievement, low SES, trauma, and abuse have been well-documented within the EBD population, what has been less documented is the link between low language function and students identified with EBD (Benner, Nelson, & Epstein, 2002; Green-Mitchell, 2016).

High comorbidity rates, the simultaneous existence of two identified disabilities, between students who exhibit antisocial behaviors and students identified

with a language impairment (LI) have been documented since the 1980s (Benner et al., 2002; Petersen et al., 2013; Silva, Williams, & McGee, 1987). In a meta-analysis that examined 26 studies and included 2,796 students identified with EBD, Benner et al. (2002) found that 71% of the subjects in the study had a concurrent LI as measured by standardized or criterion referent language assessments. Yet, somehow, and like this researcher's experience, students identified with EBD are not being identified as LI at alarmingly high rates. In a meta-analysis of 22 studies, including 1,171 students identified with EBD ages 5-13, Hollo, Wehby, and Oliver (2014) found that 81% of students identified with EBD were found to have below average language abilities. The students in the study had never been diagnosed with an LI previously; yet, 47% were classified as having a moderate to severe LI, per standardized language assessments. Since students identified with EBD are not being assessed or qualifying for LI, these students are not receiving services for their possible low language abilities. However, since the current method of assessment and intervention for LI is structural in nature (American Speech-Language Hearing Association, 1993; Chomsky, 1968), the interventions that would likely be planned for these students would not address the language function, or underlying concepts, necessary to create a change in overall thinking and behavior (Arwood, 2011). The previously mentioned meta-analyses established a connection between language *structures* and students struggling to acquire prosocial behaviors; however, they do not address what connection language *functions* have with students struggling to acquire prosocial behaviors.

Language functions are theorized to be representative of thinking and essential for learning (Bruner, 1975; Halliday, 1975; Vygotsky, 1962); however, the role language functions play as a unifying factor between cognition and behavior is rarely mentioned in the assessment or treatment of students struggling to acquire prosocial behaviors (American Speech-Language Hearing Association, 1993; Hollo, 2012). Piaget (1952) describes levels of conceptual cognition (functions) that parallel developmental language products (structures). Within these concepts is the semantic field of agency, a social function of language (Arwood, 2011). Agency acquisition is an important piece in the functional use of language as it is the student's ability to place themselves in relation to others (Ahearn, 2001; Taylor, 1985). Taylor (1985) agrees and articulates that it is through language that humans are able to view the world clearly and become explicitly aware of their environment, including themselves in relationship to other agents. Agency is an important social concept to acquire, because it is the overlap of agents, actions, and objects that make up the basic semantic relationships to serve as the foundation for language function (Arwood, Brown, & Kaulitz, 2015; Brown, 1973).

When relating and interacting with agents, behaviors and interactions can largely fall into two categories: prosocial or antisocial (Arwood et al., 2015; Martin-Raugh, Kell, & Motowidlo, 2016). The outward prosocial or antisocial behaviors are theorized to be determined by underlying prosocial or antisocial concepts (Arwood et al., 2015; Martin-Raugh et al., 2016). Prosocial concepts are described as agents who support, nurture, and protect the initiation and maintenance of healthy relationships and result in prosocial behaviors. Antisocial concepts are the opposite and lead to

antisocial behavior (Arwood et al., 2015). In a study that sought to examine the association between prosocial knowledge and emotional intelligence to prosocial behaviors, Martin-Raugh et al. (2016) found that prosocial behavior is mediated, and indirectly influenced by the acquisition of prosocial knowledge, or concepts. This finding aligns with language theorists who argue that the acquisition of language influences concept acquisition (Arwood et al., 2015; Bruner, 1975; Carroll, 1964; Halliday, 1975; Lenneberg, 1962; Vygotsky, 1962; Whorf, 1956). If language influences concept acquisition, such as prosocial and antisocial concepts, and since knowledge of prosocial concepts mediates prosocial behavior (Martin-Raugh et al., 2016), it is possible that language functions influence the acquisition of prosocial behavior through the acquisition of prosocial concepts. Poulshock (2006) provides a convincing argument that supports the need for language in human moral development. Similarly, Taylor (1985) asserts that because language can facilitate new thinking, students' social conceptual growth and abilities to think and respond to others are intricately linked to their acquisition of language. Therefore, if language functions supply the conceptual thinking and agency required for students to support, nurture, and protect others, then the acquisition of language functions appear to play a role in the acquisition of prosocial behaviors.

Language functions can be measured according to three levels that describe the relationship between language and thinking. These three levels of language function, that will be described in detail in Chapter Two, are called pre-language function, language function, and linguistic function (Arwood, 2011). Even at the elementary level, a student must be at the language level of language function to understand the

social concepts typically being targeted by common social and emotional curriculum (Arwood, 2011; Kuypers, 2011; Piaget, 1959; Sugai & Horner, 2006). In one recent study that specifically examined the language function of students struggling to acquire prosocial behaviors in an alternative high school setting, Green-Mitchell (2016) used functional language sampling assessment and found that all students in the small sample demonstrated restricted language function and found that participants struggled to consistently responded with language reflecting prosocial concepts. Consistent with Hollo et al.'s (2014) study, none of the students in Green-Mitchell's sample received special education services for LI. Green-Mitchell (2016) reported that the pre-language levels of language function demonstrated by the students did not allow them to comprehend most of the social concepts being targeted in the social curriculum used at the study site. Although this study was too small to make broad statements about language function and its possible connection to the acquisition of prosocial behaviors, it did establish a groundwork for future study. First, this study established a foundation to explore language function and its potential connection to the acquisition of prosocial concepts and, therefore, behaviors. Second, it demonstrated the potential utility of language function sampling and analysis among a population of students struggling to acquire behaviors described as prosocial. Lastly, it established the practice of using a neuroeducation approach to study social and moral development.

Specifically, Arwood's Neuroeducation framework is a translational discipline drawing from literature in neuroscience (brain), cognitive psychology (mind), and language theory (Arwood & Merideth, 2017). Converse to the two-tiered, input-output

learning model that is thought to dominate American pedagogy (Yager, 2000), Arwood's Neuroeducation framework aligns with a four-tiered learning model that represents the synergistic processes of the brain while incorporating literature from the fields of cognitive psychology and language (Arwood, 2011; Arwood & Merideth, 2017). This learning model is the Neuro-Semantic Language Learning Theory (NsLLT) and parallels current neuroscience research on how the brain turns sensory input into thinking and learning (Arwood, 2011; Arwood & Merideth, 2017).

Specific to the acquisition of prosocial behaviors, the NsLLT offers a unique perspective to consider when contemplating how students learn to be prosocial through the process of language acquisition. The process of language acquisition is theorized to play a significant role in the way a student learns to behave. Behavior is theorized not to be a direct translation from stimulus input to output response (Skinner, 1953), but rather the product of a language-based learning process that involves language to name concepts and concepts to grow language (Lenneberg, 1973; Vygotsky, 1962). In this way, acquiring language precedes learning to think, and learning to think precedes learning to behave. Consequently, a student's behavioral, cognitive, and language growth are theorized to be linked through the process of language acquisition (Arwood et al., 2015).

The notion that behavior and thinking are connected through language does not match with the current educational trends that provide separate instruction for each entity (Lane, 2007). Traditionally, the U.S. educational model considers behavior, academic, and language instruction as disconnected entities (Lane, 2007). When teachers only target behavioral skills and not academic, language, or other cognitive

areas, the gap between students' academic and social achievement becomes greater and the students identified with EBD are not prepared to participate conventionally within school or society (Farley, Torres, Wailehua, & Cook, 2012). Traditional practices such as conduct codes and reinforcers/punishers that are designed to help students make good behavior choices have proven *not* to be universally successful (Van Acker, 2007). If educators are going to better prepare students identified with EBD to acquire prosocial behaviors, it appears that the acquisition of language must be taken into consideration.

Description of Problem

If the acquisition of language function plays a role in the attainment of prosocial behaviors through the acquisition of prosocial concepts, one problem is that students who are struggling to acquire prosocial behaviors, such as students identified with EBD, are not consistently considered or identified for LI although evidence in the literature suggests that, perhaps, they should be. Additionally, if language function is a foundational component for acquiring the social concepts that generate prosocial behaviors, another problem is that current programs designed to teach social and prosocial behavior may require a level of language function that is too high for the students who are struggling with behavior. Finally, because traditional U.S. education philosophy views behavior as separate from language, students may not be receiving interventions and strategies that include the necessary language for the acquisition of prosocial concepts, possibly stifling the acquisition of prosocial behaviors (Arwood et al., 2015; Lane, 2007).

Literature suggests that language, specifically language functions, mediate the thinking needed to acquire prosocial concepts that can potentially allow for students identified with EBD to participate conventionally within society (Arwood et al., 2015; Carroll, 1964; Halliday, 1975). However, limited research exists that targets language functions with students identified with EBD of any age. A clearer understanding of this relationship can potentially help educators better prepare students identified with EBD acquire prosocial behaviors in an educational setting.

Purpose of the Research

The purpose of this study was comprised of two components. One component was to explore relevant literature in cognitive psychology, neuroscience, and language that encompasses the acquisition of prosocial behaviors with the intent of finding a translational neuroeducation model to address students struggling to acquire prosocial behaviors. The second component of this study sought to explore the connection between levels of language function and the acquisition of underlying prosocial concepts through language function sampling analysis with elementary students identified with EBD and/or LI.

Research Questions

1. What similarities and differences in language function levels and characteristics exist, if any, between elementary students with EBD, LI, and/or both from varying educational settings as measured by functional language sampling analyses?
    a. When asked to orally respond to an auditory prompt from the Temporal Analysis of Propositions (TEMPro)?

b. When asked to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual level?
c. When asked to orally tell a story about an APRICOT II event-based picture that depicts complex semantic relationships at the concrete-operational conceptual level?
d. When asked to cartoon a story from one of the previously told APROCOT I or II pictures?

2. Will students identified with EBD, LI, and/or both make prosocial or antisocial relationships among the agents, their actions, and the context?
    a. When asked to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual level?
    b. When asked to orally tell a story about an APRICOT II event-based picture that depicts complex semantic relationships at the concrete conceptual level?
    c. When asked to cartoon a story from one of the previously told APROCOT I or II pictures?

Justification

While the connection between language *structures* and students struggling to acquire prosocial behaviors has been established, little research exists that targets the connection between language *functions* and students struggling to acquire prosocial behaviors. With a disparity between a high comorbidity rate of EBD and LI and a high

percentage of students identified with EBD overlooked for LI, consideration of language function with students identified with EBD could serve as an equalizer for identification and provide insights for educational programming.

Exploring the connection between acquiring the prosocial concepts that result in prosocial behaviors and the level of language function is especially important for educators working with elementary-aged students because of the likelihood that prosocial behavior acquired in childhood will lead to prosocial adults. In a well-cited study, Robins (1978) found that antisocial behavior presented in childhood predicts high levels of antisocial behaviors in adulthood. This study included four adult male cohorts (one all white, one all black, and two racially diverse to represent U.S. population). Childhood data was obtained through childhood behavioral records and juvenile police and court records while adult data was obtained through interviews, military records, police, prison, and social agency records. Additionally, this study found that not all children with antisocial behaviors grow up to be adults with antisocial behaviors; in fact, most do not. However, for adults to demonstrate antisocial behaviors, the antisocial behaviors *must* have been present during childhood. This indicates that if students can learn prosocial behaviors during childhood, they decrease the probability of becoming adults with antisocial behaviors highlighting the importance of investigating the acquisition of prosocial behaviors at the elementary level (Robins, 1978).

Specifically, this study of language sampling aimed to describe the role language function contributes to the acquisition of prosocial concepts and behaviors among elementary students identified with EBD. Using assumptions from a

neuroeducation framework, if students' behaviors reflect the prosocial or antisocial concepts acquired through a language learning process, then insights gained from how language function is connected to prosocial concept acquisition can potentially impact classroom behavior strategies and curriculum in the future to help elementary students become prosocial citizens.

Overview of Methods

Methods for this study were chosen to address the two main previously mentioned research questions. A brief overview of the methods used to address each question is described below.

What similarities and differences in language function levels and characteristics exist, if any, between elementary students with EBD, LI, and/or both from varying educational settings as measured by functional language sampling analysis? Instruments and activities used to address this question were encompassed in the four subsequent sub-questions pertaining to the first research question. A complete description of the instruments used and how data were analyzed is included in Chapter Three of this study. A brief description of the instruments used and summary of how data were analyzed is included below.

Temporal Analysis of Propositions (TEMPro). With the TEMPro, participants were asked a formal level, auditory prompt that included two temporal modifiers to examine language function levels and characteristics in comparison to neurotypical children of the same age range. The prompt was, "What do you do on a typical day?" The prompt was modified by decreasing the displacement and semanticity if the participant was unable to provide a series of arguments that addressed the prompt.

Participant responses were recorded for later transcription and analyzed for the number of arguments provided, evidence of auditory propositions, language function level of the response, ability to create and maintain a shared referent, and metacognitive mode of the participant.

APRICOT I and II Pictures. Participants were asked to tell an oral story about two event-based pictures following a model from the researcher to examine levels of language function and characteristics with the use of a shared visual referent. The APRICOT I pictures depicted semantic relationships at the pre-operational level of conceptualization, while the APRICOT II pictures depicted semantic relationships at the concrete level of conceptualization. The participants' responses were recorded, transcribed, and analyzed using deductive content analysis with predefined categories based on existing literature in language function (Elo & Kyngäs, 2008). Specifically, participant responses were analyzed for language function level, semantic errors, ability to maintain a shared referent, and ability to produce grammatically correct, complete stories with maximal extension, expansion, and modulation in comparison to what is expected for neurotypical developing children of the same ages.

Cartooning. Lastly, participants were asked to cartoon a response from the APRICOT I or II pictures. Cartooning provides an opportunity for the participant to share meaning with visual concepts. The participants' cartoons were compared to their oral response about the same picture and analyzed for differences in language function levels and characteristics between the oral response and cartooned response. An overview of the methods used to address the second research question is described next.

Will students identified with EBD, LI, and/or both make prosocial or antisocial relationships among the agents, their actions, and the context? Instruments and activities used to address this question were also encompassed in the three subsequent sub-questions. Recorded and transcribed oral responses, as well as, drawn and written cartoons from the first research question were used to analyze prosocial or antisocial concepts within the language samples. To address the second research question, the oral responses and cartoons were analyzed by comparing concepts expressed within the language samples with definitions for prosocial and antisocial relationships found in the literature. For this study, prosocial concepts were defined as ideas that reflect interpersonal care (Serow, 1991), through nurturance, support, inclusion, and protection (Goldstein, 1998; Smith, 1985) that lead to the initiation and maintenance of healthy relationships (Arwood et al., 2015). Antisocial concepts were defined as those that have the opposite characteristics, and do not aid the initiation or maintenance of healthy relationships (Arwood et al., 2015). Behaviors that can be described as antisocial include violations of socially conventional forms of behavior that are reoccurring, typically involving aggression, rule violations, vandalism, and defiance (Simcha-Fagan, Gersten, & Langner, 1986). For example, behavioral acts described during the collection of language samples that reflect antisocial concepts included physical harm, taunting, purposeful destruction of objects, and lying.

Collectively, the methods for this study were designed to obtain natural and authentic data representative of language that was reflective of the participant's thinking to examine the connection between levels of language function and the

acquisition of prosocial concepts with elementary students identified with EBD and/or LI.

Overview of Results

Overall, all participants exhibited deficits in language at a pre-language level of function, regardless of eligibility (EBD or LI) and educational setting. This finding indicates that when language is examined through functional analysis, levels and characteristics were remarkably similar between participants already identified with LI and students with EBD without LI identification. Structural differences were noticed between participants with EBD and participants with LI. The participants with EBD, particularly those not in self-contained settings (0-39% in regular class), were found to have acquired a fair amount of language structures. Since these participants demonstrated more language structures, it is possible that deficits in language function may have been concealed through their ability to produce surface structures. This finding may be a contributing factor to the current disparity among students with EBD dually identified with LI (Hollo, 2014).

When the language samples were analyzed for evidence of prosocial or antisocial relationships and concepts, results indicated a proclivity for students with EBD to assign antisocial meaning to semantic relationships, especially when given a picture with a social conflict. Participants' ability to provide prosocial relationships were limited due to difficulties with semanticity, displacement, and efficiency signifying that the participants may have not acquired the basic semantic relationships necessary for understanding or using prosocial concepts and relationships. The participants with EBD who showed antisocial relationships in their responses,

specifically, included several examples of physical harm. This indicates a low level of agency that reflects objectification and potential difficulties deciphering the difference between objects and agents, likely affecting their ability to be socially competent.

As a whole, these findings suggest that deficits in language function and a tendency to assign antisocial meaning to semantic relationships is a combination that may lead to an inability to initiate and maintain healthy relationships: a distinguishing feature for students with EBD. These findings support the notion that the acquisition of language function as evidenced by extension, expansion, and modulation of basic semantic relationships, may play a key role in the acquisition of prosocial concepts, and therefore behavior (Arwood et al., 2015; Martin-Raugh et al., 2016). Further, when comparing the level of language function found among the participants with EBD and the level of language and conceptualization needed to participate in most contemporary social/emotional and behavior curriculums (Kuypers, 2011; Sugai & Horner, 2006), it seems apparent that there is a gap between what is needed to access the curricula and what was demonstrated by the participants in this study. Furthermore, since many contemporary curricula do not address the underlying concepts of targeted "expected behavior," these curricula may not be providing the language for students with restricted language function to acquire prosocial concepts. Additionally, the deficits found in language function among all groups and the indication of visual metacognition for all participants sheds light on potential educational practices that may aid in the acquisition of prosocial concepts, thinking, and behavior.

Summary of Chapter

Although several studies establish a connection between language *structures* and students struggling to acquire prosocial behaviors, what connection language *functions* may have with students struggling to acquire prosocial behaviors is scarcely addressed. With solidly high comorbidity rates between EBD and LI, and the disparity between high comorbidity rates and high percentages of EBD students under-identified with LI, this researcher sought to 1) triangulate literature in the areas of cognitive psychology, neuroscience, and language to support a neuroeducation model to address students struggling to acquire prosocial behaviors; and 2) explore the connection between language function and the acquisition of prosocial concepts. This chapter outlined the background, problem, purpose, and justification for the study, along with the research questions intended to be addressed.

Chapter Two, the Review of Literature, provides the reader with a triangulation of literature in the areas of cognitive psychology, neuroscience, and language theory with the intent of finding support for a translational neuroeducation model to address the acquisition of prosocial concepts and behaviors. These sections are followed by a description of the NsLLT. The NsLLT sits at the intersection of the three aforementioned domains and provides the theoretical undergirding for this study. Following the description of the NsLLT, an overview of the identification of EBD and LI in U.S. schools is provided. This is followed by a summary of relevant literature that studied the connection between students with EBD and deficits with language *structures*, as well as, language *functions.* Chapter Three provides an explanation and outline of the methods, setting, participants, recruitment procedures, instruments, and

data analysis for this study. Results and findings for this study are reported in Chapter Four, followed by the discussion and conclusion of the findings that are reported in Chapter Five.

Chapter Two: Review of Literature

Introduction

The purpose of this study was comprised of two components. One component was to explore relevant literature in cognitive psychology, neuroscience, and language that encompasses the acquisition of prosocial behaviors with the intent of finding a translational neuroeducation model to address students struggling to acquire prosocial behaviors. This component of the study will be addressed in this chapter along with a review of other pertinent literature leading to an understanding of the research gap and population addressed in the second component of the study. The second component of this study of language sampling, the application of theory, sought to explore the connection between levels of language function and the acquisition of underlying prosocial concepts through language function sampling analyses with elementary students identified with emotional and behavioral disorders (EBD) and/or language impairment (LI).

This chapter begins by establishing a theoretical framework in neuroeducation followed by a review of relevant literature in the three aforementioned lenses of neuroeducation as they relate to the acquisition of prosocial versus antisocial behaviors. In the second section, literature in cognitive psychology points out theories and educational applications from the current dominant educational paradigm in the United States (U.S.). In the third section, literature from neuroscience highlights specific areas of the brain associated with prosocial and antisocial acquisition, as well as literature exploring concept and language acquisition at the neurological level. The fourth section introduces the Neuro-Semantic Language Learning Theory (NsLLT) as

the theoretical backbone for the neuroeducation model utilized for this study (Arwood, 2011; Arwood & Merideth, 2017). The fifth section divides language literature into sub-sections: language structures and language functions. Each sub-section contains definitions, historical context, and methods of measurement as they pertain to the acquisition of prosocial concepts and behaviors. The sixth section defines and outlines the eligibility criteria and current educational settings for students with emotional and behavioral disorders (EBD) and language impairment (LI); the populations of students that make up this study's participants. The sixth, and final, section of this review of literature highlights relevant research exploring the connection between students struggling to acquire prosocial behaviors and language, identifying a gap in literature exploring the connection between language function and students struggling to acquire prosocial behaviors. An outcome of this review will be a suggested paradigm shift to a translational neuroeducation model to address students struggling to acquire prosocial behaviors.

Theoretical Framework in Neuroeducation

Arwood's model of neuroeducation is a translational application derived from a triangulation of literature in the areas of neuroscience (brain), cognitive psychology (mind), and language theory (Arwood & Merideth, 2017). Arwood's approach to neuroeducation differs from traditional neuroeducation frameworks in that traditional frameworks only include perspectives from cognitive psychology to translate research from neuroscience into education applications (Nouri & Mehrmohammandi, 2012). Arwood's model of neuroeducation framework differs by adding a perspective of

literature from language theory. Figure 2.1 represents Arwood's Neuroeducation model (Arwood & Merideth, 2017).

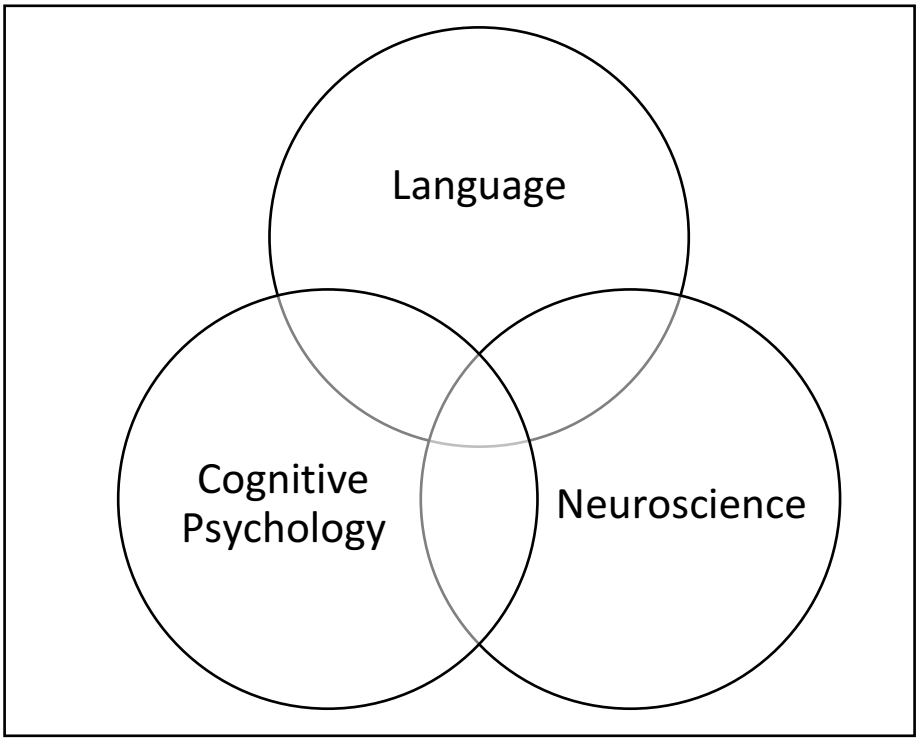


Figure 2.1. Three lenses of Arwood's Neuroeducation framework.

The addition of language theory to a neuroeducation model is important because language is theorized to serve as the mediating factor between the mind (cognitive psychology) and the brain (neuroscience) (Arwood, 2011; Lenneberg, 1969). Since language is used to represent and share ideas, language interprets all data, including data from neuroscience, cognitive psychology, and education. This study will add to the existing literature in neuroeducation by addressing the acquisition of prosocial behaviors using a neuroeducation model. The model of neuroeducation used for this study reflects Arwood's model, but will be referred to as "neuroeducation" henceforth.

There are several theories within the three lenses of neuroeducation that address the acquisition of prosocial behaviors; however, these theories do not always align perfectly with one another (Arwood et al., 2015; Bruner, 1975; Ghazanfar & Schroeder, 2006; Pulvermuller, 2005; Skinner, 1953). For example, most theories in psychology suggest that the etiology for behavior is related to internal factors (Cain, 2002; Hall, 1979) or a combination of internal and environmental factors (Bronfenbrenner, 1994; Skinner, 1953). From a neuroscience perspective, behavior is the product of the cellular structures of the brain organizing sensory input into networks (Gainotti, Ciaraffa, Silveri, & Marra, 2009; Ghazanfar & Schroeder, 2006; Pulvermuller, 2005). Finally, using a language lens, behaviors are considered outward representations of a person's thinking (Arwood, 1991; Bruner, 1975). The neuroeducation framework highlighted in this study considers contributing factors from all three lenses.

A critical distinction to make regarding one of the focal points of this study is the *act* of behaving prosocially, versus the *concepts* that result in prosocial behavior. In U.S. culture, Walker et al. (2004) define prosocial behavior as "cooperative, positive, and mutually reciprocal forms of social behavior" (p. 3). Other authors characterize prosocial behavior as purposeful actions that are beneficial to other people in a general sense (Penner, Dovidio, Piliavin, & Schroeder, 2005). These actions can include helping, sharing, donating, cooperating, and volunteering (Martin-Raugh et al., 2016). However, some language theorists would argue that the underlying meaning of an act, or behavior, is what determines if the behavior is prosocial (Arwood et al., 2015; Searle, 1969; Vygotsky, 1962). Arwood et al. (2015)

define social competence as the ability to initiate and maintain healthy relationships. These relationships are initiated and sustained through some of the basic psychological human needs such as processes of nurturance, protection, inclusion, and support (Goldstein, 1998; Smith, 1985). For example, a student can demonstrate the act of sharing, but without the underlying concepts and language for why he is sharing and how his acts support the other person, sharing is not truly a prosocial act. The distinction between outward prosocial behaviors and the prosocial concepts that potentially drive the outward behaviors will be referred to throughout this study.

In current U.S. education, applications grounded in cognitive psychology serve as the mainstream framework when addressing antisocial behaviors (Mayer, Lochman, & Van Acker, 2005). Antisocial behaviors are defined by Simcha-Fagan et al. (1986) as reoccurring violations of socially conventional forms of behavior that typically involve aggression, rule violations, vandalism, defiance of authority, and violation of social norms and values. Opposite to the effects of prosocial concepts, antisocial concepts do not foster the initiation and maintenance of healthy relationships (Arwood et al., 2015). The following section will outline traditional learning frameworks and educational applications used in contemporary education with the acquisition of prosocial behaviors.

Cognitive Psychology Frameworks and the Acquisition of Prosocial Behaviors

In contemporary American education, there are two main schools of thought about how prosocial behaviors are acquired. These two schools of thought contain theoretical frameworks grouped according to the etiology of prosocial behavior acquisition. One grouping reflects a predominant inclination toward environmental

influences on the acquisition of prosocial behaviors while the other grouping focuses on the individual's internal state. The frameworks of behaviorism and the cognitive model serve as the theoretical backing for most American educational applications used to address the acquisition of prosocial behaviors, or the prevention of antisocial behaviors and will be discussed in the following sections (Bandura, 1971; Kelly, 1955; Kuypers, 2011; Lane, Gresham, & O'Shaughnessy, 2002; Skinner, 1953; Sugai & Horner, 2002). Other frameworks that will be mentioned, but not described in detail, include ecological, biophysical, and psychodynamic frameworks (Bandura, 1965; Bronfenbrenner, 1994; Cain, 2002; Hall, 1979; Penner et al., 2005). The first framework that will be discussed is behaviorism (Skinner, 1953). This framework falls within the group of theories that reflect the impact of environmental influences on behavior acquisition. The second framework discussed in detail will be the cognitive model, a philosophy that espouses the significance of students' internal states as it influences the acquisition of prosocial behaviors (Kelly, 1955). Each section will include a review of the theoretical frameworks and educational applications.

Behaviorism and the acquisition of prosocial behaviors. The concept undergirding a behaviorism framework is that psychology should only be concerned with observable behavior and should not refer to the mental construct underlying the observable behavior (Skinner, 1938). Although mental processes are acknowledged, they are garnered out of the relationship between a stimulus and response and these responses are theorized to be influenced by the environment (Skinner, 1953). One educational belief grounded in behaviorism philosophy is that all behaviors are learned through association or habituation and can be strengthened with practice, or rehearsal

(Skinner, 1987). Contemporary behaviorism is mostly influenced by the work of B.F. Skinner who was especially instrumental in developing the theory of operant conditioning (Skinner, 1953). Skinner developed the theory of operant conditioning from Thorndike's Law of Effect (Thorndike, 1927) that states people are more likely to repeat a behavior if it produces a satisfying effect and are unlikely to repeat a behavior if it produces an uncomfortable effect. Operant conditioning employs the use of "reward" and "punishers" to alter behavior through an associative learning process (Skinner, 1953, p. 59). An example of a study employing these philosophies was conducted by Skinner in 1938. In this study, Skinner used a rat to examine the effect of operant conditioning by using a lever that dispenses food, food being the reward. One of the measures used to determine if conditioning had occurred was the documentation of time intervals between each push of the lever. Over time, the pushes of the lever increased significantly, proving the rat had been conditioned, or "learned," to use the lever.

Skinner often used animals as experimental subjects in his earlier works; however, using animals and applying the results to human learning has its limitations because animals do not have the function of language like humans (Sankey, 2010). When reviewing cases of primate language, Sankey (2010) found that, although primates were able to acquire a limited amount of contextual signs, they were unable to combine signs in a novel way. This inability to combine signs points to the notion that the primates did not understand underlying concepts that can be used flexibly. In a sense, the primates were able to learn the pattern of language and associate it contextually, but did not demonstrate a deep understanding of the underlying meaning

behind its use. To use language in this way is termed *borrowed language* (Arwood, 2011) and will be discussed further in the upcoming sections. Although Skinner influenced the theory of behaviorism, he was not the only contributor to this theory.

Two other noted theorists, who contributed to the theory of behaviorism, are Pavlov and Bandura. Pavlov gained notoriety for his well-known experiments involving dogs. In these experiments, he conditioned dogs to salivate by pairing an unconditioned stimulus, meat powder, with a neutral stimulus, a bell (Pavlov, 1927). Through his work, the classical conditioning paradigm was created. This paradigm consists of using an unconditioned response with a neutral stimulus to elicit a conditioned response. This type of conditioning paired with Skinner's (1953) operant conditioning serves as a sizable part of the foundation for behaviorism.

Bandura added to the traditional behaviorist view through his theory of social learning, typically called social learning theory (Bandura, 1965). This theory proposes that people not only learn through experiencing rewards and punishers, but also learn through observing others being rewarded or punished. Social learning theory claims that people learn through observing, modeling, and imitating (Bandura, 1965). Social learning theory is applied in education today by the combination of teaching strategies for students identified with EBD to watch or imitate a model and then receive a reward or punishment (Sutherland, Wehby, & Copeland, 2000). This viewpoint of social learning suggests that students identified with EBD should be able to learn to be prosocial through methods of watching or imitating the models or being rewarded or punished to learn acceptable behavior.

Using the theories from the behaviorist framework, behavior is a function of environmental stimuli or influences that manipulate inner control of behavior. Therefore, assessment and interventions through this lens focus on environmental variables. To that end, frameworks within behaviorism postulate that if the environmental variables change, the behavior will change in turn. The following subsection discusses past and current educational practices that have roots in behaviorism theories.

Behaviorism application in education. When educational programs, strategies, and policies are applied from behaviorists' perspectives, they function to prevent antisocial behaviors from occurring through the form of rewards and/or punishment (Arum, 2005). Conduct code enforcement practices, such as exclusion and corporal punishment, serve as examples of the use of punishers in traditional American education (Arum, 2005). Schools frequently develop conduct codes that outline the behavioral expectations for students and protocols for enforcement (Arum, 2005). Exclusion policies such as "zero-tolerance" largely have been proven to be harmful and ineffective for students identified with EBD, while failing to decrease antisocial behaviors (Van Acker, 2007). Additionally, when these types of methods are enforced with students who have been found to have severe antisocial behaviors, the students are likely to demonstrate even more aggressive antisocial behaviors sometimes escalating to violence (Meyer, 1995).

In addition to these traditional policies used today, behaviorism theory is also evident in other contemporary education practices that focus on the "rewards" rather than "punishers." Sugai and Horner (2002) agreed that exclusionary and punitive

approaches to discipline would likely lead to increased antisocial behavior from the targeted student population and proposed a multisystem approach that was later named Positive Behavior Interventions and Supports (PBIS).

Positive Behavior Interventions and Supports (PBIS). Positive Behavior Intervention and Supports (PBIS) is an approach supported and outlined by Sugai and Horner (2002) and Walker et al. (1996). This system is rooted in Applied Behavioral Analysis (ABA) and serves as a method to alter behaviors using approaches derived from behaviorism (Skinner, 1953; Sugai & Horner, 2002). The application of PBIS in contemporary U.S. schools conforms with behaviorism and Skinner's ideas on a reductionist model for teaching and learning (Skinner, 1987). This reductionist model encourages task analysis, or the breakdown of the whole behavior into small, step-by step units or acts taught and reinforced in small increments. Skinner encouraged the use of rewards and token economies. This reward and token system is a significant undergirding of the PBIS system and its design to teach wanted or unwanted behaviors (Skinner, 1953, 1987).

The PBIS approach to teach "expected behaviors" (Sugai & Horner, 2002) has been found to be helpful, but not universally effective, at reducing extrinsic behaviors that are inappropriate (Benner, Beaudoin, Chen, Davis, & Ralston, 2010; Bradshaw, Mitchell, & Leaf, 2010; Miller & McKevitt, 2015). To describe PBIS in more detail, PBIS is a three-tiered, school-wide approach designed to reduce antisocial behaviors in schools, especially for at-risk students. Elements believed to prevent antisocial behaviors and encourage expected (prosocial) behaviors highlighted within a PBIS system are intended to establish a school culture of safety, responsibility, and respect.

The methodology includes clearly outlined behavioral expectations, recognizing appropriate prosocial behaviors, collecting behavioral data, and committing to maintaining the development of staff with the PBIS philosophies (Sugai & Horner, 2006). Programs such as PBIS have been growing in popularity over the last 15 years with a little over 23,000 schools accepting PBIS as their behavior and discipline framework (Positive Behavior Intervention and Supports, 2016; Swain-Bradway, Swoszowski, Boden, & Sprague, 2013).

Studies investigating the effectiveness of PBIS have shown a positive influence on overall student behaviors (Benner et al., 2010; Bradshaw et al., 2010; Simonsen & Sugai, 2013). In the general education setting, school-wide PBIS has been shown to be effective in all three tiers (Horner, Sugai, & Anderson, 2010). For example, in a longitudinal randomized control study that examined data from 37 elementary schools, Bradshaw et al. (2010) found that using a school-wide PBIS system at the elementary level significantly reduced student suspensions and office referrals. Research on the effectiveness of PBIS within alternative education settings is limited; however, some studies have found positive outcomes with the implementation of PBIS in this type of setting. Using teacher rating scales, Benner et al. (2010) found a positive correlation between the use of PBIS and student behavior with a small number of elementary, middle, and high school students (N= 37) identified with EBD in self-contained educational settings. Classroom teachers reported statistically significant reductions between pre- and post- test rating scores for internalizing behaviors, externalizing behaviors, and total behavior problems.

In regard to implementing PBIS, specifically for students identified with EBD, Bradley, Doolittle, and Bartolotta (2008) argue that PBIS alone is not enough to yield improved behavioral outcomes for this population. Instead, Bradley et al. (2008) support a combination of services, such as response to intervention (RTI) and early intervention services, along with PBIS to help improve the process of identifying and supporting students who may need additional interventions. While PBIS has been shown to be an effective system for reducing antisocial behavior and has been found to be more effective in decreasing behavior referrals than punitive systems (Simonsen & Sugai, 2013), other studies have found PBIS and reward centered systems ineffective at increasing behaviors that are described as prosocial (Benabou & Tirole, 2006; Fabes, Fultz, Eisenberg, May-Plumlee, & Christopher, 1989; Miller & McKevitt, 2015; Paulsen, Hallquist, Geier, & Luna, 2015).

As described in the previous paragraph, PBIS has been found to be effective in influencing positive behavioral outcomes with students overall: yet little research has been conducted that specifically looks into the impact that PBIS may have for students with severely challenging behaviors. One study that did such found PBIS to be ineffective with students identified with severely challenging behaviors in an alternative setting (Miller & McKevitt, 2015). In a three-year study of kindergarten through twelfth grade alternative school students, Miller and McKevitt (2015) did not find any significant change in student behavior from the year before PBIS was implemented to the end of the study. Number of students in the study varied slightly from year-to-year but averaged 52 students per year and data was collected through student behavior point cards to determine behavioral differences. This study also

found that students' aggressive behaviors and the use of seclusion had slightly increased after PBIS had had been implemented, while use of safety seats (seats used to help students from harming themselves or others) decreased slightly. Overall, this study suggests that the use of PBIS with students found to have severe behavior challenges may not have had an impact on increasing "expected behaviors." This study concluded that more research is necessary addressing the impact of PBIS for students with severe challenging behaviors.

Using rewards, as PBIS suggests, to incentivize positive and expected behavior is argued by some to decrease internal motivation (Benabou & Tirole, 2006; Paulsen et al., 2015), reduce compassion (Fabes et al., 1989), impair individual agency (Arwood et al., 2015), and only produce the desired behaviors in the specific reward environment (Arnove & Strout, 1978). When rewards are introduced as an incentive for behaviors that are described as prosocial, Benabou and Tirole (2006) argue that the meaning attached to the behaviors is subsequently changed. Changing the meaning behind the behaviors can deter the emphasis of the behavior from a socially competent inclined rationale, to a self-serving one. This shift in emphasis is argued to restrict personal agency growth and, therefore, restrict moral development (Arwood et al., 2015; Taylor, 1985). Also, the altered meaning behind the behavior has been found to potentially delay the transition from external motivation to internal motivation (Paulsen et al., 2015). With PBIS and the use of rewards found not to be universally effective, PBIS receives an array of criticism.

Criticisms surrounding the implementation of PBIS focus around a lack of a holistic approach and high degree of fidelity that is required to positively influence

student behaviors. Farley et al. (2012) and Lane (2007) criticize behavior programs and systems such as PBIS that do not place an emphasis on the integration of behavior, academics, and cognition. Similarly, Arwood et al. (2015) criticize the theoretical undergirding to PBIS that views behavior, cognition, academics, and language as separate segments of a whole person. Additionally, PBIS is criticized for the fidelity of implementation needed for positive behavior outcomes to occur. Studies have shown that quality training and high-fidelity implementation of PBIS in both general education and alternative settings is crucial to the success of positive behavior outcomes (Benner et al., 2010; Bradshaw et al., 2010). The requirement of high-fidelity PBIS implementation can become a barrier to affecting positive behavioral outcomes when school personnel are already resistant to adopting PBIS as a universal intervention system. This resistance may be due to lack of administrative direction and leadership, skepticism about the need for a universal system, hopelessness about change, philosophical differences, and staff feelings of disenfranchisement (Lohrmann, Forman, Martin, & Palmieri, 2008). The implementation of PBIS is one example of how behaviorist theory is used to reduce antisocial behaviors in schools. Another theory that emphasizes environmental changes that will be briefly outlined is Ecological theory.

Ecological Theory. According to an ecological theoretical approach the context, or culture, is what aids in defining whether behaviors are considered prosocial or antisocial (Rhodes, 1967). Bronfenbrenner's ecological theory of development is an example of a theory that supports behavior as a result of environmental factors (Bronfenbrenner, 1994). Ecological theory supports several contemporary educational

applications, the wraparound approach and restorative justice will be highlighted in this section.

The wraparound approach has emerged as a family-oriented and ecologically comprehensive intervention that includes comprehensive assessments, interventions, and close collaboration of families, schools, and community-based services providers (Quinn & Lee, 2007). This approach is frequently used for students identified with EBD who present with pervasive and chronic challenges (Quinn & Lee, 2007). The wraparound approach uses multiple levels of Bronfenbrenner's (1994) theory to attempt to address problematic behavior. A limited number of studies have emerged since the early 1990's that report overall favorable outcomes for this approach (Clark et al., 1996; Evans, Armstrong, & Kuppinger, 1996; Hyde, Burchard, & Woodworth, 1996; Myaard, Crawford, Jackson, & Alessi, 2000). In a quasi-experimental study that examined the viability of wraparound services for adolescents in an urban setting returning from residential treatment facilities, Hyde et al. (1996) found that 47% of the adolescents in the wraparound group were living in regular community placements, attending schools for the majority of the week, and had three or fewer days of serious behaviors problems reported in a month. Only 8% of adolescents receiving traditional mental health services were found to achieve that same level of success, suggesting positive results for this population and age. Further support for the wraparound approach includes a multiple-baseline case study of four adolescent youths with severe emotional disturbances (Myaard et al., 2000). Participants in this study began receiving wraparound services at different points in time and all were found to show immediate improvements shortly after the introduction of wraparound services in

compliance, peer interactions, physical aggression, alcohol and drug use and verbal abuse (Myaard et al., 2000).

When examining younger children, Evans et al. (1996) found positive effects for children placed in foster care receiving wraparound services (n = 27) versus traditional foster care family-based treatment (n = 15). This one-year long, randomized control study of children between the ages of 5-12 found substantial behavioral and mood differences between the two groups but no differences with respect to family cohesiveness or self-esteem. While results from the above-mentioned studies are encouraging for students with EBD, limited research has been conducted examining the effects of a wraparound approach with elementary-level students with EBD (Evans et al., 1996). Additionally, although research indicates that maintaining fidelity to the principles of a wraparound approach with students with EBD (Bruns, Suter, Force, & Burchard, 2005), little is mentioned about the specific types of treatments provided to the participants in each study. It is possible that the types of treatments provided, as part of a wraparound approach, contribute to the success or lack thereof. Examining the level of language used with different treatment methods could have given extra insight into the outcomes of the wraparound approach. Another contemporary educational application based in ecological theory, restorative justice, will be discussed next.

Restorative justice is defined as a way to "hold offenders accountable, repair harm to the victims, and provide support and assistance to offenders to encourage their reintegration into community" (Suvall, 2009, p. 558). Specific applications of restorative justice used in schools include victim-offender mediation or reconciliation,

restorative conferencing for conflict resolution, and peacemaking circles (Evans, Lester, & Anfara, 2013). Restorative justice approaches contrast with punitive approaches to problematic behaviors, such as zero tolerance policies, by focusing on social engagement rather than focusing on social control (Suvall, 2009). Several studies have been conducted within the juvenile court system resulting in positive outcomes for this approach. Latimer, Dowden, and Muise (2005) conducted a meta-analysis of 22 studies exploring the effectiveness of restorative justice practices in correctional facilities. Results of this meta-analysis show that restorative approaches were found to be substantially more effective in accomplishing victim-offender satisfaction, a reduction of levels of recidivism, and higher levels of compliance than correctional facilities not using restorative justice practices.

Less empirical research has been conducted in the school setting; however, studies conducted show positive effects for the use of restorative justice practices (Karp & Breslin, 2001; Suvall, 2009; Wearmouth, McKinney, & Glynn, 2007). In a study that included three school districts from Minnesota, Colorado, and Pennsylvania, Karp and Breslin (2001) studied the effects of restorative justice policies in place of zero tolerance policies. This study found that, although schools implemented restorative justice slightly differently, the majority of schools at all levels of K-12 education reported decreases in major discipline referrals and reductions in suspensions and expulsions. Other outcomes for restorative justice practices found in schools include the feeling of acceptance and safety and understanding among administrators and students (Suvall, 2009) aided in the resolution of conflicts (Wearmouth et al., 2007). Restorative justice practices appear to be built on the

assumption that the students taking part in such practices have a high enough level of language to engage in conversation, the ability to take the perspective of another person, or understand the complex concepts being addressed as part of the restorative plan. Current research has not discussed how restorative justice practices impact students with impaired language or what alterations need to be made to restorative justice practices for these students.

Shifting from the belief that the acquisition of prosocial behaviors is highly influenced by the environment, the next frameworks assume that the etiology and treatment for behaviors described as antisocial are influenced by both environment, and internal factors. These frameworks include the cognitive, biophysical, and psychodynamic models.

Cognitive model and the acquisition of prosocial behaviors. The cognitive model proposes that emotional and behavioral disorders stem from faulty cognitions or constructions of reality (Kelly, 1955). This view is based on the idea that the way people think and perceive the world leads to emotions that affect the person's behavior. Cognitive-behavior psychologists emphasize the reciprocal relationship between cognition and behavior, and how that relationship is informed by the environment (Bandura, 1971). To this end, if people change their cognitions, or what they think, they will be able to change their behavior.

The cognitive model assumes that human processes, like perception, are the primary cause for disordered emotions. Perception, a cognitive factor important to the cognitive model, is supported from early anthropological investigations. Jastrow (1902) discussed the impact of how cultural differences affected saliency with specific

objects or viewpoints, even when visual acuity was similar. Bruner and Goodman (1947) demonstrated the power of perception and culture with their study that showed how students living in low-income situations perceived a coin larger than richer students. Bruner and Krech (1950) assert that behavior is dependent on the perception of the individual and that perception can shift over time. Krech (1950) also argues that judging outcomes, or products of behavior, as a measure of learning is inadequate. Although a person may demonstrate similar behavioral products, the learning may be different based on different perceptions of the environmental stimulus. This notion of learning contrasts with behaviorist principles of learning. Principles grounded in behaviorism designate that behavior indicates that learning has been achieved; however, cognitive principles imply that looking internally and exploring the "why" behind behaviors is also important.

Several types of cognitive restructuring therapies have been developed to provide a remedy for problematic behavior. Two types of cognitive restructuring therapies that will be discussed in this review are Rational Emotive Behavioral Therapy (REBT) (Ellis, 1980) and Cognitive Behavior Therapy (CBT), sometimes referred to as Cognitive Behavior Modification (CBM) (Mayer et al., 2005). These types of cognitive restructuring techniques were chosen for a brief review because of their educational relevance.

The REBT methodology is derived from the idea that problematic behaviors largely originate from sets of irrational beliefs that lead to the shaping of short-term expectations, appraisals, and attributions (Ellis, 1980). The irrational beliefs are argued to stem from social-types of interaction among significant people, messages

from the media, and important peers (Ellis, 1980). This type of social influence is similar to the role of *assignment of meaning* found in language theory (Bruner, 1975; Carroll, 1964; Tomasello, 2003). Language theorists agree with Ellis (1980) in the sense that social interaction shapes the way people think and how those thoughts can scaffold into a rational (prosocial) or irrational (antisocial) direction. Ellis (1980) posits an "ABC" model to organize the sequence of how an event, or the environment, can shape a person's behavior. This ABC model is not to be confused with the antecedent, behavior, and consequence model out of the literature in behaviorism and frequently used with functional behavior assessments (FBA) in schools (Van Acker, Boreson, Gable, & Potterton, 2005). According to REBT methodology, "A" represents the acting event, "B" represents the person's rational or irrational belief about the event, and "C" represents the emotional or behavioral consequence. The key to behavioral intervention using REBT is to replace irrational beliefs with rational beliefs, that will ultimately alter the behavioral consequence. This approach has been found to be an effective counseling technique for decreasing disruptive behaviors with children and adolescents. In a meta-analysis of 19 studies that used REBT with children and adolescence, Gonzalez et al. (2004) found a positive and significant effect size for students in the intervention group when compared with the control group. Disruptive behavior was found to have the largest positive effect size. However, Ellis (1980) warns that REBT may not be an appropriate intervention for all students. Ellis (1980) reports that students with mild emotional and behavioral impairments who are motivated to change their behavior will have the most success, whereas more moderate to severe impairments will have less success. When an

approach is taken that employs both principles of behaviorism and cognitive methods, the approach is called CBT (Mayer et al., 2005).

The CBT approach teaches people to mediate their own behavior through self-strategies while also applying behaviorism principles such as reinforcing, monitoring, self-correcting, and self-regulation. This approach has been found to be the most commonly used in schools with students identified with EBD (Mayer et al., 2005). A contemporary example of this approach is the Zones of Regulation curriculum (Kuypers, 2011). This curriculum is designed to teach students about their emotions and how their emotions fit within color-coded zones to help determine what specific emotion-informed behavioral strategies should be used. Throughout the use of this curriculum, reinforcement schedules are recommended to be used with the students. Little empirical research has been conducted with this specific curriculum. One study in a kindergarten classroom found a positive impact on self-regulations based off pre/post teacher rating scales (Zones of Regulation, 2017). Overall, CBT has been found to be promising for school-aged students identified with EBD (Ager & Cole, 1991), although effects of the treatment have been found to not always be long-term (Wyman et al., 2010). A possible explanation from a neuroeducation perspective as to why the effects are not always long term is due to concepts and multi-step processes that require the student to process high levels of conceptualization and language (Arwood, 2011; Halliday, 1975). Without acquiring the concepts and language required to independently regulate emotion, the students will be dependent on others to help them through the process (Vygotsky, 1962). Without conceptual development and language to represent their thinking, the patterns of perception will be discarded as

new input is processed (Ghazanfar & Schroeder, 2006; Pulvermuller, 1999). Therefore, the student is unable to independently use the strategies beyond familiar and routine contexts.

The educational applications used with students identified with EBD based on assumptions from the cognitive model assume that faulty thinking patterns cause feelings that influence behavior (Bandura, 1971). However, as discussed further in the neuroscience language sections of this literature review, a person's ability to behave prosocially is greatly influenced by the neuro-semantic process of acquiring meaning that leads to the language based brain functions of attention, cognition, and emotional regulation (Posner & Rothbart, 1998). The next section will briefly discuss two other frameworks that focus on the combination of environmental and internal factors and their educational applications.

Psychodynamic and Biophysical Models. Both the psychodynamic and biophysical models focus on the individuals' internal state and interaction with the environment. The psychodynamic model consists of several theories that aim to explain the motivation of human behavior; however, two prominent theoretical strands underpin this model. The first is Freud's psychoanalytic theory (Hall, 1979) and the second is Rogers and Maslow's humanistic theory (Cain, 2002). Two prominent applications seen in contemporary education based off these theories are humanistic education and affective education. Both of these educational applications invest in the processes that elicit changes in behavior, believe emotional crisis can be a catalyst for behavior change, believe interactions and relationships with others early in life affect personality and behavior, and focus interventions on the person and his perceptions of

the environment (Webber & Plotts, 2008). Additionally, both theories highlight the importance of developing a well-adjusted and happy child; and both theories suggest that social and emotional development is equal to or more important that academic development (Abrams, 1992; Cain, 2002).

Using a biophysical framework, physiological abnormalities that include genetic, neurological, and/or temperamental components are believed to cause emotional disorders and problematic behaviors (Webber & Plotts, 2008). Subsequently, food and/or drug therapies are often used to alter internal physiological structures to promote a change in behavior for students (Bateman et al., 2004; Hall, Bowman, Ley, & Frakenberger, 2006; Klein, Abikoff, Hechtman, & Weiss, 2004; Peacock, Lewis, Northstone, & Wiles, 2011). Overall, research concerning diet does not appear to have a long-term effect on the behaviors of upper elementary students, but might have short-term affects for the behaviors for younger children (Bateman et al., 2004; Peacock et al., 2011). Literature in the area of pharmaceuticals used in the treatment of problematic behaviors is considered inconclusive since most studies in this area focus on behaviors associated with Attention Deficit Hyperactivity Disorder (ADHD) and not emotional disorders or conduct disorders (Forness, Freeman, & Paparella, 2006; Klein et al., 2004). Neurological etiologies can also fall within the biophysical model. The neurological contribution for prosocial behaviors is a growing field as neuroimaging and medical evaluation technology grows. While contributions from frameworks within the realm of cognitive psychology provide insight into how theories of the *mind* aid in the acquisition of prosocial behaviors, contributions from the field of neuroscience provide insights into the structures and functions of the *brain*

that provide the biological underpinning for the processes of prosocial behavior acquisition. The field of neuroscience is the second domain in a neuroeducation model and will be reviewed in the next section.

Neuroscience and the Acquisition of Prosocial Behavior

Traditional neurological theories view the brain as a set of separate structures that are recruited when provided specific stimuli, and it is these structures that determine the function of the brain (Ghazanfar & Schroeder, 2006). However, this model limits the functions of the brain to specific pathways for cognition and does not allow for the growth of larger and better-connected circuits and networks (Clarke & Tyler, 2014). Mounting evidence from recent neuroscience research suggests that the brain works synergistically and suggests that the functions of the brain influence the structures in a process called neuroplasticity (Bookheimer, 2002; Diodge, 2007; Meyer et al., 2007). Additionally, new research indicates that higher order thinking, such as language for displaced concepts, is influential for the acquisition of prosocial behavior (Pulvermuller, 1999, 2013). The next sections of this chapter will outline the traditional, unimodal paradigm, and the newer, multimodal paradigm of neurology related to the acquisition of prosocial behaviors.

Traditional neuroscience model. Traditional neurological models are grounded in a unimodal paradigm, meaning that separate structures of the brain are responsible for processing sensory inputs. These areas, or structures, are thought to be distinguished from other structures of the brain that serve separate functions (Klemen & Chambers, 2012). For example, meaning from visual input is traditionally thought to be localized to the occipital lobe, while meaning from language is traditionally

thought the be localized in small parts of the temporal lobe called Wernicke's and Broca's areas (Hagoort, 2005). Traditional models are believed to represent how people make meaning out of sensory data by following a path that is hierarchical mainly using feed forward neurological connections (Klemen & Chambers, 2012). This means that the data received from the sensory organs (eyes, ears, nose etc.) travels a linear channel from the subcortical regions of the brain to the neocortex. Subcortical regions can include the hippocampi, basal ganglia, amygdalae, fornix, cingulate gyri, and thalami. The subcortical regions of the brain constitute the limbic system (Isaacson, 1982). The structures of the limbic system are important to note because all sensory input must travel through these subcortical regions to reach the cortical regions where concepts, language, and conscious thoughts are processed (Pulvermuller, 1999; Shevrin & Dickman, 1980). From a unimodal perspective, the structures of the limbic system are believed to support brain functions for learning, memory, motivation, and emotion (Isaacson, 1982); but, from a multimodal perspective, these structures are not associated with conscious thought (Crone & Ridderinkhof, 2011). The neocortex, also known as the cerebral cortex, consists of regions that are known for higher-order processing for unconscious thought and language (Fellman & Essen, 1991). These areas include the frontal, parietal, temporal, and occipital lobes.

The basis for a unimodal model results from over 150 years of research that utilized a deficit approach to brain study (Bookheimer, 2002). A deficit approach is when the function of the brain is observed following a lesion or injury by noting the breakdown or inability to compete a task by the person with the lesion or injury. This

reveals the function of the specific brain region affected (Bookheimer, 2002; Ghazanfar & Schroeder, 2006). Through this model, the structures of the brain are believed to influence the function. Specific structures such as the prefrontal cortex, orbitofrontal cortex, and anterior cingulate cortex have been identified as brain regions associated with antisocial behaviors (Anderson, Bechara, Damasio, Tranel, & Damasio, 1999; Bush, Luu, & Posner, 2000; Posner & Rothbart, 1998; Schore, 1999; Yang & Raine, 2009). For example, Anderson, Bechara, Damasio, Tranel, and Damasio (1999) found that when damage to the prefrontal cortex occurs early in life, called "early-onset," the resulting behaviors resemble psychopathy. Further evidence includes findings from a meta-analysis of 43 brain-imaging studies that included 789 antisocial, violent, and/or psychopathic subjects and 473 control subjects. Results indicated that antisocial behaviors were found to be significantly associated with reduced prefrontal structure and function (Yang & Raine, 2009). Although the deficit approach has been an effective way to map and match structures of the brain in relationship to their function, new imaging and research technologies have been, and continue to be, developed that allow researchers to understand the inner workings of the brain with more clarity (Bookheimer, 2002).

Recently, neuroscience evidence has provided additional insights and methods that allow for alternative explanations to the unimodal approach. Through measures such as positron emission tomography (PET) and functional magnetic resonance imaging (fMRI), brain researchers are now able to measure areas that are not only essential to a performance task, but also areas that are involved or contribute to the task (Bookheimer, 2002). Instead of specific large regions or modules responsible for

creating meaning in the brain, semantic knowledge is thought to be organized in widely-distributed, and relatively small, clusters of modules that are tightly inter-connected with other modules including the primary and supplementary motor systems (Bookheimer, 2002; Gallese & Lakoff, 2005; Ghazanfar & Schroeder, 2006; Klemen & Chambers, 2012; Pulvermuller, 2013). This new evidence indicates that the brain is far more inter-connected than originally believed by traditional neuroscientists and leads to the notion that the brain functions not in a liner way, but in more of a multimodal way.

Evidence is mounting that conceptual knowledge, also called semantic knowledge, is rooted and organized within the sensory motor-systems and is inherently multimodal in nature (Gallese & Lakoff, 2005). The brain integrates multimodal sensory information into overlapped patterns to form circuits, or concepts, which then form larger networks (Gallese & Lakoff, 2005). This means that information from multiple sensory inputs are integrated (cross-modal) throughout a much larger area of the brain. These cross-modal systems allow for higher-order brain functions such as conscious thought, language, and executive attention (Posner & Rothbart, 1998; Pulvermuller, 2013). These higher-order functions serve as a basis for voluntary control over thought, emotion, and behavior (Posner & Rothbart, 1998). Multimodal integration is dependent on the congruency of two simultaneous signals and/or synchrony of signals across cortical structures (Ghazanfar & Schroeder, 2006).

Not all behavior is conscious, such as primitive sucking reflexes, screaming when suddenly startled, or any implicitly learned primitive association of a stimulus and the reflexive motor response (Bargh & Morsella, 2008). Some theorists postulate

that unconscious impulses in the brain are the source of behavior and that consciousness only plays the after-the-fact role of sense maker (Bargh & Morsella, 2008). This view represents bottom up, processing, usually evident in young children (Skeide & Friederici, 2016). This means that integration is occurring from the subcortical regions to the cortical regions through feed forward channels (Klemen & Chambers, 2012). As children grow older, and acquire more language, top down processes are evident indicating that input is integrated through the feed forward and feedback channels allowing for multiple points of access (Skeide & Friederici, 2016). This is relevant because language and thinking are cortical processes (Kiefer & Pulvermuller, 2012) and for students to change their behavior, or to obtain command of their behaviors, they must be able to reflect and think about their behavior. This means that input must be integrating in the cortical pathways that form the circuits and networks in the brain (Pulvermuller, 2013). In a sense, the child is making meaning that forms the acquisition of concepts from both feed forward and feedback channels (Klemen & Chambers, 2012). To some language theorists, acquiring meaning is the very essence of the function of language (Halliday, 1975; Peirce, 1894).

To acquire meaning of a concept, such as one related to behavior, the brain must work synergistically creating cortical networks that allow for functions of language, such as executive attention, cognition, and symbolization (Halliday, 1975; Peirce, 1894). Using the assumption that meaning is acquired through integrated input creating cortical pathways and networks, the acquisition of prosocial behaviors appears to be affected by the brain's process of acquiring concepts and larger integrated networks of higher order thinking, or language (Bell & Wolfe, 2004). The

amount of language function will ultimately influence the extent behaviors can be reflected upon (Arwood et al., 2015). The next section will discuss the neurological processes involved with concept and language acquisition, or how the brain makes meaning from raw sensory data.

Brain mechanisms for acquiring semantic knowledge. Ghazanfar and Schroeder (2006) state, "The integration of information from different sensory systems is a fundamental characteristic of perception and cognition" (p. 284). This means that humans take in sensory stimuli from the outside world through sensory organs such as the eyes, ears, and hands. This data is integrated to form a unified representation of that person's knowledge of their world, generally called semantic concepts or perceptions. However, the sensory stimuli are not automatically turned into understandable concepts or representations. With repeated meaningful stimulation, neural pathways are strengthened by "wiring together," or converging with stimuli from other modalities, or the same modality, to form cell assemblies (Gallistel & Matzel, 2013). This strengthening of neuronal pathways to form circuits is often referred to as the Hebbian Principle and is often summarized with the phrase: neurons that fire together, wire together (Gallistel & Matzel, 2013). The strengthening of these cell assemblies can be a combination of several different meaningful sensory modalities. For example, visual modalities can process input such as light and movement and can potentially overlap to form a visual cluster of cells, or patterns (Arwood, 2011; Gainotti et al., 2009). The cell assemblies are integrated in higher processing areas of the brain such as the parietal, temporal, and frontal lobes through feed forward channels. Larger-scale integration is possible due to the large amount of

feedback channels that allow for conceptualization of higher-level cognitive tasks (Klemen & Chambers, 2012). Larger scale integration using feedback channels means that the visual input that has been overlapped with other visual input, can be integrated with different areas of the brain through the brain's ability to provide feedback, rather than just follow one channel that only flows forward. The use of large-scale integration through the use of feedback channels is a distinguishing difference between the traditional unimodal model of how the brain creates, stores, and retrieves encoded input and the multimodal model of concept acquisition and language function.

It is important to note that light stimuli are not the only stimuli to be recorded in the visual cortex. In a study using retrograde tracing injections with nine cynomolgus monkeys, Falchier, Clavagnier, Barone, and Kennedy (2002) found that the visual cortex also receives projections from the auditory cortex, as well as the somatosensory areas. This means that both acoustic and pressure input can be processed in the visual cortex (Falchier et al., 2002). In a different study that aimed to discover if people born blind used visual cortical circuits similar to seeing people when processing numerical problems, Kanjlia, Lane, Feigenson, and Bedny (2015) used fMRI-imaging techniques with 17 blind and 19 sighted participants asked to solve pairs of mathematical equations. The results show that the blind participants used their visual cortex when solving equations more so than the sighted participants. In another study that used participants who were blind, Sadato et al. (1996) found that the visual cortex was activated by discriminatory movement stimuli, such as a person using their fingers to read braille. Sadato et al. (1996) suggests that the somatosensory

input processed by the primary visual cortex more likely represents spatial imagery rather than visual imagery; but nonetheless, this study along with the others mentioned, supports the idea that the primary visual cortex does not strictly process visual input. Visual information, specifically, is hypothesized to be transferred to other areas in the cortex from the occipital region of the brain through ventral and dorsal pathways (Gainotti et al., 2009; Weiller, Bormann, Saur, Musso, & Rijntjes, 2011).

This widely accepted model of vision and hearing processing hypothesizes that the ventral cortical pathway is considered the "what" pathway and is believed to play a role in the construction of objects and color (Weiller et al., 2011). The dorsal pathway sends projections to the parietal lobe and represents the "where" pathway. The dorsal pathway functions to guide actions and is mostly integrated with pressure, movement, and proprioceptive information (Gainotti et al., 2009). Recent research suggests that brain structures responsible for semantic knowledge are located in the cortical areas where the dorsal and ventral streams of visual processing converge with other perceptual afferences, consistent with a sensory-motor model of semantic knowledge (Gainotti et al., 2009; Gallese & Lakoff, 2005; Vigliocco, Vinson, Lewis, & Garrett, 2004). These findings support the notion found in language, cognitive psychology, and neuroscience literature that the majority of people in the U.S. currently utilize visual metacognition (Arwood, 2011; Faw, 2009; Zeman, Dewar, & Della Sala, 2015).

When people create patterns from cross-modal visual-sensory overlap, or through intra-modal visual-visual overlap, concepts are represented in visual, spatial, or other imagery leading to conceptualization that is visual in nature (Gage & Muotri, 2012; Koelewijn, Bronkhorst, & Theeuwes, 2010). For multimodal integration to

occur, acoustic signals or light/movement signals must have temporal synchrony allowing for circuits, or concepts, to be widely distributed to the language networks (Meister et al., 2003; Stevenson, VanDerKlok, Pisoni, & James, 2011). Visual metacognition can be represented as mental images, pictures, movies, diagrams, or any other type of visual sign or symbol meaningful to the learner (Arwood, 1991).

Arwood (2011) found that approximately 95% of people interviewed for whole language samples were believed to utilize visual/spatial cognition, while the remaining 5% utilized auditory cognition. Using visual imaging profiles, Faw (2009) surveyed 2,500 people and found that only 2-5% of the sample reported the lowest imaging categories of "no image," or "dim image." Participants who responded in the lowest imaging categories described hearing their own voice or other people's voices rather than seeing visual images when reading. Faw's (2009) study found that the mean of all participants is on the vivid end of the visual imaging continuum, supporting Arwood's (2011) claim that the clear majority of people in the U.S. think with visual concepts. The impact on education that arises from the notion that most students are believed to think with a visual system is substantial because without meaningful multimodal sensory input for people with visual metacogntion, concepts are unable to be successfully formed. For students who utilize auditory metacognition, stimuli overlap to integrate into auditory or visual cell assemblies. This type of multimodal input is sometimes referred to as audiovisual speech (Stevenson et al., 2011). When a mismatch occurs between environmental stimuli and the student's learning system, the input will not integrate into cortical regions of the brain for concepts and language (Pulvermuller, 1999). Instead, the input will remain at the subcortical level, known as

perceptual patterns according to the Neuro-Semantic Language Learning Theory (NsLLT) (Arwood, 2011; Scheibel & Scheibel, 1965). When this mismatch occurs between sensory input and metacognitive mode, acoustic patterns may result. These patterns lack underlying meaning. For example, teaching behavior outside a visual approach to visual thinkers may result in students imitating the sound of spoken rules but not understand the rules.

Researchers Merzenich et al. (1996) and Tallal et al. (1996) studied the effects of temporal modification of the acoustic wave with the hypothesis that phonological deficits play a large role in students with LI rather than cognitive or linguistic impairments. Using audiovisual interventions several times per week for one month with a small sample of five to ten-year-old participants, Merzenich et al. (1996) and Tallal et al. (1996) found a two-year increase in receptive language comprehension tasks involving structures of language such as receptive phonology, morphology, and syntax. With such a significant growth in only four weeks of audio-visual intervention Tallal et al. (1996) and colleagues suggested that the idea that the participants actually learned approximately two years of language in such a short period of intervention was "unlikely." The researchers hypothesized that the participants had already acquired the concepts being assessed prior to the intervention; however, they were unable to express such language skills intelligibly and conventionally (Merzenich et al., 1996; Tallal et al., 1996). It is possible that the researchers' hypothesis was correct and that the participants were aware of the language concepts prior to the research intervention. However, the significant increase in language structures may have resulted from a subcortical pattern association of language skills that were then

reproduced during the post-test situation (Ghazanfar & Schroeder, 2006). In this case, the binary feedback from the audio-visual games may not have provided enough meaningful sensory input to form long-term concept acquisition (Bookheimer, 2002; Gallistel & Matzel, 2013). Similar results were found by, Loeb, Gillam, Hoffman, Brandel, and Marquis (2009). Participants in the study made significant short-term sound blending gains, but the interventions that targeted phonemic awareness and reading skills did not yield significant long-term effects and did not improve the participants' overall reading abilities.

The above-mentioned studies demonstrate how children can be taught acoustic patterns and are able to repeat them for a short period of time, but without conceptualization were unable to integrate the targeted patterns into their natural language. This means that presenting audiovisual stimuli, as done in the previously mentioned studies, may not be providing input in a meaningful way to those 95% of those students with visual metacognition (Arwood, 2011).

Sensory patterns represent meaningful input, or semantic features. Semantic features are attribute-like features, acquired from past sensory experiences later named as concepts for color, shape, action, taste, or smell (Kiefer & Pulvermuller, 2012). According to Kiefer and Pulvermuller (2012), "Each concept is coded by multiple representational units, usually using the activation vector of an entire "layer" of a network. Thus, the activation pattern across several representational units establishes the theory (distribution theory)" (p. 807). In other words, each concept is derived from small bits of encoded data and semantic features distributed through circuits connecting the semantic features to a concept. According to the distribution

framework, the semantic features are represented in modality specific categories and are dependent on sensory experiences during concept acquisition. Distribution theory proposes that semantic features of the same type are grouped in a relational sense for the purpose of encoding and retrieval. This grouping means that concepts, stored in semantic memory, are accessible through multiple access points of sensory distribution connected by circuits into networks (Arwood, 2011; Kiefer & Pulvermuller, 2012). Pulvermuller (1999) reviewed several neurological studies that involved semantic knowledge and concluded that distributed cell assemblies had defined topographies, or networks, that vary with semantic properties of the words. Pulvermuller (1999) found that these networks are not only in the left hemisphere cortical areas, but also are found in additional cortical areas in the right hemisphere. Essentially, the distributed cell assemblies with distinct topographies are the neurological counterpart to words, or the deep semantics of language (Kousta, Vigliocco, Vinson, Andrews, & Del Campo, 2011; Pulvermuller, 2013). To explain it in a different way, language represents the neurological process of concept acquisition ,a process that uses the whole brain synergistically. Words are used to mark, or tag, a concept that serves as linguistic symbols to communicate thoughts (Arwood, 2011; Peirce, 1894). Words do not merely tag specific perceived objects, words also label and tag the set of relationships that allow for use and understanding of both concrete and abstract semantics (Lenneberg, 1969).

The specific process to neurologically acquire meaningful words, or language, is called semantics (Kousta et al., 2011). Neurologically acquiring language that holds meaning is different than the imitative process of associating visual or acoustic

patterns to objects or signs (Lenneberg, 1969). Semantics can be broken down into two categories: concrete semantics or abstract semantics (Vigliocco et al., 2014). To compare, concrete semantics exist in space and time and can be perceived and acted upon. An example of concrete semantics is the meaning of objects that can be physically seen or touched, like a coffee cup (Hale, 1988; Kousta et al., 2011). According to literature in language theory, this type of semantics coincides with concepts that are represented by non-displaced words, or language that represents the "here and now" levels of displacement and semanticity (Arwood, 2011; Chomsky, 1968; Vygotsky, 1962). Abstract semantics, or displaced concepts, do not exist in space and time and are internally represented constructs dependent on the experience and language of the person perceiving the meaning to a concept (Hale, 1988; Kousta et al., 2011). Semanticity is a function of language that refers to an increase of meaning for a concept (Arwood, 2011). In language terms, the deep meaning and understructure of the words represented by large distributed networks is referred to as deep semantics and this is typically achieved through neurologically meaningful linguistic input (Vigliocco et al., 2014).

Essentially, it is through the use of more language that concepts are deepened. This reciprocity between acquisition and use is extremely relevant when it comes to displaced, or abstract concepts, such as prosocial and antisocial behavioral concepts. For example, it is for this reason that Arwood et al., (2015) argue that emotions are a function of language. Since emotions are abstract concepts, emotions require the highest level of neurological integration at the network level. Therefore, the regulation of emotions appears to be language based rather than a product of a unimodal limbic

system. The acquisition of prosocial or antisocial concepts (circuits) will be evident according to the developmental products of behavior and language (networks) according to Arwood et al. (2015). So, if students acquire prosocial relationship concepts, their behavioral output should be reflective of their acquired prosocial concepts.

To summarize, the process for acquiring semantic meaning is as follows: Data is taken in through the sensory organs and encoded as semantic features (Ghazanfar & Schroeder, 2006; Kiefer & Pulvermuller, 2012). These semantic features converge with semantic features from other modalities through feed forward and feedback channels in the cortical dorsal and ventral pathways (Gainotti et al., 2009). These converging semantic features form cell assemblies that represent visual or auditory circuits for visual or auditory concepts (Kiefer & Pulvermuller, 2012). These cell assemblies that have formed concepts are distributed as cortical networks for language (Pulvermuller, 1999, 2013). In a neurological sense, language is both a product of the neurological process of acquiring meaning, as well as a component to the meaning making process (Kiefer & Pulvermuller, 2012; Pulvermuller, 1999, 2013). There appear to be strong connections between concept acquisition, language, and neuroscience. To overlap these three areas, the next section will describe a theoretical model that integrates what is known about neuroscience and language acquisition in regard to the acquisition of prosocial concepts and behaviors. The Neuro-Semantic Language Learning Theory (NsLLT) is a theoretical model that addresses the synergy between the neurology of acquiring meaning and the acquisition of language (Arwood, 2011). The NsLLT supports the notion that language acquisition, considered critical

for the acquisition of prosocial behaviors, parallels the neurobiological process for learning meaning.

Neuro-Semantic Language Learning Theory

The NsLLT accentuates the acquisition of language function in the process of learning. According to Arwood, "Language function develops from the neurobiological acquisition of meaning" (Arwood & Merideth, 2017, p. 21). The NsLLT is positioned at the confluence of constructs from language and cognitive psychology and integrated with literature from neuroscience that describes the neuro-semantic process of language acquisition (Arwood, 2011). The term "neuro-semantic" stands for the idea that meaning, or semantics, is acquired neurobiologically (Arwood, 2011; Gallistel & Matzel, 2013; Kiefer & Pulvermuller, 2012; Pulvermuller, 2013). According to the NsLLT, language learning is unique to each individual's experience and represents the underlying acquisition of concepts, not sub-cortical patterns or imitated language structures (Arwood & Meredith, 2017). Different from the traditional cognitive psychology input/output or stimulus/response learning theories, the NsLLT is a four-tiered learning theory. With this theory, each tier depends on scaffolding from the previous tier. The four tiers of the NsLLT are summarized below (Arwood, 2011).

1. Sensory input- sensory properties such as light waves, acoustic waves, and pressure are received through sensory receptors in the peripheral nervous system.
2. Perceptual patterns- The simultaneous input from the sensory receptors overlap to create patterns that are sorted, organized, and integrated by the

cellular structures. The region of the brain that sorts and organizes includes subcortical regions.

3. Concepts- Old patterns overlap with new patterns to create interconnected tracks of circuits, and are considered the meaningful concepts, images, or thoughts
4. Language- A distributed system of networks represents language function. An abstract symbol system of language can be used to tag concepts that facilitate further conceptual and language growth as neural circuits of meaning continue to overlap and deepen within the cortex.

An important notion unique to this theory is the layering of patterns to form concepts (Arwood, 2011). At the second tier of the NsLLT, different kinds of sensory patterns overlap to create either auditory or visual concepts. For example, acoustic patterns overlap with visual patterns to produce auditory concepts. While visual overlapped patterns will create a visual concept much like a mental image or mental movie, an overlap of visual movements such as hand signing will form visual concepts, but in the form of shapes (Arwood, 2011). According to the NsLLT, language acts as a central mediating component for cognitive and social development as language function serves as a critical factor for encoding input into existing circuits for increased semanticity (Arwood, 2011).

Language is theorized to play a critical role in the acquisition of prosocial behaviors (Arwood, 2011; Arwood et al., 2015; Lenneberg, 1962, 1973; Taylor, 1985); however, what language consists of, how it is acquired, and its relation to thinking has changed and evolved through time (Greene, 1972). With the NsLLT

describing the neuro-biological way that people acquire language function, it is important to consider how language is viewed through the three lenses that comprise the NsLLT. Language, from a neuroscience lens, consists of distributed networks in the cortex as described in the previous section (Pulvermuller, 1999). From a cognitive psychology lens, language is viewed as the observable and measurable structures grouped into categories such as form, content, and use (American Speech-Language Hearing Association, 1993; Chomsky, 1968). Finally, from a language theory lens, language is viewed according to underlying cognitive representations acquired through socio-cognitive processes aligned with neurobiological processes described earlier in this chapter (Arwood, 2011; Brown, 2007). The next section will focus on language structures and functions and the role language may play with the acquisition of prosocial behaviors

Language

The NsLLT highlights the process of language acquisition through the neuro-biological hierarchy of human conceptualization (Arwood & Merideth, 2017). The NsLLT sits at the center of the neuroeducation model used for this study and supports the notion that the neurological function of concept acquisition and language function occur before surface structures of language emerge (Arwood, 1983; Dore, 1974; Vygotsky, 1962). However, in current U.S. education culture, language is defined and applied through knowledge of its surface *structures* rather that its functions (American Speech-Language Hearing Association, 1993). Just as the areas of education are broken apart into separate areas such as academics, behavior, and language (Lane, 2007); language is also broken down into the structures, or "parts." Through this

paradigm, language is studied, measured, and interventions are centered on the structures of language rather than the functions (American Speech-Language Hearing Association, 1993; Chomsky, 1968; Wilson, Blackmon, Hall, & Elcholtz, 1991). However, using a paradigm rooted in the philosophy of how language functions, how meaning is neurologically acquired, and how meaning is used is called pragmaticism (Arwood, 1984; Halliday, 1975; Peirce, 1905; Searle, 1969; Tomasello, 2003). Using this philosophy, language interventions, measurements, and studies are focused around the *function* of language, rather than the structures. The next sections will describe definitions, historical influences, and assessment measures for both reductionist (language structures) and pragmatic paradigms (language functions) as they relate to the acquisition of prosocial behaviors.

Language structures. The structures of language are observable, measurable, and consist of sounds, words, sentences, and rules that define the use of each structure within a language (Arwood, 2011; Chomsky, 1968; Morris, 2005). The national governing organization for speech and language pathologists, (American Speech-Language Hearing Association, 1993) [ASHA], defines a language disorder according to the form, content, and use of language. The definition of a language disorder according to ASHA is provided below:

> "A language disorder is impaired comprehension and/or use of spoken, written and/or other symbol systems. The disorder may involve 1) the form of language (phonology, morphology, and syntax), 2) The content of language (semantics), and/or 3) the function of language in communication (pragmatics) in any combination" (American Speech-Language Hearing Association, 1993).

Figure 2.2 provides further descriptions and definitions for the terms content, form, and use, as defined by ASHA.

Form of Language	
Phonology	The sound system of a language and the rules that govern the sound combinations.
Morphology	The system that governs the structure of words and the construction of word forms.
Syntax	The system of governing the order and combination of words to form sentences, and the relationships among the elements within a sentence.
Content of Language	
Semantics	The system that governs the meanings of words and sentences
Use of Language	
Pragmatics	The system that combines the above language components in functional and socially appropriate communication

Figure 2.2 Components of language according to ASHA (1993).

The structures of language are observed and plotted throughout time in a stair-step fashion indicating language developmental milestones of when expected outcomes occur naturally throughout childhood due to time and maturity (American Speech-Language Hearing Association, 2017a; Lenneberg, 1967). The dominance of the developmental view of assessing and treating language according to its structures

has been largely influenced by the psycholinguist view of grammars, specifically the work of Noam Chomsky (Chomsky, 1957, 1968; Greene, 1972). The next section will discuss Chomsky's influence on current language assessment and intervention models in education.

Psycholinguistic influences on language development and acquisition.

Psycholinguistics is a sub-discipline of psychology and linguistics, defined as the study of the structure of language to analyze language (Greene, 1972; Pronko, 1946). Arguably, the most influential linguist is Noam Chomsky, who introduced a frequently changing theory of generative grammar (Chomsky, 1957, 1968; Greene, 1972). When Chomsky's universal grammar theories emerged, it was a challenge to the commonly accepted behaviorist belief of how language is acquired. Skinner (1953, 1957) claimed that a verbal response (language) is directly attached to the stimulus and is acquired according to the principles of operant conditioning. According to Skinner (1953, 1957), language is developed without the need for superseding variables such as meaning, cognition, or grammar rules. Using this theory, a person only learns the language to which they are exposed and conditioned. Subsequently, this places a limit on the possibilities of sentences a person can make. In contrast, Chomsky (1957) argued that a language learning theory based off of behaviorism was unable to account for the novelty of language. Chomsky's main argument was that the number of grammatical sentences is potentially infinite since it is possible for a person to produce a new combination of words never spoken. Chomsky (1957) argues that instead of relying on a child to calculate the probabilities of stimulus-response associations between words in a sentence through a finite sample of sentences to

which the child happens to be exposed; it is far more efficient for a child to develop rules for producing novel grammatical sentences.

Chomsky's grammar theory is largely labeled transformational generative grammar and can be described as a computational structure of rules that allow for people to generate an infinite number of grammatically correct sentences transformed from a simple kernel sentence (Chomsky, 1957; Greene, 1972). For example, applying the following grammar rules generates a simple sentence such as, "Tom likes the bird" The grammar rules rewrite the sentence as Noun Phrase (Tom) + Verb Phrase (likes the bird). Figure 2.3 demonstrates how this sentence can be broken down further according to grammar rules.

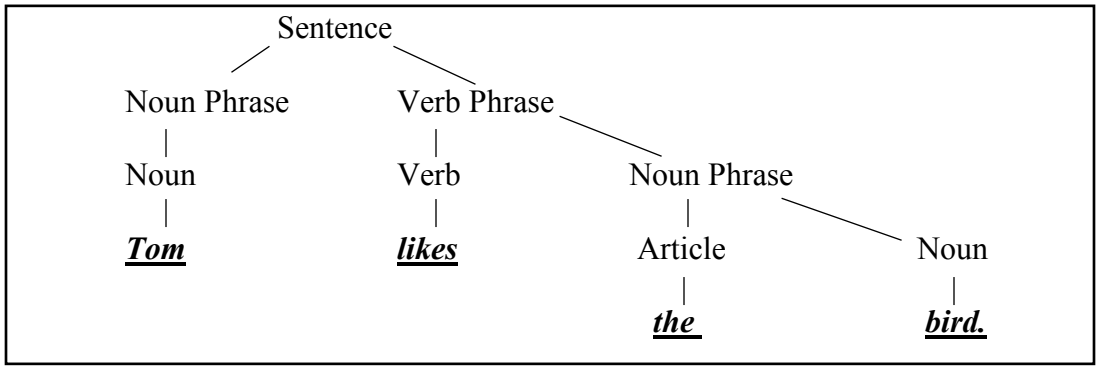


Figure 2.3. Sentence diagram using Chomsky's Generative Grammar to the sentence *Tom likes the bird.*

Applying these rules of generative grammar, other sentences can be generated:

Brian eats the hotdog.
The cat chases the mouse.
Mariah lost a toy.

However, if the sentence "the cat chases the mouse" were to be reversed, transformation grammar rules have to be applied (Chomsky, 1957). Transformational grammar rules are central to generative grammar and are prescriptive permutations.

Without transformational grammar rules, a reversal of the sentence would read, "The mouse the cat chases," and would be grammatically incorrect. When transformational rules are applied, the language output is corrected to "The mouse *was* chased *by* the cat." According to Chomsky (1957), transformational grammar rules leave no limits to the complexity or number of sentences that can be generated.

The properties of generative grammar arose from Chomsky's argument that humans are biologically equipped with innate abilities that allow them to learn language, and that these abilities are embedded in a Language Acquisition Device (LAD) in the brain (Chomsky, 1968). Universal grammar is the assumption that all humans, regardless of what language they speak, are born with an LAD that allows them to acquire language (Chomsky, 1968). Using philosophies from Chomsky's grammar theories, the emphasis on language structures is evident. Although recent advancements in neuroscience disprove the notion of an LAD, Chomsky's influence on language acquisition and measurement remain prevalent in U.S. education (Dekker, Mareschal, Johnson, & Sereno, 2014; Pulvermuller, 2010, 2013; Spaulding, Plante, & Farinella, 2006).

Chomsky's grammars are described as computational and lends to easy analysis using the scientific method (Greene, 1972; Lenneberg, 1969). Using Chomsky's view of language, language analysis is based off the assumption that correct output of grammar (structures) indicates linguistic competence for the language user (Greene, 1972). However, psycholinguists are not *only* concerned with the outward surface structures of language; they are also concerned with the language user's ability to convey meaning (Chomsky, 1968; Greene, 1972). Chomsky states, "A

person who has learned a language has acquired a system of rules that relate sound and meaning in a certain specific way. He has, in other words, acquired a certain competence that he puts to use in producing and understanding speech" (Chomsky, 1970, p. 184). As the theory of generative grammar changed overtime, Chomsky introduced the concepts of deep and surface structures to explain the relationship between underlying cognitive content and syntactic form. In Chomsky's 1965 version of transformational grammar theory, he added a semantic component to the theory, as well as, provided two levels of language analysis that he called surface structures and deep structures.

Deep and surface structures of language. One major problem posed by some linguists and language researchers is that surface structures give little indication about the meaning of the sentence (Arwood, 2011; Bruner, 1975; Chomsky, 1968; Halliday, 1975; Slobin, 1991; Tomasello, 2003). Before the terms surface structures and deep structures were officially used in Chomsky's transformational grammar theory in 1965 (Chomsky, 1968; Greene, 1972), the structure of a semantic theory was argued by Katz and Fodor (1963) for the purpose of offering a synchronic description of natural language that represents what a language user *knows* about the structure of language that allows them to *use* and comprehend meaning in sentences. According to interpretive semantic theory, semantics and syntax are dependent upon each other (Katz & Fodor, 1963). Greene (1972) supports this notion by stating, "The only purpose of syntactic rules is to express semantic relationships, the meaning of sentences being determined by the syntactic relations holding between individual words" (p. 191).

Chomsky (1968) described surface structures as the categorization and study of the units of sound that can create patterns of meaning such as words, phrases, and sentences. He described deep structures as the abstract and complex ideas made up of words, phrases, and sentences that make up the subject of the surface structure. These deep structures create a system of propositions that connects the surface structures. Propositions, according to Chomsky (1968) are the connected ideas from underlying arguments that are realized through surface structure output (Arwood, 1984; Chomsky, 1968). For example, the sentence, *The little boy cried when his mom left.* includes multiple underlying arguments, or ideas, such as: *There is a boy, boys can be little, a little boy is usually young, boys can cry, crying is an action your body does, etc*. Although Chomsky views the underlying ideas as structures, such as words and sentences, other language theorists view these underlying ideas as concepts that may be metacognitively represented as visual or auditory images (Arwood, 2011; Carroll, 1964; Peirce, 1894). According to Chomsky (1968), deep and surface structures are related by a finite system of grammatical transformation rules as described in an earlier section (Chomsky, 1968). Transformational grammar rules, considered a formal operation by Chomsky, are evident in adults; however, according to developmental milestones of speech and language products, children are found to not demonstrate complete grammar structures until ages seven or eight (Brown, 1973). The next section helps clarify the difference between the neuro-semantic process of language acquisition as it was described with the NsLLT, the focus of this study, and language development as it is commonly viewed in current U.S. education.

Language development. Another aspect of language influenced by Chomsky is the developmental manner that language is posited to be acquired. According to Chomsky (1957,1968), language acquisition is a developmental process that will occur for all people because all people are born with underlying universal grammar. He asserts that all people are born with an LAD that allows them to acquire language. However, LAD does not describe *how* language is acquired. A common assumption is that language develops naturally, and that capacities unfold as a child grows and matures (Lenneberg, 1967; Piaget, 1959). Language development is often linked to a developmental milestone chart that moves unidirectionally in a stair step fashion.

Developmental milestones represent the age, or age range, at which most people accomplish specific language skills and reflects structural growth from one stage of language development to the next (American Speech-Language Hearing Association, 2017a). For example, according to ASHA (2017a) most students who are four to five-years old can use sentences that have more than one action word and are able to tell a short story. In this way, language development is looking at the language products of making sentences and using specific words to be able to tell a story as an indication of language competence; however, only looking at the language products at the surface structure level does not take into consideration the deep structures and meaning behind the sentences and stories. By comparing students to the developmental milestones, the assumption is that a lack of structural development by a certain age is indicative of language-learning difficulties. The use of structures to measure and analyze language continues to be the current method of language analysis in psychology and education (American Speech-Language Hearing Association,

2017c; Brown, 1973; Garrett, 2008; Retherford, 2000). This way of assessing and analyzing language is a direct result of Chomsky's ideas (Greene, 1972). The use of structures for assessing and analyzing language will be discussed in more detail in the following section.

Structural language assessments. In U.S. schools, students must meet eligibility requirements outlined by local, state, and federal agencies to be considered for special education services under the category of Language Impairment or LI (Individuals with Disabilities Education Act, 2004). According to ASHA (2017c), students suspected of an LI are to be given comprehensive, linguistically appropriate assessments. Based on the linguistic development of the child, certain measures are to be given that assess phonology, semantics, morphology, syntax, and pragmatics (American Speech-Language Hearing Association, 2017c). Looking *linguistically* at these components means that clinicians and evaluators are typically looking at the surface structures of language (Chomsky, 1956, 1968; Halliday, 1975). For example, semantics is defined as the system that governs meanings of words and sentences according to ASHA (1993). This definition agrees with the linguistic description of deep structures proposed by (Chomsky, 1968), and the neuroscience description by which meaning is made through a neuro-semantic process (Pulvermuller, 1999, 2010, 2013). However, semantics is currently measured through surface level vocabulary analysis such as measuring knowledge of antonyms, synonyms, multiple meaning words, etc. (Morris, 2005; Wilson et al., 1991). Except for using the words *language function* when describing the purpose of a standardized assessment for pragmatics, all of ASHA's (2017b) other words, descriptions, and measurement examples indicate

that language assessments are intended to measure language structures. Ironically, even the standardized assessments of language *function* for pragmatics focus on the structures of language use, such as eye contact and turn taking, rather than the underlying acquisition of meaning (American Speech-Language Hearing Association, 2017c).

Although not the only criterion, standardized assessments are frequently used when identifying a student with an LI in the schools (Hollo, 2012; Individuals with Disabilities Education Act, 2004; Spaulding et al., 2006; Washington Adminstrative Codes, 2013). Often these assessments include commercial, norm-referenced standardized language assessments that are divided into smaller sub-tests designed to isolate and measure specific forms of language, such as a sub-test that only measures syntax (Wilson et al., 1991). The assumption is that students with LI will demonstrate language structures that result in low scores according to these tests. From that assumption, local education agencies use cut-off scores, typically -1.5 standard deviations below the mean, to determine eligibility for LI (Hollo, 2012; Spaulding et al., 2006). Interestingly, Spaulding et al. (2006) conducted a study that failed to support the assumption that children with language impairments routinely score on the low end of standardized tests' normative distribution. This study suggested that the use of standardized language assessments only indicate a likeliness of an LI and that additional measures should be used in addition to standardized measures to increase the probability of correct LI identification. This suggestion matches ASHA's (2017b) description of a comprehensive language assessment that can include several diverse types of assessments in addition to standardized assessments. One type of assessment

mentioned by ASHA (2017b) that is used frequently with standardized language assessments, and even required in some states, is language sampling (Oregon Department of Education, 2013). When discussing traditional procedures of spoken language assessment for speech and language pathologists (SLPs), ASHA (2017b) gives specific examples of language sampling measurements. Two of the examples ASHA lists are Mean Length of Utterance (MLU) and Type-Token Ratio (TTR). Both of these language sampling measurements assess language structures.

Mean Length of Utterance (MLU) is a measure popularized by Roger Brown (1973) and coincides with Brown's Stages of Syntactic and Morphological Development. Traditionally, 100 utterances are collected. To calculate the MLU, the total number of morphemes is then divided by the total number of utterances. The MLU score is then used to indicate language proficiency. Type-Token Ratio (TTR) is another method to analyze language samples used by SLPs and specifically mentioned by ASHA (2017b) when discussing how to measure for spoken language disorders. This measurement is said to assist SLPs in measuring the development of expressive vocabulary by examining vocabulary diversity (Retherford, 2000). To obtain a TTR, the language collected by the SLP is transcribed so that the number of different words used (types) can be divided by the total number of words in the utterance (tokens). If a student uses a small variety of words, they will have a low TTR. If a student uses a high variety of words, they will have a high TTR. A high TTR indicates a larger amount of lexical diversity, and therefore indicates higher overall language abilities. A low TTR indicates the opposite (Retherford, 2000).

These two language sampling techniques illustrate how the structures of language (morphemes and words) tend to be analyzed, even with language sampling. While the knowledge of language structures can be valuable when comparing one student to other students according to developmental observations, it does little to inform the SLP or educator what the student was intending to communicate or the meaning underlying the communication. Although the assessment of language through structures is routine today, several language theorists and researchers argue that analysis of language through assessment of the structure is inadequate (Arwood, 1983; Bruner, 1975; Carroll, 1964; Dore & McDermott, 1982; Greene, 1972; Halliday, 1975; Lenneberg, 1969; Vygotsky, 1962). Structural assessments and structural analysis of language samples are due to the current assumption that the student's overall language ability is dependent on the structures of words instead of the concepts the words represent (Arwood, 2011; Bruner, 1975; Halliday, 1975; Vygotsky, 1962).

Using a psycholinguistic view of the relationship between thought and language, language is a product of the person's cognition (Chomsky, 1968; Greene, 1972; Piaget, 1959). The psycholinguistic view of language falls within the reductionist paradigm. With this paradigm, language is not innately connected to behaviors. Instead, what is observable about the student is reduced into small sub-components such as language, motor, cognition, etc. (Chomsky, 1968; Skinner, 1987). Using a view of language presupposed by pragmaticism, functional language theorists posit that language function, or thought, underlies surface forms of language (Arwood, 2011; Peirce, 1905; Vygotsky, 1962; Whorf, 1956; Wolff & Holmes, 2011). Using this view, social and cognitive growth is presupposed by deep semantics, or language

function, and is acquired through social interaction (Arwood et al., 2015; Bruner, 1975; Carroll, 1964; Halliday, 1975; Vygotsky, 1962). With this view, outward behaviors are fueled by the acquisition of deep meaning through neuro-semantic and socio-cognitive processes that function in a variety of social and cognitive ways. This view suggests that the acquisition of deep semantic meaning, or language function, is likely to influences outward behaviors (Arwood, 2011; Carroll, 1964; Dore & McDermott, 1982; Halliday, 1975). For that reason, the next section will describe the acquisition of language function. The next section will build off the neurobiological underpinnings previously described in this chapter to further define language function and describe the way semiotics is used pragmatically with semantics.

Language function. Language functions are defined as the underlying cognitive representations acquired through socio-cognitive and neurobiological processes described earlier in this chapter (Arwood, 2011; Cain, 2002; Hall, 1979; Kelly, 1955; Pulvermuller, 1999). Similar to Chomsky's deep and surface structures, language functions are like the deep structures that represent the underlying meaning of the words and sentences of the surface structures (Chomsky, 1968; Peirce, 1894; Vygotsky, 1962). In other words, language functions represent a person's thinking while the surface structures represent a conventional form of expression (Dore & McDermott, 1982; Halliday, 1976; Searle, 1969). Some researchers say that the surface structures of language only exist because of the deeper structures, or functions (Carroll, 1964; Halliday, 1975; Searle, 1969; Vygotsky, 1962; Whorf, 1956), and similarly, that the growth of language functions underpins the growth of language structures (Arwood, 2011; Pulvermuller, 2013). Overall, the process of acquiring

language, in terms of function, is the process of neurologically making meaning and forming concepts through social interaction and experience (Bruner, 1975; Halliday, 1975; Lenneberg, 1962; Pulvermuller, 2013; Tomasello, 2003).

Considered the father of pragmatics, Peirce (1905) considers the "whole," of language to be greater than the sum of its "parts." What Peirce means is that the function of signs to represent the underlying acquisition of meaning is greater than the surface forms, or structures. Peirce (1905) referred to this philosophy as pragmaticism. It is important to note that this term differs from the way "pragmatics" is used in current language literature and practice (American Speech-Language Hearing Association, 1993). Educators and SLPs use the term "pragmatics" to describe the social structures of language use such as turn taking, typical eye contact during conversations, and other predictive social functions (American Speech-Language Hearing Association, 1993). To help differentiate between the contemporary use of pragmatics and Peirce's philosophy, Arwood (1983) describes pragmaticism as a blend of pragmatics in the contemporary sense, and semiotics, defined as the study of signs. Both pragmatics and semiotics are grounded in the acquisition of semantics, and when combined, pragmaticism stands for how signs affect consequences on the listener's beliefs, attitudes, and behaviors (Arwood, 1983). The notion of signs is of critical importance in pragmaticism because signs are considered the representations in the mind where all meaning is derived (Peirce, 1984). The following section will further describe signs and how signs relate to the acquisition of prosocial behavior.

Signs. According to Peirce (1894) there are three kinds of signs: icons, indications, and symbols. Icons are the likenesses of an object that serve to convey

meaning by imitating or closely imitating the object it is representing. According to Pierce, the term "object" is not only associated with physical objects, but can be associated with an object of thought as well. Peirce developed categories of *firstness, secondness*, and *thirdness* to describe the qualitative attributes of feeling, sensation, and conceptualization of the process in which signs emerge (Merrell, 2001). The category of *firstness* matches with the initial, unconscious organization of sensory input as described in the neuroscience section (Ghazanfar & Schroeder, 2006). Firstness represents an icon, and at this level the object does not have extensive meaning because meaning must be assigned from an outside agent (Bruner, 1975; Vygotsky, 1962). In language, these icons may be like semantic features, or properties of the object. For example, a picture of a toilet on a student's visual schedule is the iconic representation of the object of toilet. To the student, these visual graphics exist but have no interpretation. At this level, the icon of the toilet only represents the patterns of the object (the toilet); it does not indicate an appropriate place to use the restroom when you must go. This kind of interpretation represents the next kind of sign called an indication (Peirce, 1905).

The next kind of sign, an indication, or indicie, marks a relationship between objects, or *secondness*. At this level, the indicie must be interpreted because it is not an exact imitation of the object, is shared between agents, and aligns with the neurological process of overlapping semantic features encoded into perceptual patterns (Kiefer & Pulvermuller, 2012). An example provided by Peirce (1894) is an arrow on a guidepost pointing to a road that is to be taken. This type of indicator also occurs between a learner acquiring meaning and the adult assigning meaning (Arwood, 1983;

Bruner, 1975). For example, a child reaches for an object and, in response, the adult points to the object, picks it up, and hands it to the child. These nonverbal relationships, or semantic relationships, indicate a connection between the meaning of the behavior and what others interpret (Arwood, 1983: Bruner, 1975: Dore, 1974).

The third sign is called a symbol, or general sign, and has associated meanings through usage. A symbol, or *thirdness*, can have multiple different meanings, must be interpreted by others, and is applicable in many different situations. *Thirdness* aligns with the visual or auditory circuits that form the concepts in the cortex, and then form networks for symbolic language (Pulvermuller, 1999, 2013). Words and sentences are examples of symbols according to Peirce (1905). In language terms, a symbol requires levels of language and conceptualization high enough to be able to interpret and use the symbol (Arwood, 2011). For example, a picture of a toilet can be considered a symbol on a student's visual schedule when the picture of the toilet symbolizes that it is time for the student's restroom break and the student is supposed to go to the restroom, use the toilet appropriately, and return to class. Symbols can only exist when the underlying meaning of the symbol can be shared with another person. For example, although the symbol of the toilet may hold meaning for the teacher, the student may not share that meaning for the symbol. Since language is used to share the meaning of the symbol, this supports the notion that language can only be constructed through social interactions (Bruner, 1975; Carroll, 1964; Dore & McDermott, 1982).

Peirce (1894) notes that people think in signs, and that a new sign, or concept, can only grow from other signs. The initial thought object may be from a mixed sign, but in order for new concepts to be realized, the sign must reach the symbolic level.

To acquire signs is to neurologically organize external stimuli in a way that can be retrieved for later use; therefore, acquiring and refining signs is not only considered a process of semiosis, but also it is a process of neuro-semantics (Arwood, 1983). The concepts acquired through semiotics can be either concrete or abstract, with indicies and symbols being more abstract than icons (Peirce, 1894). Similar to the feed forward and feedback channels that integrate and inhibit perceptual patterns (Scheibel & Scheibel, 1965), abstract symbols evolve from concrete meanings through the categories of firstness, secondess, and thirdness (Peirce, 1894; Pulvermuller, 2013). Through use and experience, symbols grow in depth and breadth. This growth that increases the underlying meaning for the concept is known as semanticity (Arwood, 2011; Azevedo & Hadwin, 2005; Peirce, 1894). The deepening of semanticity is a result of strengthened connections of the neural networks by new meaningful multimodal semantic features being encoded across time, "layered" (Arwood, 2011) into interconnected pathways (Montefinese, Ambrosini, Fairfield, & Mammarella, 2013), and distributed to the language networks (Pulvermuller, 2013). Without social interaction, the layering of concepts would not be possible, as social interaction allows for a shared system of symbols to be used to construct meaning for cognition and language. The ability to produce infinite meanings through the relationships of signs and symbols is referred to semiosis of language and, to that extent, language can only exist when there are semiotic interchanges between people (Arwood, 1983). Therefore, all conscious behavior, language or otherwise, consists of the relationship between the acquisition of meaning (semantics) and the use of signs and symbols

(semiotics and pragmatics) that are acquired neurobiologically within the socio-cognitive constructs of society.

As cognition develops in complexity, so do the functions of language. Language becomes a vehicle for further cognitive growth through the sharing of meaning with speech acts (Searle, 1969). In regard to speech acts, Searle (1969) states:

> "The speech act or acts performed in the utterance of a sentence are in general a function of the meaning of the sentence. The meaning of a sentence does not in all cases uniquely determine what speech act is performed in a given utterance of that sentence, for a speaker may mean more than what he actually says, but it is always in principle possible for him to say exactly what he means" (p.18).

Speech acts are *how* meaning is shared and interpreted by others. The next section will discuss speech acts as a function of language.

Speech Acts. How do words stand for things and what is the difference between saying something with meaning versus saying something meaningless? These are some of the questions that guide the philosophical study of language in contrast to a study of linguistic philosophy. Simply put, the study of linguistics examines the structures of language, while the study of language philosophy examines the meaning and function of language to indicate signs and symbols (Searle, 1969). Speech Act Theory attempts to answer the question of *how* meaning is shared between user and interpretant, whereas the sign is considered *what* is shared (Dore, 1975; Pierce, 1894).

According to Searle's (1969) approach to speech acts, an operational definition for speech acts is, "a unit of linguistic communication, consisting of a

proposition and an illocutionary force, which is expressed according to grammatical and pragmatic rules, which functions to convey a speaker's conceptual representations and intentions" (Dore, 1974, p. 344). Speech Act Theory is considered a dynamic process that includes the interpretation and use of signs from user to interpreter (Searle, 1969). Speech acts were first proposed by Austin in 1962, and included the three types of performative acts called locutionary, illocutionary, and perlocutionary. These acts deal with the speech utterances and propositions that alter the speaker's and hearer's attitudes, beliefs, and behaviors (Arwood, 1983; Searle 1969). The changes in beliefs, attitudes, and behaviors result from the contextual and synergistic sharing of signs with the use of language structures; however, it is not the language structures that alter meaning within the speaker and hearer. It is the successful communication of the concepts that result in the change of attitudes, feelings, and beliefs. Austin's work was expanded and refined by Searle (1969) who hypothesized that a speech act is the basic unit of communication that connects what a speaker means or intends with what the hearer understands. Used with the principle of expressibility, the idea that whatever can be meant can be said, Searle (1969) outlined the conditions and rules of a successful speech act. Searle (1969) also refined the three types of speech acts called utterances, propositions, and illocutionary acts.

The first speech act described is the utterance act. An utterance act is when phonemes and morphemes are combined into sentences or utterances, but void of meaning. An example of an utterance act is echolalia (Morris, 2005). In this instance, a person can repeat sounds, phrases, sentences, or even longer utterances such as movie scenes, without intention of sharing meaning. This act is considered the least

complex act and differs from the second act, the proposition, because it does not include levels of referring and predicating. The second act, according to Searle (1969), is the proposition and is comprised of two branches: a reference act and a predicate act. A reference is any kind of expression (does not have to be verbal) that functions to identify, or indicate, any kind of individual or particular thing. For example, in the phrase, "Go!" the referent is not specifically mentioned, but this phrase functions as "[you] or [everybody] go!" The predicate depends on the referent and pertains to the qualities of the referent. Using the previous example of "[you] go!" the predicate is "go!" When combined with a referent the product is called a proposition (Searle, 1969).

On a larger scale, a predicate can be referring to a previous argument, or idea, and when two or more arguments are predicated, the third idea is considered an auditory proposition that is connected in time through temporal language (Arwood, 2011; Arwood & Beggs, 1992). Temporal language can be marked by words such as "before," "after," "so," or "because." Data collected through language sampling by Arwood and colleagues found that students (ages seven to young adult) with language learning disorders were found to produce limited auditory propositions with the use of temporal language. This data aligns with the neuroscience evidence that some people use visual pathways to form concepts resulting in visual cognitive abilities (Gainotti et al., 2009; Gallese & Lakoff, 2005; Gallistel & Matzel, 2013; Klemen & Chambers, 2012). Further, it supports the notion that people with LI symbolize information spatially and not with time, therefore, resulting in the lack of auditory propositions (Arwood, 1983; Arwood & Beggs, 1992). An instrument designed to document

differences in language function using auditory propositions is called the Temporal Analysis of Propositions (TEMPro). This instrument will be used in this study and discussed later in this chapter and in Chapter Three (Arwood & Beggs, 1992). Propositions contain the conceptual information of an utterance, but the intention behind the utterance is the third type of speech act, the illocutionary act.

The illocutionary act serves as the intended consequence for the utterance. In other words, the function of the utterance lies in the illocutionary act. Some examples of this act include making statements, giving commands, asking questions, and making promises (Searle, 1969). The illocutionary act is sometimes referred to as the illocutionary force and is the consequence, or effect, that the communication has on behaviors, thoughts, and beliefs of the audience. To help distinguish between proposition and illocutionary force, in the proposition, "Mariah is going to bed," the illocutionary force is an assertion. In the proposition, "Is Mariah going to bed?" the illocutionary force is a question. The illocutionary act or force is what bridges the importance of the meaning and the intention. If a speaker is unable to share the meaning, or concept, to their audience, then the illocutionary force will not be realized (Searle, 1969). The cognitive functions for deciphering meaning and signs, along with the socialization of sharing meaning and intention, describe the synergistic nature of speech acts (Arwood, 1983). Children do not need full command of the forms of language in order to share meaning or intent; however, their forms will indicate the concepts they have acquired (Lenneberg, 1969; Peirce, 1894; Vygotsky, 1962). Agreeing with this notion, Dore (1974) identified primitive speech acts that children develop as they acquire concepts that can be shared.

Dore (1974) observed two children, one male and one female, every two weeks over several months to support his hypothesis that children possess systematic knowledge about the pragmatics of language before the acquisition of formal language structures. Using four types of behavioral evidence including 1) the child's utterance, 2) nonlinguistic behavior, 3) the adult's response, and 4) situational contexts, Dore isolated what he calls primitive speech acts. Dore postulates that these primitive speech acts are utterances consisting, formally, of single words that function to convey the child's intentions, before the child acquires the ability to produce sentences. Dore (1974) lists the primitive speech acts that young children use as labeling, repeating, answering, requesting (action), requesting (answer), calling, greeting, protesting, and practicing. Each primitive utterance of one or two words reflects the entire process of the child's development up to that point in time (Arwood, 1983). Vygotsky (1962) supports the notion that language functions underlie the forms expressed during language acquisition when he wrote:

> "In mastering external speech, the child starts from one word, then connects two or three words; a little later, he advances from simple sentence to more complicated ones, and finally to coherent speech made up of series of such sentences: in other words, he proceeds from part to the whole. In regard to meaning, on the other hand, the first word of the child is a whole sentence. Semantically, the child starts from the whole, from a meaningful complex, and only later begins to master the separate semantic units, the meanings of words, and to divide his formerly undifferentiated thought into those units" (p. 126).

The language theorists mentioned in this section all support the notion that acquiring and sharing meaning is at the heart of language acquisition (Arwood, 1983; Bruner, 1975; Dore, 1974; Peirce, 1905; Searle, 1969; Vygotsky, 1962). It is through speech acts that a person expresses his intentions to another person. For those intentions to be realized, both speaker and listener must have shared knowledge of the symbol referent or sign indication. If one party does not possess the necessary deep semantic structures to interpret the speaker's message, their behaviors, attitudes, and thoughts will not be altered as intended by the speaker (Searle, 1969). In regard to acquiring prosocial behaviors, if the student has not acquired the deep semantics to interpret the language being shared by others, perhaps teachers, then their underlying concepts will not change and outward behaviors will not be altered. In a sense, lack of change in behavior indicates a lack of change in underlying meaning. While speech acts provide insight into *how* meaning is shared and acquired between speaker and interpretant, to continue to explain the semiotic and pragmatic process of language function acquisition, Halliday (1975) provides insight into *why* meaning is shared and acquired.

Halliday's categories of language function. Halliday (1975, 1976). Halliday (1975) stresses the importance of language in the development of the child as a social being and on the social structure of the child's environment. According to Halliday (1975) and other language theorists (Arwood, 2011; Bruner, 1975; Tomasello, 2003), children acquire language through language use. For Halliday (1975,1976) the meaning associated with language function and a child's social function cannot be separated because learning language is "learning how to mean." Halliday states,

"Language is a social activity. It has developed as it has, both in the function it serves, and in the structures which express these functions, in response to the demands made by society and as a reflection of these demands" (Halliday, 1976, p. vii). According to observational studies, Halliday (1975) hypothesizes that children use and acquire language because of the functions it serves them. Table 2.1 lists the seven categories of language function that offer an explanation to *why* children acquire and share meanings according to Halliday (1975).

Table 2.1

Summary of Halliday's Language Functions for Children

Type of Language Function	Definition
Instrumental	Language used to get things done; to satisfy a need
Regulatory	Language used to control others' behaviors
Interactional	Language used to form and maintain social relationships
Personal	Language used to express thoughts and opinions
Imaginative	Language used to express creative thoughts
Heuristic	Language used to seek knowledge (question) and to learn
Informative	Language used to convey information

Note. This table was adapted from Fry, Phillips, Lobaugh, and Madole (1996).

The first four functions listed (instrumental, regulatory, interactional, and personal) regulate the child's physical, social, and emotional needs. The last three

functions listed serve as a way for the child to interact and make sense of their environment. Even at a young age, children are able to use speech acts and language functions to get their needs met, albeit they are dependent upon others during a portion of this acquisition time (Arwood, 2011; Bruner, 1975; Dore, 1974; Halliday, 1975; Vygotsky, 1962). As the child grows semantically over time, the function of their language also grows. For example, Halliday's (1976) language functions give way to three broad meta-functions as a child grows in semanticity. These functions are the ideational, interpersonal, and textual functions. These functions serve and reflect a wide variety of societal purposes as semantic complexity deepens through interactions with more advanced language users. As more complex ideas and meanings are acquired, meaning can be shared through the use of advanced language functions. Advanced language functions help to pre-define data analysis codes for this study (Arwood, 2011).

Advanced language functions. As children's cognition and concepts increase, their language function increases as well (Arwood, 2011; Brown, 1973; Bruner, 1975; Halliday, 1975, 1976). As described earlier, language functions are more than the developmental products of language structures; language is a neuro-semantic process entwined with socialization and cognition (Arwood, 2011; Dore, 1974; Halliday, 1975; Tomasello, 2003; Vygotsky, 1962). As children learn how to share meaning, build relationships with others, and think critically, the advanced language functions of expansion, extension, modulation, displacement, efficiency, productivity, and flexibility are critical for social competence that leads to the acquisition of more advanced prosocial behaviors (Arwood, 2011).

As the children acquire higher levels of functional language through social interaction, children expand, extend, and modulate the basic semantic relationships of agent, action, and object (Bruner, 1975). As children's ability to share meaning is refined, children are better able to share intentions to the hearer (Arwood, 2011; Searle, 1969). As children *expand* their understanding of basic semantic relationships, children's language structures also increase (Cudd & Roberts, 1994). As children learn to *extend* the meaning of basic semantic relationships by expressing the connection between the relationships of who, what, when, where, why, and how, children are better able to share concepts socially in a less restricted manner (Gruendel, 1977). This means the listener can understand the complete meaning shared by the child without much need for further interpretation or clarifying questions to "fill in the gaps" (Arwood, 2011). As children further refine their thinking and increase underlying semanticity, changes in the comprehension of the semantic relationships are evident through the advanced language function of *modulation* (Berko, 1958; Humphries, Binder, Medler, & Liebenthal, 2006). In this instance, children can structurally alter their language output to reflect the underlying refinement in meaning. For example, as children learn to think beyond the here-and-now, children will add past tense morphemes onto a word of an already realized concept, such as "stomp" becomes "stomped" (Clark, 2016).

As children continue adding underlying meaning to their thinking by extending the meaning of themselves and their relationships to others, children can understand ideas and concepts that are not in the immediate present. This function of language is called *displacement* and results from meaningful interactions that allow for concepts to

layer over one another through shared experiences (Hockett, 1960; Ratner & Bruner, 1978). An example of an educational activity using displaced concepts is talking or writing about the lifestyle of a cowboy from the 1800s. As children are able to conceptualize and use concepts that are displaced in space and time, the complexity of the underlying meaning increases. Again, through neurobiological experiences and socio-cognitive refinement with signs and symbols, the previous meanings are changed, and new meanings attached to old (Wood, Bruner, & Ross, 1976). This overlapping process is not only neurobiological, but also linguistic in that it produces an increase in semantic complexity, or *semanticity* (Azevedo & Hadwin, 2005; Hockett, 1960).

Semanticity allows people to think about and discuss higher order concepts such as "responsibility" and "respect" (Arwood, 2011; Azevedo & Hadwin, 2005; Hockett, 1960). The child is able to express underlying complex semantics through the language functions of displacement, semanticity, *productivity*, *flexibility*, and *efficiency* (Akhtar & Tomasello, 1997; Arwood, 1983; Hawkins, 2004; Hockett, 1960). Low redundancy, or spoken efficiency, results from increased underlying semanticity that allows for a child to use language *productively* and *flexibly* (Akhtar & Tomasello, 1997; Hawkins, 2004; Hockett, 1960). The function of *flexibility* permits the child to think about semantic relationships in multiple ways that allows for the concepts and meaning to be used and shared in a wide variety (Bruner, 1975; Hockett, 1960). *Productivity* is a function of language that allows for a person to share acquired concepts in several different methods such as writing, speaking, gesturing, art or any other way meaning can be expressed. In turn, productivity also allows for the

understanding of multiple methods of expression (Akhtar & Tomasello, 1997; Berko, 1958).

Advanced language functions are critical for a student to acquire social competence, defined as the ability to initiate and maintain healthy relationships (Arwood et al., 2015; Meichenbaum, Butler, & Gruson, 1981). Advanced language functions allow the student to deepen concepts that will provide the underlying meaning necessary for the student to be able to understand and use abstract concepts such as perspective, emotion, and kindness (Azevedo & Hadwin, 2005; Pulvermuller, 2013). Starting as young as pre-k, contemporary behavior intervention programs are using abstract concepts, such as "respect," as the cornerstone for decreasing antisocial behaviors (Kuypers, 2011; Sugai & Horner, 2006). However, the acquisition of abstract concepts requires multiple meaningful experiences that have been assigned by more advance language users across time (Granito, Scorolli, & Borghi, 2015; Pulvermuller, 2013; Vygotsky, 1962). The importance of social interaction with another language user cannot be substituted when acquiring language and concepts (Bruner, 1975; Clark, 1998; Frith & Frith, 2012; Tomasello, 2003; Vygotsky, 1962). The role of social interaction with the acquisition of language and concepts is described in the following section.

Social interaction and the acquisition language function. Previous sections in the chapter have described the neurobiological underpinnings of language acquisition and cultural relevancy and meaning of language function in relation to language acquisition. Although reviewed in the previous sections, the socio-cognitive aspects of language acquisition have not been fully described. This section will discuss the

importance of social interaction and assignment of meaning regarding acquisition of prosocial concepts and behaviors.

Social interaction, specifically interaction with more advanced language users, serves as a critical role to the acquisition of language (Bruner, 1975; Clark, 1998; Frith & Frith, 2012; Mercer, 2013; Tomasello, 2003). In his seminal work, Vygotsky (1962) observed that until abstract concepts were acquired in early adolescence, children relied significantly on the interaction between adult users of language to help build meaning for concepts. Vygotsky (1962) states that, "Verbal intercourse with adults thus becomes a powerful factor in the development of the child's concepts… it is the rule rather than the exception in the intellectual development of the child" (p. 69). This notion aligns with Halliday's (1975) belief that language is developed out of a need to communicate and share meaning, as well as Peirce's (1894) hypothesis that symbols only grow through use and experience with other people sharing symbols. Bruner (1975) also agreed with the importance of social interaction in regard to the acquisition of language.

Bruner hypothesized that language is constructed for the regulation of joint attention and joint action at a pre-linguistic level. He argues that it is through the deixis of an interpreting adult that a young child learns the basic semantic relationships of agent, action, and object (Bruner, 1975). He also contends that it is with the interpreting adult interacting and expanding the child's utterances that the child is able to grasp linguistic meaning and use appropriately ordered utterances to share intentions and meanings. Without social interaction, language and concepts would not form. This notion serves as a possible explanation for children who have

not acquired language due to lack of socialization, such as the "wolf children" mentioned by Lenneberg (1967). It is with social interaction and *assignment of meaning* through the deixis of the language interpretant and language speaker that allow for children to form the mental concepts that serve as the representation of their thinking to be shared (Granito et al., 2015; Vygotsky, 1962).

Current neuroscience evidence supports Vygotsky's theory discussing the importance of social interaction for conceptual and language acquisition (Frith & Frith, 2012; Pulvermuller, 1999, 2013). Neurologically, the brain requires a change in function to create a change in structures that can be described as distributed networks (Pulvermuller, 2013). Meaningful input created and refined by other language users is critical for the acquisition of signs which, in turn, is critical for the change in brain structures to form the use of language functions (Bühler, 1990; Peirce, 1905; Pulvermuller, 1999). Vygotsky (1962) observed that children use language to learn concepts *and* use language to represent the concepts that are socially mediated through the process of others assigning meaning to the children's behavior.

If behavior represents the underlying semantics acquired, and semantics are acquired through internal neuro-biological processes, along with the external socio-cognitive processes, then all behavior can be considered a way to share meaning, or communication (Dore, 1974; Frith & Frith, 2012; Peirce, 1894; Poulshock, 2006; Searle, 1969). Behavior is judged as acceptable or unacceptable by the experienced language user who assigns meaning to the behavior (Arwood et al., 2015; Bruner, 1975). Therefore, for a person to learn the meaning about specific behaviors, the person must receive meaningful neurobiological input through social interaction. This

input leads to distributed networks of language function that allows the person to think about making choices regarding their chosen behaviors. Yet, all social interaction occurs in a culture and society that is theorized to impact the meaning being assigned through interactions (Whorf, 1956). Society and culture are theorized to play a key role in the acquisition of language function and is discussed in the next section.

Culture and language function acquisition. The notion that children learn language from interacting within their environments is an idea already addressed from multiple philosophical viewpoints (Bronfenbrenner, 1994; Chomsky, 1968; Skinner, 1953). The reciprocity between language function and culture is not, however, addressed in the aforementioned viewpoints. Since language is acquired from assignment of meaning through social reciprocity, language is considered both the representation *and* sharing of meaning (Arwood, 2011; Halliday, 1975; Searle, 1969; Vygotsky, 1962); Therefore, the meaning of language is determined by what a particular society and culture values (Lenneberg, 1969; Whorf, 1956). Linguistic relativity is an example of how culture and society are theorized to affect the thinking of an individual through the specific meaning assigned through language (Whorf, 1956). For example, Wolff and Holmes (2011) reference cultures in New Guinea who do not identify the multitude of colors that are described and labeled within the English language of Western Civilization. Instead this culture only identifies five basic color terms and subsequently people from this culture are unable to discriminate, from memory, other colors beyond the five focal colors of their own language. Halliday (2007) echoed the interplay between society and culture on the acquisition of language when he said:

> "If we say that linguistic structure "reflects" social structure, we are really assigning a role that is too passive…Rather we should say that linguistic structure is the realization of social structure, actively symbolizing it in a process of mutual creativity. Because it stands as a metaphor for society, language has the property of not only transmitting the social order but also maintaining and potentially modifying it" (p. 255).

Essentially, the culture in which children live will influence the meaning of their actions and language function. As an individuals' meanings are constructed, social reality is also constructed. Language does not only reflect social reality, but also aids in the creation of it (Searle, 1969; Whorf, 1956). This notion is particularly important when considering the acquisition of prosocial behaviors. In a well-cited longitudinal study, Hart and Risley (1995) studied 42 families of varying economic backgrounds for three years. The researchers found that all of the children in the study grew up to speak and behave like their families, or culture. For example, if the parents gave directives like "move," and "shut up," the children also demonstrated those verbal behaviors. If the parents demonstrated polite behaviors, their children did too. Lenneberg (1969) considers that everything in a person's life, including behaviors and language, result from the person's interaction with its milieu and social interactions. Language reflects societal or cultural constructs and plays a particularly important role in the acquisition and refinement of the underlying concepts, represented by language, that impact a person's thinking.

If language function represents the underlying, culturally influenced, conceptual underpinnings a person has neuro-semantically acquired (Halliday, 2007;

Vygotsky, 1962) and if language function is reflective of cognitive and social growth (Bruner, 1975; Halliday, 1975), then language function has the potential to steer a person's behavioral products in a prosocial or antisocial direction depending on the relational concepts acquired (Arwood et al., 2015). Language function used as a relational tool contributes to the acquisition of agency (Arwood et al., 2015; Halliday, 1975; Tomasello, 2003; Vygotsky, 1962). Agency is considered a function of language that facilitates the ability of a person to position himself in relation to others; and, agency develops in conjunction with the deepening of the person's concepts, or semanticity of the person (Chapman, 2000; Taylor, 1985). The next section will describe the relationship between the levels of conceptualization and the development of agency as it relates to the acquisition of prosocial behaviors.

Agency and levels of concepts. Agency is a term that has become ubiquitous within various fields of study (Ahearn, 2001). For the purpose of this study, agency will be defined as both the sociocultural mediated capacity to act and as the basic language function to think about people and what people do (Ahearn, 2001; Arwood, 2011). In other words, agency is the ability for a student to place himself in relationship to others, and the ability to see others and how they relate to each other. The concept of agency is a function of language that gets its origin from the development of basic semantic relationships (Brown, 1973; Kernan, 1970). Basic semantic relationships are agents (the person) with their actions and objects. Bruner (1975) describes basic semantic relationships as "actions as carried out by agents and having effects of particular kinds in particular places" (p.5). These early functions of language allow for the child to become independent over time, communicate wants

and needs, and accomplish acts through deepening, expanding, and extending the meaning of these basic semantic relationships. As the child's language function grows in depth, so does the child's cognition and agency (Ahearn, 2001; Arwood et al., 2015; Bruner, 1975; Halliday, 1975).

For neurotypical learners, social competence is defined as the ability to initiate and maintain healthy relationships, and it is expected to increase with age, cognition, and language (Arwood et al., 2015; Gallagher, 1993; Meichenbaum et al., 1981). This progression parallels the development that occurs during specific age milestones as described by Piaget (1959). Although the agency rate of growth and developmental products are similar to Piaget's stages of cognitive development, they are not mirror images of each other because agency is a language concept that can be scaffolded, or layered, in a prosocial or antisocial direction (Morcom & Cumming-Potvin, 2010; Ratner & Bruner, 1978). What this means is that prosocial and antisocial concepts are acquired through the same neuro-semantic and socio-cognitive processes described earlier in this chapter. Whether or not the concepts acquired are prosocial or antisocial depends on the meaning assigned to the behavior from outside agents (Arwood et al., 2015; Morcom & Cumming-Potvin, 2010; Pulvermuller, 2013).

Taylor (1985) explains that human moral agency is the acquisition of human abstract social concepts and argues that the agent's vision of how they are interacting with the world is mediated through language. He writes that because language can facilitate new thinking, students' social and moral conceptual growth, and ability to think and respond to others, it is intricately linked to their acquisition of language. Agency is a function of language that is bound by the conceptual levels of students

and will be described next (Arwood et al., 2015; Bruner, 1975; Halliday, 1976; Piaget, 1959; Vallacher & Wegner, 1989).

The developmental products of language parallel the expected stair-step stages of cognitive development according to Piaget (1959). The synergy among the areas of semiotics, semantics, and pragmatics provides a possible explanation for why this occurs and why a student's ability to relate to others (agency) relies on the neurobiological acquisition of social concepts (Arwood, 1983). The relationships among agents, their actions, and objects within events facilitates the production of signs (Peirce, 1894). It is the need to communicate about those relationships that facilitates the need for social interaction (Bruner, 1975; Dore & McDermott, 1982; Halliday, 1975). This way of taking meaning (semantics) and sharing it with others (pragmatics) because of semiotics is another way of describing the synergy among language function, cognition, and socialization (Arwood, 1983). Piaget's (1952) cognitive stages are sequentially ordered: sensorimotor from ages birth to two, pre-operational from ages two to seven, concrete from ages seven to eleven, and formal cognition from age eleven through adulthood. For the purpose of describing the acquisition of language function, the names of these stages will describe levels of conceptualization (Arwood, 2011; Carroll, 1964). In a sense, these stages are used to help understand the amount of semanticity, displacement, efficiency, and flexibility required to understand and use concepts at specific levels of language function (Arwood, 2011; Hockett, 1960).

At the sensory motor level, the student's concepts and verbal output are limited to the basic nonverbal use of agent, action, object, within the "here and now" functions

of joint reference and joint action (Bruner, 1975). The verbal output at this time is reflective of the concepts the student is acquiring, such as “me do,” and “drink milk” (Brown, 1973; Bruner, 1975; Clark, 2016; Dore, 1974). At this level, learners have a restricted sense of agency based on their surrounding environment (Arwood, 2011; David, Newen, & Vogeley, 2008) With limited conceptualization and language function, the student’s outward behavior functions to alter and explore their environment by crying, grabbing, hitting, throwing things, and tasting (Arwood et al., 2015). As the sensory input is overlapped (Ghazanfar & Schroeder, 2006), cell assemblies are formed and integrated through feed forward and feedback channels forming concepts (Kiefer & Pulvermuller, 2012; Klemen & Chambers, 2012). Through this neurological process, concepts are formed in relation to the meaning assigned by others to the student’s behavior. This neurological process of acquiring concepts aligns with the first three tiers of the NsLLT (Arwood, 2011).

Arwood et al. (2015) state that prosocial concepts and subsequent behaviors are acquired from years of prosocial experiences and assigning value to behaviors that are supportive, inclusive, nurturing, and safe (Goldstein, 1998; Smith, 1985). Assignment of meaning to behavior that does not value support, nurturance, and safety will result in antisocial concepts, leading to subsequent antisocial behavior (Hart & Risley, 1995; Morcom & Cumming-Potvin, 2010). With enough concepts and language, students are able to use language to assign meaning to their behaviors (Arwood, 2011; Mercer, 2013). However, children at the sensorimotor stage do not have enough language to assign meaning to their own behavior (Clark, 1998). The next level of conceptualization is called the pre-operational level, and at this stage the

child's behavior is still dependent on assignment of meaning from others (Arwood, 2011; Carroll, 1964; Piaget, 1959).

At the pre-operational level, the student has acquired the semantic features of objects, actions, and events to form signs representative of icons, indices, and symbols (Peirce, 1894). At this stage, children are able to extend, modulate, or expand basic semantic features, but not with maximal efficiency (Arwood, 2011; Clark, 2016; Cudd & Roberts, 1994; Gruendel, 1977; Hawkins, 2004). The concepts acquired are in the "here and now" and are non-displaced concepts that can be seen, touched, or felt (Hockett, 1960). According to Peirce, this type of conceptualization between students and their environment is referred to *firstness.* At this level, the students are beginning to connect to others as they relate to themselves or *secondness*, but there is no *thirdness* at this level (Merrell, 2001). Language function at this level is restricted in structures (Brown, 1973) and demonstrates limited functions that are centered around the child such as, "These are my crayons," and "I'm bored" (Arwood et al., 2015). The child's agency is considered egocentric and actions towards others are self-serving (Halliday, 1975; Piaget, 1959; Vygotsky, 1962). As mentioned previously, children are unable to use language to assign meaning to their own behavior at this level and are dependent on more advanced language users to interpret what behavior is acceptable in specific contexts and what behavior is not acceptable in specific contexts (Arwood et al., 2015; Clark, 1998; Mercer, 2013).

Through measurements such as surveys and rating scales with college-aged students, Vallacher and Wegner (1989) identified two levels of personal agency labeled as low-level agency and high-level agency. Lower level agents seemingly fit

into the level of pre-operational development. Low-level agents were described as being more prone to disruptions during every day activities, sensitive to contextual cues for a purpose of action and guidance, and were found to be more impulsive, less motivated, and less consistent with their behavior over time. Lack of acquisition of language function serves as possible explanation for the characteristics described for the low-level agent, as limited language function will result in limited cognition and social abilities (Arwood, 1983). The descriptions of high-level agents seemingly fit within the next two levels of conceptualization: the concrete and formal levels.

At the concrete level of conceptualization, the student has acquired enough conceptual overlap that the student is now able to understand more complex and displaced concepts, such as point of view (Hockett, 1960; Piaget, 1952; Pulvermuller, 2013; Vygotsky, 1962). The student is now able to think about other agents not only in relationship to himself but also in relationship to the larger context or society (Arwood, 2011; Halliday, 2007). As more language is acquired, semanticity deepens and the student is aware of abstract and displaced concepts. The student has acquired a full language system with the ability to share grammatically complete ideas in conversation and maintains socially appropriate behaviors (American Speech-Language Hearing Association, 2017b; Brown, 1973). A student functioning at the concrete level is able to follow rules of shared expectations, such as classroom and school rules, Additionally, his thinking has moved beyond the “here and now” and egocentric stage (Arwood, 2011; Piaget, 1959; Vygotsky, 1962). Vallacher and Wegner’s (1989) description of high-level agents aligns with conceptualization at the concrete or formal level. High-level agents are described as having conscious concern

with the significance of an action, consistent and stable actions, and are less inclined to commit opportunistic criminal offenses. High-level agents are also more concerned and likely to think about *why* they acted a certain way and consider actions and consequences. This description of a high-level agent aligns with the final level of conceptualization: the formal level.

The formal level of conceptualization occurs when interconnected concepts overlap and layer to create interconnected distributed networks that form the ability for the student to function with maximum linguistic function (Arwood, 2011; Carroll, 1964; Pulvermuller, 2013). At this level, language functions as an efficient and productive tool to deepen symbolic relationships, referred to as *thirdness* by Pierce (Merrell, 2001). At the formal level of conceptualization, the student is able to understand and use formal level social concepts such as "ethics" and "honesty" and is able to function, problem solve, and make choices that reflect the greater societal good (Arwood, 2011; Gallagher, 1993; Halliday, 1976, 2007).

Some formal concepts have been associated with antisocial behaviors. Specifically, lack of knowledge of emotion words has been identified within the neuroscience literature to be connected to antisocial behaviors (Bell & Wolfe, 2004; Cole, Martin, & Dennis, 2004; Fairchild et al., 2013; Kousta et al., 2011; Masten, Morelli, & Eisenberger, 2011; Moseley, Carota, Hauk, Mohr, & Pulvermuller, 2012; Pulvermuller, 1999, 2013; Vigliocco et al., 2014). Emotions are commonly targeted in contemporary behavior interventions because of the large body of literature that discusses the neurological connection between emotion words, concepts, and behavior (Carrizales-Engelmann, 2016; Kuypers, 2011). However, (Arwood et al., 2015) argues

that since emotions are formal concepts, they can only be acquired over time, through the neuro-biological, socio-cognitive process of language acquisition described earlier in this chapter. Pulvermuller (2013) supports this notion and argues that abstract emotions, and other internal states, are manifested in the actions and interactions the learner has with people using language. For example, he explains that a student can learn an emotion word such as "excited" by physically showing action schemas (behavior). This action schema is then tagged with the abstract word from another language user, over time, and the abstract concept is eventually acquired. Specifically, (Pulvermuller, 2013) states that the key to developing the verbal language for emotion is through the development and overlap of previously learned concepts. Further support for this notion is that by approximately age 11, also the age Piaget (1959) noted as the beginning of the formal operational level, approximately 60% of a child's vocabulary consists of abstract words that represent underlying abstract concepts (Stadthagen-Gonzalez & Davis, 2006). These pieces of evidence counter contemporary social skills, behavioral, and social/emotional curricula that teach emotional regulation and behavioral management through scripted, displaced, and sequenced lessons with children as young as preschool (Carrizales-Engelmann, 2016; Committee for Children, 1992; Kuypers, 2011). Without the necessary level of language function and concepts, the emotional concepts will remain at a level of language too high for most of the targeted audience.

Several theorists and researchers previously mentioned support the notion that language has the ability to facilitate new thinking, and change current thinking patterns, that appears to be necessary for the acquisition of prosocial behaviors

(Arwood, 2011; Bruner, 1975; Carroll, 1964; Taylor, 1985; Tomasello, 2003; Whorf, 1956). Throughout the acquisition of language function section of this chapter, the synergy among cognition, language, and socialization has been described. The following section will outline the three semantic phases that are considered the levels of language function, followed by a section that describes the rationale and methods for assessing language functions.

Levels of language function. The three semantic phases that describe levels of language function are called *pre-language, language*, and *linguistic* (Arwood, 1983, 2011). Although typically developing children acquire command of grammatical language structures around ages seven or eight (Brown, 1973), language functions continue to extend, expand, and refine a person's thinking throughout their lifetime (Arwood, 2011; Hart & Risley, 1995). Since levels of language function represent the relationship between language and thinking, levels of language function parallel the conceptual levels described in the prior section.

Overall, the language functions of a person at the *pre-language level* reflect concepts and behaviors from the sensory-motor and pre-operational levels of conceptualization (Arwood, 1983, 2011; Piaget, 1952; Vallacher & Wegner, 1989). Indicators of pre-language function are restricted grammar, inability to converse without the listener needing to interpret meaning, and limited displacement, semanticity, efficiency, flexibility, and productivity (Akhtar & Tomasello, 1997; Cudd & Roberts, 1994; Hockett, 1960). Additionally, an indicator of pre-language function consists of language reflecting egocentric, "here and now" thinking (Arwood, 2011; Piaget, 1959; Vygotsky, 1962).

The *language* level of language function reflects thinking and behaviors from the concrete level of conceptualization (Arwood, 1983, 2011). People functioning at this level will have acquired a complete language system, evidenced from correct grammar usage (Arwood, 2011; Brown, 1973; Clark, 2016). Other indicators of language function at this level are conversational language, evidence of advanced language functions such as displacement, semanticity, flexibility, productivity, and redundancy beyond "here and now" thinking (Clark, 2016). Language will reflect awareness of agent-to-agent relationships, as well as awareness of societal rules (Gallagher, 1993; Piaget, 1959; Vallacher & Wegner, 1989). Finally, contextual elements of a story are communicated to a listener such as who, what, and where; and, sometimes the child will be able to communicate when, why, and how (Applebee, 1978).

People functioning at the *linguistic* level of language function demonstrate language that reflects a formal level of conceptualization (Piaget, 1959). Language users at this level are able to use the linguistic functions of displacement, semanticity, flexibility, productivity, and efficiency at their maximum levels (Akhtar & Tomasello, 1997; Arwood, 2011; Hawkins, 2004). Other indicators include language and behaviors that reflect consideration of the "greater good" and social competence (Arwood et al., 2015; Gallagher, 1993). Throughout this chapter the synergistic relationship among behavior, cognition, and language has been described. Literature reviewed from this chapter reveals that language function has the potential to provide an authentic view into a student's current cognitive state and social growth. Identifying language function levels has the potential to determine deficits in the

acquisition of concepts. The following section will discuss the rationale behind, and methods in the assessment of, language function that can potentially lead to the identification of such deficits in prosocial conceptual acquisition.

Rationale for functional language assessment. As discussed previously in this chapter, the current method of language assessment is conducted in a structural manner. Even when the intention is to measure the language function, the actual analysis is completed through a structural lens (American Speech-Language Hearing Association, 2017c; Brown, 1973; Garrett, 2008). As previously described, language theorists believe that language is more than just words and grammatical structures (Arwood, 2011; Bruner, 1975; Carroll, 1964; Halliday, 1975; Lenneberg, 1969; Peirce, 1894; Tomasello, 2003; Vygotsky, 1962), and deeper analysis of the function is necessary (Arwood, 2011; Bruner, 1975; Searle, 1969).

When considering how meaningful sentences are produced, Greene (1972) describes analysis of surface order words to be an inadequate explanation. Searle (1969) agrees and argues that analysis of language should focus on more than analysis of language structures. Searle elaborates further by saying that language is semantically rule-governed, and these rule-governed forms can be studied independently. However, he asserts that to only examine the features of language provides an incomplete picture. Arwood (1983) argues that meaning can only be measured through interchanges between speaker and hearer resulting in meaning being shared; not from the surface forms uttered by the speaker. She argues that without considering what is underlying the surface forms, the analysis of language is superficial and does not measure the user's communicative effectiveness. Dore and

McDermot (1982) support this view and assert that the function and interpretation of the words themselves are missed when only language structures are analyzed.

Dore and McDermot (1982) stress that the function of language is missed by a formal structural linguistic analysis. They argue that an analysis of vocabulary, or even sets of propositions between speaker and hearer, is not an adequate representation for analysis due to the lack of incorporation of context and interactional considerations. In this sense, Dore and McDermot (1982) posit that the most complete analysis of language occurs by analyzing what speakers and listeners intend to accomplish with their utterances. The linguistic structures used in these interactions are analyzed as a reflection of what the language users know and understand. These arguments support Pierce's (1905) notion that the whole of language is greater than the sum of its parts, the concept of pragmaticism. Another concern with only evaluating the structures of language, that may be of particular importance for this study, is the notion that "saying is not actually knowing."

It is possible for a student to have learned language surface structures without understanding the underlying meaning, or function (Bruner, 1975; Clark, 2016; Lenneberg, 1969; Tomasello, 2003). For example, a toddler can use a variety of formal level words such as "agitate" or "disappointed" several times throughout the day to several different communication partners. The toddler can pronounce these utterances correctly, seemingly use these utterances in the correct context, and still not know what the words mean or how these utterances relate to him. Students who have learned the acoustic patterns of words, but do not have the language function, or deep semantic structure of the ideas, will lack the meaning behind the concepts and will be

unable to use the utterances to share meaning or to deepen their conceptual knowledge (Bruner, 1975; Halliday, 1977; Searle, 1969; Vygotsky). This is important to note because students can appear to be socially competent through verbal output, yet continue to be socially and behaviorally incompetent due to lack of understanding the underlying meaning.

An example in the literature is in the case of psychopaths. After interviewing prison inmates who had been diagnosed with antisocial personality disorder, Hare (1999) found the inmates' language samples to be, for the most part, structurally sound. However, the inmates made odd word choices such as similar sounding word substitutions like, "annual" for "anal," and "unconscientious" for "unconscious." Additionally, Hare (1999) reported that the inmates would make constant contradictory statements in their interview samples. Hare (1999) labeled the psychopath's speech patterns as "verbal quirks" (p. 126), but his description of "verbal quirks" matches with a term used by Arwood (2011) called *borrowed language.*

Borrowed language is a structurally sound imitation of language that the communicator heard previously at some point and is able to repeat with some contextual accuracy. Naturally, the language is limited in meaning (Arwood, 2011; Lenneberg, 1969). Neurologically, borrowed language can be explained as input that has failed to have neuro-semantic meaning; thus, the input does not integrate into circuits and networks at the cortical level for language (Pexman, Siakaluk, & Yap, 2013; Pulvermuller, 2013). Rather, the input remains in the subcortical regions of the brain, or at the perceptual pattern level according to the NsLLT (Arwood, 2011; Scheibel & Scheibel, 1965; Shevrin & Dickman, 1980). Subcortical regions that make

up the limbic system move sensory input, but do not function to produce conscious thought (Pexman et al., 2013; Pulvermuller, 2013). At the subcortical pattern level, acoustic patterns and language structures can be repeated; however, without underlying conceptual meaning or shared symbolization, the verbal output is merely a set of language structures with limited functions. This example relates to contemporary education and the acquisition of prosocial concepts because a student may appear to be competent with a prosocial concept due to a verbal response, but it is possible that the student may be using borrowed language within an appropriate context. When students understand the deep meaning, or the language function, of prosocial concepts at the concrete level or greater, their behaviors will reflect the conceptual knowledge (Martin-Raugh et al., 2016; Piaget, 1952; Vygotsky, 1962).

Only using structural analyses to measure language with students identified with EBD is of concern because it is possible for these students to score within normal limits on a standardized structural language assessments and be found ineligible for school-based language interventions (Spaulding et al., 2006). However, since the language assessments are structurally based, it is possible for the students to have low language function that goes unidentified because language function is not routinely measured (American Speech-Language Hearing Association, 1993; Arwood, 2011; Greene, 1972). It is possible that the dearth of assessment and awareness of language function may be leading to the current "fly under the radar" situation that appears to be happening with the under-identification of LI within the EBD population (Hollo et al., 2014). Although not frequently used at this time among educators or SLPs (American Speech-Language Hearing Association, 2017c), language function assessment has

been successfully used to identify information about students' social, language, and cognitive levels, and has helped provide insight into students' learning systems (Arwood, 2011; Arwood & Beggs, 1992; Green-Mitchell, 2016; Rostamizadeh, 2009).

Methods for language function assessment. An assessment of language function is completed through language sampling. The analysis of functional language sampling does not have much in common with a structural language sample other than it is typically an analyzed sample of natural language. Methods for functional language assessment can be varied, but the materials and questions are always carefully selected and modified during administration according to the student's current social, cognitive, and linguistic function levels (Arwood, 2011). Although there are no universal language sampling guidelines for language function sampling and analysis, the following methods have been chosen for this study and will be briefly reviewed in the next subsections.

Language of pictures. It is not an uncommon practice to utilize pictures for language sampling, as pictures provide context and a shared visual referent for the examination of language features (Hadley, 1998; Heilmann, Miller, Nockerts, & Dunaway, 2010). However, pictures themselves do not provide meaning for the examinee. Similar to the symbols of words, meaning for pictures depends on the perception and experience from the person interpreting the images (Wendt, 1956). In this way, pictures provide an excellent source of insight into the cognitive, language, and social level of the examinee because the examinee is only able to "see" the parts of the picture for which they have concepts and language (Arwood, Kaulitz, & Brown, 2007; Wendt, 1956). Specifically, pictures that include agents, actions, and objects

relating with each other provides opportunities for the examiner to gain insight into the social concepts the examinee possesses (Arwood et al., 2007; Kernan, 1970; Wendt, 1956). These types of pictures are called event-based pictures and serve a specific purpose for a functional language assessment. Since relationships are not static, the examinee will have to understand the relationships among agents, their actions, and objects in the pictures that can be shared through speech acts and propositions (Searle, 1969; Wendt, 1956). Often, an examinee with language at the language level of language function will talk about these events in story form with features from the cognitive psychology lens such as characters, sequence, and conflict (Applebee, 1978; Arwood, 2011). For this study, the event-based pictures will give the participants an opportunity to assign social meaning to the relationships in the picture; and, if the participant's language function is high enough, these relationships will be prosocial or antisocial concepts in nature (Arwood et al., 2015). If a participant has not acquired enough language function, it is likely he or she will merely label or describe the items and actions in the picture, failing to provide connected semantic relationships in the form of grammatical propositions (Searle, 1969). This is indicative of restricted language function at the pre-language level (Arwood, 2011). Finally, since pictures are symbolic and merely represent reality, different interpretations of a picture can reflect cognitive and language levels, such as an examinee's interpretation of an agent acting "responsible" or "terrible" (Arwood et al., 2015; Wendt, 1956). For this study, the oral language sample collected from an event-based picture will also attempt to be cartooned for further clarification about the examinee's thinking and language.

Cartooning. Cartooning is another technique used to investigate the examinee's cognition and language function levels (Arwood & Kaulitz, 2007). Cartooning consists of the examinee drawing an event-based picture in sequenced frames with space to write about the event. While sometimes examinees are able to echo or use borrowed language to orally tell about picture (Lenneberg, 1969), drawing out the concepts may reveal gaps in language function (Arwood, 2011; Schwamborn, Mayer, Thillmann, Leopold, & Leutner, 2010).When used in intervention, cartooning provides opportunities for a student to overlap visual and motor input to help create concepts (Gainotti et al., 2009; Meister et al., 2003; Stevenson et al., 2011), tagged with language to raise the examinee's level of thinking (Arwood, 2011).

Drawing for educational purposes has been found to be a successful learning strategy. Using drawing strategies in combination with verbal recollection of facts and events, in comparison to only using verbal strategies, has been found to provide increased abilities to recall factual and narrative information (Gross, Hayne, & Drury, 2009). Additionally, accuracy and complexity of concepts depicted in students' drawings has been found to predict education performance when using learner-drawing strategy (Schmeck, Mayer, Opfermann, Pfeiffer, & Leutner, 2014). Pictures and drawing are two visual methods to assess language function. The next method of language function assessment does not include visuals. Instead this method measures the examinee's use of temporal language specific to English.

Temporal assessment of English. Another assessment that addresses functional language acquisition centers on the use of linguistic functions to answer a time-based question without a visual referent. English is a low context (Carroll, 1964), time-

based, alphabetic (Arwood, 2011), and auditory language (Flaherty, 2003). The use of time concepts in an English speaker's verbal output is what provides the context for the listener to make sense out of the communication. The mismatch between primarily using an auditory language (English) to communicate and having a visual learning system tends to lead people with a visual learning system to demonstrate difficulties using time concepts to answer auditory, time-based questions (Arwood & Beggs, 1992). Language that indicates a lack of understanding of time can indicate restricted language function that potentially impacts the student's ability to act prosocially (Arwood, 2011; Arwood & Beggs, 1992). For example, English restricted in time may restrict the student to pre-operational thinking and a pre-language level of language function. This restriction in language function represents an inability to understand displaced concepts and events in time, such as consequences (Arwood et al., 2015). Arwood and Beggs (1992) created an assessment of temporal function called Temporal Analysis of Propositions (TEMPro) designed to identify a speaker's specific type of metacognition.

The TEMPro is a tool designed to document language function differences in students ages eight and older (Arwood & Beggs, 1992). By age eight, most children are able to use temporal concepts to communicate ideas not shared by both the speaker and listener (Arwood & Beggs, 1992; Brown, 1973). In this context, temporal concepts include events sequenced over time, explanation of abstract ideas, and the communication of ideas that cannot be referenced by both the speaker and the listener. Literature in language philosophy supports the rationale for the TEMPro (Searle,

1969). The TEMPro is utilized in this study and is discussed in further detail in Chapter Three.

The previous sections outlined evidence suggesting that the acquisition of language *function* possibly serves as a foundation for the acquisition of prosocial behaviors (Arwood, 2011; Bruner, 1975; Poulshock, 2006; Taylor, 1985); yet little research has been conducted that studies the connection between language function with students struggling to acquire prosocial behaviors (Green-Mitchell, 2016). Using a reductionist paradigm mentioned earlier in this chapter, a connection already exists between language *structures* and students struggling to acquire prosocial behaviors (Benner et al., 2002; Cohen, Menna, et al., 1998; Hollo et al., 2014; Toppelberg & Shapiro, 2000; Warr-Leeper, Wright, & Mack, 1994). Applying a neuroeducation framework to the acquisition of prosocial behaviors, this study sought to explore the connection between levels of language function and the acquisition of underlying prosocial concepts through language function sampling analyses with elementary students identified with (EBD) and/or (LI). To help the reader better understand the components of this study and to better clarify the gap in literature between language function and structure, the next section begins with an explanation of *how* students are identified as EBD and/or LI.

EBD and LI Definitions, Identification, and Placement

Within the American public education system there are stringent criteria and guidelines that must be met in order for a child to be found eligible to receive services in schools (Individuals with Disabilities Education Act, 2004). This section will detail EBD and LI eligibility and placement in public U.S. elementary schools to help the

reader better understand special education processes and placement in these two areas. In this section the definitions, labels, and criteria through the Individuals with Disabilities Education Act (IDEA) will be highlighted because they provide the defining criteria in public schools, the setting of this study.

EBD terms and identification. There are several different terms used in conjunction with EBD due to the complex nature of behavior, the philosophical basis for behavior, and objectivity of identification. Other common identifying terms include mental health issues, mental illness, emotional health, emotionally disturbed, emotionally disabled, or behaviorally disabled (National Alliance on Mental Health, 2016). To broadly define, any of the above-mentioned terms indicate that the student has a medical condition that is disrupting their thinking, feeling, mood, daily functioning, and ability to create relationships with others (National Alliance on Mental Health, 2016).

According to IDEA, (Individuals with Disabilities Education Act, 2004), the specific term that is used to describe this group is "Emotional Disturbance." Alternate terms frequently used within education are "behavior disorder," and "emotional disability" (Friend & Bursuck, 2009). To create a more uniform understanding of this population and to offer a less stigmatizing label, the National Mental Health and Special Education Coalition adopted the term "emotional and behavioral disorders" (EBD) (Smith, 2007). This is the term that will be used throughout this study. The current IDEA criteria for identification of a student with an emotional disturbance can be found in section 300.8 (c) (4) and says:

(i) Emotional disturbance means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's education performance:

a. An inability to learn that cannot be explained by intellectual, sensory, or health factors.

b. An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.

c. Inappropriate types of behavior or feelings under normal circumstances.

d. A general pervasive mood of unhappiness or depression.

e. A tendency to develop physical symptoms or fears associated with personal or school problems.

(ii) Emotional disturbance includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance under paragraph (c) (4) (i) of this section (Individuals with Disabilities Education Act, 2004).

According to IDEA (2004), for a student to become eligible for special education services under the category of emotional disturbance, the IDEA criteria must be met through a multidisciplinary assessment with determination of eligibility decided by the student's educational team, including a parent and teacher. Standardized assessments, observations, and teacher/parent surveys are common techniques used to make an emotional disturbance eligibility decision (Webber & Plotts, 2008). Once students have been found eligible, the student may receive

specially designed instruction as indicated on their Individualized Education Plan (IEP), a legal document that outlines the student's plans and services according to federal and state eligibilities. These services can occur in a variety of educational settings (Individuals with Disabilities Education Act, 2004). In simpler terms, evaluation results from students' eligibility assessments determine *if* and *what* services the student will receive; and, then the students' IEP teams determine *how* the services will be delivered and *where*. *Where* the services are delivered is referred to as the educational placement or setting. The next section will discuss educational settings and placement for students identified with EBD.

EBD educational setting and placement. One of the six principles of IDEA (2004) is called Least Restrictive Environment (LRE). When IEP teams are determining placement, LRE must be taken into consideration. Provisions regarding LRE provided by IDEA (2004) are primarily found in §§300.114 through §§300.117 and states, to the maximum extent appropriate, students identified with special education needs are to be educated with students who have not been identified with special education needs. Additionally, special classes, separate schooling, or other removal of students identified with special education needs from the regular education environment is only to occur when education in regular classrooms, with the use of supplementary aids and services, cannot be attained due to the nature or severity of the disability. Placement options identified by IDEA (2004) are labeled according to the percentage of time students spend with general education peers during the day or week. Placement, or LRE, options are given the following titles: 80% or more in regular class, 40%-79% in regular class, 0-39% in regular class, separate school,

residential facility, homebound hospital, correctional facility, or parent-opted private school (Department of Education, 2016). There is not a standard placement or treatment protocol for students identified with EBD in U.S. schools. Merrell and Walker (2004) describe the options for students identified with EBD to be a broad spectrum that are sometimes only offered in extremes. For example, some students may receive a little extra time in the resource room or monitoring by a special education teacher, while others are served in a self-contained classroom or separate educational facility.

Every year the U.S. Department of Education creates a report for Congress that outlines statistics concerning the implementation of IDEA. According to this report, in 2014, the majority (46%) of students identified as EBD spent most of their educational time *in the regular class for 80% or more of the day* (Department of Education, 2016). In comparison, a general education student who is not eligible for special education spends 100% of their time in the general education classroom environment. The next placement option with the highest percentage of students eligible for special education under the category of EBD is *in the regular class 0-39% of the day* (19%). This percentage is typically reflective of a student who spends most of their day in a self-contained, homogeneous classroom (Jull, 2008). Students identified with EBD can spend time in environments outside of their neighborhood school as well, if determined by the IEP team. Approximately 18% of students identified with EBD spend their educational time in separate educational locations, such as day treatment centers or correctional facilities (Department of Education, 2016).

Placement of a student in self-contained classrooms or outside educational facilities are determined by the IEP team based on the nature and severity of the behaviors (Individuals with Disabilities Education Act, 2004). Jull (2008) reports that these homogeneous, self-contained classrooms or separate facilities are in place largely due to the disruptive nature of behaviors presented by students identified with EBD. The next section describes definitions, eligibility criteria, and educational setting and placement for students identified with LI: the second participant group in this study.

LI terms and identification. Like EBD, there are several different terms commonly used to describe a student who demonstrates a deficit in language. Terms that are commonly used in conjunction with the term "language impairment" include, "spoken language disorder," "oral language disorder"(American Speech-Language Hearing Association, 2017c), "language disability"(American Psychiatric Association, 2013), "specific language impairment" (Morris, 2005), or "language learning disorders" (Arwood & Beggs, 1992). Additionally, terms such as "deficit," "disorder," "impairment," and "disability," are all used interchangeably (Morris, 2005). The identification of LI fits within a broader category of communication disorders. Communication disorder is the official eligibility term used in several states and encompass several different types of communication impairments such as LI (Oregon Department of Education, 2013; Washington Adminstrative Codes, 2013). The national scientific, professional, and credentialing association for audiologists and SLPs defines a communication disorder as:

> A communication disorder is impairment in the ability to receive, send, process, and comprehend concepts or verbal, nonverbal and graphic symbol systems. A communication disorder may be evident in the processes of hearing, language, and/or speech. A communication disorder may range in severity from mild to profound. It may be developmental or acquired. Individuals may demonstrate one or any combination of communication disorders. A communication disorder may result in a primary disability or it may be secondary to other disabilities (American Speech-Language Hearing Association, 1993).

According to the American Speech-Language Hearing Association (1993) the specific disorders described under the broad category of communication disorder that are pertinent to this study are included below:

1. A ***speech disorder*** is an impairment of the articulation of speech sounds, fluency and/or voice.
2. A ***language disorder*** is impaired comprehension and/or use of spoken, written and/or other symbol systems. The disorder may involve (1) the form of language (phonology, morphology, and syntax), (2) the content of language (semantics), and/or (3) the function of language in communication (pragmatics) in any combination.
3. ***Central auditory processing disorders*** are deficits in the information processing of audible signals not attributed to impaired peripheral hearing sensitivity or intellectual impairment. This information processing involves perceptual, cognitive, and linguistic functions that, with appropriate

interaction, result in effective receptive communication of auditorily presented stimuli.

4. A ***social communication disorder*** is characterized by difficulties with the use of verbal and nonverbal language for social purposes. Primary difficulties are in social interaction, social cognition, and pragmatics.

Guidelines for speech or language impairment are vague and maintain that the impairment must adversely affect a student's educational performance (Individuals with Disabilities Education Act, 2004). In IDEA (2004), a speech or language impairment is listed in §§300.8 as "a communication disorder, such as stuttering, impaired articulation, language impairment, or voice impairment that adversely affects a child's educational performance." Specific regulations about eligibility are delegated to state administrative codes and to local agencies. Typically, eligibility in schools is determined through a discrepancy model or designated cutoff score where Z-scores, standardized scores, or percentiles on standardized assessments are taken into consideration (Hollo, 2012; Spaulding et al., 2006). Testing procedures for determining LI can vary from school to school, but traditionally includes a standardized test, language sample, and classroom observation completed by the SLP that assesses the student's language skills in the areas of semantics, syntax, morphology, phonology, and pragmatics (Garrett, 2008). Similar to students identified with EBD, once found eligible for services, the educational team determines the most appropriate plan and placement for a student identified with LI.

LI educational setting and placement. In contrast to the placement continuum of students identified with EBD, students identified with speech or

language impairments have less of a variety of placement trends. In 2014, approximately 87% of students eligible with speech and language impairments spent *80% or more time in their regular class*. All other placement setting options included 5% or less of the total students eligible with speech and language impairments (National Center for Education Statistics, 2012). This means that students identified with speech and language disorders spend the majority of their school day in a general education class with their general education peers. The National Center for Education Statistics (2012) did not specify if the percentages for placement options were calculated based on primary, secondary, dual, or single eligibility status. Although this section provided several terms and related definitions, this study used the terms EBD and LI to refer to eligibility criteria and definitions as cited by IDEA (2004).

As mentioned previously in this study, current educational philosophies and practices are heavily influenced through a cognitive psychology lens (American Speech-Language Hearing Association, 1993; Skinner, 1987). This lens influences the assessment and measures used to determine the special education eligibilities previously described. Using a reductionist model and measuring language *structurally,* several pieces of literature have found a connection between students with language impairments and students struggling to acquire prosocial behaviors, such as students identified with EBD (Benner et al., 2002; Cohen, Menna, et al., 1998; Hollo et al., 2014; Toppelberg & Shapiro, 2000; Warr-Leeper et al., 1994). The following sections will review the relevant literature regarding the connection between language *structures* and *functions* and students struggling to acquire prosocial behaviors.

Emotional and Behavioral Disorders and Language Impairment

Language structures and antisocial behaviors. With the traditional assessment of language predominantly measured through structures, as outlined in a previous section of this chapter, a connection has been established between students exhibiting antisocial behavior, such as students with EBD, and students with LI (Benner, Nelson, & Epstein, 2002). Rooted in a reductionist educational paradigm, the connection between the two separate entities of language and behavior is only shown when students score poorly on separate tests or rating scales of behavior *and* language. Several studies have found such a connection between language deficits and students identified with EBD.

In a meta-analysis that examined students with EBD and language deficits that included 26 studies with a total of 2,796 participants, Benner et al. (2002) found that approximately 71% of the students identified with EBD had co-occurring language deficits. Furthermore, the authors also found that 57% of the students identified with language deficits were also found to have an EBD, demonstrating a bi-directional relationship between EBD and language. Similarly, Nelson, Benner, and Rogers-Adkinson (2003) found that among a K-12 population of students identified with EBD (N = 152), roughly 45% (n = 69) revealed deficits with language. Moreover, the 45% of students with EBD that were found to have language deficits, were also found to have deficits in the areas of reading, writing, and math. Beitchman (1998) stresses the importance of early identification with both EBD and LI noting that the relationship between EBD and students with language deficits remains consistent throughout a student's growth in years. Essentially, the author suggests that students with EBD and

LI will not naturally "grow out" of either. Although early identification is recommended, Cantwell and Baker (1991) found that identification of students with co-occurring EBD and language deficits increase over time. The authors speculate that this increase in identification may be due to a lack of command over language. As typically developing students gain command of language and begin to participant in society, the students with language and behavior deficits do not, making the deficits more noticeable. However, even with evidence of a strong relationships between EBD and language deficits, students identified with EBD are not being referred or identified with LI at high rates.

Since the early 1990s, students identified with EBD are being under-identified at high rates. In a meta-analysis of 22 studies including 1,171 students identified with EBD ages 5-13, Hollo et al. (2014) found that 81% of students identified with EBD were found to have below average language abilities. The students in the study had never been diagnosed with an LI previously; yet, 47% were classified with moderate to severe LI per standardized language assessments. This lack of LI identification within the EBD population occurs in the educational setting, but the majority of the research in this area has occurred in mental health and community settings (Cohen, Barwick, Horodezky, Vallance, & Im, 1998; Toppelberg & Shapiro, 2000; Warr-Leeper et al., 1994). In a study that assessed the language of 37 children ages 5-12 in an outpatient clinic setting, 28% of the children who had previously not been suspected or identified with an LI were found to have moderate to severe language deficits. Similarly, Warr-Leeper et al. (1994) studied the language abilities of 20 males between the ages of 10 and 14 who had been admitted to a residential treatment

facility due to significant antisocial behaviors. None of the participants had been identified with deficits in language prior to the study; yet findings indicated that 80% of the participants were found to have significant language impairments as determined by most standardized assessment scores falling more than two standard deviations below the mean. Additionally, in a study including 380 children ages 7-14 from two mental health centers, Cohen, Barwick, et al. (1998) found that 40% of the children from the sample had language deficits that were undiagnosed and had never received treatment/intervention. With deficits in language being overlooked or unidentified, some researchers are calling for language to be considered for students identified with EBD and for SLPs to become more involved in the assessment and intervention of students identified with EBD.

With literature supporting the notion that students with EBD have a high incidence of LI, some researchers are recommending more involvement of SLPs in student treatment programs. Sanger, Maag, and Shapera (1994) argue that due to the high rate of co-occurrence between students identified with EBD and LI, an increased involvement of the SLP is warranted in the identification, program development, and treatment of students with EBD. In a study that examined the language skills of mildly/moderately impacted students identified with EBD who spent most of their day in the general education classroom with assistance from a resource room, all students (N = 30) who were not receiving language therapy scored, minimally, one standard deviation below the mean on all but one language test (Ruhl, Hughes, & Camarata, 1992). The researchers highlighted the importance of considering students identified with EBD “at-risk” for communication deficits and argued that improving

communicative competence would address the student's behavioral areas of need. Although Hyter, Rogers-Adkinson, Self, Simmons, and Jantz (2001) found that classroom based language therapy conducted with an SLP proved to be helpful for increasing language abilities for students with EBD, Brinton and Fujuki (1993) postulate that SLPs are typically not involved in the educational plans of students with EBD and may not have formal instruction on how to implement language programs for students of this nature. Even though Getty and Summy (2006) assert that it is "crucial that classroom teachers and SLPs work collaboratively to encourage students to effectively use language" (p. 17), several authors previously mentioned support the notion that language is rarely considered when addressing students with EBD. Contemporary approaches to addressing behaviors in schools appear to not consider language as a possible function for behaviors (Cohen, Barwick, et al., 1998; Hollo et al., 2014; Ruhl et al., 1992).

A trend found in the language and EBD literature is the suspicion that language deficits of students identified with EBD are often overlooked due to the disruptive behaviors that camouflage the language disorder (Cohen, Menna, et al., 1998; Sanger et al., 1994; Toppelberg & Shapiro, 2000). This suspicion highlights the reductionist model that breaks down students' abilities into smaller sub-components such as language, motor, cognition, behavior, sensory, perception etc. with each being separate from the other (Chomsky, 1968; Skinner, 1987). In contrast, some theorists and researchers argue that students' social, cognitive, and language abilities are integrated and dynamic. Similarly, these theorists and researchers believe that language is more than words and grammatical structures and, therefore require deeper

analysis of the functions (Arwood, 2011; Bruner, 1975; Carroll, 1964; Halliday, 1975; Lenneberg, 1969; Peirce, 1894; Tomasello, 2003; Vygotsky, 1962). The next section will review literature that used language *function* to analyze the language of students struggling to acquire prosocial behaviors.

Language function and antisocial behaviors. To date, studies using language function to analyze language are scarce. Using neurotypical elementary students, Rostamizadeh (2009) sought to examine how language samples could be used in the context of critical literacy to assess cognitive growth with the use of a specific set of teaching strategies called Viconic Language Methods™ (Arwood, 2011). This qualitative study took place in a large, suburban school district. Participants consisted of five students in 4th grade, ages nine and ten without any additional educational supports or identifications beyond what was provided in the classroom. For one month, Rostamizadeh (2009) collected language samples, student artifacts, student interviews, and took observational notes to determine if cognitive growth had occurred among the five participants, as measured by levels of language function and conceptualization during a unit studying the formal concept of "segregation." Results indicate that assessment of language function was an "extremely" successful way to measure changes in cognition (Rostamizadeh, 2009, p. 98). Additionally, Rostimizadeh (2009) found that, although participants' language structures increased about the concept of "segregation" by the end of the unit, language function had not increased in depth or quality. In a study that more closely aligns with the purpose of this study, Green-Mitchell (2016) focused on language function analysis with students struggling to acquire prosocial behaviors.

Green-Mitchell (2016) used language function analysis to study the potential for the acquisition of language function as an antecedent to prosocial moral development sample of ten alternative high school students. In this qualitative study, Green-Mitchell (2016) used the TEMPro oral prompts, oral storytelling, and cartooning as measures of language function among two groups of students from the same alternative high school. One group was comprised of students with significant behavior problems and the other was comprised of the highest achieving students in the school. Results indicated that all students in the study were found to have pre-language levels of language function, while students in neither group were able to consistently demonstrate prosocial connections in their oral or cartooned stories. The findings of this study suggest that students marginalized for antisocial behaviors, such as students attending alternative high schools, may have significant deficits in language function. Additionally, the findings from this study indicate that current behavior programs utilized in alternative high schools may not provide appropriate opportunities for the students to acquire prosocial concepts for higher moral development. Fitting with the under-identification trends described in the previous section, none of the students in Green-Mitchell's study were receiving interventions or special education programming for language deficits at the time of the study. Although, this study's findings are unable to be generalized, it helped establish footing for future research exploring the connection between language function and the acquisition of prosocial behavior.

Summary of Chapter

This review of literature first introduced and defined the neuroeducation framework used for this study. An extensive review of literature explored how and why cognitive psychology, neuroscience, and language inform one another to provide the rationale behind the use of a neuroeducation model to explore the connection between language function and the acquisition of prosocial concepts. Synthesized, the neuroeducation literature aligns with the NsLLT as a theoretical underpinning for the present study. In addition to establishing a neuroeducation framework concerning the acquisition of prosocial behaviors, this study sought to explore the connection between levels of language function and the acquisition of underlying prosocial concepts through language function sampling analysis with elementary students identified with EBD and/or LI. A review of literature that explored the connection between, both, language structures *and* language functions with students struggling to acquire prosocial concepts revealed a gap in the literature. Although literature supports the connection between deficits in language *structures* and students identified with EBD in all levels of education and multiple settings, limited, if any, research to date has been conducted that explores the connection between language function and students identified with EBD at any level. To that end, the following research questions have been formulated for this study:

1. What similarities and differences in language function levels and characteristics exist, if any, between elementary students with EBD, LI, and/or both from varying educational settings as measured by functional language sampling analysis?

a. When asked to orally respond to an auditory prompt from the TEMPro?
b. When asked to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual level?
c. When asked to orally tell a story about an APRICOT II event-based picture that depicts complex semantic relationships at the concrete-operational conceptual level?
d. When asked to cartoon a story from one of the previously told APROCOT I or II pictures?

2. Will students identified with EBD, LI, and/or both make prosocial or antisocial relationships among the agents, their actions, and the context?
    a. When asked to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual level?
    b. When asked to orally tell a story about an APRICOT II event-based picture that depicts complex semantic relationships at the concrete conceptual level?
    c. When asked to cartoon a story from one of the previously told APROCOT I or II pictures?

Chapter Three: Methodology

This chapter contains a discussion of research design, rationale of research methods, recruitment procedures, participants, instrumentation, ethical considerations, data collection, and data analysis for this study.

Purpose Statement and Research Questions

The purpose of this study was comprised of two components. One component was to explore relevant literature in cognitive psychology, neuroscience, and language that encompasses the acquisition of prosocial behaviors with the intent of finding support for a translational neuroeducation model to address students struggling to acquire prosocial behaviors. The second component of this study sought to explore the connection between levels of language function and the acquisition of underlying prosocial concepts through language function sampling analysis with elementary students identified with emotional and behavioral disorders (EBD) and/or language impairment.

Since the purpose of this study was twofold, this study was approached in two parts. The first part included a review and triangulation of literature in the areas of cognitive psychology, neuroscience, and language because those are the components of neuroeducation as defined by Arwood (Arwood & Merideth, 2017). A review of relevant literature included in Chapter Two supports the notion of using neuroeducation as a model to address the acquisition of prosocial behaviors and the results of this portion of the study will be further discussed in Chapter Four. Although a connection has been found between language structures and students struggling to acquire prosocial behaviors, such as students with EBD, a literature gap has been

identified exploring the connection of students identified with EBD and language *functions*. Using a neuroeducation framework grounded in the Neuro-Semantic Language Learning Theory (NsLLT), there is reason to believe that students struggling to acquire prosocial behaviors, such as students with EBD, may demonstrate deficits in language *functions*. The second part of this study aimed to address this supposition with the following research questions:

Research Questions

1. What similarities and differences in language function levels and characteristics exist, if any, between elementary students with EBD, LI, and/or both from varying educational settings as measured by functional language sampling analyses?
    a. When asked to orally respond to an auditory prompt from the TEMPro?
    b. When asked to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual level?
    c. When asked to orally tell a story about an APRICOT II event-based picture that depicts complex semantic relationships at the concrete-operational conceptual level?
    d. When asked to cartoon the same story from one of the previously told APROCOT I or II pictures?
2. Will students identified with EBD, LI, and/or both make prosocial or antisocial relationships among the agents, their actions, and the context?

a. When asked to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual level?
b. When asked to orally tell a story about an APRICOT II event-based picture that depicts complex semantic relationships at the concrete conceptual level?
c. When asked to cartoon the same story from one of the previously told APROCOT I or II pictures?

Rationale for Methodology

This study of language sampling can be applied to the field of education; however, due to the background of the researcher and methods of language sampling and analysis, this study will be most applicable in the field of speech and language pathology. Research methodology for this study falls outside the bounds of what is typically considered qualitative research due to the use of pre-determined language function levels and specific attention to prosocial and antisocial language within the elicited language samples (Creswell, 2013). Due to increasing complexity in the field of speech-language pathology, novel research approaches are valuable complements to more traditional research methods (Brinton & Fujiki, 2003).

Traditionally, research in the area of speech-language pathology has mainly applied quantitative methods to address a variety of research questions (Hammer, 2011). Findings from studies employing quantitative methodology have generated a solid foundation of knowledge from which new research questions and practices have arisen (Hammer, 2011; Izaryk & Skarakis-Doyle, 2017). Qualitative research methods

utilized in the field of speech-language pathology often study complicated, multifaceted, and interconnected variables that are not able to be quantified; however, methods that are less frequently used can be beneficial when addressing complicated and specific assessment and treatment research questions (Brinton & Fujiki, 2003; Izaryk & Skarakis-Doyle, 2017). This study of language sampling used descriptive methods in language function sampling and analysis to explore the complicated relationship between the acquisition of prosocial concepts and behavior with level of language function among a specific group of elementary students. Language analysis that consists of more than the typical structural analysis is supported by researchers in the fields of linguistics (Greene, 1972; Lenneberg, 1973), language (Arwood et al., 2015; Brinton & Fujiki, 2003; Hadley, 1998; Tomasello, 2003), and psychology (Bruner, 1975; Vygotsky, 1962). In general, language sampling is utilized by speech and language pathologists (SLPs) because it offers greater potential for deep insight than what standardized language assessments might be able to provide (Hadley, 1998). For this study, methods of sampling were chosen specifically to provide insights for the levels and characteristics of language *function*.

The specific methods of language function sampling and analysis highlighted in Chapter Two will be further discussed in this chapter, and were specifically chosen for this study because of the suggested relationship between students' behavior and the underlying thinking that accompanies their behavior (Arwood et al., 2015; Lenneberg, 1967; Vygotsky, 1962). These researchers, along with others mentioned in Chapter Two, suggest that language functions to indicate students' thinking or cognition. This means that to truly understand the function of students' behaviors, the evaluator needs

to understand the concepts being represented (Peirce, 1905; Searle, 1969). One method to analyze the underlying concepts is with language function sampling and analysis. Functional language sampling analysis has the potential to determine functional language deficits that may offer insight into students' cognitive, social, and language acquisition levels that could help explain the connection between levels of language function and prosocial concepts with elementary students identified with EBD. Along with language function sampling and analysis, participant special education files were reviewed for pertinent educational history.

Setting

Participants in this study were from six elementary schools in two medium-sized suburban school districts located in the Pacific Northwest region of the United States. The two neighboring school districts that participated in the study were of comparable size and demographics and were chosen due to researcher convenience. As of the May 2017, both districts were comprised of approximately 50% male and 50% female students. Students in the districts were mainly reported as White (73% and 68%), followed by Hispanic (17% and 20%) and two or more races (6% and 8%) respectively. American Indian or Alaskan Native, Asian, Black, and Native Hawaiian all were reported as less than 2%. According to state report cards from both districts, students receiving free or reduced lunch were reported at 61% and 57%, students eligible for special education services were reported at 13% and 17%, and both districts reported 3% of students on Section 504 educational accommodation plans (plans that provide accommodations for students with disabilities that is not included within the bounds of special education). The next section will outline participant

inclusion/exclusion criteria, recruitment procedures for participation in this study, and procedures for the review of special education files for each participant.

Procedures for Participation

Inclusion and exclusion criteria. Inclusion and exclusion criteria for participation were chosen with the intention of eliciting a small sample of elementary students that would provide the most valid and reliable data to explore the connection between levels of language function and the underlying acquisition of prosocial concepts through language function sampling analysis. It was important for the participant sample to remain relatively small because of the large amount of time required for completion of the recruitment procedures, file reviews, language sample collection, and language sample analysis. Three main inclusion criteria for participation were outlined for this study. The first criterion was attendance at an elementary school in one of the participating school districts. The second was a minimum age requirement. Participants must have been 8 years of age or older to meet the minimum age requirement for one of the measurements of language function selected for this study, the Temporal Analysis of Propositions (TEMPro). The third inclusion criterion was that special education services and placement must have been provided by the participant's local education agency (local district). In other words, students who had educational placements beyond the bounds of the district, such as day treatment facilities or correctional facilities, were excluded. This criterion was included because most public education students receiving special education services, including students identified with EBD and LI, receive services from their local education agency (Department of Education, 2016).

Most students with EBD and LI receive special education services from their local education agencies in the following settings: 80-100% in the regular class; 40-79% in the regular class; or 0-30% in the regular class. These percentages are based on the amount of time the student spends in the regular education classroom. The amount of time the student spends in the special education classroom is deducted from the total minutes the student spends at school each week to equal the educational setting percentages mentioned above. This percentage of time spent in the regular class, also known as educational setting, is a decision made by the IEP team and is based on academic benefit, non-academic benefit, and effect that the student will have on the teacher and other students (Individuals with Disabilities Education Act, 2004). Additional setting, or educational placement, options available for students were not included in this study. The titles used for educational settings in this study, such as 80-100% in regular class, were consistent with the titles used for setting identification at the state and national level (Individuals with Disabilities Education Act, 2004). Since there is a current lack of research investigating language *function* among the EBD population at the elementary level, a sample of students identified with EBD and LI from the three most popular educational settings was included in an effort to provide the most reliable and relatable results for educators and SLPs.

Along with educational placement outside of the student's LRE, exclusion criteria included students currently or previously identified as English Language Learners (ELL) and students with special education eligibilities such as Autism, Other Health Impairment, or Intellectual Disability that may have been receiving services within the self-contained behavior classrooms. These groups were excluded from the

study in an effort to keep the sample population homogeneous and to limit other variables that are known to impact language development.

Recruitment and participation procedures. Due to the Family and Educational Privacy Act (FERPA) enacted in 1974 (Individuals with Disabilities Education Act, 2004), valuable information regarding inclusion and exclusion criteria for each participant was not available to this researcher without signed parental consent in one of the participating districts. Once consent was obtained, the researcher was able to access special education records to decipher which students met inclusion criteria. The researcher was a special education employee with the other participating district in the study and, therefore, could preview special education records for inclusion and exclusion criteria prior to signed parental consent. A copy of the consent letters can be found in Appendix A. The following sections outline the recruitment procedures for obtaining consent for both, EBD and LI students and procedures for the review of special education records.

Recruitment procedures included three phases: 1) procuring lists of possible participants, 2) making phone calls to families to explain the study, and 3) sending and receiving signed consent forms for participation. The recruitment process varied slightly between the two participating school districts because the researcher was employed by one of the districts. The primary difference in the recruitment processes between the two districts was that some of the inclusion/exclusion criteria was able to be applied before phase two in the district the researcher was employed, and after phase two in the second district (the district the researcher was not employed). Because the researcher had access to some inclusion/exclusion criteria at the district

she was employed, such as age, the list of potential participants was narrowed prior to contacting parents by phone (phase two). Due to FERPA regulations, the researcher only had access to a master list of elementary students identified with EBD and contact information to begin phase two in the district she was not employed. The list of potential participants was narrowed from inclusion/exclusion criteria after phase three, during the review of special education records, for the second district. The following sections describes the recruitment procedures for EBD and LI participants by district.

Recruitment of Participants with EBD. Phase one of participant recruitment consisted of obtaining a list of all elementary students from both districts that were identified with EBD. Upon request, the researcher was provided a list from each district that included student name, school name, parent name, phone number, and address. The district in which the researcher was employed also provided student birthdate, grade, areas of specially designed instruction (SDI), placement setting, and current case manager. There were 27 elementary students identified with EBD between the two participating districts. Since the researcher was given information about educational placement and age from her employing district, three students were excluded at this time. One student was excluded because he was not yet eight-years-old and two students were excluded because of educational placements at day treatment facilities. The researcher then began phase two of the recruitment process by attempting to call the families of all remaining 24 possible participants.

The researcher chose to call all the families before sending home the written consent for participation form in an attempt to increase the rate of participation and to

increase the trustworthiness of the study (Blom-Hoffman et al., 2009). Participation rates have been found to be the highest if multiple communication attempts are made; therefore, the researcher used phone calls along with consent letters to obtain consent. During these phone calls, the researcher attempted to call all 24 families, but was only able to personally speak with 15 of the 24 families to briefly discuss the background of the researcher and the research, explain the language activities included in the study, and to answer any questions the families had about the study. Messages with similar information were left for the remaining nine families. Of the 15 families that the researcher spoke with, 13 granted verbal consent over the phone and two denied consent. The two families who denied consent over the phone were not mailed letters of consent in phase three of the recruitment process.

In phase three of the recruitment process, consent forms for the parent to sign and return were mailed home along with the researcher's business card and a self-addressed, stamped envelope. The consent forms were sent through the mail instead of in the backpack of the children to decrease opportunities for the consent to get lost or forgotten in transit to home and back. Three weeks after the initial mailing of consent forms, a second consent form was mailed to those families who had given verbal consent but had not returned the physical consent form yet. A total of 12 consents for students identified with EBD were signed and returned to the researcher granting permission to participate in the study. For the second school district, once consent was received, the researcher could view special education student records to check for further inclusion/exclusion criteria. Following a review of special education records, three students from the second school district did not meet inclusion criteria. One

student was not yet 8 years old, one student had been dismissed from special education, and one student's educational placement was in a day treatment facility. After all phases of the recruitment process were complete, a total of nine participants identified with EBD met the inclusion criteria and had returned signed consents for participation. Further information about the participants with EBD and the procedures for file reviews are included later in this chapter and in Chapter Four.

Recruitment of participants with LI. Since the aim of this study was to investigate levels of language function and its connection to the acquisition of prosocial concepts, it was important to include students with LI who did not exhibit antisocial behaviors consistently as evidenced by the lack of instruction in the areas of behavior or social/emotional according to their IEPs. According to the Department of Education (2016), students identified with a communication disorder, LI included, are provided special education services in the 80-100% in the general education classroom setting 87% of the time. Because of this overwhelming majority, the students identified with LI for this study fell within the educational placement category of 80-100% of time in the general education classroom.

The researcher began the recruitment process for the students with LI after the nine students with EBD were identified. For comparison purposes, the researcher intended to have a smaller number of participants with LI of similar age to the EBD sample, within the 80-100% educational setting participate in the study. Due to time constraints, and since the researcher could preview special education records at the participating district where she was employed, the researcher purposively selected two well-matched students identified with LI to participate in the study. Phase one of this

recruitment process consisted of obtaining a list of students who were eligible for services under the category of communication disorder in the district where she was employed. A total of 224 elementary students in the district were eligible for communication services. Students were eliminated from the list of potential participants that did not meet inclusion criteria. A total of 120 students were removed because they were not yet eight-years-old; 35 were removed because they were older than the participants in the EBD sample and not a good match for comparison purposes; 18 were removed because they were receiving services in the areas of behavior or social/emotional; 16 were removed because they were identified with significant cognitive, academic, or adaptive needs that required the student to be placed in educational settings of 0-39% in the regular class or 40-79% in the regular class; 15 were removed because they were only receiving articulation services; 6 were removed because they were identified with autism; and 2 students were removed because they had moved out of the district. Following this exclusion process, a total of 12 students fit within the inclusion criteria. Since the researcher only wanted a small group of students identified with LI, the researcher compared student IEPs and assessment results to find the most appropriately matched two students by cognitive evaluation scores, academic services, and age. The researcher completed phase two and three with these two students and both returned signed consent forms. This concluded the recruitment process for participation selection. The following section provides an overview of the procedures for the review of special education records that occurred after phase three.

Review of special education records. Following the receipt of signed consent to participate in the study, the participants' special education records were reviewed by the researcher in both districts. Although both participating school districts used online special education record systems, the information kept in the online systems was limited. Online records can be incomplete for several reasons. Reasons include move-in students who have records that did not transfer into the specific online system used by the district or special education records older than the initiation of the systems in the district. For those reasons, the researcher elected to view complete, hard-copy special education records stored in the special education offices of both school districts. Due to FERPA, special education records are confidential not to be taken out of the special education offices unless to be transferred to a student's new school district (Individuals with Disabilities Education Act, 2004). For these reasons, the researcher made several appointments with the special education departments of both districts to review special education records for the study participants.

This researcher personally reviewed the participants' special education records. The files were reviewed for the following information: 1) birthdate, 2) special education eligibility history, 3) history of assessment information including language assessment, 4) history of disciplinary referrals or behavioral description/data, 5) history of educational placement, 6) history of emotional, physical, sexual abuse or other life traumas, 7) information about first or second languages, and 8) IEP goals and service areas. Although socio-economic status (SES) information would have been useful, this information was not available to this researcher. Each review of special education records took from one to three hours to complete.

Although IDEA (2004) sets forth national standards and requirements for special education which are uniform to all public schools in the U.S., how this information is reported and what specific information is reported is not uniform. State and local regulations, as well as individual educator preferences, often dictate what details can be found in students' special educational records. For this study, special education records were not identical from participant-to-participant. For example, some participant records had documented history of past childhood trauma and other records had no mention of it. Having no mention of childhood trauma does not automatically mean the child did not suffer childhood trauma; it only means that it was not discussed in the special education reports available to this researcher. Detailed results of the review of special education records are included in Chapter Four. The next section provides an overview of the 11 participants recruited for this study.

Participants

A sample of 11 public school students (eight males and three females) receiving special education services for EBD or LI participated in this study. The participant sample was drawn from elementary students identified with EBD or LI from three separate special education settings as determined from their Individualized Education Plan (IEP): 0-30% in regular class (n = 5), 40-79% in regular class (n = 2), and 80%-100% in regular class (n = 4). All participants in this study were reported as having white, non-Hispanic ethnic backgrounds (n = 11). Ages of the participants ranged from age 8 to 9 years old, with a mean age of 9.2 (SD = .39). While this sample was stratified and purposive, it was a sample of convenience. A visual representation of the purposive and stratified sampling used for this study is included in Figure 3.1.

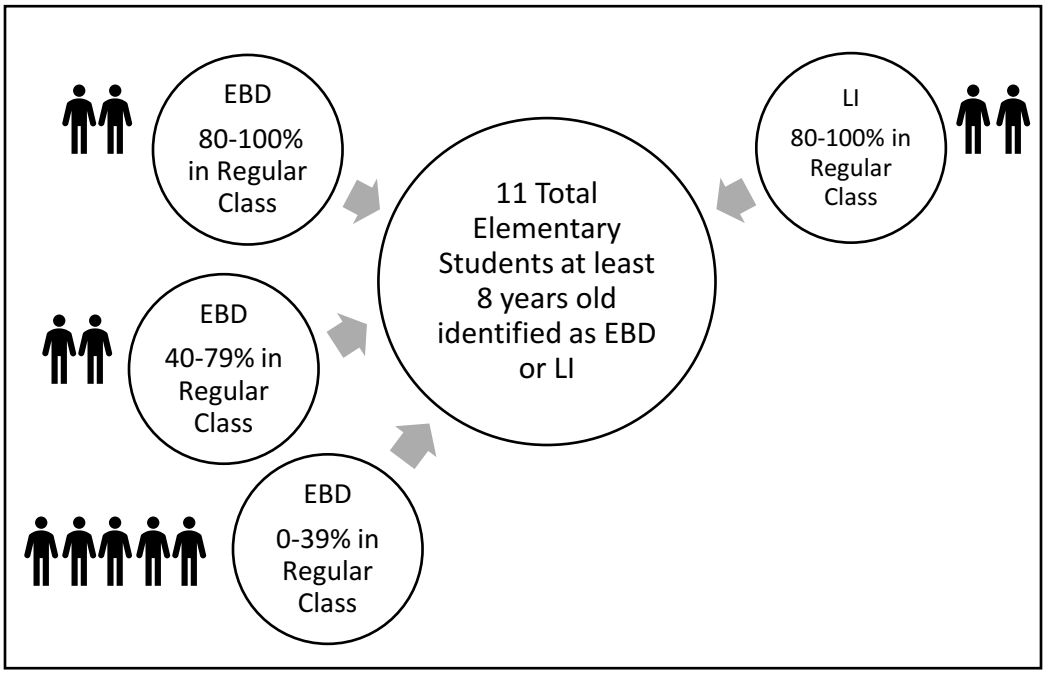


Figure 3.1. Breakdown of stratified purposive sampling. Icons of humans indicate the number of participants in each group.

For this study, participants with in the 80-100% in the regular class represented students who get the majority of their special education services from a resource room-type setting. Participants in the 40-79% in the regular class setting represent students who either have intensive resource room services or a mix of self-contained classrooms supports, and resource room supports. The participants in the 0-39% in regular class setting for this study all were placed in in self-contained behavior-based classrooms. Self-contained behavior-based classrooms are specific classrooms staffed to provide educational services for students with significant behavioral needs (Jull, 2008).

This researcher hoped to have participants with special education eligibilities with EBD, and dual identification of EBD and LI from the three educational settings

mentioned above, as well as participants identified with LI who did not demonstrate behavioral difficulties (Department of Education, 2016). However, no students were found within the participant sample with dual eligibilities of EBD and LI. This matches with the trend found in the literature that indicates students identified with EBD are not being consistently being identified with LI (Hollo et al., 2014), although these two eligibilities have been found to be frequently co-occurring (Benner et al., 2002). The researcher had hoped for this stratification in the participant sample to make a comparison between students identified with EBD with and without LI among the various education settings.

The two students identified with LI for this study represent most students identified with LI *without* consistent antisocial behaviors spending 80-100% of their time in the regular class. Students identified with LI in educational settings of 40-79% and 0-39% were excluded from this study because placement in settings with restricted access to general education, as mentioned above, is typically due to other areas of educational weakness such as restricted cognitive or academic abilities in addition to LI. In fact, when language is determined to be the cause of low classroom achievement, educational settings with a high percentage of time in the regular classroom is considered best practice and recommended (Roller, Rodriquez, Warner, & Lindahl, 1992). This differs from the rationale to place students with EBD in educational setting with restricted general education time. Students with EBD are placed in more restrictive settings largely due to the severity of antisocial behaviors that disrupts the learning and potentially threatens the safety of the regular classroom environment. (Jull, 2008). The use of educational setting to compare severity of

behaviors and severity of language abilities would not have been consistent and therefore was not included in this study. The next subsections provide further description of the participants in this study.

Students identified with EBD. Elementary students identified with EBD were selected for this study to represent students struggling to acquire prosocial behaviors. Fundamental information for inclusion in this study and historical information regarding LI history is included in Table 3.1. Age on the table is represented in years while gender is represented by male (M) and female (F).

Table 3.1

Age, Gender, Educational Placement, and Language History for Participants with EBD

Participant	Gender	Age	Educational Placement[a]	History of LI	History of Language Assessment
1	F	8	80-100%	No	Yes
2	M	9	80-100%	No	Yes
3	M	9	40-79%	No	No
4	M	9	40-79%	Yes	Yes
5	F	8	0-39%	No	No
6	M	9	0-39%	No	No
7	M	9	0-39%	No	No
8	M	8	0-39%	No	Yes
9	F	9	0-39%	No	No

[a] The percentage indicates a range of time in percentage that the participant spends in a regular education classroom.

Students identified with LI. Elementary students identified with LI who did not demonstrate antisocial behaviors were selected as participants in this study for comparison purposes. This small sample of students was selected to represent students with language impairments, but without antisocial behaviors. Fundamental information for inclusion in this study and historical information regarding LI history is included in Table 3.2. Age on the table is represented in years while gender is represented by male (M) and female (F).

Table 3.2

Age, Gender, Educational Placement, and History of EBD for Participants with LI

Participant	Gender	Age	Educational Placement[a]	History of EBD	Years of LI Eligibility
10	M	9	80-100%	No	3
11	M	8	80-100%	No	4

[a]The percentage indicates a range of time in percentage that the participant spends in a regular education classroom.

Language Sample Collection Procedures and Instruments

The participants in the study took part in the collection of oral, drawn, and written language samples that consisted of a one-time, one-on-one session that lasted between 15 and 45 minutes. The location of the language sample collections occurred at the participant's elementary school. The researcher was provided a suggested place and time for the collection by the participant's case manager or by a building SLP. The requirements for a location were a table, chairs, routine location for the participant, and limited distractors. Examples of locations where language samples were collected included SLPs' therapy offices, resource rooms, and adjacent

classrooms that were used for one-on-one or small group work. The SLPs assigned to the participant's elementary schools aided the researcher in scheduling the language sample collections or provided further information to allow for scheduling. The SLPs assigned to the participant's schools were invited to observe the language sample collection and/or meet up to discuss the procedures, instruments, or rationale. A total of four of the six invited SLPs observed the language sample collection sessions. The researcher also conducted a professional development in the spring of 2018, for the SLPs of both participating districts that focused on the instruments, procedure, and rationale behind the collection and analysis of language function samples within the field of speech and language pathology.

Instruments and language sample collection methods. Instruments and materials used to collect the language samples included the Temporal Analysis of Propositions (TEMPro), APRICOT I and APRICOT II event-based pictures, and cartooning paper. The instruments provided activities that served as prompts for the collection of the oral, drawn, and written language samples. The oral language sample was audio recorded for later transcription and analysis. The participant's drawing and writing samples were copied and kept for later analysis by the researcher. There were slight variances in the order the instruments and materials were presented due to the natural reciprocity that occurs with communication; however, the instruments were mostly able to be administered in the order they are presented in the next sections: 1) TEMPro, 2) APRICOT I and II oral stories, and 3) cartooning. The following section describes the instruments used and specific language sample procedures for each instrument in further detail.

Temporal analysis of propositions (TEMPro). The first instrument administered during the collection of the language function sample was the TEMPro**.** The TEMPro is a tool designed to document language function differences in students ages eight and older (Arwood & Beggs, 1992). By age eight, most children are able to use temporal concepts to communicate ideas not shared by both the speaker and listener (Arwood & Beggs, 1992; Brown, 1973). In this context, temporal concepts include events sequenced over time, explanation of abstract ideas, and communicating ideas that cannot be referenced by both the speaker and the listener. Terms utilized in this tool include:

Predicating: "The act of connecting at least two ideas by using a temporal sequence" (Arwood & Beggs, 1992, p. 2).

Propositions: "The intended primary content of an utterance (a cognitive unit) established through the acts of referring and predicating. Propositions are, therefore, determined by the use of an utterance to refer and predicate" (Arwood & Beggs, 1992, p. 2).

Referring: "The act of sharing information" (Arwood & Beggs, 1992, p. 2).

This tool has been found to be highly reliable when used to discriminate between typical language and atypical language as evidenced by Cronbach's alpha of .96 (Arwood & Beggs, 1992). Literature reviewed in Chapter Two of this study supports the notion that students with visual cognition symbolize information spatially rather than temporally. These differences are evident in the student's language when asked to answer a question that involves organization of time. Data collected through language sampling by Arwood and colleagues found that students (ages seven to

young adult) with language learning disorders were found to produce limited auditory propositions with the use of temporal language (Arwood & Beggs, 1992). These results align with evidence found in neuroscience literature that some people use visual pathways to form concepts resulting in visual cognitive abilities (Gainotti et al., 2009; Gallese & Lakoff, 2005; Gallistel & Matzel, 2013; Klemen & Chambers, 2012). Further, it supports the notion that people with LI are likely to symbolize information spatially and not with time; therefore resulting in the lack of auditory propositions (Arwood, 1983; Arwood & Beggs, 1992). On the contrary, students who use auditory symbols will develop temporal relationships that can be identified as propositions in a collected language sample (Arwood & Beggs, 1992). To this end, this tool allows the evaluator to determine if the participant learns and thinks with a visual system or an auditory system, as well as determine if language function is restricted.

To collect an appropriate language sample to be analyzed with the TEMPro, the researcher asked participants to do a linguistic task that was not in the here and now and did not include a visual shared referent. The researcher asked the participants, "What do you do on a typical day?" The language sample was recorded and transcribed as described in a later section of this chapter. If the student was unable to answer the original question due to the advanced language functions required to process formal, displaced concepts, the question was altered by the researcher to allow the participant to better answer the question (Arwood, 2011; Carroll, 1964). The question was altered to "Tell me what you do on a school day?" This question reflects a lower language function level represented by concrete conceptualization due to the removal of the formal concept "typical" with the maximum displacement of time (day)

(Arwood, 2011; Vygotsky, 1962). If the participant was still unable to answer the question, it was modified to "Tell me what you do from the time you wake up in the morning to when you go to sleep at night." This question requires pre-language function to answer and reflects preoperational concepts (Bruner, 1975; Piaget, 1959). If the student was unable to answer the question at the preoperational level of conceptualization, the question was not asked again. The modifications to the TEMPro are noted in the results section of this study.

According to the research completed to test the validity and reliability of this tool, people who exhibit typical language development are able to connect ideas temporally into a proposition and are able to produce an average of 3.83 propositions per language sample (Arwood & Beggs, 1992). If a person is unable to produce a proposition, the arguments can be analyzed for indicators of language function abilities as well as type of learning system. People with atypical language development are unable to connect three ideas temporally; rather they conceptualize time spatially and linearly and respond by providing a list of information, rather than language that connects ideas through time. According to the TEMPro, when one or no auditory propositions are demonstrated through language sampling, a visual-spatial learning system is indicated. When three or more propositions are produced in the language sample, an auditory processing system is indicated

The TEMPro also provides the examiner a list of specific semantic language errors to document that may also indicate a deficit in language function (Arwood & Beggs, 1992). A list of targeted semantic language errors identified by the TEMPro can be found in Appendix B. Semantic errors from other portions of the language

sample were also documented using the terms from this list of semantic errors. Information analyzed with the TEMPro served as a component in the determination of language function levels and characteristics to help answer the first research question.

APRICOT I and APRICOT II pictures for stories. APRICOT I and II pictures were used to give the students an opportunity to produce a language sample that included a visual shared referent. The APRICOT I and II pictures are considered event-based because they include agents doing things with other agents within a specific context. These pictures are leveled for cognitive/conceptual levels as described in Chapter Two of this study. APRICOT I pictures were created with the pre-operational thinker (ages 3-7) in mind while the APRICOT II pictures were created for students functioning at the concrete (ages 7-11) or formal levels (ages 11+) of cognition/conceptualization (Arwood, 1985; Piaget, 1959).

To help the participants understand how to tell a story using the static visual referent points in the pictures, the researcher modeled an oral story-based APRICOT I picture # 4 "The Grocery Store Display" prior to the participants telling their stories. The researcher's model story was not told from a written script to keep the natural flow of the storytelling but was told in a consistent manner among participants. The researcher's model story was created to reflect concrete conceptualization since that is the level most participants should be functioning according to their age (Piaget, 1959). The researcher's story included the language functions of expansion, extensions and modulation resulting in a story that included connected relationships about who, what, when, where, why, and how.

Each participant was asked to tell a story about a picture of their choosing (two total). No other defining criteria or instruction was given to the participant as to not shape their response towards a specific storytelling expectation. Each participant was given three event-based picture options (a total of six pictures) to choose from to control for participant interest. The participants were first shown the three APRICOT I pictures and were asked to choose one to tell a story about. The APRICOT I pictures utilized in this study were APRICOT I picture # 3 "*The Oranges*," APRICOT I picture #12 "*Playing Basketball,"* and APRICOT I picture # 13 "*The Barbeque."* Following the oral story about the chosen APRICOT I picture, the participant was shown three APRICOT II pictures to choose from and to tell a story about. The APRICOT II pictures utilized in this study were APICOT II picture # 2 "*The Kitchen Scene*," APRICOT II picture #9 "*The Fall in the Yard,"* and APRICOT II picture # 12 "*Skateboarding in the Street*." The APRICOT I and II pictures used for this study are included in Appendix C. The APRICOT I and II event-based pictures were used to address both main research questions and, specifically, sub-questions, 1.b., 1.c., 2.a, and 2.b.

Cartooning. For the last component of the language function sample collection, the participants were asked to cartoon his or her understanding of the relationships from the event-based APRICOT I or II pictures. As mentioned in Chapter Two, cartooning is a technique used to investigate the participant's conceptualization and language function levels (Arwood & Kaulitz, 2007). Cartooning is a Viconic Language Method (VLM) that allows for visual thinking to occur in auditory situations (Arwood, 2011).

Elements involved with cartooning are supported in the neuroscience literature included in Chapter Two of this study (Ghazanfar & Schroeder, 2006; Kiefer & Pulvermuller, 2012; Meister et al., 2003; Pulvermuller, 2013). As mentioned in Chapter Two, sensory input overlaps with other sensory input to create visual or auditory concepts (Dekker et al., 2014; Koelewijn et al., 2010; Stevenson et al., 2011). For students, who need visual and movement overlap of patterns to create visual concepts, cartooning provides the combination of sensory input required to acquire concepts when tagged with meaning (Arwood, 2011; Meister et al., 2003; Sadato et al., 1996). Cartooning has been chosen for this study because it provides the participants an opportunity to show (draw) their ideas from their stories. When compared with the oral language function sample, gaps in conceptualization may be evident. For example, the student may be able to tell a story with structures that appear to be representative of typical development, but when asked to draw his or her story, the semantic relationships may not be represented. This would indicate the student is using borrowed language (Lenneberg, 1969) to tell an oral story but has not acquired the meaning of the words being shared. The same can be true in a reversed situation when the student can draw a detailed picture, but cannot tell or write a story about it. It is through the comparison of conceptual acquisition through language function that gaps can be identified and language level of language function can be determined (Arwood, 2011). In a similar fashion, participant's written portion of his cartoon should include appropriate vocabulary, linking ideas, and demonstrate awareness of the reader (Temple, 2013). Since vocabulary, the linking of ideas, and awareness of

the reader are language-based concepts, deficits found within the written portion of the cartooning task can also indicate restrictions in language function.

Similar to the oral storytelling task using the APRICOT I and II pictures, the researcher used a pre-made cartooned model from the same APRICOT I picture that was orally modeled by the researcher. Following the oral story model, the researcher showed the participants the pre-made cartoon and then re-told the story using the cartoon model. The cartooned model used by the researcher is included in Appendix D. Cartooning paper and a writing utensil was provided for each participant. Each paper consisted of six frames, an area to draw, and lines to write about the picture. At least one participant requested a different kind of paper for this portion of the study. The participants were asked to draw their story in the empty boxes and to write about it on the lines below. There was no requirement for how many frames the participant needed to use. The researcher answered clarifying questions about the process of cartooning with the participants but did not answer questions about the content of their event-based story. The researcher brought a small bag of colorful pencils and erasers for the participants to choose from and when they were finished with the activities that served as a "thank you" treat for taking time to work with the researcher. The cartooned language samples were measured with the use of the semantic error list and ANSPA mentioned in earlier sections as well as with pre-defined codes based off literature in language function that will be further discussed in the data analysis section in this chapter. The participant's cartoons were used to address both main research questions and, specifically, research questions 1.d and 2.c.

Data Analysis

The transcriptions of student responses were reviewed and analyzed by the researcher using deductive content analyses with predefined categories based on existing literature in language function (Elo & Kyngäs, 2008). Deductive content analysis was chosen as a method to analyze the data for this study because this approach has been found to be useful when applying a theory in a different manner that it has been tested (Elo & Kyngäs, 2008). Additionally, measurement tools provided by TEMPro and Arwood's Neuro-Semantic Language Learning Pre-Language Assessment Protocol [ANSPA] (Arwood, 2011) were used to aid in the analysis of language function and are described in the next sections. Explanations of data analysis are organized according to research question and sub questions.

Language levels and characteristics. The first research question asks, *what similarities and differences in language function levels and characteristics exist, if any, between elementary students with EBD, LI, and/or both from varying educational settings as measured by functional language sampling analyses?* Some methods of analysis, such as methods used to identify levels and characteristics of language function and maintenance of a shared referent, were used throughout several sub-questions. Methods of analysis that were used throughout sub-questions 1.a, 1.b, 1.c, and 1.d will be described first, followed by more specific analysis, if needed, according to each instrument per sub-question.

Levels and characteristics of language function were measured according to pre-defined deductive content analysis codes, especially from the sections of the literature review that covered levels of concepts, agency, advanced language

functions, and levels of language function. To be more specific, since all participants in the study were between the ages of eight and nine years old, every participant should be functioning at the language level according to their age (Applebee, 1978; Arwood, 2011; Brown, 1973; Vygotsky, 1962). By age eight, participants should be able maintain a shared referent to orally create a story that *expands* the basic semantic relationships to include pertinent contextual information (who, what, when, where, why, how) (Cudd & Roberts, 1994), *extends* the semanticity of the basic semantic relationships with the use of specific language (e.g. using specific names for agents, places, etc.) (Gruendel, 1977), and *modulates* the language structures to indicate understanding of underlying concepts such as time or quantity (e.g. usage of adult grammar) (Brown, 1973; Clark, 2016). Whether participants demonstrated expected levels of expansion, extension, and modulation is specifically addressed in Chapter Four to help answer the first research question. Table 3.3 further describes the expanded language functions of extension, expansion, and modulation with an example.

Table 3.3

Definitions and Examples of the Terms: Basic Semantic Relationships, Expansion, Extension, and Modulation

Language Function Terms	Definition	Example
Basic semantic relationship	Agent + action + object	Her go swim
Extension	Process by which meaning is added to underlying thoughts; increasing meaning of basic semantic relationships	*My mom* go swim
Expansion	Increasing sentence structure; language is used to expand on basic functions of agents, actions, and objects for more complex meanings, greater variety of use in diverse settings, for increased efficiency	My mom swim *with me at the YMCA yesterday*
Modulation	Changing the meaning of language such as to add a morpheme to words	My mom *went* swim*ming* with me at the YMCA yesterday

Additionally, by age eight, students should able to produce an oral story that shows ideas that are beyond the "here and now" level of *displacement, semanticity, efficiency, productivity,* and *flexibility* (Hockett, 1960). Also, each participant should be able to create and determine semantic boundaries of their utterances. For example, in cognitive psychology terms, the stories told about the APRICOT pictures and responses to the TEMPro, should be logically sequenced and include a clear beginning, middle, and end (Applebee, 1978). The researcher used the ANSPA

(Arwood, 2011) and the semantic error checklist from the TEMPro to aid in the analysis of language function and determination of language function levels. The ANSPA is a ten, yes/no question, guide that helps the researcher determine if the participants are functioning at a pre-language level of language function or a language level of language function. The ANSPA also gives insight into the participants' level of conceptualization (Piaget, 1959). The questions have been slightly adapted to reflect the language used in a study. All ten questions are included in Appendix E. A sample of the questions include:

1. Does the participant use consistent age-appropriate forms?
2. Does the participant use utterances to share the meaning of the context?
3. Does the participant talk about the "here and now?"

Levels of language function were included in tables for all sub-questions within the first research question. The tables presented in Chapter Four include the language function level of each participant and were abbreviated accordingly: Pre-Language (PL), Language (L), or Linguistic (Li). Some of the characteristics of language function observed include *referring* and *sharing* a topic according to referent. These are both language function characteristics expected according to the participants' chronological ages (Searle, 1969).

To maintain a shared referent, the participant should be referring to the shared context created during the reciprocity of the language function activity. For example, the participants responses to the "typical day" prompt are expected to provide enough context to establish a shared referent to allow the researcher to have a clear understanding for what their entire day might look like. To aid with the measurement

of a shared referent the researcher, specifically, used questions two and three from the ANSPA (Arwood, 2011). These two questions query about the participants' referential and shared functions of language. Additionally, the semantic error checklist was used to help identify topic or referential identification problems, off target responses, and topic closure difficulties. The participants' observed ability to maintain a shared referent is presented in Chapter Four to help address the first research question. The next paragraphs discuss analyses related to specific sub-questions.

In relation to the first overall research question, *what similarities and differences in language function levels and characteristics exist, if any, between elementary students with EBD, LI, and/or both from varying educational settings as measured by functional language sampling analyses?* The first sub-question specifically asks: *when asked to orally respond to an auditory prompt from the TEMPro.* Data specifically collected from the TEMPro prompts were reported in response to this sub-question. Typical language development, according to the TEMPro, indicates that the participants over age eight should be able to produce at least three auditory propositions (Arwood & Beggs, 1992). With the TEMPro, a minimum of three ideas, or arguments, must be connected in a temporal sequence to justify a proposition. An example of how a proposition is formed is provided in Figure 3.2 as defined in the TEMPro (Arwood & Beggs, 1992, p. 5).

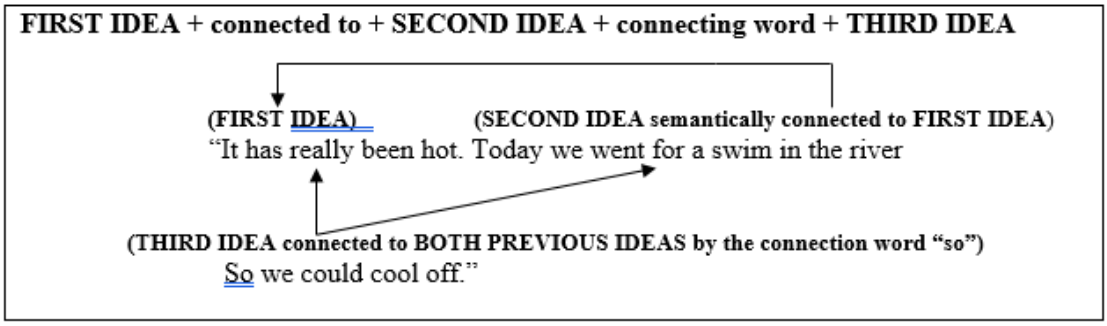


Figure 3.2. Example of an auditory proposition as utilized in the TEMPro.

Examples of typical vs. atypical development as provided by Arwood and Beggs (1992) are included below:

Typical Language: "We walk to school, it takes about 20 minutes, and then at school, I go to my classes" (Arwood & Beggs, 1992, p. 6).

This example demonstrates typical language because the student's answer is grammatically correct, uses temporal language such as "and then," uses the time element of "20 minutes," and three arguments are connected to form a proposition.

Atypical Language: "…then I eat breakfast, then I take off to…and go up to the bus stop, then I get to school, then I go to the park behind the school" (Arwood & Beggs, 1992, p. 7).

This sample demonstrates atypical language because the arguments are not connected to form a proposition, rather the arguments are strung together in a list with the temporal language "then," and "and then" to denote movement through the list, not through time. Additionally, the listener has to interpret a portion of what is being communicated. For example, the speaker states that he or she takes off, but where does he or she go? It is also not clear what happened at school *before* they go to the park

behind the school to do something. The researcher used guided questions featured in Figure 3.3, provided by the TEMPro, to help in the determination of propositions.

1. Is there a logical sequence of events? Does an idea refer to a preceding idea?
2. Do temporal words function to connect one idea to another through time?
3. Does the tense usage function to create a natural sequence?
4. Is there shared meaning without the listener making inferences?
5. Are there a minimum of three related ideas that are connected temporally to establish a proposition?
6. Does the student demonstrate any of the following semantic language errors?

Figure 3.3. List of question to help determine auditory propositions as defined by the TEMPro.

Data regarding the number of arguments and propositions were recorded numerically on a table in Chapter Four with the number "0" indicating the instances when the participant was unable to produce any arguments or propositions. Failure to produce three propositions with the use of temporal language indicates metacognition that is visual (Arwood & Beggs, 1992). The participants' metacognition will be represented in Chapter Four on a table as (A) for participants with auditory metacognition and (V) for visual metacognition.

In relationship to the first overall research question, *what similarities and differences in language function levels and characteristics exist, if any, between elementary students with EBD, LI, and/or both from varying educational settings as measured by functional language sampling analyses?* The second and third sub-questions ask: *when asked to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual*

level? And *when asked to orally tell story about an APRICOT II event-based picture that depicts complex semantic relationships at the concrete-operational level?* Analyses of the oral stories told from the APRICOT I and APRICT II pictures were used to answer these research questions. These instruments do not have a specific measurement protocols. The oral language samples were analyzed with the use of the semantic error checklist, semantic boundaries such as "beginning, middle, and end," and the ANSPA. Analyses of language function and characteristics were completed and recorded on tables presented in Chapter Four as described earlier in this section

In relationship to the first overall research question, *what similarities and differences in language function levels and characteristics exist, if any, between elementary students with EBD, LI, and/or both from varying educational settings as measured by functional language sampling analyses?* The fourth sub-question asks: *when asked to cartoon the same story from one of the previously told APRICOT I or II pictures?* This question was addressed by analyzing and comparing the cartoon drawn about a previously told oral story. For analysis, the researcher reviewed the original copies of the cartoons drawn and written by the participants and compared them with transcripts from oral stories told about the APRICOT I or II pictures. They should match the cartoons. Students with typically developing language function should have a cartoon that matches in complexity and content to their orally told story and should demonstrate typical language function characteristics for their age (Applebee, 1978; Arwood et al., 2007; Temple, 2013). This language sampling method also does not have a specific measurement protocol. Analysis of language function and characteristics for the cartoon were completed and recorded on the table associated to

this question in Chapter Four as described earlier in this section. Results of the analysis were put into a table. Expected levels of expansion, extension, and modulation, as well as overall language function levels, were noted as described earlier. Whether the oral stories matched the cartooned stories was indicated by (Y) for "yes" or (N) for "no." In the event that a participant chose not to draw or write, the code "NA" was used for "Not Applicable".

For each sub-question, the language function and characteristics of each participant group based on educational setting was compared qualitatively by analyses from the TEMPro, semantic error chart, ANSPA, and the pre-defined codes from the language function literature. These results were summarized and the most prominent themes regarding similarities and differences were reported in terms of language function in Chapter Four as described in the previous sections. Particularly pertinent examples gathered from the analyses will be included in Chapter Four to provide specific illustration of the researcher's findings for each sub question.

Prosocial and antisocial relationships. The second research question asked, *will students identified with EBD, LI, and/or both make prosocial or antisocial relationships among the agents, their actions, and the context?* To address this question, the APRICOT I, APRICOT II, and cartooning language samples that were collected an analyzed for the first research question were analyzed again, but for prosocial and/or antisocial relationships. Unlike the first research question, this research question used the same analysis and reporting methods for all three sub-questions. The next sections will describe how all sub-questions were analyzed and reported.

Students with typical language function, based on age, should be able to communicate the relationships among the agents and their actions at the language level of language function with language that represents the acquisition of prosocial concepts. Relationships among the agents were determined if the participant provided a response that included interactions and social connections between agents in the pictures, rather than merely describing the picture, agents, or actions. Language samples that were too restricted in form and/or function to reflect prosocial or antisocial relationships were identified as "language too restricted (LTR)." Determination of language that was representative of prosocial or antisocial concepts for oral storytelling and cartooning adhered to the definitions of prosocial and antisocial concepts discussed in previous chapters of this study.

For this study, prosocial concepts were defined as ideas that reflected interpersonal care (Serow, 1991), through nurturance, support, inclusion, and protection (Goldstein, 1998; Smith, 1985) that lead to the initiation and maintenance of healthy relationships (Arwood et al., 2015). Behaviors indicated through the oral stories and cartoons match other researchers' definitions of prosocial behavior such as, "cooperative, positive, and mutually reciprocal forms of social behavior" (Walker et al., 2004, p. 3). However, it is important to note that an action described by a participant that is typically interpreted as prosocial in nature, such as an apology, may not *actually* be derived from a prosocial concept. For an action or event to be considered prosocial, the participant must share an appropriate level of agency among the agents, their actions, within the context of the stories. Using the high and low levels of agency described by Vallacher and Wegner (1989), for a prosocial concept to exist, the

participant's description of the event or action must show conscious concern with the significance of the action. This level of agency matches with the conceptual development at the concrete or formal level of agency (Arwood, 2011; Piaget, 1959).

Additionally, language, such as an apology, must meet the constituent rules between speaker and hearer to be considered a speech act (Searle, 1969) to be truly considered prosocial. To be identified as a speech act, the intention, purpose, or effect of the act needs to be considered and clearly expressed by the participant. For example, when telling an oral story from an APRICOT II picture about a boy falling off a ladder and spilling a can of paint, an alternative high school student from Green-Mitchell's 2016 study said "… so his brother n mom came rushin over to see if he was ok and help him up and clean up the mess." In this example, the actions of the mother and brother are prosocial because both brother and mother showed a conscious concern by "rushin over." Additionally, the language met the constituent rules of a speech act because the intention, purpose, or effect of the acts by the mother and brother were clear when the student said, "to see if he was ok and to help him up and clean up the mess." If the listener needs to infer or interpret the intention, purpose, or effect of the language act, then it failed to meet the rules of a speech act. At that point the language act is considered an utterance act, an act with little or no meaning (Searle, 1969). For example, if the student in the previous example did not provide the final sentence of "to see if he was ok…" the listener would have needed to interpret the intention, purpose, and effect of "rushing over." In that case, it would not reach the level prosocial relationship.

Antisocial concepts are defined as the opposite of prosocial concepts and are ideas and actions that do not initiate and maintain a healthy relationships with other people (Arwood et al., 2015). These ideas described by the participants will not protect, nurture, or support other agents in the story. This definition of antisocial concepts matches with definitions from other researchers who define antisocial behaviors as violations of socially conventional forms of behavior that are, usually, reoccurring acts of aggression, rule violations, vandalism, defiance of authority, or violation of social norms and values (Simcha-Fagan et al., 1986). Examples of antisocial actions that fit this definition include lying, fighting, opposition or defiance to authority, rule-breaking, cheating, stealing, bullying, aggression, threatening, or verbal abuse toward others (Lane et al., 2002). Agency levels for antisocial actions, such as the actions described above, match Vallacher and Wegner's (1989) description of a low-level agent. This description aligns with agency at the pre-operational conceptual level described in Chapter Two (Arwood, 2011; Piaget, 1959).

The results of this analysis are summarized and organized in Chapter Four. Information in Tables 4.8, 4.10, and 4.12 include an indication of the type of relationship among the agents, their actions, and the context demonstrated by the participant's language sample. These concepts were coded as (P) for prosocial and (A) for antisocial. In instances when the actions described by the participants did not provide enough language in form and/or function to reflect prosocial or antisocial concept usage, the relationships were marked as "language too restricted" and coded as LTR. Particularly notable examples of participant responses demonstrating

prosocial, antisocial, and LTR were highlighted in Chapter Four to provide samples and illustrations of the findings.

Multiple Coding

Upon completion of the analyses of language function by this researcher, one participant's transcripts and cartoon were analyzed by two individuals not associated with this study. The individuals providing the additional coding for this study met two criteria, 1) national certification as an SLP and, 2) completion of the Post Master's Neuroeducation Program at the University of Portland. By meeting these two criteria it is reasonable to believe that the additional coders obtained the necessary knowledge in language development, language function, and neuroeducation to reliably analyze the language samples. Using multiple coders to analyze was an added measure to increase the trustworthiness of this study (Barbour, 2001). This added measure of trustworthiness was used to cross check the deductive analysis strategies and the interpretation of the data completed by the researcher. Inter-coder reliability was found to be .74 according to Fleiss' Kappa indicating that the multiple coder analyses were categorized to be in substantial agreement (Landis & Koch, 1977).

Transcription and Data Protection

With the exception of the cartooned portion of the study, the language sample activities were conducted orally. Each oral language sample was audio recorded and later transcribed for analysis. Transcriptions from recorded language samples have been found to be an accurate way to document language samples for analysis (Heilmann et al., 2008). The researcher used an iPhone 7 as the hardware to record the language samples. The recording software the researcher used was the Voice Memo

application designed for Apple iPhone operating systems (iOS). The recorded language sample files were transferred to a Hewlett Packard laptop computer with an Intel core i5 processor and stored. The Windows 10 operating system was used for playback and transcription using Windows Media Player. The recorded language samples were played back at full speed and at reduced speed to increase the likelihood of accurate transcriptions. Transcriptions were transcribed verbatim. This includes pauses, repetitions, articulation errors, and mispronunciations. Unintelligible utterances were documented with the letters XX such as, "I see a XX." When a participant gestured, pointed, or used another form of non-verbal communication to indicate an idea to the researcher, such communication was transcribed in parenthesis. Participant language transcripts from the language samples collected for this study are included in Appendix F.

Ethical Considerations: Participant Risk and Safeguards

Participant risk for this study was minimal. The language samples were collected at times and days suggested by the participant's special education teacher to avoid potential conflicts and to avoid missing important instruction time. Since the participants in this study frequently visit specialists and are regularly asked to converse about their day, tell stories about pictures, and draw and write; the procedures included in this study were deemed to be low risk for the participants. No participant responded adversely to the researcher's presence or request to tell stories, draw, or write. Some participants chose not to write about their stories and there were no negative consequences for that choice. The researcher attempted to limit potential anxiety about the presence of a new teacher (the researcher) by taking a moment for

the participants to ask questions or tell the researcher about themselves before beginning the language collection procedures. This study is not anticipated to have risk of civil or criminal liability, lead to changes in special education eligibility or service status for the participants, change in financial standing, or risk of altering a participant's reputation. It is possible that there were other risks that could not be predicted for this study.

Identifying information about the participants and participating school districts were kept confidential. To protect rights and ensure the confidentiality of the participants involved, the following steps were taken: All data connected to this study including audio recordings, transcriptions, cartooned artifacts, notes from the review of special education records, and bracketing memos were kept in a secure location during and following the study. Electronic copies of the data were kept in files on the researcher's password protected computer. Each participant in the study was assigned a numerical code to keep identifiable information confidential. Additionally, possible identifying information such as the identity of the school and district was kept confidential through the use of geographical markers in terms of school type and region. Participation in this study was voluntary but required parental/guardian consent. Since the participants of this study were of elementary age and had special education identifications, signed consent from the participants was not required; however, the participants had the choice of working with the researcher or not. The participants also had the choice to end the language sample collection session after they started, if they chose. All participants in the study completed all parts of the

language collection procedure apart from four participants who chose not to write about their drawings/stories and one participant who chose not cartoon.

This study received initial approval by the University of Portland's Institutional Review Board (IRB00006544) on September 13, 2017. One of the school districts that had initially agreed to participate in the study chose not to participate shortly after this approval. Another school district was then contacted and agreed to participate shortly thereafter. The University of Portland approved the revised study proposal indicating the change of school district on October 5, 2017, fulfilling all IRB-related issues involving human subjects for this study. The change in school districts occurred before any of the recruitment procedures had begun and was deemed an insignificant change that did not affect the trustworthiness of this study's outcomes.

Role of the Researcher

The researcher in this study has worked as a school-based Speech and Language Pathologist (SLP) for a little over a decade in three different states. In her experience, she has worked with students ages 3-21 with most of her practice spent working with elementary-aged students. In addition to the special education responsibilities that accompanies the role of a school-based SLP, the researcher has been a part of general education teams designed to provide screening, interventions, and progress monitoring to students struggling to succeed in general education such as Response to Intervention (RTI), Student Intervention Team (SIT), and Speech and Language Intervention Programs (SLIP). Through these experiences the researcher has gained deep and broad knowledge about special education eligibility criteria, law, and policy, along with knowledge about the pre-referral process for students to access

special education services or a 504 plan (Individuals with Disabilities Education Act, 2004).

This researcher has completed various coursework and continuing education within the fields of education and speech and language pathology. The researcher was inspired by a continued curiosity and interest in the areas of learning and language to complete the Post Master's Neuroeducation Program at the University of Portland. Although the neuroeducation program encompasses course work that delves into neuroscience, cognitive psychology, and language function, this researcher is neither a neuroscientist nor a psychologist. The researcher's background as an SLP provides, to a certain extent, knowledge and expertise in the areas of speech and language acquisition and development.

Researcher bias in studies that involve human interpretation is expected (Pannucci & Wilkins, 2010). This researcher's biases are as follows: First, as a certified and licensed school-based SLP, this researcher's approach to identification and intervention of EBD and LI within the schools are from the perspective of an SLP. Additionally, this researcher has been practicing intervention and instructional methods influenced by the neuroeducation framework outlined in this study since 2013, and continues to attend workshops presented by Dr. Ellyn Arwood, the author of the NsLLT and instruments cited in this study. Moreover, this researcher's personal beliefs are that language plays a significant role in learning and is underrepresented in current and popular strategies and methods that address behavior in schools. These biases may have lead this researcher toward a propensity to identify significance in an area or trend where an unbiased observer may not.

These biases were addressed through supervision of this study from the researcher's dissertation chair and committee members as well as from the use of bracketing methodology (Gearing, 2004; Tufford & Newman, 2010). Gearing (2004) describes bracketing as the process in which the researcher suspends her biases and assumptions when engaging in the research process. Two bracketing methods were utilized to help limit the researcher's preconceptions regarding the study topic. One method was through the use of memos throughout the collection of data and analysis as a way to reflect on the researcher's positioning with the analysis and interpretation of the data. The second method this researcher used to minimize bias was bracketing interviews. These interviews were conducted with fellow doctoral students or master's level educators who did not have backgrounds in neuroeducation. The purpose of committee supervision and bracketing methodology was to help mitigate the potentially distracting effects of personal bias on the outcome of this qualitative case study.

Summary

The purpose of this chapter was to outline the rationale for this study, methodology, participants, setting, recruitment procedures, instruments, language collection procedures, and data analysis for this study. This study utilized purposive, stratified, and criterion-based sampling to recruit voluntary participants ages eight and nine. Research questions were addressed through a variety of language function sampling techniques that were analyzed through deductive content analysis with predefined categories based on existing literature in language function. This study was

ethically executed, and participant data was protected throughout the process. The next chapter presents the results of this study.

Chapter Four: Results

The purpose of this study was comprised of two components. One component was to explore relevant literature in cognitive psychology, neuroscience, and language that encompasses the acquisition of prosocial behaviors with the intent of supporting a translational neuroeducation model to address students struggling to acquire prosocial behaviors. A review of literature in Chapter Two addressed the first component of this study. Literature reviewed in the areas of cognitive psychology, neuroscience, and language supports the view that prosocial behaviors are acquired through neuro-semantic, socio-cognitive language acquisition processes involving the assignment of meaning of prosocial concepts over a long period of time (Arwood, 2011; Bruner, 1975; Poulshock, 2006; Pulvermuller, 2013; Taylor, 1985). The Neuro-Semantic Language Learning Theory (NsLLT) represents the triangulation of these disciplines and undergirds the neuroeducation framework used in this study, as a way to address students struggling to acquire prosocial behaviors. The contributing factors for the acquisition for prosocial behavior are summarized from each domain of neuroeducation in Figure 4.1.

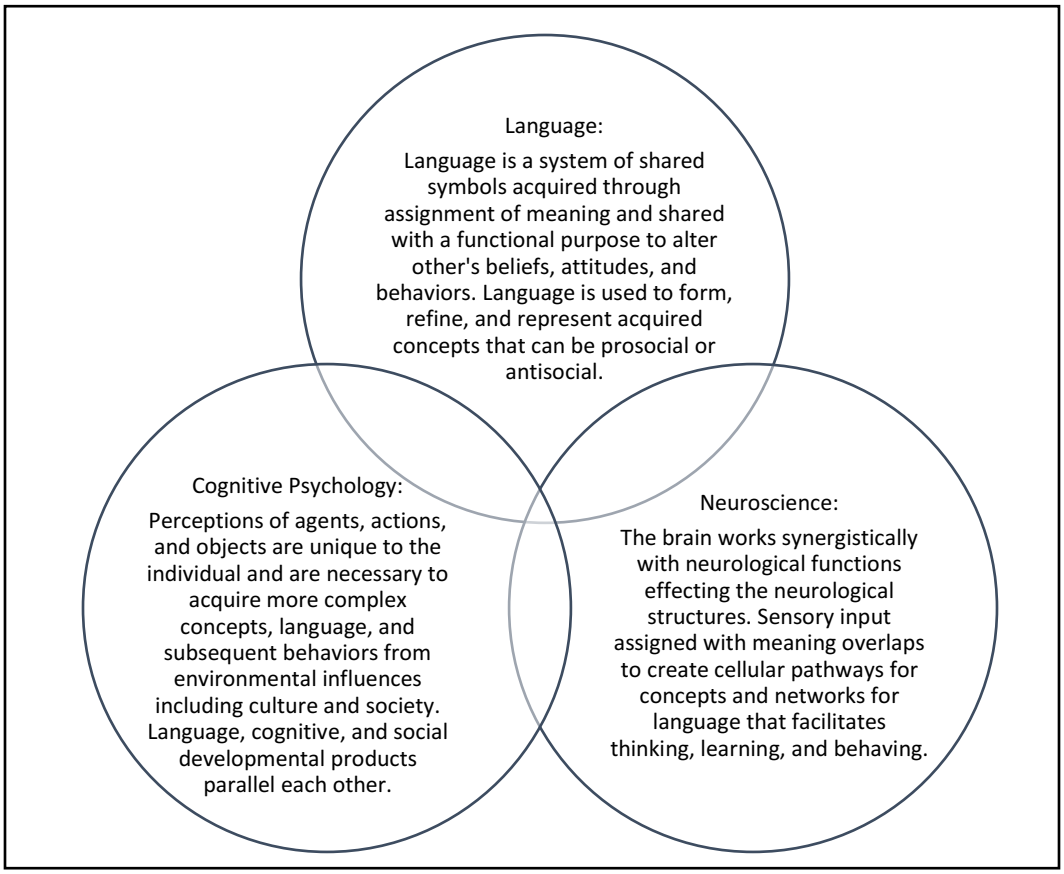


Figure 4.1. Summary of the factors that contribute to the acquisition of prosocial behaviors according to the lenses of Arwood's Neuroeducation Framework.

Each summary listed in Figure 4.1 is supported by literature reported in Chapter Two. Figure 4.2 identifies and organizes key supporting pieces of literature according to the three domains of neuroeducation.

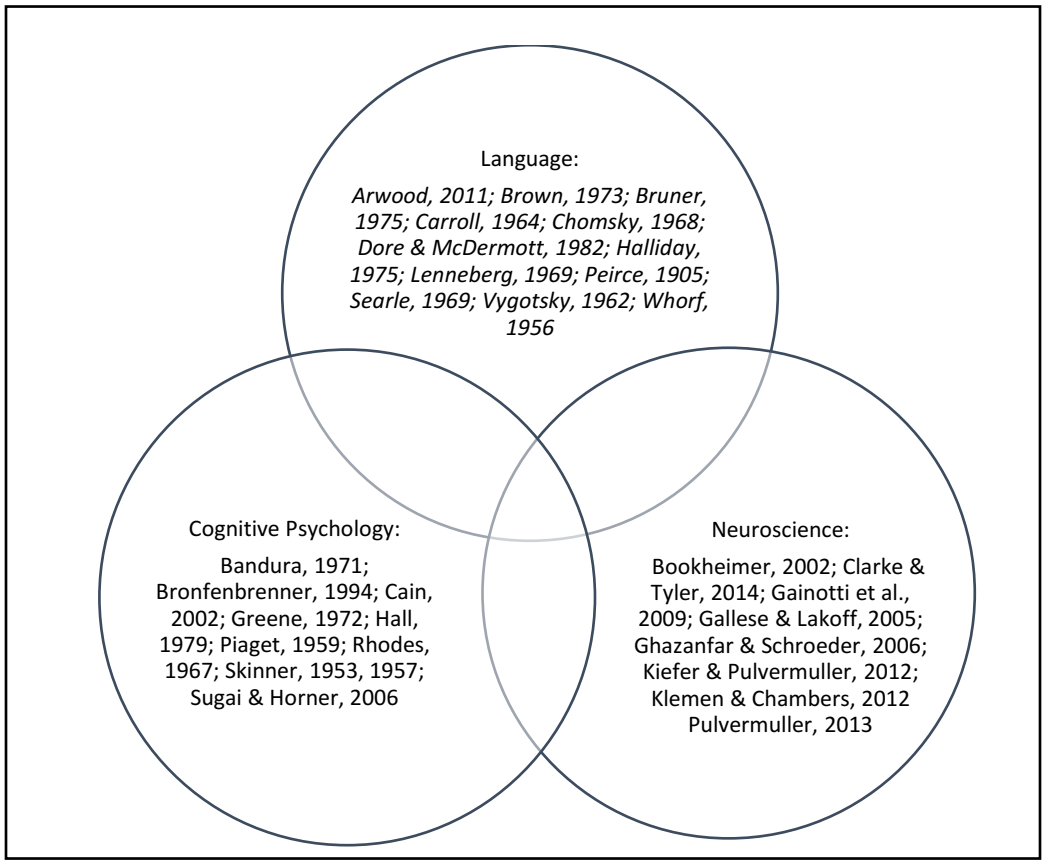


Figure 4.2. Summary of supporting literature that contributes to the acquisition of prosocial behaviors according to the lenses of Arwood's Neuroeducaion Framework.

The second component of this study, the application of theory, sought to explore the connection between levels of language function and the acquisition of underlying prosocial concepts through language function sampling analyses with elementary students identified with emotional and behavioral disorders (EBD) and/or language impairments (LI). The following research questions sought to address the second component of this study:

1. What similarities and differences in language function levels and characteristics exist, if any, between elementary students with EBD, LI, and/or both from varying educational settings as measured by functional language sampling analyses?

a. When asked to orally respond to an auditory prompt from the TEMPro?
b. When asked to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual level?
c. When asked to orally tell a story about an APRICOT II event-based picture that depicts complex semantic relationships at the concrete-operational conceptual level?
d. When asked to cartoon a story from one of the previously told APROCOT I or II pictures?

2. Will students identified with EBD, LI, and/or both make prosocial or antisocial relationships among the agents, their actions, and the context?
    a. When asked to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual level?
    b. When asked to orally tell a story about an APRICOT II event-based picture that depicts complex semantic relationships at the concrete conceptual level?
    c. When asked to cartoon a story from one of the previously told APROCOT I or II pictures?

Results from Review of Participant Special Education Records

To better understand the histories of the 11 participants in this study, comprehensive reviews of special education records were conducted after signed

consents were received. The procedures for these reviews were outlined in Chapter Three of this study. The following sections report the detailed results from the review of special education records organized by educational eligibility and placement.

Students identified with EBD. This section describes the results from the review of special education records for participants identified with EBD.

Educational setting: 80-100% in the regular class.

Participant 1. This female participant was an eight-year-old, third grade student at the time of this study. According to her IEP, she spent approximately 91% of her week in the general education classroom. Her special education services at the time of the study were in the area of social/emotional and her goals focused on techniques to regulate emotions. This participant was initially found eligible for services under the IDEA category of Developmental Disabilities (DD) while in preschool. During this initial evaluation in 2014, this participant was given a communication assessment that included a teacher report, classroom/testing observations, and a standardized assessment called The Comprehensive Assessment of Spoken Language (CASL). The participant's language standard scores were within normal limits in all areas assessed. In the report, the evaluating SLP commented on this participant's deficit in social communication; however, eligibility for services was not recommended because the SLP believed the student's social communication deficits would be addressed with the specially designed instruction under her qualifying area of social/emotional. This participant was re-evaluated in the spring of 2017; and, her eligibility category was changed from DD to EBD at that time. During the spring 2017 evaluation, assessments were completed in the areas of behavior and

social/emotional because those were the only two reported areas of concern. This participant's academic abilities were reported to be at grade level.

This participant's special education records indicated that she was medicated for a mood disorder at the time of this study. Reported childhood trauma include the separation of her parents while she was in preschool. According to special education records, this participant's antisocial behaviors included screaming at teachers and peers, hiding under tables at inappropriate times, knocking over furniture, leaving the classroom without permission, being physically aggressive toward teachers and peers (hitting, kicking, biting, spitting), and harming herself by hitting herself in the face.

Participant 2. This male participant was a nine-year-old, third grade student at the time of this study. According to his IEP, he spent approximately 91% of his week in his general education classroom. His special education services at the time of the study were in the area of social/emotional and his goals focused on "self-regulation of his feelings to increase his positive responses." This participant was initially found eligible for special education services under the category of DD while in preschool. According to a developmental screener often used with preschool aged children called The Developmental Indicators for the Assessment of Learning, Fourth Edition (DIAL-4), areas that were found to *not* be of concern were cognition, language, self-help, basic concepts, or social/emotional. According to the evaluation report for this eligibility document, the assessing SLP did not complete a formalized language assessment at that time because it was not an area of concern according to the DIAL-4. The participant's articulation abilities were formally assessed at that time and found to be significantly below average. This participant was found eligible for articulation

services and received specially designed instruction (SDI) in this area for two school years before being dismissed from articulation services in 2014. This participant has had a series of re-evaluations since his initial evaluation in 2013; however, language was never formally assessed during any of these re-evaluations. This participant was most recently re-evaluated in fall 2017 in the areas of behavior and social/emotional. This participant's eligibility category was changed from DD to EBD at that time. Besides the two years of articulation services, this participant has not received special education services in any areas outside of social/emotional and behavior.

According to special education records, a history of sexual abuse has been reported. Reported antisocial behaviors include disruptive behaviors (making inappropriate noises, pouting, pushing work away), destructive behaviors (pushing furniture over, yelling at teachers and peers aggressively, slamming fists on desk), and physically aggressive behaviors (physical aggression toward other students).

Educational setting: 40-79% in the regular class.

Participant 3. This male participant was a nine-year-old, third-grade student at the time of this study. According to his IEP, he spent approximately 68% of his week in his general education classroom. His special education services at the time of the study were in the area of social/behavior, reading, written language, math, and sensory processing. This participant's social/behavior goals targeted a five-step emotional regulation process to increase appropriate behaviors. This participant was initially found eligible for special education under the eligibility category of EBD in the spring of 2017 while the participant was in second grade. The eligibility report from this assessment indicated that cognitive and academic evaluation scores should be

interpreted with caution and may not accurately reflect this participant's actual abilities due to "behavior." Language was not assessed during this evaluation.

According to special education records, this participant was taking medication for Attention Deficit Hyper-Activity Disorder (ADHD) at the time of this study and was reported to meet the criteria for mood dysregulation disorder. It was specifically reported that this participant does not have a history of abuse or domestic violence but had not had a relationship with his biological father for the last five years. Antisocial behaviors reported include defiance (pushing materials away, telling adults "no," refusal to work or comply with other directions) and disruptive behaviors (runs or walks around the classroom making noises at inappropriate times, hangs upside-down from his desk at inappropriate times, rolls on the floor at inappropriate times, makes verbal comments that are off topic and unexpected for the situation).

Participant 4. This male participant was a nine-year-old, third grader at the time of this study. According to his IEP, he spent approximately 58% of his week in the general education classroom. His special education services at the time of the study were in the area of social/behavior, reading, written language, and math. This participant's social/behavior goals targeted the regulation of emotions. This participant was initially found eligible for special education services under the category of DD in 2010, when the student was in preschool. The participant was also identified with LI during this initial evaluation. According to the Preschool Language Scale, Fourth Edition (PLS-4), this participant qualified with scores that indicated a significant language deficit. This participant received language therapy services as a student identified with LI until a re-evaluation in 2016 found him ineligible for language or

communication services. From 2010 to the fall of 2016, the participant received speech and language therapy with goals that targeted using 1-2 words to make a request, identifying nouns, answering "what" questions, using phrases of 3-4 words for a variety of language functions, answering where questions, following directions with spatial concepts, and using at least six language functions to communicate. According to his last language assessment in the fall of 2016, scores from a language assessment called the Oral and Written Language Scales, Second Edition (OWLS-2) indicated language abilities within the low average range. Other assessment data from this participant's 2016 evaluation include cognitive scores that fell within the low average range, and academic scores that fell within the moderately below average range. This participant's eligibility category changed from DD to EBD during his re-evaluation in the fall of 2016.

According to special education records, this participant's parent reported that the student had an additional diagnosis of ADHD and Oppositional Defiant Disorder (ODD). This participant changed schools three times since kindergarten and attendance was reported as being inconsistent. Antisocial behaviors reported include physical aggression towards staff (hitting/punching, spitting) and peers (threatening), and disruptive behaviors (throwing/tossing furniture, profanity, running from staff).

Educational setting: 0-39% in the regular class.

Participant 5. This female participant was an eight-year-old, third grade student at the time of this study. According to her IEP, she spent approximately 15% of her week in the general education classroom setting. Her special education services at the time of the study were in the areas of social/emotional, behavior, written

language, and reading. Her current social/emotional goals targeted the regulation of emotions. Her current behavior goal targeted asking for a break when frustrated. This participant was initially found eligible for special education services under the IDEA category of EBD in the spring of 2016 while in first grade. This participant has not been assessed in communication, including language. Assessment results from her initial evaluation indicate average cognition according to the Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V).

According to special education records, this participant has a family history of mental illness and the participant has been diagnosed with Disruptive Behavior Disorder Not Otherwise Specified (DBD-NOS). Antisocial behaviors reported include physically aggressive and assaulting behavior towards staff and peers (screaming, yelling, hitting others) and destructive behaviors (throwing chairs). Behavior data, from the 2016-2017 school year, includes five assaults, 88 behaviors related to work avoidance, 152 acts of defiance, 152 disruptive episodes, 155 emotional outbursts, 100 episodes of shutting down, and 9 room clears (instances when the safety of others is in danger, so all other students are purposefully removed from the room).

Student 6. This male participant was a nine-year-old, fourth grade student at the time of this study. According to his IEP, he spent approximately 35% of his week in his general education classroom. At the time of this study, he only received specially designed instruction in the area of behavior and his behavioral goals targeted work completion. This participant was initially found eligible for special education services under the IDEA category of DD while in preschool. A re-evaluation completed in 2015 changed his special education eligibility from DD to EBD. A

cognitive assessment, the WISC-V, completed at this re-evaluation reported scores that were in the high average range. To date, this participant has not been assessed in the area of communication or language.

This participant moved three times, each time to a different state since starting kindergarten. There were no comments in this participant's educational records about childhood trauma or abuse. Antisocial behaviors reported for this participant include physical aggression towards people and objects, non-compliance, and eloping from staff and classrooms.

Student 7. This male participant was a nine-year-old, third-grade student at the time of this study. According to his IEP, he spent 0% of his week in the general education classroom. His special education services at the time of the study were in the areas of social/emotional, behavior, reading, writing, math, and communication (articulation only). His social/emotional goals at the time of the study targeted self-regulation strategies and his behavior goals focused on improving safety towards self and others when feeling frustrated. At the time of this study, this participant received communication services for articulation with goals that targeted correct production of the "r" sounds. This participant was initially found eligible for special education services under the category of EBD in 2014, while in first grade. The communication eligibility for articulation services were added in 2016; however, language was not assessed because it was not reported as a concern. Cognitive scores from the most recent 2017 special education re-evaluation, according to the Kaufman Assessment Battery for Children, Second Edition (KABC-II), indicate cognition mildly below average.

This participant has an extensive and significant history of childhood trauma. According to special education records, this student was continually exposed to drug use, abuse, domestic violence, and crime for the first five years of life. The student was then placed in six different foster care homes before finding a permanent placement and was separated from his siblings. Because of the frequent change in foster families, this participant changed schools frequently. No other medical or psychiatric diagnoses were indicated in his special education records at the time of the study. Antisocial behaviors reported for this participant include physical aggression (hitting, kicking, punching, self-injurious behaviors), defiance (refusing to work, follow directions), destruction (throwing objects, knocking over and throwing chairs, breaking school property), and disruptive behaviors (name calling, yelling at peers and staff, walking around classroom, disrobing, making rude comments to peers). In the first month of the 2017-2018 school year, this participant received 21 major and 1 minor discipline referrals as categorized by his school's discipline referral system.

Student 8. This male participant was an eight-year-old, second grade student at the time of the study. According to his IEP, he spent 0% of his week in his general education classroom. His special education services at the time of the study were in the areas of behavior, reading, writing, and math. His current behavior goals targeted completion of academic tasks within a certain allotment of time with few cues. This participant was initially found eligible for special education under the category of EBD in the spring of 2016. During that assessment, the participant was evaluated in the area of language due to concern with the participant's difficulty in following directions and understanding vocabulary. Two standardized language assessments

were completed: The Clinical Evaluation of Language Fundamentals, Fifth Edition (CELF-5) and the Peabody Picture Vocabulary Test, Fourth Edition (PPVT-4). According to the CELF-5, the participant's scores indicate low average language abilities, and according to the PVVT-4, the participant's score indicated high average receptive vocabulary abilities. The participant was not found eligible as a student with LI during that assessment and has not been assessed in language since. Cognition was found to be within the range of low average according to the WISC-V.

According to special education records this participant's parents have divorced, and he has no history of abuse or domestic violence. This participant was reported to have no other diagnoses and was taking no medication at the time of the study. Antisocial behavior reported for this student included behaviors described as disruptive (self-stimulation, vulgar language, sexualized language, sharing violent ideas, making inappropriate noises) and defiant (refusal to work, shutting down).

Student 9. This participant was a nine-year-old, fourth grade female student at the time of this study. According to her IEP, this participant spent 10% of her week in the general education classroom. At the time of this study she received special education services in the area of social/emotional. Her social/emotional goal targeted the regulation of emotions. This participant was initially found eligible for special education services under the category of EBD in the fall of 2017 while in fourth grade. This participant had not been assessed in the area of communication, including language. Assessment results from her initial evaluation indicate average cognition according to the Stanford-Binet Intelligence Scales (SB).

According to special education records, this participant has a history of witnessing domestic abuse in the home. This participant attended three different schools since kindergarten and has been reported absent a considerable amount of time. Since her kindergarten year, this participant has missed 4%, 16%, 16%, and 32% of school per school year. Antisocial behaviors reported include aggressive behaviors (stabbing students with objects, spitting in students' faces, hitting, fighting, bullying, aggression towards staff members), disruptive behaviors (yelling, making noises, climbing on desks/chairs/countertops, putting non-food items in her mouth and running out of the room, grabbing items), and destructive behaviors (throwing items). Between the 2014 and 2017 school years, this student received 180 discipline referrals. She received 74 referrals for aggressive behaviors, 30 for inappropriate student behavior, 30 for assault with major injury, 18 for theft, 10 for disruptive conduct, and 10 for failure to cooperate.

Students identified with LI.

Educational setting: 80-100% in regular class.

Student 10. This male participant was a nine-year-old, third-grade student at the time of this study. According to his IEP, he spent approximately 89% of his week in his general education classroom. He received special education services in the areas of expressive/receptive language and reading. His expressive and receptive language goals targeted describing who, what, where, when, and why about event-based books or activities and increasing vocabulary through knowledge of synonyms and antonyms. This participant was initially found eligible for special education services under the IDEA category of DD in 2014, while in preschool. This participant was

identified as a student with LI during this initial special education evaluation and has been participating in language therapy with goals targeting articulation, "wh" question concepts, re-telling stories, and grammar. He was re-assessed in the spring of 2017 when his special education eligibility category changed from DD to specific learning disability (SLD). At this re-evaluation, he continued to be identified as a student with LI. Two language assessments were completed for this special education re-evaluation. Results from the OWLS-II and CELF-4 indicated language considered moderately below average. According to a cognitive assessment completed for this re-evaluation, the KABC-2, the participant's overall cognitive scores fell within the low average range.

According to special education records, this student does not have any formal behavior referrals on record and information regarding history of trauma or abuse was not reported. The participant has moved schools one time since starting kindergarten. No other medical diagnoses were mentioned in the special education records available to this researcher.

Student 11. This male participant was a nine-year-old, fourth-grade student at the time of this study. According to his IEP, he spent approximately 83% of his week in his general education classroom. At the time of the study, the participant was receiving special education services in the areas of reading, writing, math, and expressive/receptive language. Language goals at the time of this study focused on providing factual information and paraphrasing. This participant was initially found eligible for services under the category of DD in 2013. In 2014, the participant was re-assessed in the areas of cognitive, academics, and communication. At that time his

eligibility category was changed from DD to SLD and he continued to be identified as a student with LI. Both language assessments from this evaluation, the Test of Language Development, Fourth Edition (TOLD-4) and the OWLS-II found this participant's language to be mildly below average. A cognitive assessment, the WISC-V found this participant's cognitive abilities to be average.

According to special education records, this participant did not have a history of behavior referrals or any other indication of behavior difficulties. Information about trauma or abuse history was not reported, but he did have a reported diagnosis of ADHD and was taking prescribed medication.

The remainder of this chapter is organized into sections according to the two research questions and seven research sub-questions. As described above and in previous chapters of this study, the participants were between the ages of eight and nine years old and were expected to function at the language level of language function according to their chronological age. Each participant's language sample was analyzed for each sub-question. There were instances when participants did not provide a language sample that could be analyzed, and those instances are noted in each section as they occurred. Each section includes a summary and table of group results and descriptive summaries from each participant.

Research Question 1

The first research question asks, what similarities and differences in language function levels and characteristics exist, if any, between elementary students with EBD, LI, and/or both from varying educational settings as measured by functional language sampling analyses? The following sections describe the results of each sub-

question followed by a synthesized summary of the major findings for the overall question.

Question 1.a. results. The first sub-question asked participants to orally respond to an auditory prompt from the TEMPro. Procedures, a description of the TEMPro, and analysis methods are included in Chapter Three. Participant results are organized by eligibility (EBD or LI) and educational setting for the first assessment of language function are included in Table 4.1, followed by a summary of group results.

Table 4.1

Temporal Analysis Derived From the Participant's Response to the TEMPro "Typical Day" Prompt

	EBD Participants (1-9)									LI Participants	
	80-100%[a]		40-79%[a]		0-39%[a]					80-100%[a]	
	1	2	3	4	5	6	7	8	9	10	11
Arguments[b]	0/7/7	0/5	0/0/8	0/0/7	0/2/7	1/1/2	0/2/2	0/1/2	1/1/2	0/1/3	7
Propositions	0	0	0	0	0	0	0	0	0	0	0
Metacognition	V	V	V	V	V	V	V	V	V	V	V
Maintain shared referent	No	No	No	No	No	No	No	No	No	No	No
Level of language function	PL	PL	PL	PL	PL	PL	PL	PL	PL	PL	PL

Note. V=Visual Metacognition, PL = Pre-Language
[a]These percentages represent educational setting. The percentage indicates a range of time the participant spends in a regular education classroom.
[b]The arguments were recorded reflecting the level of the prompt. Starting with a formal level prompt followed by a concrete level prompt, if needed, and concluded with pre-operational level prompt, if needed.

Group results indicate participants in this study, regardless of eligibility or educational setting, demonstrated limited abilities to temporally connect two

arguments with another argument to create an auditory proposition. As described in Chapters Two and Three, lack of the temporal elements required to produce an auditory proposition indicates visual metacognition instead of auditory. For this reason, responses to the TEMPro auditory prompts indicated visual metacognition for all participants. Participants within the sample demonstrated limited abilities to adequately maintain a shared referent due to their inability to use language to create a shared context, off-topic interruptions, and/or inability to discuss an entire normal day as the prompt requested.

Overall, only three participants were able to provide at least one argument to the prompt at the formal level as it was initially asked suggesting that, overall, the participants' deficits in language function affect their ability to understand and respond to questions, including concepts, at the formal level. All participants who were given the prompt at the pre-operational level (the second modification of the question) were able to respond with more than one argument. This finding suggests that the participants in this study responded with the most language structures when the question required a "here and now" level of thinking. The highest number of arguments, at any level of the auditory prompts, came from the groups identified with EBD who were not in a self-contained setting (80-100% and 40-79% in regular class). This indicates that, to some extent, these participants have acquired a substantial amount of language structures, although they have not acquired functional command of them. Lack of ability to produce an expected number of auditory propositions, inability to create and maintain a shared referent, and ability to provide language structures to respond to a prompt with a "here and now" level of displacement indicate

language function at the pre-language level for all participants. According to the age of the participants, language function should be functioning at the language level. This finding indicates participants identified with EBD, who are not currently identified with LI, demonstrate deficits in language function similar to students already identified with LI.

Individual descriptive results organized by subgroup.

EBD:80%-100% in regular class. In response to the initial auditory prompt given at a formal level, Participant 1 responded with, "I don't know what typical means, but." When, clarified by decreasing the displacement and semanticity of the prompt, Participant 1 was able to begin her response at a concrete level by responding with "Oh, well what I do on a normal day is, I usually get to (pause) get to go into class to get to do all kinds of fun stuff." If this participant's response would have continued to describe the fun types of activities done in a typical day marked with appropriate extension, expansion, and modulation, then her language function level would have been found to be functioning at the language level. However, as her response became displaced from the "here and now," this participant's language functions and structures became restricted. This participant only discussed a variety of disconnected actions she does before school and failed to connect any arguments temporally through extension and expansion indicating language restricted to the pre-language level of function.

Participant 2 was initially able to begin his response at the concrete level of semanticity and displacement by discussing what he usually does after school, "Afterschool I usually just go home and play video games." However, similar to the

Participant 1, as Participant 2 produced more arguments, his responses veered toward the "here and now," a hallmark of pre-operational thinking and language function at the pre-language level. For example, Participant 2 ended his response by talking about the Book Fair, an event that was happening at the time of the language sample collection and an event the participant has visited the day before. Producing initial responses at the concrete level was unique to this group of participants.

EBD: 40%-79% in regular class. Participant 3's response to the pre-operational level prompt and analysis of his language function is presented in Table 4.2 below. Participant 4 attempted to answer the first two auditory prompts by responding with "great" and "a playground." These responses indicated that he did not understand the function of the prompt but understood, pragmatically, that a response was expected in this situation. Participant 4 was able to provide some structural examples of expansion by providing a rudimentary list of part of his daily schedule. His account abruptly ended at recess and skipped to, "At the end, I say bye to my friends." Participant 4 failed to consistently extend and modulate his arguments into grammatically correct utterances that did not require a significant amount of interpretation. This participant's lack of ability to logically respond to the first two auditory prompts and restrictions in the language functions of expansion, extension, and modulation indicates language function at a pre-language level.

EBD: 0%-39% in regular class. Participant 5 demonstrated substantial difficulties creating and maintaining a shared referent. For example, this participant interrupted or talked over the researcher seven times during this portion of the language sample mostly to talk about a stuffed toy cat she brought. This participant

failed to extend, expand and modulate her arguments into grammatically correct and understandable responses. For example, in response to the prompt at the concrete level, Participant 5 said, “I just be lazy but when my friends over I’m not lazy.” Due to this participant’s restricted language function, she was unable to establish a shared level of meaning, indicating language function at the pre-language level.

Participants 6 through 9 within this subgroup all demonstrated considerable difficulty responding to the auditory TEMPro prompts at all levels of modification. These participants provided vague responses that gave no indication about what is done during the day. Participant 6 said, “Going to school” and “I have fun.” Participant 7 said, “I don’t know. Stay here. Be bored.” Participant 9 said “Play and eat dinner!” Participant 8 appeared to be talking about what happened the morning of the day the researcher collected the language sample by responding with, “I woke up before my mommy even woke me up.” These responses reflect restricted language function in all areas addressed and, overall, do not help serve the function of the question suggesting language function at the pre-language level.

Table 4.2

Examples and Analysis for the TEMPro Auditory "Typical Day" Prompts

Participant TEMPro Excerpts	Specific Analysis
Participant 3: "My mom usually lets me play on my phone if I do like really really good in school like, and I do all my work like little, like no little fit throwing which I got to before and I'm like honest. So I'm going to be honest today and hopefully nothing bad happens for the rest of the day. Hopefully my mom lets me play on my phone since it's the start of the weekend."	Although the participant uses the word "usually," he fails to provide a clear understanding of the conditions that lead to his mom "usually" letting him play on his phone. It is likely that this participant is borrowing the language associated with the rules for phone privileges such as "*do all my work,*" "*no little fit throwing*," and "*be honest"* because at the end of the response he changes the reasoning to "… since it's the start of the weekend." Restrictions in expansion, extension, and modulation indicate a pre-language level of function.
Participant 11: "Uhh, well, in the morning I just watch something for a little bit, get dressed, take a shower, then eat a XXXX bowl, brush my teeth, then watch a little more TV, then lay down for a little bit, then go to school."	This participant was unable to produce an auditory proposition and failed describe his day beyond his before school activities. Although this participant used the word "then" between the list of events, it is not used temporally. For example, it is not logical that the participant "gets dressed" *before* "takes a shower" indicating that "then" is not used as a temporal marker. These restrictions result in the listener taking on more than a shared level of understanding suggesting language function at the pre-language level.

LI: 80%-100% in regular class. Participant 10 provided responses similar in function and structures to the responses from EBD Participants 6, 7, 8, and 9 described above. Participant 10 was unable to provide arguments to the original auditory prompt at the formal level by stating, "I don't know." When the prompt was presented at the

concrete level, this participant only said, “Just work.” When the displacement and semanticity of the prompt was lowered to the pre-operational level, the participant responded with, “Just umm do papers and umm umm do math and science.” This participant’s responses failed to provide adequate semantic context and connect arguments temporally to create a shared referent that would have allowed the listener to understand a normal school day. This participant’s language function was restricted in all areas addressed resulting in responses that did not reach a level of shared meaning. These language function characteristics suggest language function at the pre-language level. Participant 11 was the only participant that provided a series of arguments to the initial, formal level auditory prompt. His response was determined to function at the pre-language level and is included in Table 4.2 above.

Question 1.b. results. This question asked participants to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual level. Procedures, a description of APRICOT I pictures, and analysis methods are included in Chapter Three. Since all participants were ages eight and nine during the time the language samples were collected, language function was expected to be at the language level according to the participants’ chronological age. A summary of results for question 1.b. are shown on Table 4.3 followed by a summary of group results.

Table 4.3

Language Function Analysis Findings Derived From the Participant's APRICOT I Oral Responses

	EBD Participants (1-9)									LI Participants	
	80-100%[a]		40-79%[a]		0-39%[a]					80-100%[a]	
	1	2	3	4	5	6	7	8	9	10	11
Expected levels of expansion, modulation extension	No	No	No	No	No	No	No	No	No	No	No
Maintain shared referent	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Semantic errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Level of language function[b]	PL	PL	PL	PL	PL	PL	PL	PL	PL	PL	PL

Note. PL = Pre-language

[a]These percentages represent educational setting. The percentage indicates range of time the participant spends in a regular education classroom.

Overall, participants in this study demonstrated language at the pre-language level when providing a response to an APRICOT I event-based picture indicating deficits in language function. In fact, all participants, regardless of educational eligibility or placement, struggled to produce responses that rose to the level of a "story." These difficulties were likely due to restrictions in expansion, extension, modulation, and responses that indicated a "here and now" level of thinking that failed to provide semantic boundaries such as a "beginning," "middle," and "end." This finding supports the previous sub-question finding that, although the students with LI have deficits in language that have been structurally identified, both groups have

similar deficits in function that are impacting their ability to think and communicate. Nearly all participants maintained the visual shared referent: the APRICOT I picture.

Individual descriptive results organized by sub-group.

EBD:80%-100% in regular class. Participant 1 was unable to temporally connect the semantic relationships described in the picture into a "story." This participant was the only participant to expand her response beyond the "here and now" of the picture provided in the APRICOT I picture; however, the participant's language function and structures deteriorated as her response become further displaced in time and space. For example, initially the participant responded with, "…Tom, Brady, and Michael were playing a game of basketball and Tom accidentally threw the ball and then it went into the road." When the story became more displaced she said, "And the man was like oh no and then he just paused slammed on his breaks and and the ball didn't make it." The participant then used dialogue for the remainder of the response, perhaps using borrowed language, rather than continue the response as the narrator. These findings suggest that when the thinking level is at the pre-operational level, this participant is able to share meaning about a visual referent at the language level of language function. But, when the thinking level is raised to match her chronological age, her language function drops indicating that she is thinking with a restricted level of understanding as seen with the limited structures.

Participant 2's response to the APTICOT I picture particularly lacked extended meaning by failing to identify agents in the picture beyond their pronouns or role, like "car driver." For example, Participant 2 said, "…the person driving by when he threw it in the road on purpose and he was tryina catch it but he didn' let him." This lack of

extension lead to referential difficulties throughout the response suggesting that even when the level of thinking required was at the pre-operational level and a shared visual referent was provided, this participant was unable to create a response reaching a shared level of meaning, indicating language at the pre-language level.

EBD:40%-79% in regular class. Participant 3 struggled to maintain a shared referent, even with a visual referent provided at the pre-operational level. This participant interrupted frequently and often spoke tangentially. This participant spent most of his time with the APRICOT I picture asking questions and criticizing the picture itself and describing and criticizing the agents and their actions included in the picture. For example, Participant 2 said, "That face looks like a little kid. That doesn't even look like a grown man. I'm not kidding…For, apparently the cup was sitting up and then it smacked it down, really? How did it go "whoopa" and turn? Usually if it is right here it would have been missed, I don't know how that's possible then." These language function characteristics suggest that this participant demonstrates a low level of agency. These findings also indicate that this participant's restricted language function affects his ability to relate with other agents and the context, possibly leading to the "egocentric" type response to the APRICOT I pictures.

Participant 4 struggled to temporally connect the basic semantic relationships in the picture through modulation, expansion, and extension into a response that was displaced beyond the "here and now." Additionally, like participant 3, this participant struggled to maintain a shared referent by abruptly changing referents mid-story. For example, Participant 4 said, "…and someone passed and that guy passed it to this guy and and uh oh he made it ball go into the road 'n the car was goin hit the boy (pause)

and then (pause, flipped over the picture) wow there's a sentence right on the back." Based on the analysis of their language samples, participants in this sub-group demonstrated pre-language level of language.

EBD:0%-39% in regular class. Participants 5 and 8 provided short responses that lacked in nearly all areas of language function addressed. Participant 5's entire response consisted of "The two little ones were playing catch. The then the oldest little one threw the ball then it hit a glass of juice. Period." Participant 8's entire response consisted of "Yeah, he's gonna throw it and he's tryna grab the ball over there and she's tryna get it cause there's a car in the road." Both participants failed to extend meaning of the agents in the pictures by either only identifying a portion of the agents in the picture or only referring to them by their pronouns, indicating a low level of agency that matches with language at the pre-language level of function.

Participant 6 produced a response with more arguments than other participants in this group. He said "…And then the two young boys were playing and then they knocked over the can of worms because they were going to go fishing next /ext/ and then one of the worms hit the dad on the arm and one landed on the stove." Participant 6 demonstrated some structural elements of extension, expansion, and modulation by extending meaning to the agents by calling them "boys" and expanded upon that meaning by calling them "two young boys;" however, the overall meaning of the response was limited to the "here and now" level of displacement, semanticity, and efficiency indicating language at the pre-language level. This finding suggests that although Participant 6 appeared to have acquired a lot of language structures, he has not acquired the function of language. Participants 7 and 9 both struggled expanding

and extending elements of their responses temporally, leading to restricted efficiency and overall language function. Both students' responses and brief analyses of their stories are included in Table 4.4 below.

Table 4.4

Examples and Analysis from the APRICOT I Oral Responses

Participant's APRICOT I Stories	Specific Analysis
Participant 7: "So they were going to the grocery store to get some oranges and lemons and he pulled one from the bottom and they all fell down and made him slip and they are going to have to pick them up, buy new ones, or get some from the garden. And then um the mom um said, "what happened?" and they told that they pulled one from the bottom without noticing."	This participant created a response with several expanded semantic relationships including "where" the agents were going and information about "why" some events were happening; however, he did not provide temporal modulation to connect the arguments of the response without need for interpretation. Additionally, this participant demonstrated topic closure difficulties and restricted displacement by only talking about the "here and now" in the picture indicating language at the pre-language level.
Participant 9: "They were all playing soccer or no, basketball. And then one person threw it over that guy it fell into the road while car was coming. He ran to get it but the car, but he was coming and he was surprised (long pause)."	Due to the lack of extension with basic semantic relationships and referential identification difficulties, as the response progresses it becomes increasingly difficult to understand. Additionally, this response is limited to the "here and now" level of displacement and semanticity indicating language function at the pre-language level.

LI:80%-100% in regular class. Participants 10 and 11 both, particularly, demonstrated difficulty with expanding and modulating the connections among the semantic relationships to create semantically and grammatically accurate responses that did not require interpretation. For example, participant 11 said "… they went so

fast under got them and then they dropped some down." Participant 11 said, "…then they, um, he got a orange and then all these stacks of orange came down." These deficits in language structures and functions indicate language function at the pre-language level for participants 10 and 11. While all participants in the study demonstrated semantic errors, the two participants in the LI group demonstrated the most difficulty using the structures of language to make conventionally meaningful utterances. This finding suggests that the students in the LI group are likely to have been educationally identified due to their structural deficits.

Question 1.c. results. This question asked, participants to orally tell a story about an APRICOT II event-based picture that depicts complex semantic relationships at the concrete-operational conceptual level?

The participant responses to the APRICOT II pictures were analyzed as described in the data analysis section of Chapter Three. According to chronological age, APRICOT II pictures are considered age-appropriate for all participants in this study. Participants should have been able to connect the complex semantic agents beyond the "here and now" level of displacement and semanticity to produce a grammatically correct story with appropriate semantic boundaries and a shared level of meaning. Participant results for question 1.c. are included in Table 4.5.

Table 4.5

Language Function Analysis Derived From the Participants' APRICOT II Oral Responses

	EBD Participants (1-9)									LI Participants	
	80-100%[a]		40-79%[a]		0-39%[a]					80-100%[a]	
	1	2	3	4	5	6	7	8	9	10	11
Expected levels of expansion, modulation extension	No	No	No	No	No	No	No	No	No	No	No
Maintain shared referent	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Semantic errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Level of language function[b]	PL	PL	PL	PL	PL	PL	PL	PL	PL	PL	PL

Note. PL = Pre-language

[a]These percentages represent educational setting. The percentage indicates range of time the participant spends in a regular education classroom.

Overall, participants in this study, regardless of educational eligibility or placement, demonstrated language at the pre-language level when providing a response to an APRICOT II event-based picture indicating deficits in language function. This means that the participants' understanding of the underlying concepts represented with complex semantic relationships in the pictures were likely not understood as evidenced by lack of language functions and structures in the oral responses. With the exception of Participant 3, all participants were able to maintain a shared referent when telling a story about the APRICOT II picture. These results were similar to the results of sub-question 1.b. This means that when given a visual referent

at both a concrete and pre-operational level of concepts, most participants in this study were better able to maintain a shared referent when compared to results of the auditory prompt from sub-question 1.a. When compared to their APRICOT I stories, most participants' language function did not change in the degree that it was restricted. This suggests that for most participants, a higher conceptual level of the referent did not allow the participant to produce a response that was more or less conceptually or linguistically complex.

Individual descriptive results organized by sub-group.

EBD:80%-100% in regular class. Unlike the story that participant 1 told for the APRICOT I picture, for the APRICOT II picture, this participant did not produce language function beyond a pre-language level and thinking beyond a pre-operational level. This finding indicates that Participant 1 was unable to produce language with shared meaning when the visual referent matched her thinking level. For example, the participant demonstrated substantial difficulty with extending meaning to the agents. The participant spent half of her story naming and renaming the agents. She said, "…well, his nickname is Motor, people just call him Mo. And this guys name is (pause) his name is Suppose. His nickname is all their favorite things ok. His nickname is Skateboard and his nickname is Basket." The participant continued to talk about names and changed the name two more times before responding further to the picture. Like her APRICOT I story, this participant displaced her response in space and time, but was unable to adequately expand and modulate the underlying concepts to create a response that shared meaning without a considerable amount of interpretation, indicating language function at the pre-language level.

Participant 2 created a story for the APRICOT II picture that showed similar language function characteristics to his APRICOT I picture. This participant did not extend semantic relationships by only identifying the agents as "he," "kids," and by identifying one agent in the picture "motorcycle." This suggests that this participant does not distinguish between agents and objects in the picture. At the end of his response the participant says, "…Then he said, 'Watch this trick,' and he went right there and did a trick and then drove back here. The end." Since the participant did not talk about the agents or their actions beyond what he could see in the picture, the level of displacement was restricted to the "here and now" indicating a pre-language level of language function.

EBD: 40%-79% in regular class. Participant 3 produced a similar language sample to his sample from the APRICOT I picture. He demonstrated considerable difficulty maintaining a shared referent and made personal statements and opinions about the agents, objects, and actions in the picture rather than create semantic relationships among them, again, indicating a low level of agency. An example is when the participant said, "…huh, I don't' understand why would that kids fall off right at the end. Why would he (pause) wait (pause) why would you start turning this way? You should just stay right here because you know you put the ramp close to the road so you should start turning and then you would've gone up." This participant's restricted flexibility, displacement, semanticity, and efficiency indicate language function at the pre-language level.

Participant 4 also demonstrated language within the pre-language function level. In comparison to his APRICOT I oral response, this participant's language was

more restricted with his APRICOT II oral response. A noticeable decrease in correct grammar usage and increase in the use of dialogue, rather than narration, support this finding. For example, Participant 4 started his response with, "There once was two kids riding on their skateboards on the ramp. There was a motorcycle guy said, 'Hey what are you guys doing on the road?' 'We're playing, we're riding on our skateboards on the ramp.'" This decrease in language structures and function between the APRICOT I picture and APRICOT II picture means that the participant was unable to share meaning as efficiently when the semantic relationships in the picture were more complicated and required a higher level of thinking.

EBD: 0%-39% in regular class. Participant 5's response lacked in all areas of language function addressed indicating a pre-language level of function. This participant's response and analysis is included on Table 4.6 below. Participant 6 created a story to the APRICOT II picture that was similar in function to his response about the APRICOT I picture. This participant produced some limited modulation, expansion, and extension by identifying that the agents may be related and explaining why the children were preparing food alone by saying, "… they were making lunch because their parents were away…" However, this participant demonstrated overall language function at the pre-language level due to topic closure difficulties and by failing to expand or extend the semantic relationships beyond the "here and now" level of displacement, semanticity, and efficiency. This means that the participant may have difficulty thinking about topics, ideas, and people that aren't immediately present.

For the APRICOT II picture, Participant 7's response started at a pre-operational level of displacement and semanticity but increased to a concrete level by

the end of the response. At the beginning of his response, this participant lists the actions of the agents, unconnected to one another, by saying, “The mom was watering the flowers, he was riding his bike, he was painting…” He connects the basic semantic relationships mid-way through the story and expands the ideas to create a brief series of connected events by saying “…he broke his leg from falling off the ladder. Then they had to drove to the hospital. But they didn’t know that the hose was still on so they had no water to drink and that wasted all their water bill and it was way too high to pay because they just had to pay a lot for the doctor.” Although this participant’s sample demonstrated some concrete levels of displacement and semanticity, he was unable to expand, extend, or modulate his ideas into a grammatically correct, comprehensible story that did not require listener interpretation, indicating an overall pre-language level of language function.

Participant 8 produced a short story, similar to his APRICOT I oral story, that lacked in all areas of language function addressed. He said, “He’s gonna paint the house right there and fall off the ladder and probably broke his leg and they probably tried to help him.” This participant did not displace his response beyond the bounds of the illustration and failed to include any type of temporal language to expand response resulting in maximum amounts of interpretation.

Student 9 produced a story with more arguments for her APRICOT II oral story when compared to her APRICOT I story; however, the level of language function remained at the pre-language level of function suggesting that increased language structures do not always indicate increased language functions. Participant 9 extended semantic meaning by giving names to the agents in the story, but this

extension did not serve to create language that was less restricted. The participant had difficulties with topic closure and failed to connect semantic relationships temporally through expansion and modulation. Grammatical and semantic errors such as using the word “said,” instead of “ask” are shown in the example, “… while he was riding he fell off and hurt his knees and scraped his hand and his knees and his elbow. Um. He bonked his head on the concrete and then came to him and said if he’s ok…” These restrictions in language function added to the lack of clarity in this participant’s story that contributed to the need for listener interpretation.

Table 4.6

Examples and Analysis From the APRICOT II Oral Responses

Participant's APRICOT II Stories	Specific Analysis
Participant 5: "Kid touches the pot and its finger gets burned (laugh) or I don't know (pause, flips picture and looks at the back). It doesn't tell anything about it."	This story did not extend or expand the meaning semantic relationships mentioned into a contextual story including topic boundaries such a structural "beginning," "middle," and "end." Additionally, the language functions of displacement, semanticity, and efficiency were limited to the "here and now" indicating language function at a pre-language level.
Participant 10: "So, he fell because he tried to make that ramp and then he felled and the two boys were going to help him and hmm. Well, I think that's all."	This participant did not displace concepts in the response beyond the "here and now," and arguments were not temporally connected through extension, expansion, and modulation. For example, he said "… then he felled and the two boys were going to help him…" This excerpt shows inadequate modulation to indicate the past tense concept of the idea "fall," lack of extension by using "he" and "boys, and lack of expansion because the arguments showed little complexity indicating language function at a pre-language level.

LI:80%-100% in regular class. Overall, Participant 10 produced an oral response at the pre-language level of function for his APRICOT II response that was similar in function and structure to his APRICOT I response. This participant's story and analysis is presented in Table 4.6 above. Participant 11 demonstrated language function characteristics at a pre-language level for his APRICOT II oral story, and in comparison to his APRICOT I story, was less restricted in language function due to an

increased level of semanticity among the relationships in the picture. In his story, participant 11 demonstrated extension by naming and providing relationship indicators to the agents and showed expansion by using words to describe the situation. For example, the participant said, "OK, one day, Jen and Brody were making sandwiches for their little sister XXX (unintelligible name) was getting the pot then she picked it up and she accidently, see it's steaming…" Additionally, the participant had difficulty with topic closure and his story was restricted to the "here and now" level of displacement and efficiency, both indicators of language function at the pre-language level.

Question 1.d. results. For this sub-question, participants were asked to cartoon the same story from one of the previously told APROCOT I or II pictures. For students with visual metacognition, cartooning provides an opportunity to share their thinking in a visual modality (drawing and writing). Since all participants with EBD had mention of defiant behavior in their special education records, it was not a surprise to the researcher that some of the participants from this group refused to complete the most academic-like activity of the language sample: the writing task. Four participants refused to independently write and required assistance from the researcher, and one participant refused to cartoon entirely (draw and write). The cartooned stories were analyzed as described in the data analysis section of Chapter Three. Participant results for question 1.d. are presented in Table 4.7 followed by a summary of the overall group results for this sub-question.

Table 4.7

Language Function Analysis Findings Derived From the Participants' Cartooned Stories

	EBD Participants (1-9)									LI Participants	
	80-100%[a]		40-79%[a]		0-39%[a]					80-100%[a]	
	1	2	3*	4	5*	6*	7*	8*	9	10	11
Cartoon matched oral story?	No	No	NA	No	No	No	No	No	Yes	No	No
Expected levels of expansion, modulation extension	No	No	NA	No	No	No	No	No	No	No	No
Level of language function[c]	PL	PL	NA	PL	PL	PL	PL	PL	PL	PL	PL

Note. PL = Pre-language, NA = not applicable/refused to cartoon
[a]These percentages represent educational setting. The percentage indicates range of time the participant spends in a regular education classroom.
*These participants either refused to cartoon or needed assistance from the researcher that lead to the cartoon not being completed independently.

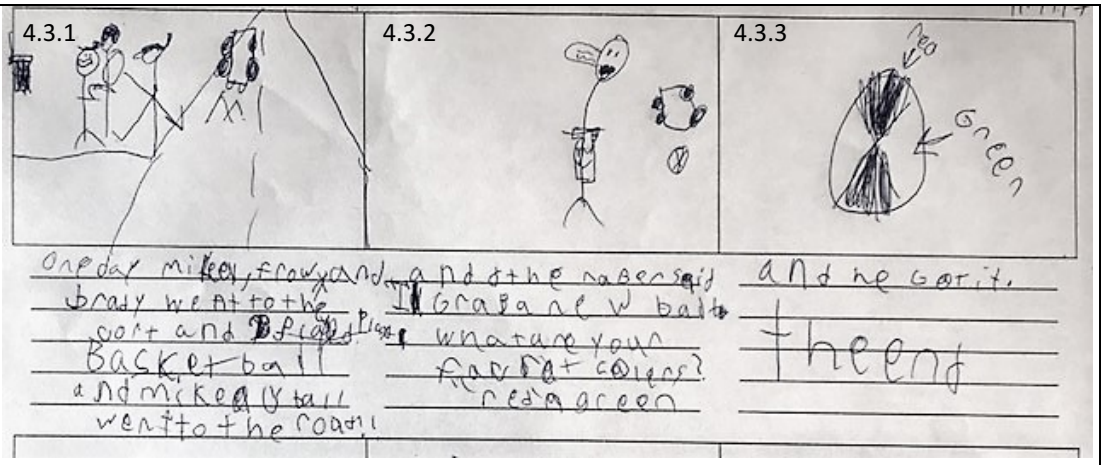
According to the chronological age of the participants, language abilities should function at the language level for all participants. However, participants in the study, regardless of eligibility or educational setting, demonstrated language function at the pre-language level for the cartooning task, indicating deficits in language function. Further, cartooning did not appear to help the participants share more meaning or increase levels of semanticity, displacement, or efficiency when compared to their oral language samples. Participants in all groups either, did not demonstrate displaced concepts in their cartoon or showed a decrease in language structure and function when they did. This suggests that the participants were likely relying on

imitation of visual patterns to construct the bulk of their stories and when the visual patterns were no longer available for imitation, the participants struggled to produce language for concepts and semantic relationships. Writing, in general, was a struggle for most of the participants. Most participants demonstrated conventions of writing well below what is expected for their chronological age and grade. Four participants, all within the self-contained EBD group, refused to independently write for their cartoon although they drew the pictures on their own. This may indicate that the current auditory and sound-based methods used to teach reading and writing in U.S. education may not meet the neurobiological needs of the participants due to their presumed visual metacognition.

Individual descriptive results organized by sub-group.

EBD:80%-100% in regular class. Participant 1's cartoon, a transcription of her writing, as well as her oral response about the APRICOT I picture are included in

Figure 4.3.



Transcription of writing:		
4.3.1: One day Mikeey, frow and brady went to the cort and playd Basketball and mike's ball went to the road!!	4.3.2: And the naBer said "I'll Grab a new ball what are your favrat colars? "red'n green	4.3.3: And he Got it. the end

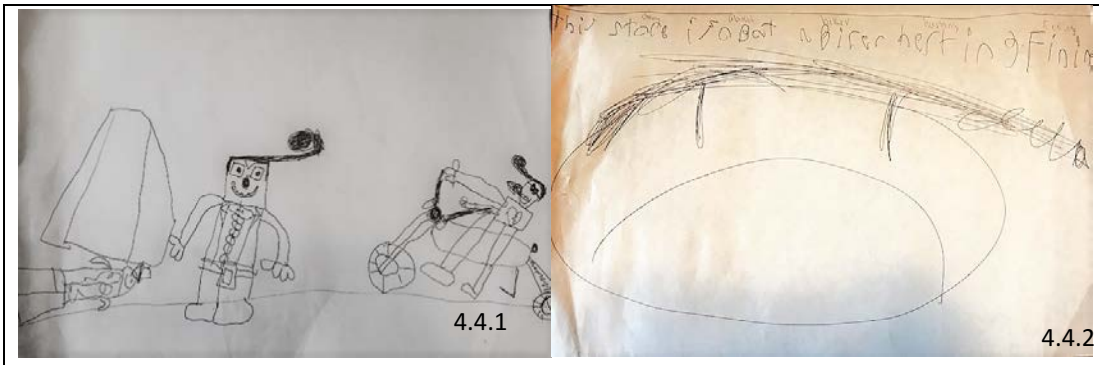
Oral story:
So, Tom, Brady, and Michael. Tom, Brady and Michael were playing a game of basketball and Tom accidentally threw the ball and then it went into the road. And Brady was grinnin and all that, thought that was funny and. Hmmm. Brady, well, Brady. Oh, yeah, Michael. Michael was like oh no, please stop stop stop stop! And the man was like oh no and then he just pause slammed on his brakes and and the ball didn't make it. /t/ The man said, I'll get you a new ball, I promise, it will be even better than that basketball. And then he asked him what his two favorite colors were and he told him red and green and so he got em a red and green basketball. And the man was like I'm sorry I broke that ball (pause). The end

Figure 4.3. Participant 1's cartooned APRICOT I story with transcriptions from the written portion of the cartoon and oral responses.

Overall, the cartoon and oral stories match in basic story components, but do not match entirely. For example, Participant 1 assigned different names to the agents between both stories, does not mention the ball getting "broke," and adds the role of the neighbor to the cartoon. Identical to the analysis of her oral stories, Participant 1 demonstrated an increase in language function when she was drawing and writing about concepts that were not displaced from the original APRICOT I picture, as

shown in Figure 4.3.1. In this frame the participant included enough context in the drawing and writing to allow for the listener to understand the story with little interpretation. Expansion and efficiency is limited in the next two frames. First, the drawing and writing in Figure 4.3.2 does not provide a reference or explanation of the relationship between the agent and the other objects in the frame, and semantic relationships are limited. Second, in Figure 4.3.3 the participant only drew a ball with the written description of, "And he got it." Besides lacking in age appropriate writing conventions, the language lacked in extension, expansion, and modulation, resulting in the listener (the researcher) having to create or infer the relationships. This finding indicates language function at the pre-language level suggesting that cartooning did not help this participant produce drawing that shared a higher level of thinking.

Participant 2's cartoon, a transcription of his writing, and his oral response about the APRICOT II are included in Figure 4.4 below.



Transcription of writing:

4.4.2: this store is abat a birer herting fining (this story is about a biker hurting feelings)

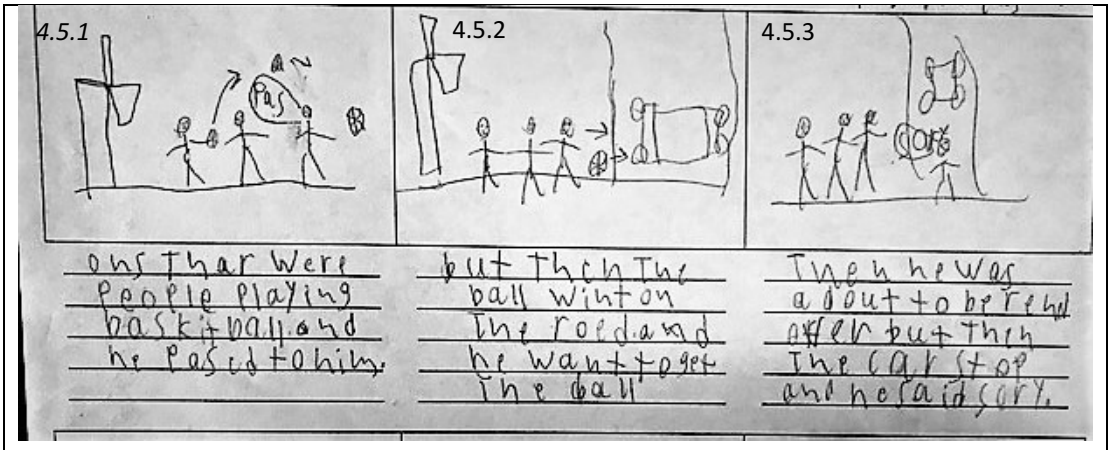
Oral story:
These two kids were trying to do a trick um and this one fell and he said, "Are you ok"? And he said and the motorcycle said, "Yeah, he's ok, just leave him alone." Then he said, "Watch this trick," and he went right there and did a trick. And then drove back here. The end.

Figure 4.4 Participant 2's cartooned APRICOT II story with transcriptions from the written portion of the cartoon and the oral responses.

During the cartooning portion of the language sample collection, Participant 2 told the researcher that he did not want to draw on the cartooning paper, instead he chose to draw on regular sized pieces of printing paper. The cartoon that Participant 2 drew does not match his oral story with the exception of a person on a motorcycle, three agents, and what is presumed to be a ramp. The brief writing sample does not match the pictures he drew and does not tell a story. The second picture appears to be a face with sad features that takes up most of the space on the page. This finding indicates a low level of understanding of the underlying concepts of the drawing, as well as, a low level of agency. The large face on the second picture could match with the argument that the story is about "hurting feelings;" however, the participant gave no indication of how the story is about hurt feelings. In fact, the participant only drew

and spoke about agents in the story being *physically* hurt, signifying that he may not understand the functional difference of the concrete concept of "hurt." This participant's mismatch between verbal explanation, written words, and cartooned drawing indicate difficulties with the language functions of flexibility, semanticity, and efficiency resulting with language function at the pre-language level.

EBD: 40-79%. Participant 3 refused to draw or write and does not have data to be included for this question. Participant 4's cartoon, a transcription of his writing, as well as his oral response about the APRICOT I picture are included in Figure 4.5



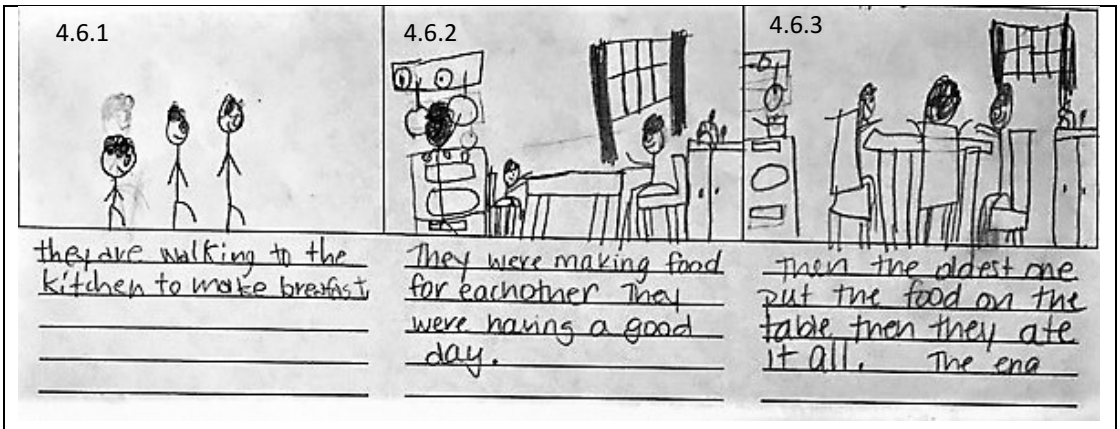
Transcription of writing:		
4.5.1: Ons thar were People Playing basketball and he pased to him.	4.5.2: but Then The ball wint on The roed and he want to get the ball	4.5.3:Then he was about to be rend over but Then The car Stop and he said sory.

Oral story:
There once were kids who were playing basketball and and someone passed and that guy passed it to this guy and and uh oh he made it ball go onto the road in the car was goin' hit the boy (pause) and then (pause) wow there's a sentence right on the back. Now I just forgot where I was at. And then the car was goin' stop and the car was tryina stop and it stopped and then the boy will say "sorry, my, my friends were playing basketball" and that, and then they just played basketball again.

Figure 4.5. Participant 4's cartooned APRICOT I story with transcriptions from the written portion of the cartoon and the oral responses.

Participant 4 was the only participant in the sample who chose to write his story before drawing. For the most part, the oral response and the cartoon matched in semantic elements; however the participant omitted the last argument, "then they just played basketball again." For the cartoon to match the oral response, the participant would have needed to draw an extra frame including those features. In terms of expansion and semanticity, this participant's cartooned response was not complex, the frames did not connect to one another temporally, and ideas portrayed in each frame did not extend beyond the "here and now," indicating a pre-language level of function. The participant's writing included unconventional spelling, atypical writing conventions, atypical letter/word spacing, and the language used was limited in modulation and extension, supporting the finding of language function at the pre-language level. This finding suggests that there is potential mismatch between this participant's presumed visual way of thinking with the auditory manner of teaching in the U.S.

EBD: 0%-39%. Participant 5's cartoon, transcription of her writing, and oral story to the APRICOT II picture are included in Figure 4.6 below.



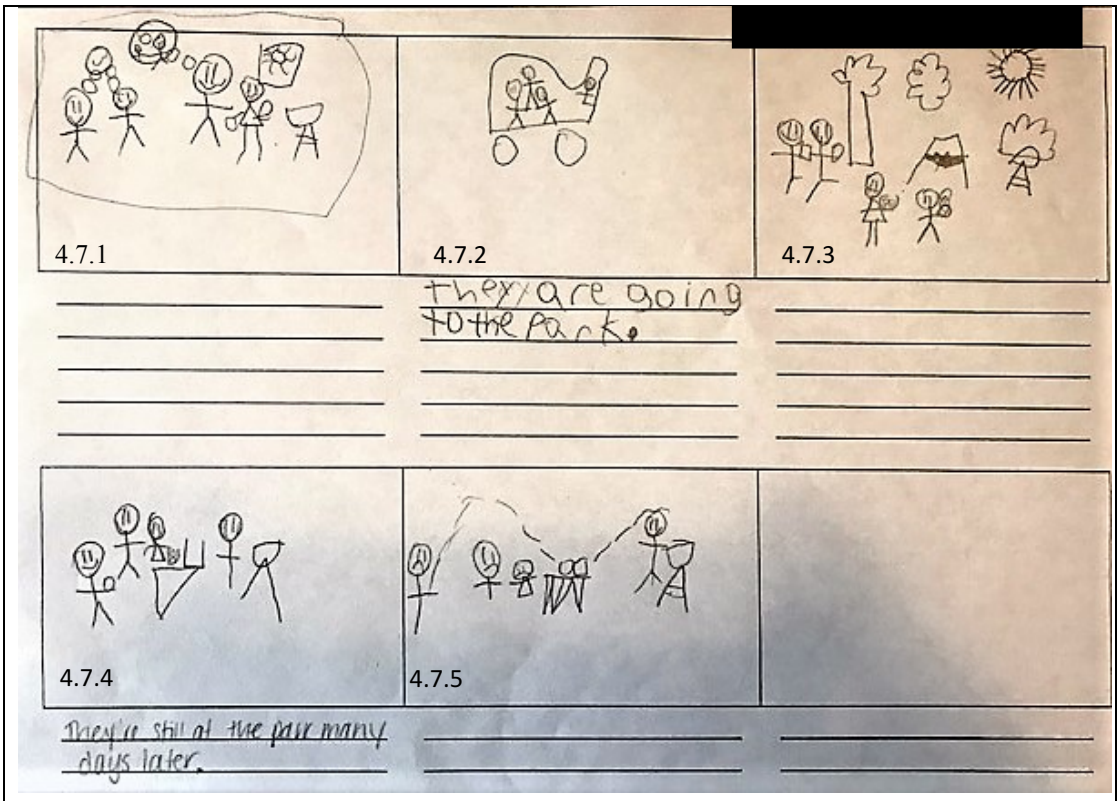
Transcription of writing:		
4.6.1: They are walking to the kitchen to make breakfast	4.6.2: They were making food for each other. They were having a good day.	4.6.3: Then the oldest one put the food on the table then they ate it all. The end
Oral story: Kid touches the pot and its finger gets burned (laugh) or, I don't know (flips picture over) It doesn't tell anything about it.		

Figure 4.6. Participant 5's cartooned APRICOT II story with transcriptions from the written portion of the cartoon and the oral responses.

The cartoon and oral story created by Participant 5 do not match in story features or semantic complexity. For example, while the oral story was about a "kid" burning "its" finger, the drawn story was about some people making breakfast. This participant demonstrated more complexity with her cartooned story than with her orally told story about the same picture suggesting that the visual cartooning task may have provided this participant with enough meaningful sensory overlap to produce a response with a higher level of thinking. It is likely that the participant was copying the features of the APRICOT II picture in the drawings for Figures 4.6.2 and 4.6.3, without extending or connecting the semantic relationships in the picture. This explains the lack of expanded contextual complexity in Figure 4.6.1. Although the

writing says, “they are walking to the kitchen…” the drawing shows no indication of where the agents are walking from or to. Although this participant produced more arguments in her cartoon than in her oral story, the function remained at a pre-language level.

The cartoon Participant 6 created, a transcription of his writing, as well as his oral response about the same picture are included in Figure 4.7 below.



Transcription of writing:

4.7.2: They are going to the park.
4.7.4: They're still at the park many days later.

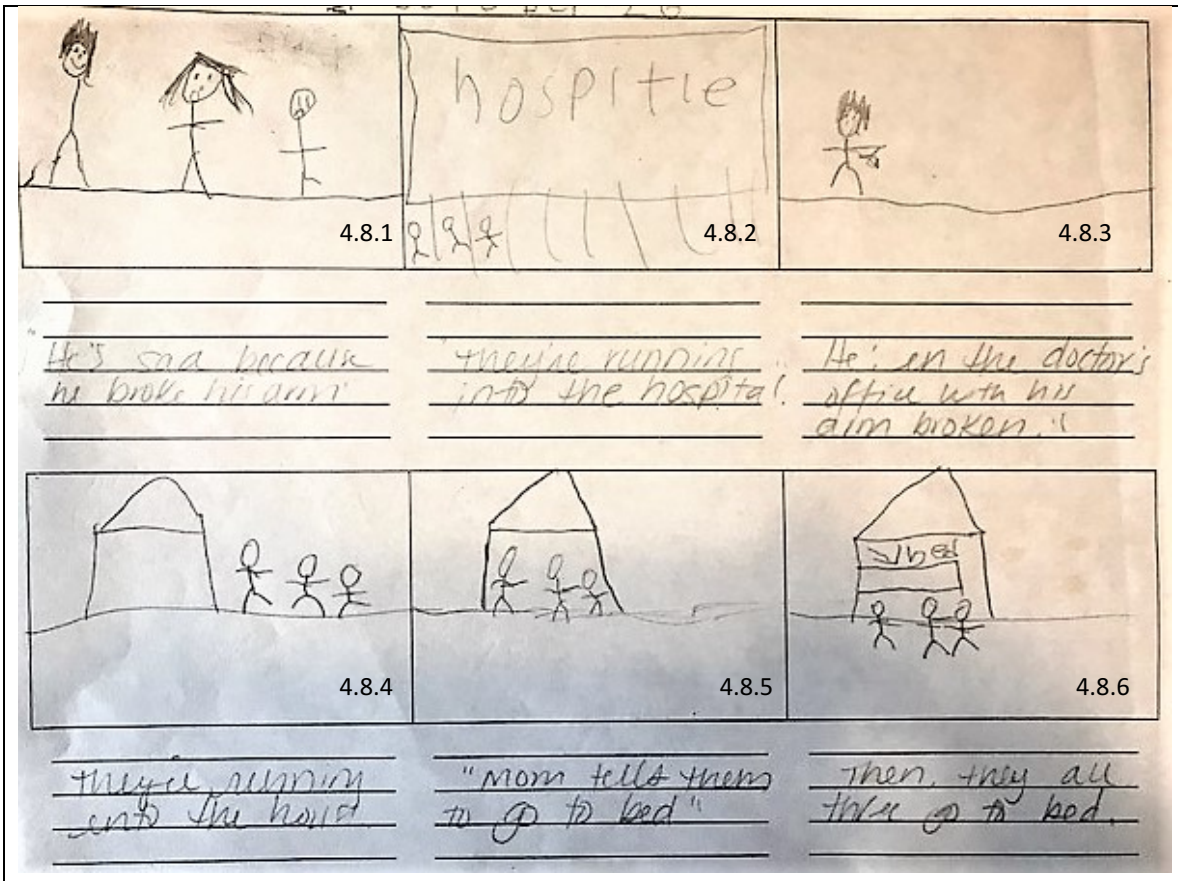
Oral story:
What are those (pointing to hamburger type patties)? I see worms. This one. Well, I think they decided to, that the dad decided, I think it's it's a nice day so we should go to the park, ark, and have a picnic. And then the two young boys were playing and then they knocked over the can of worms because they were going to go fishing next xt and then one of the worms hit the dad on the arm and one landed on the stove (Long pause then laugh).

Figure 4.7. Participant 6's cartooned APRICOT I story with transcriptions from the written portion of the cartoon and the oral responses.

The cartoon that participant 6 created did not match the story he orally told suggesting that cartooning did not help this participant produce a response with higher levels of thinking. The writing under Figure 4.7.2 was not written independently by the participant because he asked the researcher to help with spelling. He did not want to write any further but dictated the sentence for the researcher to write for Figure

4.7.4. The researcher offered to write more, but he said that was the end of his story. It appears that the participant may have been able to provide evidence of displacement, and expansion with his drawing as he showed agents thinking and traveling from what is presumed to be home to the park. However, since none of the drawings provide enough context for a story, and without the language in the written explanation, the drawings required maximum amounts of interpretation indicating language function at a pre-language level.

The cartoon participant 7 created, a transcription of his writing, as well as his oral story about the same picture are included in Figure 4.8 below.



Transcription of written sample:

4.8.1: He's sad because he broke his arm.	4.8.2: They're running into the hospital.	4.8.3: He's in the doctor's office with his arm broken.
4.8.4: They're running into the house.	4.8.5: Mom tells them go to bed	4.8.6: Then they all three go to bed.

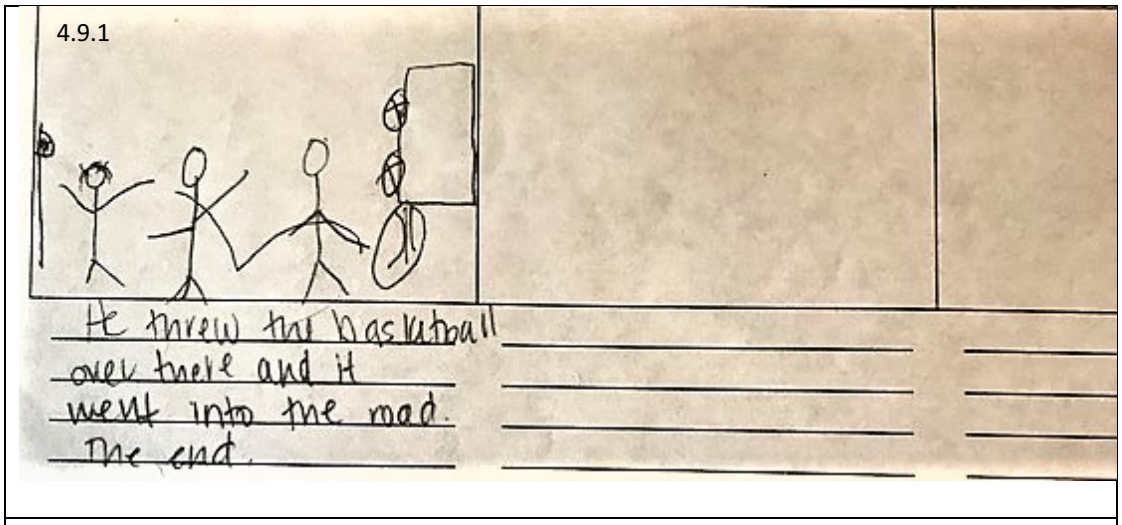
Oral story:

The mom was watering the flowers, he was riding his bike, he was painting, and he slipped off the ladder and he got hurt and then they were like "what's that noise?" and they came and he broke his leg from falling off the ladder. Then they had to drove to the hospital. But they didn't know that the hose was still on so they had no water to drink and that wasted all their water bill and it was way too high to pay because they just had to pay a lot for the doctor.

Figure 4.8. Participant 7's cartooned APRICOT II story with transcriptions from the written portion of the cartoon and the oral responses.

Participant 7's oral response and cartoon response did not match and included several different features. Features from Participant 7's oral story that reflected concrete conceptualization were omitted from the cartooned version of the story, indicating that the participant may not have acquired the concrete concepts used to orally respond to the APRICOT II picture. This student refused to write about his drawings but agreed to dictate the story while the researcher wrote. The participant provided a sentence for each picture that described a portion of the picture, but demonstrated limited extension, expansion and modulation. The lack of context for Figures 4.8.1, 4.8.2, and 4.8.3 and similar drawing elements in figures 4.8.4, 4.8.5, and 4.8.6, indicate a low level of displacement and language function at the pre-language level.

The cartoon participant 8 created, a transcription of his writing, as well as his oral response about the same APRICOT picture are included in Figure 4.9 below.



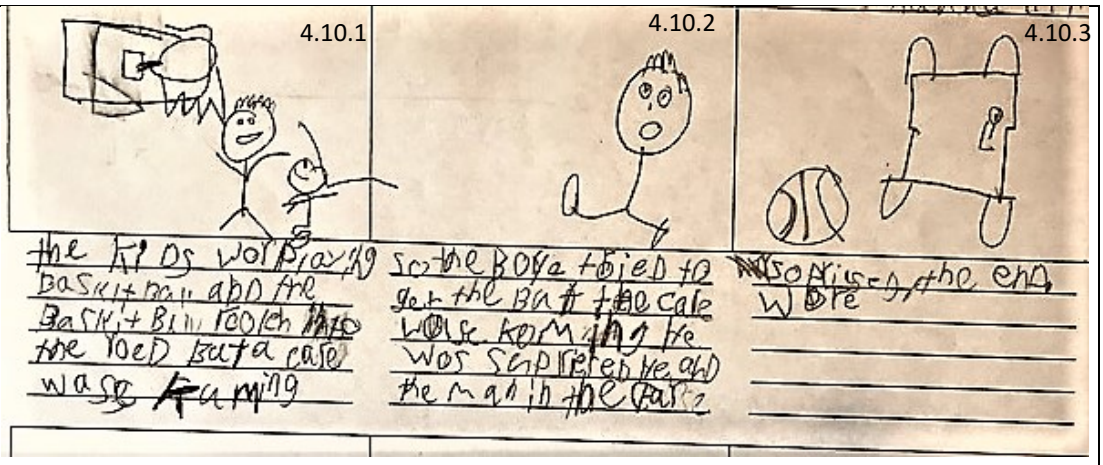
Transcription of written sample:
4.9.1: He threw the basketball over there and it went into the road. The end.

Oral story:
Yeah, he's gonna throw it and he's tryna grab the ball over there and she's tryna get it cause theres a car in the road (pause) end.

Figure 4.9. Participant 8's cartooned APRICOT I story with transcriptions from the written portion of the cartoon and the oral responses.

Participant 8's response did not create a story in either the cartoon or what he shared about the picture orally, indicating language function at the pre-language level. Since Participant 8 refused to complete the writing portion of the cartoon, the researcher wrote while the participant dictated. He only dictated to the researcher about one agent and what happens to the ball, but he drew context, three agents, a car in the road. It is likely that this participant's drawing was an imitation of the features he saw on the original APRICOT II picture, but his dictated response, as well as his oral response, demonstrates a lack of understanding of the semantic relationships in the picture. The lack of faces and lack of expansion among agents in the drawing and dictated sentences indicate a low level of agency.

The cartoon Participant 9 created, a transcription of her writing, and her oral response about the same picture are included in Figure 4.10.

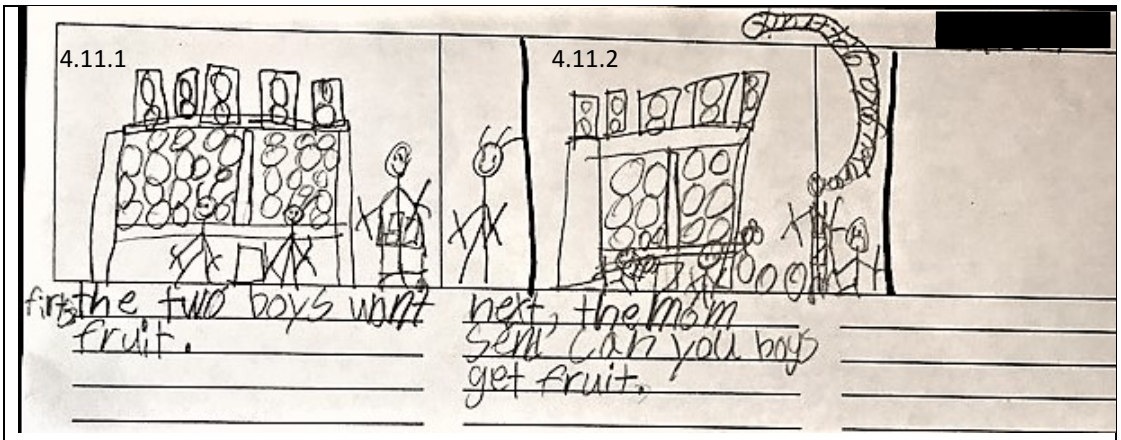


Transcription of written sample:		
4.10.1: the kids wor playing basketBall and the baskitBall roolen into the roed but a care was kuming	4.10.2: so the boye tried to get the but the care wase koming He wos suprieseb He and the man in the care	4.10.3: wore soprised. The end.
Oral story: They were all playing soccer. Or, no basketball. And then one person threw it over that guy it fell into the road while car was coming he ran to get it but the car, but he was coming and he was surprised (long pause).		

Figure 4.10. Participant 9's cartooned APRICOT I story with transcriptions from the written portion of the cartoon and the oral responses.

Participant 9 did not utilize the framed boxes on the cartoon paper to extend the semantic relationships temporally. Instead she drew one, cohesive, picture that spanned three frames of the cartooning paper, indicating a lack of awareness of spatial boundaries. The participant demonstrated limited abilities to expand, extend, and modulate the story beyond the "here and now" level of displacement, semanticity, and efficiency indicating language function at the pre-language level.

LI: 80%-100% in regular class. The cartoon participant 10 created, a transcription of his writing, and his oral story about the same picture are included in Figure 4.11.



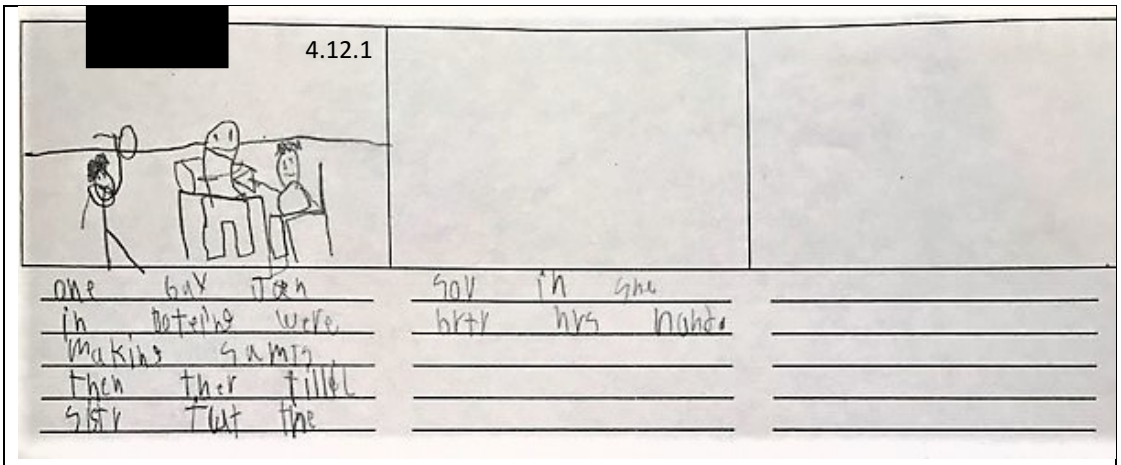
Transcription of writing:	
4.11.1: first the two boys want fruit.	4.11.2: next, the mom send can you boys get fruit.
Oral story: So, the boys were going to get some fruit and then um he got a orange and then all these stacks of orange came down and he tripped over them. The end.	

Figure 4.11. Participant 10's cartooned APRICOT I story with transcriptions from the written portion of the cartoon and the oral responses.

Participant 10's cartoon, although rich in detail in the drawing, lacks extension, expansion, and modulation with written language to create a story marked temporally with a beginning, middle, and end. This cartoon required a considerable amount of interpretation from the researcher signifying language at the pre-language level. Participant 10's oral story and cartooned story did not match. In the participant's oral story, he described an agent getting an orange, the oranges falling down, and another agent tripping over the oranges. Although the drawing in the cartoon clearly shows round objects that are presumed to be the oranges, he makes no mention of oranges in his written language and does not mention that any of the "fruit" fall. Because he only mentions "fruit" in his writing, it is unclear if the round objects are oranges since the original APRICOT I picture included more fruit than just oranges. This cartoon serves as a possible example of a participant imitating the visual patterns from the picture in

their drawing, but not demonstrating awareness of the underlying language concepts that create the meaning in the picture in their writing or oral response.

The cartoon participant 11 created, a transcription of his writing, and his oral response about the same picture are included in Figure 4.12.



Transcription of writing:
4.12.1: one bay Jan in boteing were making samis then ther lillil sistr tut the sov in she brtr hrs hand.

Oral story:
Ok. One day, Jen and Brody were making sandwiches and their little sister XXX was getting the pot and she picked it up then she accidently, see it's steaming, then the boys didn't notice when she was getting it then she burnt herself. The end. That has to hurt.

Figure 4.12. Participant 11's cartooned APRICOT II story with transcriptions from the written portion of the cartoon and the oral responses.

Participant 11's ideas shared in his cartoon do not extend beyond the "here and now" of the APRICOT II picture, and his written language lacks in expansion, extension, and modulation indicating language at the pre-language level. Participant 11's writing is unconventional in spelling and restricted in grammar further supporting language at a pre-language level and indicating a potential mismatch between his

presumed visual metacognitive learning system and the auditory nature of contemporary education.

Summary of question 1. Overall, data gathered from the first research question suggests that participants, regardless of eligibility or educational placement, demonstrated deficits in language function according to all language sample activities. This finding indicates that participants identified with EBD demonstrate deficits in language function similar to students already identified with LI. Although participants with EBD demonstrated similar deficits in language functions as the LI group, structural deficits were not as apparent. Perhaps this difference serves as a possible explanation to why LI has not been considered for the majority of students with EBD in this study. Data from the TEMPro indicate that participants in the study utilize visual metacognition, and that participants from all groups were better able to maintain a shared referent when the referent was visual. Overall, participants identified with EBD, who were not in a self-contained setting (80-100% and 40-79%), provided the most language structures. This finding indicates that, to some extent, these participants have acquired a fair quantity of language structures, but have not acquired language function expected for children their same age. This finding suggests that it is possible that the language structures acquired by the EBD participants, who spend more time in general education settings, may mask underlying deficits in language function, possibly contributing to the disparity in LI identification among students identified with EBD noted in the literature (Hollo et al., 2014).

Research Question 2

The second research question asks, will students identified with EBD, LI, and/or both make prosocial or antisocial relationships among the agents, their actions, and the context? The following sections describe the results of each sub question followed by a synthesized summary of the major findings for the overall question.

Question 2.a. results. This question asked participants to orally tell a story about an APRICOT I event-based picture that depicts basic semantic relationships at the pre-operational conceptual level. For this sub-question, the participant's APRICOT I oral responses were analyzed as described in the data analysis section of Chapter Three. Results indicating the presence of prosocial or antisocial relationships, as well as language that was too restricted to reflect such relationships from this sub-question, are summarized on Table 4.8 according to eligibility and educational placement.

Table 4.8

Findings Regarding the Presence of Prosocial or Antisocial Relationships from the Participants' APRICOT I Oral Responses

	EBD Participants (1-9)									LI Participants	
	80-100%[a]			40-79%[a]		0-39%[a]				80-100%[a]	
	1	2	3	4	5	6	7	8	9	10	11
Pro/Antisocial	A/P	A	A	LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR

Note. P = prosocial, A = antisocial, LTR = language too restricted
[a]These percentages represent educational setting. The percentage indicates range of time the participant spends in a regular education classroom.

Data revealed that the majority of the participants demonstrated language that was too restricted in form or function to determine prosocial or antisocial

relationships. Three participants from the EBD groups not served in self-contained classrooms (80-100% and 40-79%) provided responses to the APRICOT I picture that demonstrated antisocial relationships. All participants' ability to provide responses with prosocial relationships were limited. Antisocial relational concepts included responses that extended the relationships depicted in the picture resulting in physical harm of agents or objects, taunting, purposeful destruction, and lying. These results indicate that along with language function deficits, the social concepts acquired by some of the participants with EBD are antisocial in nature. These findings indicate that deficits in language function likely impact the participants' ability to provide connections among agents. Particularly, participants identified with EBD in the self-contained setting (0-39%) demonstrated levels of personal agency at the low-end of the pre-operational level of conceptualization suggesting that some of the participant's antisocial behaviors reported in the review of records could be due to lack of agency or inability to position themselves with other agents.

Individual descriptive results organized by sub-group.

EBD: 80-100% in regular class. Participant 1 demonstrated both antisocial and prosocial relationships in her response. In the first portion of her response, Participant 1 demonstrated two antisocial relationships. Participant said, "…Tom accidentally threw the ball and then it went into the road. And Brady was grinning and all that through that was funny…" This is considered antisocial because the action of throwing the ball in the road may lead to physical harm to one of the agents or destruction of the ball; yet, Participant 1 indicated that Brady smiled and thought it was funny. This agent's response did not support, protect, or nurture others and did not

raise to the level of interpersonal care. Another example of antisocial language occurs when participant 1 said, "…he just slammed on his breaks and the ball didn't make it." This extension of relationships depicted in the pictures is antisocial because of the resulting destruction of property. This means that when allowed to determine actions of the agents in the event-based picture, this participant related the agents with their action and the objects with concepts that did not nurture, protect, or support. After the ball "broke," the participant showed agents engaging in dialogue and actions that demonstrated interpersonal care, adequate agency, and actions reflective of a healthy relationship. The participant said, "…The man said, 'I'll get you a new ball, I promise'… and the man was like 'I'm sorry I broke that ball.'" Participant 2 demonstrated antisocial relationships in his story. This participant's response and analysis is highlighted below in Table 4.9.

EBD:40%-79% in regular class. Participant 3 assigned antisocial meaning when talking about the APRICOT I picture by describing semantic relationships that were purposefully harmful or negligent to the group and described a situation that included purposeful lying and blame. This participant said, "…Bet he would have known that and I can see that he actually used his grip and aimed and tried to hit the cup on purpose and he was like 'huh, I didn't know that was going to happen' uh, yeah, you did." These antisocial concepts indicate agency at a pre-operational level even though the agency of the participants should be functioning at the concrete level, according to chronological age expectations. Participant 4 described the APRICOT I picture but demonstrated language that was too restricted in function to reflect

prosocial or antisocial concepts usage. An excerpt from this participant's oral response and specific analysis is described in Table 4.9 below.

Table 4.9

Examples and Analysis of Antisocial Relationships and Excerpts of Language that was Too Restricted for Participants' APRICOT I Oral Responses

Participant Story Excerpts	Specific Analysis
Participant 2: "…he threw it (the ball) in the road on purpose and he was tryna catch it but he didn't let him. And then the car driver popped the ball and he said "hee hee I popped your dumb ball."	This participant demonstrated three examples of antisocial concepts by expanding the relationships depicted in an antisocial way, purposefully destroying property (the ball), and indicating taunting from an adult to children. These examples indicate an antisocial understanding of adult/child relationships, antisocial understanding of rules, such as the rules for basketball, and an overall lack of agency by not considering the extreme danger to agents indicated by the semantic relationships constructed by this participant.
Participant 4: "There once were kids who were playing basketball…and then the car was goin stop and the car was tryina stop and it stopped and then the boy will say "sorry, my, my friends were playing basketball…"	Although Participant 4, demonstrated a fair amount of language structures, he failed to provide enough language function reflect prosocial or antisocial relationships. The participant includes the structures of an apology; however, the participant fails to meet the rules of a speech act (Searle, 1969), resulting in an utterance act. This means that the utterance was void of meaning and was likely borrowed language.
Participant 10: "So, the boys were going to get some fruit and then they um he got a orange and then all these stacks of oranges came down and he tripped over them."	Participant 10 created a verbal list of basic semantic relationships, but this participant's language was too restricted in function and structure to reflect prosocial or antisocial concepts.

EBD: 0%-39% in regular class: All participants within in this group provided responses that described the APRICOT I pictures, but their language was too restricted

to reflect prosocial or antisocial concepts to the agents, their actions, or the context. Participants 5, 8, and 9 all provided responses with the least amount of arguments. Arguments consisted of lists of the agents and some actions in the picture, but did not connect all of the agents in the picture or assign social intentions or meaning to create full stories. Participants 6 and 7 provided more arguments in their responses than participants 5, 8, and 9; however, the information about agents, or connections among agents, provided by this group was restricted resulting in limited prosocial or antisocial relationships. Lack of connection and extension among agents is indicative of low levels of agency suggesting that participants, specifically in this sub-group, may have difficulty seeing and understanding how their actions affect other agents.

LI:80%-100% in regular class. The participants identified with LI also demonstrated language function that was too restricted to reflect prosocial or antisocial relationships. Participant 10's response and analysis are included in Table 4.9 above. Although Participant 11's language was too restricted in form and function to reflect prosocial or antisocial relationships, he provided agent to agent semantic relationships such as interactions between "the mom" and "her sons," indicating a higher level of agency than the participants identified with EBD in self-contained settings (0-39% in regular classrooms). Participant 11 said, "OK, So, mom and her sons went to the store and then the mom asked, 'can you get me some oranges and lemons?' and then they went so fast under got them and then they dropped some down, a lot of oranges, and the man slipped."

Question 2.b. results. This sub-question asked participants to orally tell a story about an APRICOT II event-based picture that depicts complex semantic

relationships at the concrete conceptual level. To address this sub-question, the participants' APRICOT II oral responses were analyzed as described in the data analysis section of Chapter Three. The APRICOT II pictures differ from the APRICOT I pictures because of an increase of semantic complexity and due to the inclusion of a social conflict. This sub-question allowed for a social problem to be highlighted to examine how participants viewed them. Findings from this question are summarized on Table 4.10 according to eligibility and special education setting.

Table 4.10

Findings Regarding the Presence of Prosocial or Antisocial Relationships from the Participants' APRICOT II Oral Responses

	EBD Participants (1-9)									LI Participants	
	80-100%[a]			40-79%[a]		0-39%[a]				80-100%[a]	
	1	2	3	4	5	6	7	8	9	10	11
Pro/Antisocial	A	A	A	LTR	A	A	A	LTR	A/P	LTR	LTR

Note. P = prosocial, A = antisocial, LTR = language too restricted.
[a]These percentages represent educational setting. The percentage indicates range of time the participant spends in a regular education classroom.

The majority of participants identified with EBD responded to the social conflicts represented in APRICOT II pictures with antisocial relationships that did not support, nurture, and protect other agents indicating an increased proclivity toward antisocial relationships in their responses. Most antisocial concepts described within the sample of participants with EBD depicted concepts of physical harm. Antisocial concepts included in participants' responses, in addition to physical harm included threats, name-calling, victimization, and neglecting care or concern for agents whom

had been injured. Prosocial relationships and concepts were limited among the participants' language samples. One participant included prosocial relationships in a response that also included antisocial relationships. Participants' ability to produce prosocial concepts in their language samples appear to have been affected by restrictions in language function. Since participants were found to have language function at the pre-language level from the first research question, the participants appeared to struggle with higher agency concepts, such as "perspective." However, participants identified with EBD mostly demonstrated low levels of agency. This finding suggests that the participants with EBD may struggle more than the participants with LI to understand their relationship as an agent with other agents and may struggle to understand how their actions affect the thoughts and actions of other agents.

Individual descriptive results organized by sub-group.

EBD: 80%-100% in regular class. Participant 1's response included several antisocial outcomes that involved physical harm to the agents. Examples of antisocial relationships included in this participant's response were escalating the injuries depicted in the drawing. For example, Participant 1 said, "…This is Michael, he accidentally ran over, um, Brady. And so Brady got hurt and he scrapped his knee and it showed the bones… and Michael says 'I'm so sorry I scrapped, I'm I accidentally ran you over.' 'It's ok,' Michael said. Um and one day he this guy came motorcycling that day and he um went up that ramp and he did um a backflip and then he landed on his feet but he rolled back and then he hitted the breaks really hard but then he flipped off and broke his neck." These escalated injures such as "showed the bones," and

"broke his neck," highlight the lack of care, protection, and support seen in a response that is prosocial in nature. Participant 1 included an apology in her response; however, the apology, as it is stated, is not entirely appropriate given the severity of the context. Additionally, the apology does not reflect interpersonal care, nurturance, or support or clearly demonstrate a high level of agency demonstrating perspective. The agent named Michael does not ask for forgiveness, offer to help, or offer to provide extra support. These types of actions would be considered prosocial in the scenario produced by Participant 1 and without these types of actions, it is unclear if the apology represents conscious concern for the significance of the action. Participant 2 demonstrated antisocial concepts within relationships depicted in his response. Participant 2's story and analysis are included in Table 4.11 below.

EBD: 40%-79% in regular class. Participant 3 demonstrated antisocial relationships in his APRICOT II response. An excerpt of participant 3's transcript and analysis of his response are included in Table 4.11 below. Participant 4 also presented antisocial relationships in his response to the APRICOT II picture. This participant indicated that an adult threatened extreme physical violence toward younger "kids" by threatening to run them over with his motorcycle if they didn't move. The participant said, "…get off or I'll run you over.' And then he said, 'hey, can I play with you too?' And then they say, 'Sure, grab your own skateboard and we'll play.' And that will be the end." Additionally, this indication that the adult and children "play" together after the threat indicates low levels of agency.

Table 4.11

Examples and Analysis of Antisocial Relationships and Language Too Restricted for Participants' APRICOT II Oral Responses

Participant Story Excerpts	Specific Analysis
Participant 2: "These two kids were trying to do a trick um and this one fell and he said "are you ok?" and he said and the motorcycle said "yeah, he's ok, just leave him alone." Then he said, "watch this trick" and he went right there and did a trick…"	Participant 2's response is antisocial due to the focus on the "motorcycle's" antisocial comment and directive for the kids to watch him "do a trick" failing to provide support or nurturance towards the injured agent. This imbalance between adult control and a child's well-being suggests a low level of agency.
Participant 3: "Whoooo. Dang. God this kid is an idiot…Are you sure you didn't knock him over? Are you sure you didn't (pointing to the agent on the motorcycle)? Because apparently the kid was faster than you…"	Participant 3's story contained antisocial relationships. First the participant engaged in antisocial behavior by calling the injured agent in the picture a name. Second, the participant suggests that the agent on the motorcycle purposefully hit the injured "kid" because he was faster than the man on the motorcycle causing physical harm, an antisocial concept.
Participant 6: "…and now he's trying to grab it while they are making sandwiches (pause). It would be funny because it would burn his hand."	Participant 6 assigned antisocial meaning to the possibility of the agent in the picture burning his hand by saying it would be funny. This is antisocial because of the indication that physical pain is a concept considered funny, not showing care or nurturance.
Participant 10: "… then he felled and the two boys were going to help him and hmm. Well, I think that's all."	The reasoning as to why the "two boys" are helping "him" and what they are helping him with is not made clear; therefore, this participant's language was found to be too restricted to reflect prosocial or antisocial relationships in his response.

EBD: 0%-39% in regular class. Participant 5 displayed antisocial relationships and concepts in her brief oral response by laughing in response to a small child getting burned. Additionally, the participant objectified the "kid" in the response by saying, *"It's* finger gets burned," and offered no support or help from any of the other agents in the response. Objectification suggests that this participant may have low levels of agency and may struggle differentiating between objects and agents. This could possible explain why she laughed when the "kid" hurt himself, because if the "kid" is an object, he does not have thoughts or feel pain. Participant 6 had a similar antisocial response for this same APRICOT II picture. An excerpt from his response and the analysis is included above in Table 4.11 above.

Participant 7 extended the relationships depicted in the APRICOT II picture to include several spiraling antisocial relationships as the story became further and further displaced. For example, the participant determined that one of the agents had broken his leg, a possible scenario based off the social problem included in the picture. He indicated that other agents in the story took the injured agent to the hospital because they "had" to, not for a prosocial reason including care, nurturance, or empathy. As the story becomes further displaced, the participant continued to include concepts of victimization and antisocial relationships such as "…But they didn't know that the hose was still on so they had no water to drink and that wasted all their water bill and it was way too high to pay because they just had to pay a lot for the doctor." Victimization reflects a low level of agency, and in this example suggests that the participant may struggle to understand that he is a separate, autonomous, agent from others or the environment.

Participant 8's brief description of the APRICOT II picture was too restricted in form and function to include prosocial or antisocial relationships. This participant said, "He's gonna paint the house right there and fall off the ladder and probably broke his leg. And they probably tried to help him." Although Participant 8 indicates the action of "helping," he does not provide enough expansion of the situation to know if the action so prosocial or not. For example, the listener doesn't know what "they" are helping with or why they are helping, two critical pieces of information to determine the whether the action reflected interpersonal care and conscious concern for the significance of the action.

Participant 9's response demonstrated antisocial and prosocial relationships. This participant demonstrated antisocial relationships due to an unnecessary escalation of physical harm when she added "he bonked his head on the concrete." Similar to Participant 8, this participant added acts such as "helping;" however, this participant included a reasoning why the agents went to help. In two instances, the agents went to help the injured agent "to see if he's ok."

LI: 80%-100% in regular class. Both participant 10 and 11 demonstrated language that was too restricted to reflect prosocial or antisocial relationships. Participant 10's response and analysis are included above on Table 4.11 above. Although Participant 11 provided multiple connections among agents in his response, indicating a higher level of agency than some of the previous responses, he failed to provide prosocial or antisocial assignment of meaning to the agents in his brief response.

Question 2.c. results. This sub-question asked participants to cartoon the same story from one of the previously told APROCOT I or II pictures. To address this question the participants' cartooned stories were analyzed as described in the data analysis section of Chapter Three. Findings for this sub-question are summarized on Table 4.12. Copies and transcripts of the participants' cartoons were included earlier in this chapter and will be referred to in this section.

Table 4.12

Findings Regarding the Presence of Prosocial or Antisocial Relationships from the Participants' APRICOT II Oral Responses

	EBD Participants (1-9)									LI Participants	
	80-100%[a]			40-79%[a]		0-39%[a]				80-100%[a]	
	1	2	3	4	5	6	7	8	9	10	11
Pro/Antisocial	LTR	A	NA	LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR

Note. P = prosocial, A = antisocial, LTR = language too restricted, NA = not applicable/refused to cartoon.
[a]These percentages represent educational setting. The percentage indicates range of time the participant spends in a regular education classroom.

Overall, language that was restricted in form and function impacted participants' ability, regardless of eligibility and placement, to reflect prosocial or antisocial relationships. Only Participant 2, a participant identified with EBD in the 80-100% in regular class setting, demonstrated antisocial relationships among the agents in his response. Since participants were previously found to utilize visual cognition, cartooning should have provided the participants an opportunity to increase thinking to represent, or further develop semantic relationships told in the oral response. For this sub-question, cartooning did not increase the participants ability to

share meaning or raise level of language function to assign prosocial meaning. Overall, due to the lack of advanced language functions for the cartooning activity, social relationships were not able to be determined for most participants and trends were identified between the groups of participants with EBD and with LI were limited. These findings indicate that participants in the study, when given opportunities designed allow for further conceptual development of prosocial concepts, consistently did not demonstrate the level of language function necessary to share meaning about prosocial concepts. This suggests that deficits in language function appear to be connected to the participants' abilities to acquire prosocial concepts.

Individual descriptive results organized by sub-group.

EBD: 80% - 100% in regular class. Participant 1 drew a detailed cartoon to match the APRICOT I picture; however, her written language merely listed the agents and their actions in the drawing, failing to provide clear and consistent prosocial or antisocial relationships. This indicates that this participant was able to copy visual patterns from the APRICOT I picture but was unable to connect agents to other agents using written language to convey prosocial or antisocial relationships. Participant 2 was the only participant to clearly demonstrate antisocial relationships in his cartoon. This participant demonstrated antisocial relationships by including escalation of physical harm to the agents in the story. Although he didn't write about this harm, he stated to the researcher as he was drawing, "The hurt kid is going to be dead because the skateboard hit him in the head." In Figure 4.4.2, this participant indicated to the researcher that he drew a knife in the head of the "hurt kid," further demonstrating an escalation of physical harm as he extended the relationships beyond what was depicted

in the picture. These examples from Participant 2 demonstrate extreme lack of empathy, nurturance, support, and protection for other agents in the story.

EBD: 40% - 79% in regular class. Participant 3 refused to cartoon and therefore has no data to include for this question. Participant 4's cartoon failed to explain the actions of the agents in the drawing to definitively determine prosocial or antisocial relationships. For example, the participant includes the indication that someone says "sorry" in Figure 4.5.3, but it is not clear who said it or why it was said. This example fails to meet the semantic constituent rules for a speech act (Searle, 1969) indicating that intention and illocutionary force could not be determined to consider that act a prosocial.

EBD: 0% - 39% in regular class. All participants in this group demonstrated language that was too restricted in form and function to provide consistent and clear prosocial or antisocial relationships. Participant 5 spent a great deal of time including details in her drawing and provided basic semantic relationships for each picture, but did not include descriptions, either verbal or written, that explained the acts the agents were doing or why the agents were doing them. This indicates that Participant 5 was able to copy visual images in her drawing but not able to provide enough context within her response to her drawing for prosocial or antisocial relationships to emerge. Participant 6 did not connect the agents in his drawing with written language, and no comments were noted while he was drawing to help explain the agents, their action, and the context of his drawing. This result suggests language function that is too restricted to produce prosocial concepts with an event-based picture.

Participant 7's language was also too restricted for prosocial or antisocial relationships to emerge. All frames of the cartoon included drawn basic semantic relationships with the exception of frame 4.8.3. The language dictated to the researcher describes each picture but does not connect the agents or assign prosocial or antisocial relationships in each picture or among frames. Filling all of the space on the paper (using all 6 frames), as well as, indications from this participant drawing such as lack of details among the agents suggest a low level of agency limiting this participants ability to relate and understand other agents.

Conversely, Participant 8 only drew one frame for his cartoon and refused to write. Like the previous participants, the researcher wrote while the participant dictated. The participant's drawing in Figure 4.9.1 included semantic features and relationships that appeared to be an imitation of the APRICOT I picture. Participant 8's dictated the following description of his drawing, "He the basketball over there and it went into the road." This dictated response only describes one agent, one action, an object, and a location. These results indicate that this participant's language function was too restricted to construct meaning among the semantic relationships in the picture to reflect prosocial relationships.

Participant 9 provided a, relatively, lengthy written description of her picture, but did not displace her picture, writing, or her story beyond relationships depicted in the APRICOT picture as seen in Figures 4.10.1, 4.10.2, and 4.10.3. This participant's written language listed what the agents were doing in the picture but did not expand the semantic relationships for prosocial or antisocial relationships to be reflected in the cartoon. This lack of language function indicates that this participant may not

understand relationships or meaning among the agents, their actions, and the objects in the picture to be able to displace and expand the response to include prosocial or antisocial relationships.

LI: 80% - 100% in regular class. Both participants in this group demonstrated language that was too restricted to show relationships among the agents, their actions, and the context. In Figure 4.1, Participant 10 provided a detailed, two-framed drawing that included all agents depicted in the APRICOT I picture but did not extend or expand his story to connect all of the relationships that he drew in a prosocial or antisocial way. Similar to several other participants, Participant 10 described each picture with written language but did not connect or explain agent to agent relationships. Participant 11 included the social conflict of one of the agents getting burned, a likely outcome given the context of the picture, in the one drawing he produced. However, this participant does not extend the relationships. Therefore, how the agents reacted to the injured agent is unknown. This detail would have provided the extension the relationships beyond the "here and now" that may have included prosocial or antisocial assignment of meaning. These findings indicate that acquisition of more advanced language function may allow the participant to expand the semantic relationships for the understanding and use of prosocial concepts.

Summary of question 2. Overall, this question found that students with EBD demonstrated a greater inclination to show antisocial relationships among agents their actions and the objects than the participants with LI. Participants' ability to produce prosocial relationships, regardless of eligibility or educational setting, was found to be limited. When combined with a finding from question 1, since participants were found

to have language function at the pre-language level, it is likely that the participants' deficits in language function impacted the participants ability produce prosocial concepts due to the semanticity and displacement needed to understand and explain prosocial relationships. Overall, the group of EBD students, specifically the group in self-contained settings (0-39% in regular class), indicated low levels of agency in their oral responses and cartoons suggesting that the participants' ability to relate and understand the actions of other agents may be limited. This potentially impacts their ability to be socially competent (Arwood et al., 2015; Meichenbaum et al., 1981). Finally, although cartooning should have provided the participants with an opportunity to share and build upon visual concepts, cartooning did not increase the participants' ability to create a response with high enough levels of language function for prosocial relationships to emerge. This finding suggests that participants may have not acquired the prosocial concepts to be able to share them with others, even with using a method geared toward their strengths as visual thinkers.

Summary of Chapter

This chapter presented the findings related to the purpose and research questions for this study. Chapter Four began by presenting the findings from a multi-disciplinary review of literature in the areas of cognitive psychology, neuroscience, and language theory outlining support for the use of a neuroeducation model as a different lens to view the acquisition of prosocial behaviors. The next section reported the results of the individual review of special education records conducted by this researcher. Following this description of each participant, results from this study's first research question and sub-questions regarding language function levels and

characteristics were presented. Next, the findings regarding prosocial and antisocial relationships were discussed.

Overall, participants exhibited deficits in language function, as evidenced by language at the pre-language level, regardless of eligibility (EBD or LI) and educational setting. This finding indicates that when language is examined through functional analysis, levels and characteristics were remarkably similar between students already identified with LI and students with EBD, without LI identification. Structural differences were noticed between participants with EBD and participants with LI. The participants with EBD, particularly those not in self-contained settings (0-39% in regular class), were found to have acquired a good amount of language structures. Since these participants demonstrated more language structures, it is possible that their deficits in language function have been concealed through their ability to produce surface structures. This finding may be a contributing factor to the current disparity among students with EBD dually identified with LI (Hollo, 2014).

When the language samples were analyzed for evidence of prosocial or antisocial relationships, results indicate a proclivity for students with EBD to assign antisocial meaning to semantic relationships, especially when given a picture with a social conflict. Participants in the sample struggled to provide responses that were exclusively prosocial in nature due to difficulties with semanticicity, displacement, and efficiency. Two participants produced instances of prosocial language along with antisocial language in their oral responses to APRICOT I and II pictures. These findings indicate that the participants in this study may have not acquired the basic semantic relationships necessary for understanding or using prosocial concepts and

relationships exclusively or consistently. The participants with EBD, who showed antisocial relationships in their responses, included several examples of physical harm. This finding indicates a low level of agency that reflects objectification and potential difficulties deciphering the difference between objects and agents likely affecting their ability to be socially competent.

Taken as a whole, deficits in language function and a tendency to assign antisocial meaning to semantic relationships is a combination that is likely to lead to an inability to initiate and maintain healthy relationships, a distinguishing feature for students with EBD. These findings support the notion that the acquisition of language function, as evidenced by extension, expansion, and modulation of basic semantic relationships, may play a key role in the acquisition of prosocial concepts, and therefore prosocial behavior (Arwood et al., 2015; Martin-Raugh et al., 2016). Further, when comparing the level of language function found among the participants with EBD and the level of language and conceptualization needed to participate in most contemporary social/emotional and behavior curriculums (Kuypers, 2011; Sugai & Horner, 2006), it seems apparent that there is a gap between what is needed to access the curricula and what was demonstrated by the participants in this study. Further, since many contemporary curricula do not address the underlying concepts of targeted "expected behavior," contemporary curricula and programs may not be providing the language for students with restricted language function to acquire prosocial concepts. Additionally, the deficits found in language function among the participants in this study, regardless of eligibility, and the indication of visual metacognition for all participants sheds light on potential educational practices that may aid in the

acquisition of prosocial concepts, thinking, and behavior. Chapter Five will include a discussion of the conclusions and implications of these findings as they support or extend knowledge from the literature presented in Chapter Two. The next chapter will also provide the limitations to this study and future research recommendations considering these findings.

Chapter Five: Discussion

Introduction

With a potential connection between language function and the acquisition of prosocial behavior, this researcher was inspired to do this study because of the high percentage of students identified with emotional and behavioral disorder (EBD) not evaluated or not qualifying for educational services as a student with a language impairment (LI); although, it is likely that they should (Hollo et al., 2014). Without consistent and accurate identification, students identified with EBD may be missing opportunities to acquire critical language concepts that may lead to prosocial thinking and behaviors.

To study the connection between levels of language function and the acquisition of prosocial concepts, this researcher devised a study involving two components. The first component involved a review of literature that resulted in the support of a neuroeducation framework to address the acquisition of prosocial behaviors. The Neuro-Semantic Language Learning Theory (NsLLT) represents the triangulation of the three lenses of neuroeducation, cognitive psychology, neuroscience, and language theory, explored in Chapter Two and serves as the theoretical basis for a neuroeducational approach to the acquisition of prosocial behaviors (Arwood, 2011). The second component of this study, the application of theory, sought to explore the connection between levels of language function and the acquisition of underlying prosocial concepts through language function sampling analysis with elementary students identified with EBD and/or LI.

Overall findings from the second component of this study showed that all participants demonstrated a deficit in language function as evidenced by language function at the pre-language level. This means that the group of students identified with EBD who had not been identified with language deficits, according to educational eligibility criteria (Individuals with Disabilities Education Act, 2004) and contemporary definitions of a language disorder (American Speech-Language Hearing Association, 2017c), demonstrated deficits in language function commensurate with students currently identified with LI. Although participants struggled to assign prosocial meaning to semantic relationships in an event-based picture, the group of participants identified with EBD demonstrated a tendency to assign antisocial meaning to semantic relationships, often including physical harm. Additionally, the group of participants with EBD demonstrated evidence of low levels of agency. Some indicated that they had acquired a good amount of language structures, while the participants with LI did not. Finally, participants in this study were found to utilize visual metacognition, and relatedly, most demonstrated more success with maintenance of a shared referent when the language activities were visual. In this chapter, these findings will be discussed in terms of conclusions and implications for practice. The chapter will conclude by describing the limitations of the study, ideas for future research, and closing remarks.

Conclusions

Initially, the researcher intended to include participants with dual eligibilities of EBD and LI in this study. Given that Benner et al. (2002) found that 71% of students formally identified as EBD also experienced clinically significant language

deficits, the researcher believed that out of a total of 27 elementary students identified with EBD between the two participating districts, there was a reasonable chance that a portion of the students given consent to participate would have dual eligibilities. Not only did the researcher find no eligible participants dually identified with EBD and LI, but also (following a review of special education records), the researcher found that only one of the nine participants in this study identified with EBD had *ever* been identified as LI in the past. In fact, only four out of the nine had ever been evaluated for LI in their educational history, with three of the four failing to be found eligible for services. These results, unfortunately, are in line with the outcomes from Hollo et al. (2014) that found that students identified with EBD were frequently unidentified as students with below average language abilities. Additionally, in a study similar to this one, Green-Mitchell (2016) found that, although all alternative high school participants in his case study demonstrated substantial deficits in language function, none of the ten participants were receiving special education services in the area of language at the time the study was conducted.

Findings from this study concerning lack of dually identified students with EBD and LI suggests that students identified with EBD *do* seem to be "flying under the radar" in regard to identification and treatment of language needs. As suggested in the literature, perhaps students with EBD have behaviors that are masking the language deficits causing them to go unnoticed (Cohen, Davine, & Meloche-Kelly, 1989; Sanger et al., 1994). Another possibility, one that is in line with the results of this study, is that students with EBD may have acquired sufficient language *structures* to give the facade of language competence, masking the need for assessment or

intervention. Since language is taught to be measured according to structures, not functions, the underlying functions are often neglected in assessment situations (American Speech-Language Hearing Association, 1993). Despite exhibiting language *functions* commensurate with participants who were currently identified with LI, the lack of participants with dual identification of EBD and LI and the tendency of students with EBD to demonstrate higher amounts of language structures highlight a potential weakness within the current educational model for language assessment. This model is based on linguistic assumptions that language ability is dependent on the structure of words instead of the concepts the words represent (Bruner, 1975; Halliday, 1975; Vygotsky, 1962). Although several language theorists argue that the assessment of language through structural analysis is inadequate, incomplete, and superficial (Arwood, 1983; Greene, 1972; Searle, 1969), structural analysis continues to be the main method of assessment among educators and SLPs today (American Speech-Language Hearing Association, 2017c; Garrett, 2008). Structural analysis of language falls within the reductionist model of contemporary U.S. education (Skinner, 1987). With this model, language and behavior are considered separate entities (Lane, 2007); one not necessarily affecting the other. They can occur in tandem if structural test scores indicate such overlap. This view of the connection between language and behavior is in contrast with the findings from this study.

Overall, the findings from both research questions agree with a neuroeducation model for attainment of prosocial behaviors through prosocial concept acquisition. Using a neuroeducation model, specifically Arwood's neuroeducation model (Arwood & Merideth, 2017), the acquisition of prosocial behaviors is greatly influenced by the

neuro-semantic and socio-cognitive process of acquiring meaning and language (Arwood et al., 2015; Bruner, 1975; Kiefer & Pulvermuller, 2012; Martin-Raugh et al., 2016; Posner & Rothbart, 1998). Theorists and researchers in the fields of cognitive psychology, neuroscience, and language agree that the concepts and language function acquired by a student will determine their outward behaviors (Arwood, 2011; Bell & Wolfe, 2004; Bruner & Krech, 1950; Carroll, 1964; Kelly, 1955; Pulvermuller, 2010; Taylor, 1985; Tomasello, 2003; Tomme & Wendt, 1993; Whorf, 1956).

This study intended to explore the connection between levels of language function and the acquisition of prosocial concepts. Level of language function and the acquisition of prosocial behavior seem particularly critical when it comes to the ability to think of other people. In order for a student to demonstrate prosocial relationships, or prosocial concepts, the student must be able to think of another person's needs; consider another person's thoughts (Vallacher & Wegner, 1989); communicate with the intention to alter another person's attitude, beliefs , or behaviors (Arwood, 1983; Searle, 1969); and have acquired enough conceptual depth to understand the semantic relationships in a social situation (Hockett, 1960; Kernan, 1970). According to theorists and researchers in language (Lenneberg, 1969; Vygotsky, 1962), cognitive psychology (Granito et al., 2015; Kousta et al., 2011), and neuroscience (Pulvermuller, 2013; Vigliocco et al., 2014), students' exhibiting characteristics of restricted language function will be unable to meet the social, cognitive, and language requirements to understand prosocial concepts that can result in prosocial behaviors. To acquire prosocial concepts, several theorists argue that assignment of meaning is a critical

component (Arwood et al., 2015; Dunn & Brown, 2001; Tomasello, 2003; Vygotsky, 1962). Assigning of meaning to prosocial or antisocial behaviors is potentially linked to levels of language function due to the possible susceptibility of children or adults with low levels of language function. This concept is supported by the findings of Hart and Risley's (1995) longitudinal work that found that children in the study grew up to speak and behave like their family. Essentially, the social environment a child grows up in is believed to have an impact on the acquisition of prosocial or antisocial concepts. For educators, this does not only indicate home situations, but also school environments.

Several contemporary curricula and programs rooted in a behaviorist paradigm are designed to promote behaviors described as prosocial by employing rewards, incentives, and punishers to serve as motivation for students exhibiting unconventional or antisocial behaviors (Benabou & Tirole, 2006; Kuypers, 2011; Sugai & Horner, 2002). This paradigm conflicts with findings from this study concerning the acquisition of prosocial behaviors. When behavioristic methods such as incentives or rewards are used to garner "expected behaviors" the meaning, or underlying concept, attached to the behavior is believed to subsequently changed (Benabou & Tirole, 2006). This means that the meaning may change from doing an act to support, nurture, and protect another person (prosocial), to doing and act that mainly provides gains for that individual (antisocial). In this sense, using rewards or punishers to help students acquire prosocial behaviors may actually be resulting in more "egocentric" thinking, rather than increasing prosocial thinking. The use of rewards is argued by some to decrease internal motivation (Benabou & Tirole, 2006; Paulsen et al., 2015), reduce

compassion (Fabes et al., 1989), impair individual agency (Arwood et al., 2015), and produce only the desired behaviors in the specific reward environment (Arnove & Strout, 1978). Without addressing the underlying prosocial concepts, the behaviors become pragmatic structures that are considered self-serving and limiting to the student's social and cognitive growth (Arwood et al., 2015; Taylor, 1985). When the child "gets something" for doing something for another person, it reinforces pre-operational ideas that actions are "all about me," a hallmark of the pre-operational level of agency (Arwood et al., 2015; Vallacher & Wegner, 1989).

The findings from this study support the notion that the acquisition of language function is believed to be a tool that mediates social and cognitive growth, influencing a student's outward behaviors (Arwood, 2011; Bruner, 1975; Halliday, 1975; Mercer, 2013; Vygotsky, 1962). One way language function is theorized to mediate social and cognitive growth is through the acquisition of agency. A major component to being able to think and act prosocially is the ability to think about other people in relationship to yourself. Agency, is a concept that refers to that ability (Ahearn, 2001; Arwood, 2011). Interestingly, participants identified with EBD in this study demonstrated low levels of agency according to analysis of their language samples, indicating difficulty constructing a concept of themselves as agents and placing themselves in relationship to others. This low level of agency may explain this participant group's proclivity to assign antisocial meaning in their language samples. Low level agents may struggle recognizing themselves as an agent with choices or options, and further may not recognize others as agents. When others are not recognized as agents, then they do not have thoughts or feelings. Therefore, "non-

agents" do not feel pain or get their feelings hurt (David et al., 2008; Taylor, 1985). Students that function with a low level of agency behave in an egocentric manner, often not considering the needs of others (Piaget, 1959). By definition, egocentric thinking cannot be prosocial because it is not supporting, nurturing, or protecting the needs of others (Smith, 1985). Students with agency close to the concrete level of conceptualization, such as the participants with LI in the study, recognize the human elements within agents and are beginning to understand "we" concepts (Arwood et al., 2015). Therefore, although language function levels in this study were found to be very similar, considering the impact the varying levels of agency has on the acquisition of prosocial concepts is an important concept to take into account.

Overall, there appears to be a gap regarding the language function level required to participate in contemporary practices that target the acquisition of prosocial behavior and the language function level of the participants in this study. Contemporary educational curricula appear to be designed for thinkers at the linguistic level of language and formal level of conceptualization (Carrizales-Engelmann, 2016; Kuypers, 2011; Sugai & Horner, 2006). Scaffolding is a great tool to use when bridging the gap between the level of current function for a student and the level of what is being taught (Wood et al., 1976). However, this researcher fears that since the participants in this study think at a pre-language function level and pre-operational level of conceptualization, the distance between the "here and now" types of concepts that the participants can make sense of, and the complex, multi-faceted types of concepts targeted by popular curricula may be too great. According to Vygotsky (1962), this gap is beyond the students' Zone of Proximal Development (ZPD).

O'Conner (1997) shared these same concerns during her work with prison inmates. She emphasized and argued for the inclusion of inmates in discourse that would be placing them in a position to grow according to their ZPD. If growth towards social competence is the goal for students or people struggling to acquire prosocial behaviors, levels of language function provide crucial factors to consider.

Social competence, or initiation and maintenance of healthy relationships, is one of the trademark deficits for students with EBD (Individuals with Disabilities Education Act, 2004). Deficits in language function impact a student's ability to be socially competent in several ways. Language restricted at the pre-language level of function, as found in this study as well as in Green-Mitchell's (2016) study, means that students will likely have difficulty with time and space concepts due to displacement restricted to the "here and now (Hockett, 1960)." Combined with restrictions with semanticity, or the amount of conceptual depth acquired, these students will likely demonstrate difficulties in school with tasks including problem solving, planning, and predicting (Blakemore & Choudhury, 2006; Vera-Estay, Dooley, & Beauchamp, 2014). For example, understanding cause and effect at the "here and now" level of thinking limits the amount and complexity of ideas that students can connect through space and time. Therefore, "poor choices" that students make that lead to educational consequences may be more related to the limited options these students consider due to restrictions in language function. Combining restrictions in language function and a proclivity to assign antisocial meaning to relationships appears to be a recipe for behavioral disorders. Without interventions that speak to the student's current level of language function, agency, and type of neurobiological

learning system, achieving language function at the language level, the level necessary for the acquisition of prosocial concepts, may be difficult to achieve.

In relation to a student's neurobiological learning system, this study found that participants utilized a visual metacognitive system. This result was not surprising and in-line with other recent studies and reports that show most people utilize a visual system to think (Arwood, 2011; Faw, 2009; Zeman et al., 2015). These results also concur with other works supporting the need for more visual-spatial information in education and highlight an educational mismatch between the auditory culture of education and the visual manner in which children seem to learn best (Alt & Gutmann, 2009; Arwood, 2011; Dekker et al., 2014).

Implications for Practice

This study garnered findings that, hopefully, will inform educational policies and practices with respect to the acquisition of prosocial behaviors. The findings from this study also hope to inform teachers, administrators, and speech language pathologists (SLPs) about the role that language, specifically language function, plays in the acquisition of prosocial behaviors with the intention of potentially influencing future educational practices.

One implication from the results of this study is that assessment or screening of language, including language function, should be consistently considered for elementary students identified with EBD. With confounding literature regarding language and EBD (Benner et al., 2002), evidence presented in this study's review of literature, and findings from this study indicate that language deficits and emotional/behavioral disorders may go hand-in-hand. This researcher finds it

interesting that part of the eligibility requirement for EBD includes “an inability to build or maintain satisfactory interpersonal relationships with peers and teachers” (section 300.8) and part of the definition for a social communication disorder according to the American Speech and Hearing Association (1993) includes primary difficulties in social interaction, social cognition, and pragmatics; yet, students with EBD are not routinely screened, assessed, or found eligible for services to address these language based deficits. A novel approach to the consideration of a language evaluation and assessment procedure for students with EBD appears to be warranted, since this population continues to go unidentified (Cohen, Barwick, et al., 1998; Hollo et al., 2014; Toppelberg & Shapiro, 2000; Warr-Leeper et al., 1994).

In terms of identification and edification, SLPs and educators require greater access to education and materials about language functions and their implications on the acquisition of prosocial behaviors. A possible suggestion would be for the American Speech Language Hearing Association (ASHA) to include information about the background, history, theoretical implications, assessment techniques, and therapy strategies in their practice portal, similar to the information provided about spoken language disorders (American Speech-Language Hearing Association, 1993). Since SLPs are often the educators on the frontline of LI identification, specific education and training on language function and the mediating role language function plays with learning and behaviors should be provided in undergraduate and graduate SLP and communication disorder programming.

For students with EBD, language-based deficits such as being unable to initiate and maintain healthy relationships do not go unnoticed by educational professionals;

however, they are typically not linked to defects with language. Instead, and like several of the participants with EBD in this study, Individualized Education Plan (IEP) goals targeting language-based concepts impacting behavior are considered "social/emotional" and "behavioral" in nature. Since these areas are considered "social/emotional" or "behavioral," the remediation strategies used to help the student acquire such concepts are not language-based and, instead, focuses on the behavioral product (Sugai & Horner, 2006). By focusing on the behavioral product and not the prosocial concept, learning is potentially limited to the second tier, or pattern level, of the NsLLT (Arwood, 2011). This means that the input will fail to reach a semantic level of memory, and whatever behavioral product being practiced may end up context dependent or lost when the routine of the behavior gone.

Instead, results from this study imply that an emphasis on the acquisition of prosocial concepts, rather than targeting specific external behaviors to reward or punish, should be undertaken. Contemporary social/emotional and behavior curriculums place emphasis on the product of the behavior rather than the process of acquiring the concept (Kuypers, 2011; Sugai & Horner, 2002). These practices were conceived with principles from the cognitive model that theorize language and behavior are a product of cognition (Piaget, 1959). Conversely, language philosophers theorize that cognition and behavior are a product of language function (Vygotsky, 1962). For example, displacement at the "here and now level," as found with the participants in this study, affects a student's ability to understand concepts that are beyond the here and now. This means that contemporary incentive programs that include a reward displaced in time from the behavior will likely be both ineffective

and not address the underlying prosocial concept. Additionally, semanticity at the "here and now" level affects concepts that can be used to make meaning without substantial amounts of scaffolding and experience with neurologically significant assignment of meaning. This indicates that programs that teach sequenced, out of context, products of behavior using formal concepts are also likely to be ineffective at helping the student acquire prosocial concepts. The missing piece for contemporary behavior programs is the rationale, or meaning, behind the behavior. When the rationale is not provided, the behavior cannot be assigned a prosocial meaning. Without meaning, social concepts will not be neurologically acquired leaving the student with low-level agency, context specific, and pattern dependent actions - not prosocial concepts that can be used flexibly and independently for prosocial behavior (Vallacher & Wegner, 1989). In regard to specific teaching methods that can be used to help students acquire prosocial behaviors, the findings of this study strongly support the use of visual and motor teaching techniques, such as drawing and writing.

Using auditory methods to help students with visual metacognition acquire social concepts will likely be a futile effort. The ease, speed, and convenience of using auditory language to attempt to help students acquire prosocial behaviors, makes other strategies difficult to take on and unlikely to succeed. However, findings from this study, and evidence presented in the review of literature, suggests that the extra time and effort taken to attempt to use visual/motor social strategies for concept acquisition may be worth it. Using drawing to acquire concepts is supported through techniques such as learner generative drawing (Gross et al., 2009; Schmeck et al., 2014; Schwamborn et al., 2010), as well as Viconic Language Methods (Rostamizadeh,

2009). Taking into consideration the language function needs of a student can help guide an educator to choose or create visuals that provide context, relationships, a shared referent, and language for the student to integrate into higher level concepts. This leads to the final implication of this study, that perhaps, there is a mismatch between the neurobiological learning system of a child with EBD and the prevalent approaches used to teach students with EBD to think and behave prosocially.

If there is, in fact, a mismatch between the learning system of the child with EBD and the primary methods used in education to help the child acquire prosocial behaviors, then an educational paradigm shift is in order. With cognitive psychology being such a dominant force intertwined with our education culture, breaking the ice with a different educational perspective is sometimes difficult. Shifting towards Arwood's neuroeducation model means that language theory will be considered in the translation of neuroscience into effective educational practices (Arwood & Merideth, 2017; Fischer, 2009). For students with EBD or other social/emotional needs, this means that interventions would be based upon current levels of function and include the assignment of meaning of prosocial concepts through a modality that matches with their neurobiological learning system. Considering the potential of a paradigm that could possibly reach those students who may have been overlooked, misunderstood, or written off from mainstream society due to extreme antisocial behaviors is timely. With current mainstream media discussion around the importance of mental health in relationship to events of extreme tragedy such as school shootings, a paradigm that triangulates successful practices and philosophies from three educational domains, such as the neuroeducation framework described in this study, provides a feeling of

promise for the future of youngsters in the U.S. A paradigm shift towards a neuroeducation model considers the important role that language functions potentially play in the growth of conceptual thinking and agency that is believed to be required for students to support, nurture, and protect each other.

Limitations

This study was limited in several ways. Although the sample for this study was purposive, it was a sample of convenience and small. Additionally, both participating districts were suburban, medium-sized school district in the Pacific Northwest and the sample was entirely white, non-Hispanic. Therefore, the participants were not demographically or ethnically representative of the general population of the U.S., which limits the generalizability of the findings. Including a larger sample with school districts across a more diverse demographic might have provided more robust insights into the research questions addressed with this study. Second, although this study aimed to investigate students within the elementary population, the participants in the study were extremely close in age with a mean age of 9.2 and low standard deviation (.39). This emphasizes an overrepresentation of students in second, third, and fourth grade, but is not representative of younger elementary-aged students. Third, most participants in this study were not familiar to the researcher prior to the collection of the language sample. This could have reduced the trustworthiness of the language sample collection as the participants may not have shared as much information with a non-familiar person as they would have with a familiar person (Brooks & Hudson, 1982). Another limitation of this study is that the language function analyses were completed solely by this researcher based on her knowledge and understanding of

language function. This can be limiting in the sense that the discussion and results are dependent on the researcher's expertise in the areas being addressed. Another limitation is the frequency of language samples collected. Although each language sample consisted of three components, each participant provided one collective language sample. Utilizing only one day to collect all three samples leaves opportunity for a participant to produce a response that could be considered an outlier relative to his actual ability and would affect the trustworthiness of this study. Using similar rationale, it is possible that some of the participants' drawings and writings were affected by their lack of confidence in those areas or confusion with the instructions, and not a lack of language function abilities.

Recommendations for Future Research

Future research related to the findings of this study could be conducted in a number of areas. Studies that focus on language function with populations of students that demonstrate antisocial behaviors is currently limited. Future research could continue exploring the potential connection between language function and other groups who struggle to demonstrate conventional behaviors. This could include a sample of incarcerated participants, students identified with EBD at a middle school, high school, day treatment facility, or participants placed in a self-contained behavior classroom with eligibility besides EBD.

Originally, this study intended to compare language function between students who were identified with EBD, with and without LI. Using that group, a study of structural and functional analysis could illuminate further insight into the problem of under identification of LI among the EBD population. This study was not able to

obtain the socio-economic status (SES) of the participants and could not reliably collect information relating to traumatic histories except what was included in the special education file reviews. A future study of language function comparing variables such as high or low SES or traumatic history would also add to the literature about language function with students who struggle to behave prosocially. Further, the results of this study suggest that visual and motor strategies be used to help students with EBD acquire prosocial concepts. A study on the effectiveness of visual and motor strategies for students identified with EBD may provide important insights on how educators can approach instructional strategies regarding the acquisition of prosocial behaviors. Finally, a plethora of research exists in the area of speech and language pathology that studies language structures; however, there are very few studies that focus on language function. Studies that focus on language function assessment, intervention, or practitioner values regarding neuroeducation or language function would be a beneficial addition to the speech and language pathology community.

Closing Remarks

The stark truth is that SLPs and educators are currently failing elementary students identified with EBD. This reality is in line with the literature that says students with EBD are not consistently or appropriately being identified with LI. This under identification is of concern in light of the review of literature that points to language acquisition being at the heart of the social and cognitive growth needed to acquire prosocial behaviors. This is *especially* dismaying considering the findings from this study indicate that participants with EBD demonstrated levels of language function commensurate to participants identified with LI and were found to be more

likely to produce antisocial relationships among agents than the group of participants with LI. Current educational practices do not appear to be meeting the needs of elementary students identified with EBD and may, actually, through mismatched interventions, potentially exacerbate aggressive behaviors in a population that is possibly inclined to conceptualize antisocially. Current educational practices may be providing concepts at a level of language not accessible by the targeted population and may be employing strategies such as rewards and punishers that, in fact, lead the student toward more egocentric thinking, not toward an elevated level of thinking. Critical policy and practice changes may be necessary for the students within this population that call for meaningful services matching to students' neurobiological learning system. A critical educational incongruence may be occurring within contemporary educational practices sparking the need for a language-based, neuroeducation-informed educational paradigm shift.

This study adds new perspective to the fields of education and speech language pathology by triangulating research in the fields of cognitive psychology, neuroscience, and language theory and by demonstrating the importance of the language function within the elementary EBD population. At some point in the future, this researcher hopes to be sitting around a table with her special education team discussing a student who is demonstrating severe antisocial behaviors, and instead of the typical slurry of suggestions such as "maybe it's his motivation?" Or "is it his home life?" The first suggestion will be, "It's probably his language."

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Appendix A

Consent for Participation

Dear Parent,

The team of speech and language pathologists (SLPs) working for the XXXX School District are constantly striving to improve educational practices which benefit all XXXX students. These practices include trying and learning new strategies to assess, implement, and monitor student language and behavior growth.

Your child is invited to participate in short storytelling, drawing, and writing activities with Emily Jaskowiak, an SLP working for the XXXX School District and doctoral student at the University of Portland. The activities your child will participate in will provide language samples that will be later analyzed for language and behavior indicators. This information will help the XXXX School District SLPs learn new methods of assessment and intervention that may help improve student language and behavior abilities. Additionally, the analysis of the language samples will be used in Emily Jaskowiak's doctoral dissertation. Your child's name, the school, and information about the school district will be kept completely confidential.

These short storytelling, drawing, and writing activities will be collected in one brief activity session. The scheduling of this activity session will be carefully arranged so that your child will not miss any other important educational activities.

Please return this form in the self-addressed and stamped envelope as soon as you can. If you have any questions, please contact Emily Jaskowiak by phone at ___ or by email at _____.

_____ has my permission to participate in storytelling, drawing, and writing activities that will serve as language samples for later analysis. I understand that the analysis, quotes, drawing samples, writing samples from these activities, and information gleaned from a brief file review may be reported in a doctoral dissertation. I understand that my child's participation in these activities is completely voluntary and will not impact his/her current educational plan or placement. I understand that all identifying information will be kept confidential.

(Child's Name)

_____ _____

(Signature of Parent/Guardian) (Date)

Appendix B

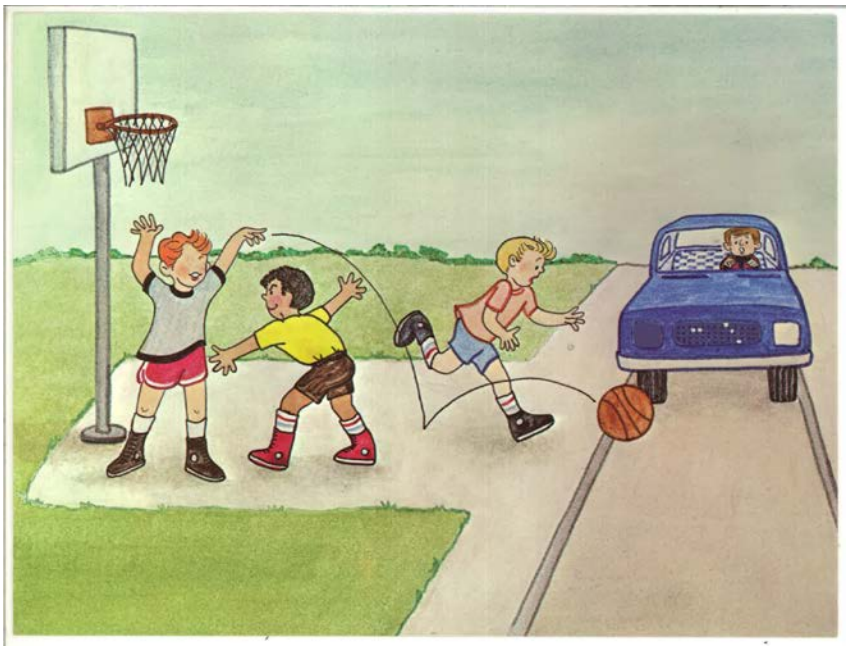
List of Semantic Errors from Adapted from TEMPro Protocol

Semantic Language Errors	Descriptions
Auditory Misperceptions	Inability to relate the phonetic qualities of a spoken word to its referent. "Gloves" are called "glubs," or "coffee" is coded as "coppee."
Off Target Response	When the speaker's utterances do not relate to the topic of conversation.
Semantic Word Errors	Unconventional usage of words. Such as calling pancakes "circles."
Neologism	Newly created words or phrases that are created from structural changes in the word (pasgetti for spaghetti); using words that have similar meaning (pull-ons for boots); or creating words with similar sounds (brad for bread).
Topical or Referential Identification Problems	When the student is unable to pick out the most important features to maintain a topic
Topic Closure Difficulties	Inability to determine the boundaries of their utterance in terms of ideas or topics, so they continue to talk. Students will continue to rephrase, reword, or reiterate the message until someone stops them.
Tangentially	Tangential statements have an association to the spoken or contextual referent, but the speaker does not maintain the topic or provide expected information to the speaker.
Echolalia	Restatement of a speaker's previously uttered words, phrases or paragraph. The student will repeat what the speaker said.
Verbal Perseveration	Reiteration of a word, phrase, sentence, or idea. This differs from echolalia because the student is not repeating the speaker's idea; they seem to be stuck on their own idea.
Phonological Problems	Similar to articulation errors, however when examined closer the errors are semantic in nature. Morphonemic units such as auxiliary verbs, past tense markers, plural indicators, possessives, and articles are omitted or altered.
Syntactical and/or Morphological Problems	Syntax errors are an unconventional ordering of words. Morphological errors are errors that omit or change units of a word. These are structural in nature and do not usually alter the function of language.

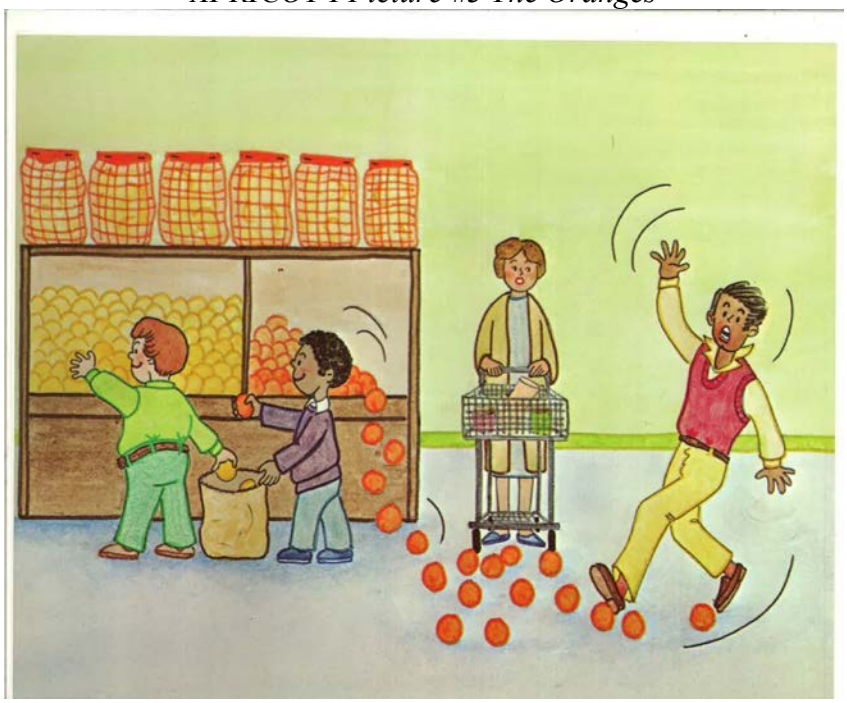
Appendix C

APRICOT I and II Pictures Used in This Study

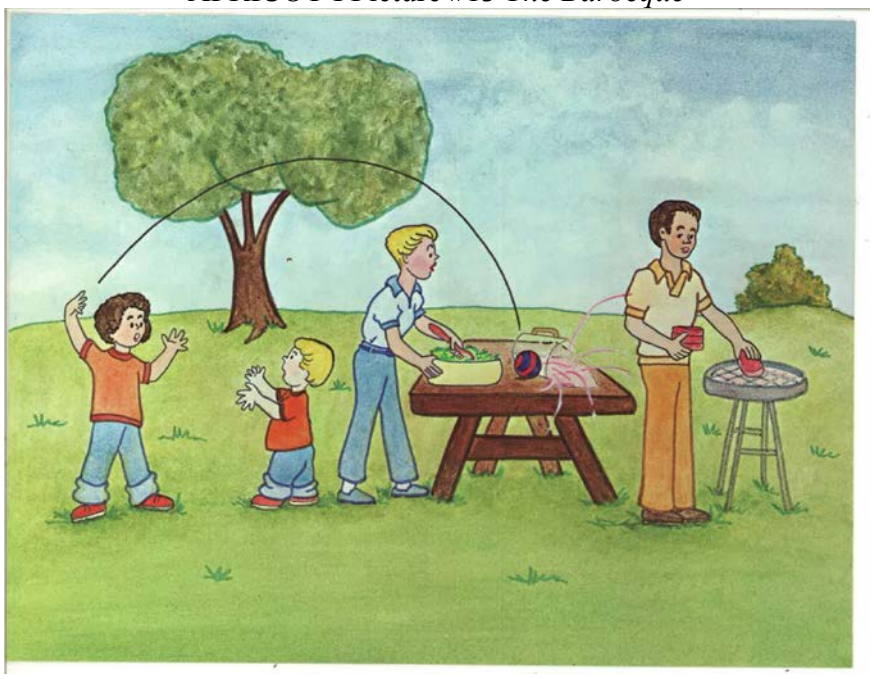
APRICOT I Picture #12 Playing Basketball



APRICOT I Picture #3 The Oranges

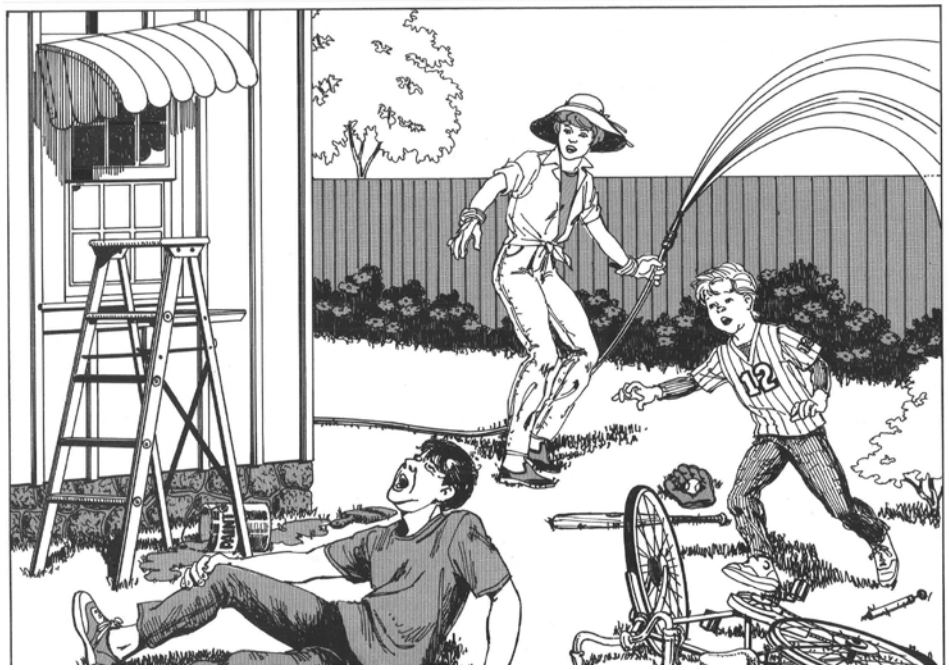


APRICOT I Picture #13 *The Barbeque*

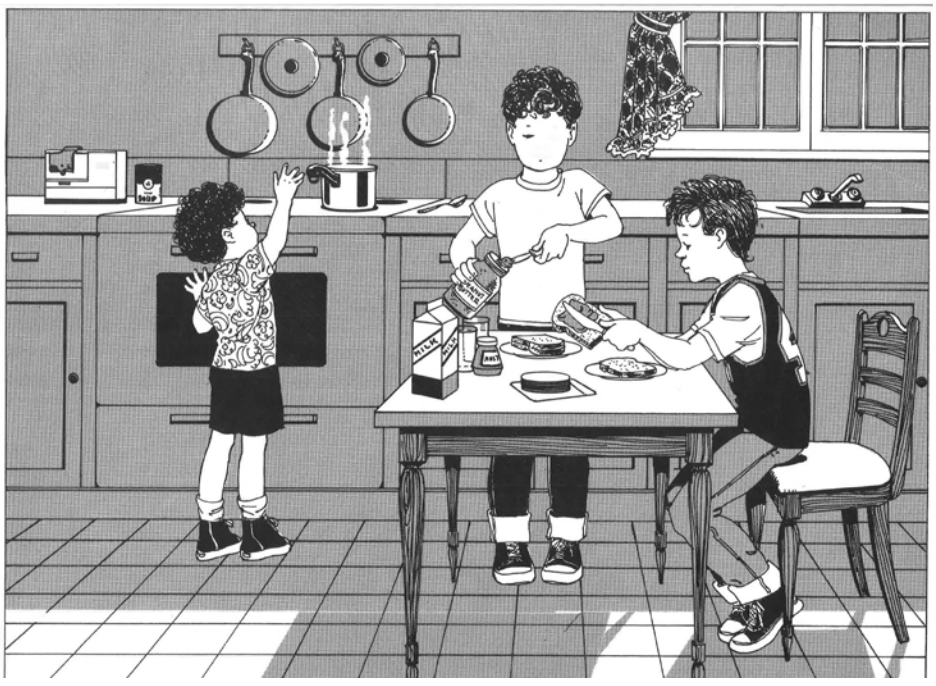


APRICOT I Picture #5 *The Grocery Store*

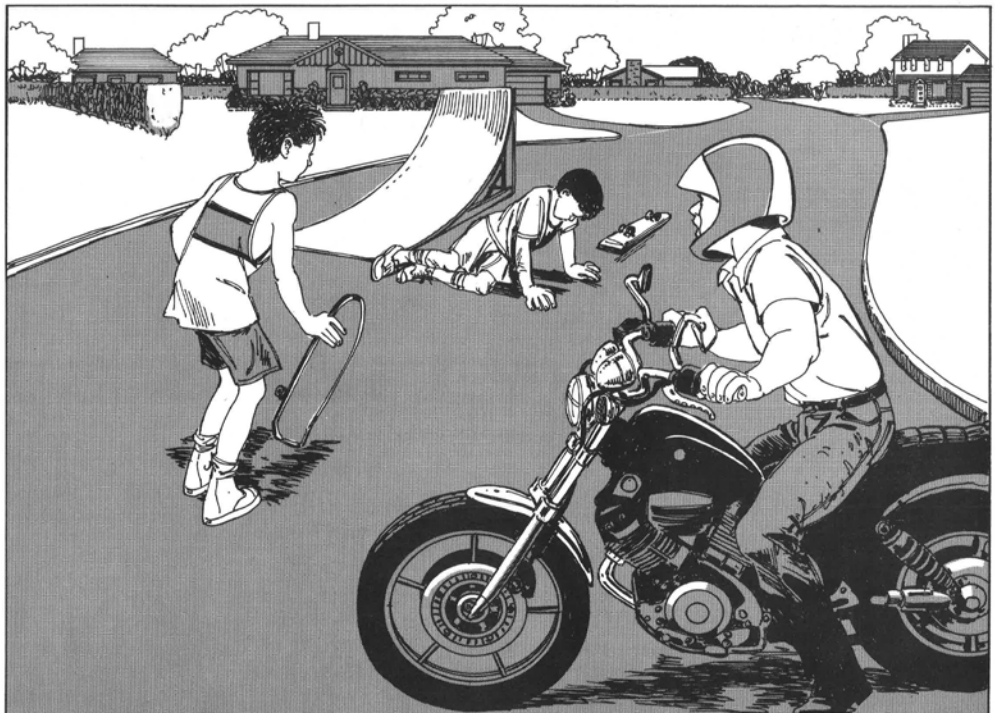
APRICOT II Picture #9 The Fall in the Yard



APRICOT II Picture #2 *The Kitchen Scene*

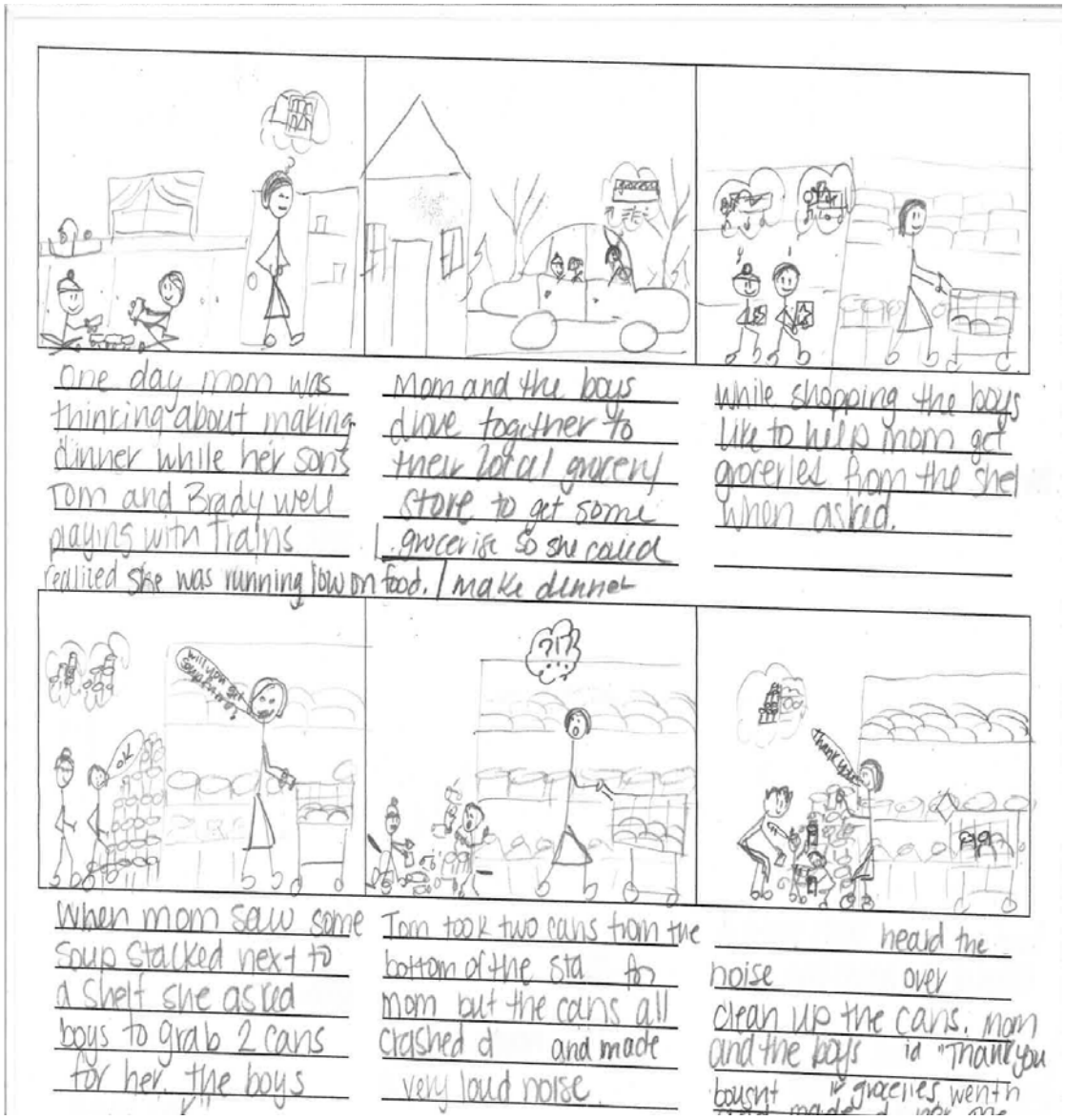


APRICOT II Picture #12 *Skateboarding in the Street*



Appendix D

Cartoon Model



Appendix E

ANSPA Questions

Arwood's Neuro-Semantic Language Learning Pre-Language Assessment Protocol (ANSPA)
From Arwood (2011) p. 187.

1. Does the participant address others and expect others to respond? This assesses the function of the participant (agent) in relationship to others (relational function).
2. Are the participant's utterances appropriate for the context? This assesses the function of whether the child's language refers to the topic (referential function).
3. Does the child use the utterances to shar the meaning of the context? This assesses the child's ability to develop a variety of meanings (semanticity function).
4. Does the child use the utterances to share the meaning of the context? This assesses the child's shared-referent function (shared function).
5. Does the listener have to interpret the child's intent or specific meaning? This assesses the child's ability to develop a variety of meanings (semanticity function).
6. Does the child talk about the "here and now?" This is assessing how well the child can talk about ideas that the child cannot see or touch or may be in time or place that is at a distance from the child (displacement function).
7. Does the child talk about a variety of different topics? This assesses the child's ability to use a variety of different types of utterances (flexibility function).
8. Are the child's utterances semantically accurate in meaning? This assesses another aspect of how well the child is acquiring concepts (semanticity function).
9. Are the child's utterances succinct in meaning or redundant? This assesses how well the child can use the English language to mean exactly what is intended- who, what, where, when, why, how?
10. Does the listener understand the speaker's meaning without having to take on more than a "shared" level of understanding? This assesses whether or not the language functions in the concrete way of sharing meaning.

Appendix F

Participant Transcripts

Transcripts are provided for each participant in this study. Responses to prompts, as well as, off topic or tangential exchanges are included. Bolded text indicates the start of a response to a specific prompt. Names and other identifying information were changed for confidentiality purposes. Text in parenthesis or brackets are researcher notes pertinent to the language sample. Unintelligible responses are indicated with XXXX. Participant responses were not altered to correct for pronunciation or grammar when transcribed.

Participant 1 Transcript

Typical Day

1- Well, what I do on a typical day. Ay. I don't know what typical means but.

Modified Typical Day 1

1- Oh, well what I do on a normal day is I usually get a to get to go into class to get to do all kinds of fun stuff. And on Fun Friday we get to do art or computers or if I we move down in our classroom with a magnet if I move down it means I get to go to planning center. So. Today is going to be the funnest day of the week.

1-Yeah.

Modified Typical Day 2

1-Well, what I do in the morning is I get dressed and eat breakfast then I eat breakfast here in the EBD. I'm a hungry girl. And also I also I would I like to do things before school but my mom doesn't let me. All she does is really is let me color and eat and get dressed.

1- So, I did pretty good.

1- You're welcome.

APRICOT I Picture

1- That's a pretty nice phone.

1- I think that one will be the most greatest story.

1- No, I thought about it.

1- So, where's the book thing?

1- Oh, ok.

1- So, Tom, Brady, and Michael. Tom, Brady and Michael were playing a game of basketball and Tom accidentally threw the ball and then it went into the road. And Brady was grinnin and all that, thought that was funny and. Hmmm. Brady, well, Brady. Oh, yeah, Michael. Michael was like "oh no, please stop stop stop stop And the man was like oh no and then he just pause slammed on his breaks and and the ball didn't make it. T. The man said, "I'll get you a new ball, I promise, it will be even better than that basketball." And then he asked him what his two favorite colors were and he told him red and green and so he got em a red and green basketball. And the man was like "I'm sorry I broke that ball (pause)." The end.

APRICOT II Picture

1- Hmm. I don't want to talk about this one because of the man hurt.

1- I don't want to talk about this one. I want to talk about that one.

1- Ok. So this boy was motorcycling and these two ok, this man is name this guy is named um let me think of the name, so, this guy's name, he's an adult, he's a teenager and his name is going to be, well his nickname is Motor. His nickname is Motor, people just call min Mo. And this guy's name is (pause) his name is suppose his nickname is all their favorite things ok. His nickname is skateboard and his nickname is Basket. So, so Mo went to ride along and then he accident and then the skateboard skateboard hitted, I forgot what his name is. Let me think of more pacific name. How about these three again. Michael, Brady, and Tommy, instead of Tom I'm just going to say Tommy. So, Brady got hurt because his, who's this guy again? No, this is Michael, he accidentally ran over, um, Brady. And so Brady got hurt he scrapped his knee and it showed his bones. Yeah, and they go to the hospital but he's ok. He got a new knee. But he'll have to stay in the hospital for a week, the doctor said (pause) and Michael says "I'm so sorry I scrapped, I'm I accidentally ran you over." "It's ok Michael said." Um and one day he this guy came motorcycling that day and he um went up that ramp and he did um a backflip and then he landed on his feet but he rolled back and then he hitted the breaks really hard but then he flipped off and broke

his neck. But they put a cast cast on there and said you'll have to stay here for 6 days until you get used to it. And then he's like "ok" and that's the end.

Participant 2 Transcript

Typical Day

2- At school or at home?

Modified Typical Day 1

2- Home.

2. After school I usually just go home and play video games (pause).

2- I usually fall asleep on the bus. Cause school is the worst and so boring (pause).

2- Book fair

2- It was for the whole week. I went on Thursday. I got a chocolate calculator. It actually smells like chocolate. And invisible UV pen (looking now at one of the pictures). Does he run over the ball?

APRICOT I Picture

2- What type of story does it have to be?

2- Like, could it be a helpful, mean?

2- Uhhh, these kids are playing basketball next to the road and the uhhh the person driving by when he threw it in the road on purpose and he was tryina catch it but he didn't let him. And then the car driver popped the ball. And he said "heee heee I popped your dumb ball" *(*pause). The end.

APRICOT II Picture

These two kids were trying to do a trick um and this one fell and he said "are you ok?" and he said and the motorcycle said "yeah, he's ok, just leave him alone." Then he said "watch this trick" and he went right there and did a trick. And then drove back here. The end.

Participant 3 Transcript

Typical Day

3- Uhhh, (made whine noise, like crying/whine)

Modified Typical Day 1

3- I don't know.

Modified Typical Day 2

3- My mom usually lets me play on my phone if I do like really really good in school like, and I do all my work like little, like no little fit throwing which I got to before and I'm like honest. So I'm going to be honest today and hopefully nothing bad happens for the rest of the day. Hopefully my mom lets me play on my phone since it's the start of the weekend.

3- Mine. It's sprint.

3- Eh.

3- Well, I can just tell my mom how I did.

3- Yup. My teacher texts my mom at the end of the day how I act.

APRICOT II Picture

3- To draw? (Long silent pause while looking at pictures)

3- Hmmm. I'd say if you knock it right now down.

3- No, I said if you knock that down it might crash on you or your lucky then it might go somewhere else. And where the heck is the mom? Or are the boys just cooking?

3- (Picked up motorcycle picture and looked at it) And, apparently, my um, my nana and grandpa, apparently they um make a lot of money. Or um I think that grandpa or his like um work actually gives him motorcycles to bring home for free. Or something because they wouldn't make that much money from a store like that, actually, yeah they would because taking care and building motorcycles is worth like a lot of money. So I would guess that he's actually getting money or, cause he like, because he gets new paint jobs like almost every day, almost every three days he gets a new paint job on his motorcycle on his spider um, I don't think he has a spider anymore it's a type of motorcycle. So he has like five motorcycles and he is um very um careful with his stuff.

3- I guess I think it's a different one now.

3-There's like a whole lot of motorcycles there. And where nana I think, used to work I think um, is where she used to take she used to work at a place where there's four-wheelers and dirt bikes and motorcycles everywhere.

3- (Still looking at the motorcycle picture) Huh. I don't understand why would that kid fall off right at the end. Why would he… wait… why would you start turning this way? You should just stay right here because you know you put the ramp close to the road so you should start turning and then you would've gone up. But pretty sure he did go up then he hit the ground or something.

3- Is that his dad or something?

3- Maybe.

3- (Long pause, while looking at pictures and picking at nail) This nail is bothering me right here (kept picking and chewing at the nail).

3- Nah, try to get it at home.

3- I'll just pick this one (picking motorcycle picture)

3- So, what's the nail story then?

3- Umm (pause). Let me see something (looking closer at the picture). Class-ic. The most classic person ever. Classic like, the most classic um like way to show they're hurt, like really classic. Draw like that little thing on their leg. That is really classic. Well, that might be a shoelace, I don't know, yeah (long pause). Wow. Well, hmmm, I would not know the bad thing about motorcycles. And it doesn't matter really if you are on a motorcycle in the rain because technically if you're driving like a lu-hoong (emphasizing the word long) time with um motorcycles the rain will not really affect the motor unless it is dumping down rain. Because they get really really hot, like really fast. Like I can feel the heat riding on my Grandpa's motorcycle. I feel the heat coming from the engine. And technically his spider um it has like these things where you can turn on like a thing that makes it really really hot and um um my nana when she rides on it when it is like burning like really burning um she um thinks its fine. Its fine to her even when it's like burning hot.

3- I think, I don't know.

3- But there was over an hour long drive with grandpa, I think I had like, because we kept stopping somewhere and um down where they found Milo, that's what they named the dog that they found, it was this mountain where they went apparently and they found this dog down there and but and inside this video they couldn't hear but

there was like but grandpa said he saw like dogs running acrosst and there were no like regular like kind of dogs they were like coyotes or something so we had to, because he wanted to fly his drone there but he put it away and then drove away.
3- Hmm hmm (affirmation)
3- Because there was this really old creepy bridge that we went on. And there was this place where I think there was this broken pathway or something where I think I seen I think the other side of a freakin road I think that's it got I think that's where it was attached and I don't know if it got um broke down or something? Because those this truck inside the water so apparently it jumped off and went crashing into the water. And I think it was the head lights or the back so I think if you would go down there and look in it there'd probably be like animals swimming around in it.
3- Yeah. Probably.
3- Hmm mmm (affirmation) I don't even know why they would do that. And I don't even know how people do this and make bridges. When they have to um like, the River Bridge, I don't even know how they put cement inside water and it dried. Like, how is that possible?
3- And like, how'd they be able to go under it or something and like make it acrosst without it just falling apart.
3- Yeah, boats still accrosst it and still not hit it because the River Bridge is really tall and how with their like and how do they always never hit the River Bridge because I bet if I saw one I bet like the first River Bridge that they ever built, I bet, I bet a boat actually hit it. And it came crashing down. Probably.
3- Maybe we can look it up on there (indicating to researcher's laptop).
3- Well, and it's fine because we have a little bit before I have to go back. Because usually I have to go back when there's groups at um 11:45
3- They're probably like on How'd They Do It. Or something. And apparently on How'd They Do It they actually show how, or I think it's from the episode maybe, no, where it's like this thing where somebody I think is making it, yeah, where somebody is making it. Not on how they do it because on How'd They Do It um everyone has a XXXX from Rick and Morty and no, I never even and I asked Google if plum is real.

3- Whooo. Dang. God this kid is an idiot. Or his skateboard might have hit the lip of the ramp right there because usually inside physics of um skate three or something, it's a skateboarding game if you make a thing facing up like this like just a straight you will usually go "wapaa!" and you'll slam against the wall.

3- Um mmm (indicated no)

3- You'll hafta make it lower and actually go with it. You'll hafta do it like this much. Lift it up do you want it to actually go. Yeah.

3- Are you sure you didn't knock him over? Are you sure you didn't (pointing to the agent on the motorcycle in the picture). Because apparently the kid was faster than you. Oh no, apparently, he was driving this way because how would he be facing this way then? Hm.

3- Hmm hmm.

3- Maybe like, hit him maybe because (long pause).

3- I really want XXXXX for my birthday. And actually, there's already mods set up on here. There's like 100 mods set up on XXXX (sounded like GTA5) for you to pick. There's helicopter mods, plane mods, boat mods, umm, characters from other games, um, uh, like maybe you can like uh, maybe you can turn into a gun. I don't know.

3- Yeah, sure (put picture aside).

APRICOT I Picture

3- OK, let's see. I'm going to choose this one.

3- Hmmm. Oh let's see. He's looking at that. Why does this look like it's actually drawn?

3- Why does this look like its drawn on the picture (pointing to the line that indicates the ball was thrown).

3- Why does this look like it was actually drawn on by a marker or something.

3- Is that why it is in this thing (referring to the lamination)?

3- What is he putting on there? Steak? No, he's putting on patties.

3- Dang. I bet it's going to get him or just put out, I bet, no it wouldn't put out that fire. That,that face looks like a little kid. That doesn't even look like a grown man. I'm not kidding (long pause). Dang (long pause) um I bet he woulda knew that, that it

might have hit the cup thing and get knocked down. Bet he would have known that and I can see that he actually used his grip and aimed and tried to hit the cup on purpose and he was like "huh, I didn't know that was going to happen." Uh, yeah, you did. You wouldn't know. You would've hit that cup. I'm not sure. It might put out the fire, I don't know. Usually I would think that it would knock it straight off the table. For, apparently the cup was sitting up and then it smacked it down, really? How did it go "whoopa" and turn. Usually if it is right here it would have missed, I don't know how that's possible then. The cup would be sitting right here away from this so this woudla actually apossed to so it would really hit this and then bounce and then hit the patties out of his hand or something. And that could be the end.

3- Yeah (refused to draw or write a story).

Participant 4 Transcripts

Typical Day

4- Great

Modified Typical Day 1

4- A playground

4- Yeah, because learning is like a playground. You learn to play. And I want to do this story.

Modified Typical Day 2

4- I wake up and I get dressed and then I walk to school and then every single time I do my daily 5 and after that I always read and after that, and when I'm done with my book I just read again and then if it's time for recess I just play with someone (pause). And at the end I say bye to my friends.

4- I want to do this one (indicated basketball picture).

APRICOT I Picture

4- I just want to do one

4- OK.

4- There once were kids who were playing basketball and and someone passed and that guy passed it to this guy and and uh oh he made it ball go onto the road in the car

was goin hit the boy (pause) and then (pause) wow there's a sentence right on the back. Now I just forgot where I was at.

4- And then the car was goin stop and the car was tryina stop and it stopped and then the boy will say "sorry, my, my friends were playing basketball" and that, and then they just played basketball again.

APRICOT II Picture

4- I like it.

4- There once was two kids riding on their skateboards on the ramp. There was a motorcycle guy said "hey what are you guys doing on the road?" "We're playing, we're riding on our skateboards on the ramp." And then they said, that's not going to be good on the story, I was going to say "get off or I'll run you over."

And then he said, "hey, can I play with you too?" And then they say "sure, grab your own skateboard and we'll play." And that will be the end.

Participant 5 Transcript

Typical Day

5- Nothing.

Modified Typical Day 1

5- (Shrugged)

Modified Typical Day 2

5- (Interrupted) Sometimes I just be lazy. But when my friends over I'm not lazy.

5- Watch it's doing a backflip (referring to toy she brought with her)

5- (Interrupted) Get dressed put socks on put shoes on then I put my coat on then wait for my bus when it's almost time I have to put my backpack on then my bus is here and some time I'm late or not (pause). Period. Watch (referring to the toy cat)

5- Uh, I cut it off. I named it Siamee. What cat does it look like?

5- Yeah.

5- No, they're black and white.

5- (Talking at the same time as the researcher) I colored his tail when I was little.

5- (Interrupting) They're white right here, here, here, here, here, here, here, here.

5- Up on your face (talking to the toy cat)!

5- Two.

5- One's Suki one's Rugar then I, we used to have kitten then Suki killed them. Because Sophie killed one by playing with it.

5- My dog.

5- How why would she like to play with a darn kitten?

5- The kittens were like this small. See. And their eyes were still closed. They would've been open right now and walking.

5- Yup. Not even one survived.

5- (Interrupting) AAAAnd my cat ate fully one. It was cute Ginger.

5- All.

5- Not even humans. Humans don't do it. That would be weird.

5- I watched this video, this it was like real looking but it was actually fake and it um this guy said "ooh humans eat their babies" (laugh).

5- Yeah, laugh.

5- No!

5- (Interrupting) This was my ipad and I threw it on the couch (loud noise sound effect).

5- No.

5- Before I went on the trampoline and it broke by laying on it.

5- (Interrupting) I broke it by laying on it.

5- (Talking at the same time as the researcher) Oh geeze.

APRICOT II Picture

5- If I landed on whatever one my cat lands on that's the two that I want (throws cat, participant smiles and laughs).

5- Oh geeze. The cat's like "no! I'm not letting you go!"

(picks one). It changeded it's mind.

5- Kid touches the pot and its finger gets burned (laugh) or. I don't know

(pause while looking at the back of the picture). It doesn't tell anything about it

(started banging stuffed kitty on the picture, making screeching noises, and laughing).

5- I doed the exercise. This is actually a exercise. This (referring to the movements she is doing with the kitty). XXX people do that.
5- Well, need a piece of paper.
5- I don't know (in a high-pitched whine voice).
5- Well I need to write XXXX (participant wanted to cartoon and not tell an oral story).
5- Yeah, you can tell by the feeling. Feel. When it's like that um, Yeah, you're not posed to use it. If it is like this feeling.
5- Yeah. You learned about pencils now (laugh). Good for you. Hi. Shake hands (referring to her stuffed cat). Yay.
5- Nooooo (laugh). I like PE.
5- So, here is this boy, just walking around (pause for drawing). MMMMMMM (laugh). Oh, I forgot (tried to erase with the bad eraser).
5- He has circly hair.
5- All of them do because they are boys. I don't know if one of them are girls. One of them might be a girl. You look like a girl. You look like a boy. I don't know (raspberry noise with mouth).
5- It's kind of like (the participant had a brief conversation about her daily schedule).
5- Now I'm going to make himmmmmmmmm (loud) shorter. I'm going to make him shorter. I just used the wrong pencil.
5- Wee (threw stuffed kitty).
5- Siamee, Siamee, Smimee, mmm (loud grunting noise) Siamee. With cute blue eyes.
5- I know.
5- And here's the older brother. Then deh deh deh. The tallest lookin. Which one looks taller than XXXX then this dude and this dude.
5- Which one looks taller?
5- Right.
5- There. They're kinda the same height lookin.
5- Ummm I kinda sometimes need help spelling.
5- So, I kinda like tell you what I need help spelling.

5- They were walking to the kitchen.

5- I don't mmmmmmm (loud grunting noise).

5- Are walking to the kitchen.

5- What?

5- Uh uh (indicating "no")

5- Kitchen to make breakfast. We can take turns writing it.

5- I have the same sunglasses! Yeah, but those are glasses, not sunglasses. Mine are like fuller like this for my sunglasses. I just noticed it on the other side.

5- Wee (threw stuffed kitty). Oh, geeze (laughs while copying down the sentence).

5- Wow.

5- No. Is that an "h" or an "n" (while reading the word "kitchen").

5- Wait, is it. What is this?

5- Did it form up to high?

5- Can someone close that door?

5- Now they are in the kitchen. Mmmmmmmmm (loud grunting noise).

The coat. Her head is. So pinkish. Like your phone case. But yours is red (tapping on the phone case). It's like Christmas. Christmas!

5- Oh my god. There. That's a better check.

5- Here's the table. There. And here's the little pillow. You see. It has no pillow but I want to make it comfy. And here's the stove. Like, "I'm going to touch the hot pot." Now I'm gonna make this part. XXXX too low. Nooo.

5- I hate it when I need to switch (pencils). The pencil is. This one has. No.

5- I'm going to make it that high so the kid can't reach it.

XXXXX reach it (in deep voice).

5- Noo! Back to using you again (deep voice, talking to/about the pencils).

5- I'm itching my back. Can you hear me itching my back? The handle. "I wanna burn my other hand" (laughs)!

5- Now we gotta make these. There.

5- Actually, I wanna XXX. Now I need the other hand over but I have XXXX here.

5- "I'm going to do flips" (threw cat). "I landed myself."

5- Remember, now it's your turn?

5- XXX finish XXX. No (continued to draw).

5- You can't see his face because he's facing that way. See. Like you can't see. See. But a…. That's one's a girl (laugh). It looks like XXX face. I'm going XXXX care if I'm just trying. It doesn't matter. Now I'm going to read that. And XXX. Look it. It actually looks like he's grabbing it when it's really not that far and stuff. When it's not that long of an arm.

5- This. This. This kid. And this one is sitting here. No, you're a boy. Two boys and one girl. Why did they move a desk in here? Why?

5- XXX I'm going to make the other chair. A small chair. It's for him. Then I XXXXXX. He's kind of short for his chair "give me food" (laughs).

5- Yeah. No.

5- I don't know.

5- I'm going to draw the window with the curtains and stuff. Black curtains. They're actually grey curtains. Wait. Uh, they have like 30 more minutes for PE. No. ten ten. So, 40 more minutes. Then.

5- Owwe. That hurt.

5- XXX is long. Now. There. Now I'm ready.

5- Wait let me look. I forgot the sink. The darn darn sink. Right over here. I gotta make it.

5- XXX (mumbling under breath while drawing).

5- Then there's that unplugger. Then I'm going to draw the cupboards just in case they have an accident.

5- Well, you're not that well with pencil, so pen (laugh). They were making (pause).

5- We're making food for eeeee chother (pause).

5- Let me think. They were having a good day. Period.

5- Good handwriting.

5- Awwe. I messed up with the XXXX (loud grunting noise).

I'm just gonna act like they grabbed ughhhh XXXXXX (loug grunting noise).

5- That's the part that I hate.

5- So, I'm just going to make the pot and this is the handle.

5- They have to get me first. So, we will have more minutes with me because they take a while to walk back (talking about her class).

5- No.

5- I don't know.

5- Here's the sink again. There's the other plugger. Then there's the cupboards again, the table. Then look (laugh). The chair (laugh). Dib dib dib dibuhhh. Eeeeeee (straining noise). Wait what if they go to PE then. When I see them walking I have to go (talking about her class).

5- The chair here. No (straining noise) XXX.

5- Can I draw this kid the small one. Meh meh meh. Did food. Gotta do the window again. Curtains. OK. Then the oldest one. Put the food on the table then they ate it all. They ate it all. What happened right there (referring to a sore on the researcher's finger)? Mm hmm.

5- Huh, no! Yes. The end.

5- I do too.

APRICOT I Picture

5- The kids were playing catch then the ball, the two little ones were playing catch. The then the oldest the oldest little one threw the ball then it hit a glass of juice. Period.

5- Yes.

Participant 6 Transcript

Typical Day

6- Well, that's my daily schedule that's not the half days that were doing. An then I have the regular schedule up on the board.

Modified Typical Day 1

6- (Interrupted) Going to school.

Modified Typical Day 2

6- I have fun

6- Yeah.

6- I'm nine.

6- I'm going into puberty early. My parents said so. I already need deodorant.

6- Yes

APRICOT I Picture

6- I like this one

6- What are those (pointing to hamburger type patties).

6- I see worms.

6- This one.

6- Well, I think they decided to, that the dad decided I think it's it's a nice day so we should go to the park, ark, and have a picnic. And then the two young boys were playing and then they knocked over the can of worms because they were going to go fishing next xt and then one of the worms hit the dad on the arm and one landed on the stove (long pause then laugh).

6- Yes.

APRICOT II Picture

6- They are funny.

6- No, I want this one.

6- Yeah.

6- Well, I think that they were making lunch because their parents were away and one of those and those two are in charge and the little one wanted to help make Raman but they said no and now he's trying to grab it while they are making sandwiches (pause). It would be funny because it would burn his hand.

6- Yes.

6- I like this one because this one is huge!

6- Thank you for not making me write.

6- I will, but when I am done drawing. I like stickmen

Participant 7 Transcript

Typical Day

(Shrugged shoulders)

Modified Typical Day 1

7- I don't know. I don't have normal school days.

Modified Typical Day 2

7- I don't know. Stay here. Be bored.

APRICOT I Picture

7- I already have a story in mind.

7- So, they were going to the grocery story to get some oranges and lemons and he pulled one from the bottom and they all fell down and made him slip and they are going to have to pick them up, buy new ones, or get some from the garden. And then, um, the mom, um, said "what happened?" And they told that they pulled one from the bottom without noticing.

APRICOT II Picture

7- The mom was watering the flowers, he was riding his bike, he was painting, and he slipped off the ladder and he got hurt and then they were like "what's that noise?" And they came and he broke his leg from falling off the ladder. Then they had to drove to the hospital. But they didn't know that the hose was still on so they had no water to drink and that wasted all their water bill and it was way too high to pay because they just had to pay a lot for the doctor (pause).

7- Yes.

Participant 8 Transcripts

Typical Day

8- I don't know.

Modified Typical Day 1

8- Just like work and that (participant spoke quietly, researcher asked him to repeat his answer). Work and that.

Modified Typical Day 2

8- I woke up before my mommy even work me up.

8- Yeah.

8- Yeah, so like I was not even tired.

8- I don't know (shrugged).

APRICOT I Picture

8- I'm not really good at doing stories at all.

8- XXX like he's XXXX the hoop and XXX he's gonna catch it and XXXX over

8- Yeah, he's gonna throw it and he's tryna grab the ball over there and she's tryna get it cause there's a car in the road (pause).

8- End.

8- Did they draw these?

APRICOT II Picture

8- He's gonna paint the house right there and fall off the ladder and probably broke his leg. And they probably tried to help him (pause).

Participant 9 Transcripts

Typical Day

9- Play.

Modified Typical Day 1

9- Play. I like to play.

Modified Typical Day 2

9- Play and eat dinner (long pause)!

APRICOT I Picture

9- They were all playing soccer. Or, no. Basketball. And then one person threw it over that guy it fell into the road while car was coming he ran to get it but the car, but he was coming and he was surprised (long pause).

9- No.

9- Yeah.

APRICOT II Picture

9- Those huge ones.

9-Yeah. No, wait, this one.

9- So, (pause) it's wet.

9- So, they all going for rides on skateboards and… and then he fell off and then he came and he got hurt really bad so he had to go get a band aid and then he bla bla and then he bla bla bla. I don't know!

9- So, they were all going to the um skatepark and then while he was riding he fell off and hurt his knees and scraped his hand and his knees and his elbow. Um. He bonked his head on the concrete and then he came to him and said if he's ok and then um and then the motorcycle guy I think it's the big big brother probably save the big brother and that's going to be Jackie that's going to be Eleanor I know it's a girl name.

Participant 10 Transcript

Typical Day

10- I don't know.

Modified Typical Day 1

10- Just work (spoken very softly).

Modified Typical Day 2

10- Just um do papers and um um do math and science.

10- Um no.

APRICOT I Picture

10- I want to do this one.

10- So, he fell because he tried to make that ramp and then he felled and the two boys were going to help him and hmm. Well. I think that's all.

10- The end.

APRICOT II Picture

10- So, the boys were going to get some fruit and then they um he got a orange and then all these stacks of orange came down and he tripped over them. The end.

Participant 11 Transcript

Typical Day

11- Uhh, well, in the morning I just watch something for a little bit, get dressed, take a shower, then eat a XXXX bowl, brush my teeth, then watch a little more TV, then lay down for a little bit, then go to school.

APRICOT I Picture

11- Uhh, that one.

11- OK. So, mom and her sons went to the store and then the mom asked, "Can you get me some oranges and lemons" and then they went so fast under got them and then

they dropped some down, a lot of oranges, and the man slipped (long pause and looked at the researcher).

11- The end.

APRICOT II Picture

11- Uhhh, this one.

11- Ok, one day, Jen and Brody were making sandwiches and their little sister XXXX was getting the pot then she picked it up then she accidently, see it's steaming, then the boys didn't notice when she was getting it then she burnt herself. The end.

11- That has to hurt.