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Sisan Walker Angel

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FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

PARENT-CHILD INTERACTIONS IN THE PRESENCE OF RISK FOR ADHD
WITH AND WITHOUT LANGUAGE IMPAIRMENT

A thesis submitted in partial fulfillment of the

requirements for the degree of

MASTER OF SCIENCE

in

SPEECH-LANGUAGE PATHOLOGY

by

Sisan Walker Angel

2015

To: Dean Ora Strickland
College of Nursing and Health Sciences

This thesis, written by Sisan Walker Angel, and entitled Parent-Child Interactions in the Presence of Risk for ADHD with and without Language Impairment, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this thesis and recommend that it be approved.

Monica S. Hough

Jean Mead

Eliane Ramos, Major Professor

Date of Defense: July 1, 2015

The thesis of Sisan Walker Angel is approved.

Dean Ora Strickland
College of Nursing and Health Sciences

Dean Lakshmi N. Reddi
University Graduate School

Florida International University, 2015

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DEDICATION

This thesis is dedicated to my mother, because throughout the years you have taught me the real meaning of hard work, dedication and true love. Mom, you gave up your life in Colombia to bring me here for a better future, and now I dedicate all my efforts and projects to you. Thank you for showing me the importance of self-giving and determination. And to my dear Ignacio, thank you for ALWAYS believing in me and supporting me in everything I do. This thesis is yours. AMDG

(Esta tesis está dedicada a mi madre, porque a lo largo de los años me has enseñado el verdadero significado del trabajo duro, la dedicación y el amor verdadero. Mami, renunciaste a tu vida en Colombia para traerme aquí por un futuro mejor, y ahora te dedico todos mis esfuerzos y proyectos a ti. Gracias por enseñarme la importancia de la entrega y determinación. Y a mi querido Ignacio, gracias por creer siempre en mí y apoyarme en todo lo que hago. Esta tesis es tuya. AMDG)

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ABSTRACT OF THE THESIS
PARENT-CHILD INTERACTIONS IN THE PRESENCE OF RISK FOR ADHD
WITH AND WITHOUT LANGUAGE IMPAIRMENT

by

Sisan Walker Angel

Florida International University, 2015

Miami, Florida

Professor Eliane Ramos, Major Professor

The purpose of this research was to analyze how parent-child interactions differ in discourse structure, communicative function and linguistic behaviors between children who are at high-risk for developing a behavioral disorder such as ADHD, and those who are at high-risk for developing a behavioral disorder with a co-occurring language impairment. Participants consisted of 20 children ages three to five years old and their parents. A five-minute parent-child interaction was video recorded and analyzed using an adapted version of the “Coding parent/child interaction as a clinical outcome: a research note” designed by Law, Barnett, and Kot (1999).

Results revealed slight differences in each communication parameter amongst the two groups, however, statistical results of parametric and non-parametric tests determined that there were no statistically significant differences between the two groups, with the exception of increased verbal initiations ($p=.040$) in children with no language impairment when compared to those with a language impairment as was expected.

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CHAPTER I

INTRODUCTION

Parent-child interactions play both a critical role in the development, adjustment and overall wellbeing of children and the sensitivity, responsiveness and emotional stability of parents (Belsky, 1999; Luecken & Lemery, 2004; Moss & St-Laurent, 2001; Wakschala & Hans, 1999; Wilson & Durbin, 2013). From birth onward, the interactions between parent and child nurture positive attachments, joint attention and language development, which are precursors to childhood psychosocial assurance and academic success (Kohn, 2005; Paul & Nurbury, 2012). Parents of children who present Language Impairment (LI) or Attention Deficit/ Hyperactivity Disorder (ADHD) report difficulties interacting with their children (Allen & Marshall, 2010; Strahm, 2008), and present higher stress levels compared to parents of typically developing children (Singer, Ethridge & Aldana, 2007). To analyze the parent-child interactions, there must be an understanding of parental attachments, relationships and the effects that both LI and ADHD have on parental behaviors.

Attachment is a sense of belonging to or connecting with a particular other. John Bowlby used the term “attachment” to describe the affectional bond between mothers and their babies. He was the first to publish the theory of attachments which focuses mainly on relationships during early childhood and explains the impact that these have on emotional development and mental health of children. Erick Erikson attests that attachments between parent and child also start with bonding and it is the first stage in developing social relationships (McManus & Richards, 1992). In his book ‘Unconditional

Parenting: Moving from Rewards and Punishment to Reason and Love' Alfie Kohn (2005) states that one of the most important aspects of infant psychosocial development is the infant's attachment to parents. Started immediately after birth, this attachment is strengthened throughout the first months of life by mutually satisfying interaction, and it is significantly critical to the infant's survival and development. By the end of the first year, most infants have formed an attachment relationship usually with the primary caretaker, and continue to nurture it accordingly as they meet developmental milestones (Kohn, 2005). How parental attachments are affected by an impairment or disability of the child is an important question pertaining to this research.

In our fast paced society stress related circumstances are part of life; as individuals become parents, they juggle to balance out work, family, friends, social life, and the responsibilities parenting brings. However, when a child presents with a disability, impairment, or disorder, parents are faced with additional and often unfamiliar challenges which cause stress levels to elevate (Carson, Perry, Diefenderfer, & Klee, 1999). Over the past four decades, the literature on parenting children with disabilities has revealed variable results, from imminent severe negative impact (Olshanky, 1962,) such as increased physical and mental health problems, increased divorce rates, and elevated levels of psychosocial problems, to beneficial and positive contributions (Hasting & Taunt, 2002). Despite the variability, it is critical to acknowledge the value and importance of all findings to better understand the influence of parent-child interactions on both parents and children.

In order to quantify the effects of a child's disability on parents, researchers have particularly focused on parents' depressive symptoms as indicators of stress (Singer et al., 2007). Symptomatology of depression varies in severity, frequency, and duration depending on the individual's illness as well as environmental factors; however, even mild depression is a cause for concern. In a longitudinal study conducted by Hays, Well, Sherbourne, Rogers and Spritzer (1995), findings indicated that people with minor depression show considerable limitations and distress in work, social, and physical functioning. Additionally, elevated levels of depressive symptoms were associated with impaired role function, lower state of well-being, and poor general health. For both men and women, becoming a parent often precipitates a reappraisal of roles and identity which can provoke a state of disequilibrium. Numerous studies have examined the relationship between stress related symptoms and the transition to parenthood, parenting behaviors, and overall relationship satisfaction (Paterson & Moran, 1988; Ruble, Fleming, Stangor, Brooks, Fitzmaurice & Deutsh, 1990). Men and women cope with stress and depression in diverse ways. According to the National Institute of Mental Health (NIH; 2011), depression is more common among women than men due to biological, life cycle, hormonal, and psychosocial factors (NIH, 2011). It is well-established that women of child-bearing age are at elevated risk for depression in the general population (Kesslet, 2003; Singer et al., 2007); however, there are factors which predispose men to depression symptoms as well. Roopnarine and Miller (1985) found that first-time fathers experience stress due to the pregnancy and child-birth; they experience anxiety related to: concerns over the health of the child, anticipation of increased financial burden, change in life style, and levels of responsibilities.

With the advent of technology, parents are now able to screen their child for genetic abnormalities in utero. Upon hearing the possibility of having a child with a disability, some parents may experience stress as their expectations for a healthy child diminish (Kramer & Houston, 1998; Naseef, 2001). In general, individuals bearing a child hope for a non-complicated birth and healthy infant; therefore, having a child with a disability or disorder sets them at a higher risk for increased levels of stress, predisposing them to symptoms of depression (Singer & Irvin, 1991).

The discussion of parental stress has also been critically important when viewed in the context of the impact it has on children, the parent-child attachments, and the child's self-regulation skills. Prenatal stress in mothers has been linked to poorer health and immune functioning of the newborn, as well as neurocognitive development, consequently impacting emotional regulation (Ruiz & Avant, 2005). Mulder, Robles, Huizink, Van den Bergh, Buitelaar, and Visser (2002) conducted a review of the literature pertaining to the influence of maternal stress during pregnancy and the resulting effects on the developing child. The review findings suggested that stress may be associated with many unknown causes of problems in children after birth. In very young children with disabilities as well as typically developing children, stress has been identified a statistically significant predictor of externalizing and internalizing behaviors (Stokka, 2008). Elevated stress levels in parents affect aspects of childhood development, such as secure attachments, joint attention, and communication desires (Osterberg & Hagekull, 2000). The literature also reveals that parental stress has the following negative effects on children: poor social competence, increased behavior problems in preschool

(Anthony, Anthony, Glanville, Naiman, Waanders & Shaffer, 2005), delayed cognitive development (Mulder et al., 2002), and increased characteristics of difficult infant temperament (Buitelaar, Huizink, Mulder, Robles de Medina, & Visser, 2003).

At some point in their life, every typically developing child experiences challenges when interacting with their parents, with many presenting the common resistant behaviors such as nagging, whining, or complaining (Harrison & Sofronoff, 2002; Osterberg & Hagekull, 2000); however, in children who present LI or ADHD, these behaviors intensify as the child seeks a way to cope with his or her feelings and compensate for the impairments. Furthermore, both Luria (1961) and Vygotsky (1962) argued that language, or more specifically, inner dialogue, was crucial for self-regulatory functioning; therefore, if a child is having difficulties with self-regulation, language skills must be accounted for (Clark, 2011). As the behaviors intensify, parents find alternative ways to manage their child's difficulties, at times turning to aggressive or maladaptive behaviors. Both congenital (present at birth) and acquired (developed post-natal) disorders present unique difficulties during the parent-child interactions.

A language impairment is a disorder that delays the mastery of receptive, expressive or pragmatic language skills in children (Paul & Nurbury, 2012). When the LI neither co-occurs with any other impairment, nor is a consequence of a primary disability it is called a Specific Language Impairment (SLI). Children with SLI do not have any hearing loss or developmental disorders such as intellectual disability, sensory disorder, neurological damage, emotional problems, or environmental deprivation (Asikainen, 2005). SLI is one of the most common childhood learning disabilities in the United

States, affecting approximately 7 to 8 percent of children in kindergarten with a higher prevalence in boys (NIH, 2011). The etiology of SLI is unknown; however, recent research suggest it has a strong genetic component which is currently being examined (NIH, 2014). In most cases of SLI, there is a substantial discrepancy between nonverbal performance and language skills characterized by a failure to learn language. Most difficulties in SLI are noted in the syntax, morphology and phonology of the verbal output by the child (Paul & Nurbury, 2012).

In contrast, ADHD is currently the most commonly researched pediatric neurobehavioral disorder affecting over 11 percent of school age children in the United States (NIH, 2014; Strahm, 2008). It is characterized by developmentally inappropriate high levels of inattention, hyperactivity, and impulsivity that impair functioning across multiple domains, including home, school, and social relationships (Modesto-Lowe, Danforth, & Brooks, 2008). These two developmental disorders, SLI and ADHD, show high rates of comorbidity in clinical samples as well as population based samples (Cohen, Vallance, Barwick, Menna, Horodezky & Isaacson, 2000; Mueller & Tomblin, 2012). Parent-child interactions of children with SLI or ADHD are characterized by presenting significantly higher levels of psychosocial stress when compared to parents of children who are typically developing (Carson, Carson, Klee & Jackman, 2007; Chaffee, Cunningham, Gilbert, Elbard & Richards, 1991); therefore, it is important to analyze parent-child interactions in the presence of both impairments.

A child's lifelong emotional and intellectual growth is nearly every parent's yearning; however, for parents who have a child with LI or ADHD, the task at hand

becomes a lifelong struggle and stressful task. Early intervention and effective support for parents should be an important treatment goal, as both LI and ADHD at a young age are associated with the type, quality, and responsiveness of the parent-child interactions (Delaney, & Kaiser, 2001; Garcia, Bagner, Pruden, & Lopez, 2014). The purpose of the following study is to analyze the discourse structure, communicative function, and linguistic behaviors in parent-child interactions of children who are at high-risk for developing a behavioral disorder, such as ADHD, with and without a language impairment.

CHAPTER II

LITERATURE REVIEW

Parent-Child Interactions

As infants develop, the bond with their parents evolves into either positive or negative attachments. Therefore, it is important to consider the effects of parent-child interactions on the child's acquisition of language, types of attachments, academic skills, and externalizing behaviors. The Early Child Care Research Network (1999), reports that supportive, warm, and engaged parent-child interactions are associated with the child's emerging competencies in social, cognitive, and linguistic domains throughout early and middle childhood. Responsiveness is defined as prompt, contingent, and appropriate behaviors in response to a child's actions; sensitivity is the degree to which parents adapt to children's needs and abilities. In general, these two characteristics are key dimensions of adaptive parenting (Dodici, Draper & Peterson, 2003). Research in the area of parent-child interactions has shown that mothers of preschool age children systematically adapt and modify their language input to the developmental level (age), language and cognitive abilities of the children, resulting in balanced and coordinated patterns of verbal exchanges (Broen, 1972; Davis & Hathaway, 1982; Fraser & Roberts, 1975). However, literature on developmental and family systems is currently emphasizing the contributions and influences of both the parents and the child independently. All parents develop expectations about their child's education and development based on their own experience and information provided by the media, family, relatives, and informal networks of friends (Russell, 2003). Children with developmental delays, language

difficulties or externalizing maladaptive behaviors contribute to the parent-child interaction in unique ways that may not meet the parent's expectations. Such unrealistic expectations may lead to anxiety and discouragement when a child cannot live up to the parents' goals. Likewise, low expectations can make it difficult for children to see and achieve their full potential (Davis-Kean, 2005).

Language Development

Language development is an extraordinarily complex process which includes cerebral development, maturation of verbal and motoric skills, imitation abilities, memory, communicative understanding, the language environment, and bidirectional social interactions (Walle & Campos, 2013). Before infants utter their first words, they learn to communicate with their caregivers via crying, vocalizations of sounds, gestures, and facial expressions. Studies conducted with infants have indicated that by four months of age, infants identify the mother's voice (Paradis, 2010), and by six months of age, most babies recognize the basic sounds of their native language (Burns, Yoshida, Hill & Werker, 2007). Development of speech and language skills in children vary depending on cognitive abilities and environmental factors; however, some typical speech and language developmental milestones during the first two years of life include, cooing, smiling, and responding to sounds from birth to three months. From four to six months, an infant should be following sounds with eye gaze, producing babbling or gurgling sounds, and responding to changes in the tone of voice. By the seventh month until 12 months, a child should be understanding words for common items, responding to simple request such as "come here", and using one to two words, plus a variety of gestures to

communicate needs or desires. From 12 to 24 months of age, a child should identify a few body parts, follow simple commands, produce new words on a regular basis, and combine two words together. (ASHA, 1993). Concerns arise when a child is not meeting a variety of these milestones and specialized early intervention is necessary to determine the most appropriate course of action.

Communication Disorders

According to the American Speech Language and Hearing Association (1993), a communication disorder is “an impairment in the ability to receive, send, process, and comprehend concepts or verbal, nonverbal and graphic symbol systems” (p. 1). Ranging from mild to profound, communication disorders are divided into speech, language, hearing, and auditory processing disorders. Pertaining to this research, it is important to note that a speech disorder is an impairment of articulation of speech sounds, fluency and/or voice, whereas a language disorder is an impairment in comprehension and/or use of spoken, written and other symbol systems (such as signing, reading). Communication disorders may be the primary diagnoses of an individual, or may be secondary to another disability or diagnosis.

Specific Language Impairment

Since the 1980’s, researchers and clinicians use the term Specific Language Impairment (SLI) when referring to an impairment or developmental delay that interferes with communication, and affects one or more of the basic learning processes involved in the understanding and usage of language (Paul & Nurbury, 2012; Reilly, Tomblin, Law, McKean, Mensah, Morgan, Goldfeld, Nicholson & Wake, 2013). The difference between

the terms Language Impairment (LI) and Specific Language Impairment (SLI) is that all other neurological or developmental disorders have been ruled out in children with SLI, whereas in children with LI, other impairments or disorders such as Autism Spectrum Disorder (ASD), developmental delays, or intellectual disabilities, may be present (NIH, 2011). Determined by applying exclusionary criteria, SLI is defined by what it is not rather than by what it is (Reilly et al., 2013). The International Classification of Diseases—10 (ICD-10) defines SLI as present when a child's language skills fall more than 2 SD below the mean and are at least 1 SD below non-verbal skills (World Health Organization, 2010). Researchers study the characteristics of SLI to better understand the overall effects of a language impairment in children and adults.

SLI may be manifested in significant difficulties with listening comprehension, following directions, oral/ gestural expression, social interactions, reading, writing or spelling, which adversely affects functioning and/or typical development (Thomas, Dale, & Plomin, 2014). The etiology of SLI is unknown; however, according to the U.S Department of Health and Human Services up to one out of 20 children in the United States show communication behaviors that are characteristic of SLI (NIH, 2011). Severities of SLI range from mild to severe, determined by careful observation and assessment conducted by a Speech Language Pathologist. Since parents play a significant role in a child's language development, the process of SLI diagnosis starts with analyzing components inherited by the environment at home by doing a parent interviews, and either standardized assessment tests or non-standardized (criterion-referenced) tests are used to reach the most appropriate diagnoses (Carson, Perry, Diefenderfer, & Klee, 1999).

As previously mentioned, SLI is characterized by presenting difficulties with syntax, grammatical morphology, and phonology. Syntax is the structure of language, involving a set of rules and principals that govern the way words combine to form phrases, clauses and sentences. For example, if children with SLI present difficulties with pronouns, they may use *he* for *him* and *his* or omit articles as in ‘*boy is eating*’ for ‘*the boy is eating*’ (Joanissea, & Seidenberg, 2002). Morphology is the way words are organized internally. Morphemes are the smallest grammatical unit that have meaning; for example, the word *cats* can be divided into two: *cat* and /s/- indicating the plural form of the preceding word. Children with SLI may struggle with the plural form -s, the present progressive -ing, and the regular past tense -ed among others (Paul & Nurbury, 2012). Phonology encompasses the structure, distribution, and sequencing of speech sounds and syllable shapes in a language; it is well known that phonological disorders frequently co-occur with SLI (Joanissea, & Seidenberg, 2002; Paul & Nurbury, 2012). A child with SLI may produce a variety of phonological processes such as fronting, assimilation and final consonant deletion, among others. Fronting is when velar or palatal sounds such as /k/, /g/ and sh are substituted with alveolar sounds like /t/, /d/ and /s/. Therefore, the child may say /tootie/ for /cookie/. Assimilation is when consonant sounds start sounding like other sounds in the word as in “bub” for “bus”. Final consonant deletion is when the last consonant in a word is left out as in “toe” for “toad”. In addition, the spontaneous speech of an English-speaking pre-school aged child with SLI may typically contain a) errors in word order, b) omission of prepositions, auxiliary verbs or contractions, c) telegraphic speech d) incorrect use of negations e) addition of irrelevant

details f) contradiction of previous statements and f) failure to respond to questions or stay on topic (Asikainen, 2005; Dunn, Flax, Sliwinski, Aram, 1996).

Parent-child Interactions in the Presence of LI

As with many other impairments, studies have identified specific components of the parent-child interactions of children with LI that negatively affect the relationship with their parents (Allen & Marshall, 2010). Parents of children with LI are less responsive to their child's non-verbal communication (e.g. gestures, externalizing behaviors), focusing heavily on their spoken language (Yoder & Warren, 2001); they have idealistic communicative expectations, and tend to be less positive and accepting of their child's utterances. Siller and Sigman (2002) found that parents of children with language difficulties are more directive, and are less likely to provide contingent feedback and semantically related utterances to topics that are child-initiated (Allen & Marshall, 2010). Recent studies have identified that a child's LI has negative effects on the parent's language output, including: quality, complexity, frequency of use and conversational style (when interacting with their child), in comparison to the parents of children who do not have SLI (Fabrizi, Costa, Lucarelli & Patruno, 2010; Majorano, & Lavelli, 2014). Knowing the significance and value of the parent-child interaction, it is important to further analyze how these interactions are affected when a child not only presents with LI but is at a high risk for ADHD.

Childhood Mental Disorders

Childhood mental disorder refers to all mental disorders that can begin and be diagnosed during childhood (e.g. ADHD, Tourette syndrome, behavior disorders, mood

and anxiety disorders, autism spectrum disorders, and substance use disorders). Mental disorders among children are described as serious changes in the ways children typically learn, behave, or handle their emotions (Giel, Climent, Harding, Ibrahim, Ladrido & Younis, 1981). Symptoms typically start in early childhood, although several disorders may develop throughout the teenage years. Specific diagnosis is regularly made in the school years, and sometimes earlier. However, some children with a mental disorder may not be recognized or diagnosed as having one until later in life. Childhood mental disorders can be treated and managed using several pharmaceutical and behavioral approaches. There are many evidence-based treatment options; therefore, it is important that parents and doctors work closely with everyone involved in the child's treatment (teachers, coaches, therapists, and other family members), in order to take advantage of all the resources available to guide the child towards success. Early diagnosis and appropriate services for children and their families can make a difference in the lives of children with mental disorders. (Lahey, Pelham, Loney, Kipp, Ehrhardt, Lee & Massetti, 2004).

Attention-Deficit/Hyperactivity Disorder (ADHD)

Attention-Deficit/Hyperactivity Disorder (ADHD) is the most common neurobehavioral disorder of childhood. Affecting over 11 percent of school-age children in the United States, ADHD diagnosis in childhood has been increasing by approximately 5% per year (Visser, Danielson, Bitsko & Hollbrook, 2013). ADHD is characterized by the presence of developmentally inappropriate levels of inattention, over activity, and/or impulsivity which interfere with appropriate social, academic, or occupational

functioning (Centers for Disease Control and Prevention, 2010). Besides the common characteristics, most children with ADHD also struggle with low self-esteem, troubled relationships and poor performance in school. (Sonuga-Barke, Auerbach, Campbell, Daley, & Thompson, 2005) Furthermore, children with ADHD typically exhibit difficulties with impulse control, time management, planning, and resisting immediate temptations (Barbro, Thernlund, & Nettelbladt, 2006). According to the American Psychiatric Association (2013), the symptoms must be present in two or more settings (e.g. home, school, work, social) and be significant enough to cause obvious interference with age-appropriate social and/or academic functioning.

The exact cause of ADHD is unknown; however, it is one of the most commonly studied pediatric disorders. Recent research has revealed that ADHD can run in families, and may have a genetic component (NIH, 2014). Other studies indicate that problems with the central nervous system at some moment in development may play a role in the development of ADHD, and certain environmental factors also increase the risk. ADHD is presented in three diverse types, predominantly inattentive, predominantly hyperactive-impulsive and combined. No single test can diagnose a child as having ADHD. Its diagnosis and definition is based on symptomatology checklists, behavior rating scales filled out by parents and teachers, and diagnostic interviews with caregivers and teachers (Muller & Tomblin, 2012).

Children mature at different rates, and have different temperaments, personalities and energy levels. However, some early signs of ADHD include excessive behaviors during different situations. Parents and teachers start noting that the child seems

constantly "unfocused", "out of control", or is having significant difficulties following rules. (NIH, 2014). Currently, ADHD is being diagnosed on average by the age of six; yet, current research documents the validity of an ADHD diagnosis in preschool age children (Lahey, Pelham, Loney, Kipp, Ehrhardt, Lee & Massetti, 2004; Matos, Bauermesiter, Bernal, 2009; Sonuga-Barke, Auerbach, Campbell, Daley, & Thompson, 2005; Wilens, Biederman, & Spencer, 2002). According to the American Academy of Pediatrics (AAP), ADHD can be diagnosed in children as young as four when symptomatology is significant enough to affect daily functioning in relationships with parents, peers and their academic achievement. Studies indicate that two-thirds of preschoolers with significant behavior problems (e.g. disruptive behaviors in school, at home and in social settings) have been found to go on to receive a mental health diagnosis of ADHD or another disruptive disorder by the age of nine (Lahey, Pelham, Loney, Kipp, Ehrhardt, Lee & Massetti, 2004). All the above results are leading researchers to pay special attention to the pre-school population. Current studies are analyzing the most effective and valid treatments for children who are being diagnosed at this young age.

Parent-child Interactions in the presence of ADHD

When a child has been dismissed from several daycares by the age of four due to their intolerable aggressive and hyperactive behaviors, the parent's journey towards stress begins to escalate. Parents of children with ADHD, as those with LI, report higher levels of parenting stress compared to parents of children without ADHD and LI (Breen & Barkley, 1988; Graziano, McNamara, Geffken & Reid, 2011; Johnson & Reader, 2002;

Mash & Johnston, 1983). They use more negative verbal control strategies, engage in poorer quality conversations, and have significantly lower family functioning in marital and sibling relationships (Strahm, 2008). In a study conducted by Modesto-Lowe, Danforth and Brooks (2008) on preschool children, results indicated that parents who have a child with ADHD tend to be more controlling and less responsive; they tend to use more verbal direction, reprimands, and corrections than parents of children without ADHD. Chronis, Lahey, Pelham Jr, Williams, Baumann, Kipp, and Rathouz (2007) compared the prevalence of psychiatric disorders in parents of young children with and without ADHD. Results demonstrated that having a child with ADHD was associated with increased rates of maternal and paternal childhood ADHD, compared with the non-ADHD children. Furthermore, mothers of children with ADHD and disruptive disorders also reported increased drinking problems in their children's fathers. In sum, despite the strong biological underpinnings of ADHD, parenting factors remain important influences on the course of ADHD. Although parenting per se may not alter the severity of ADHD, parents can access useful treatments for their children, advocate for educational supports, and prevent worsening of behavioral difficulties, which may lead to improvements in the course of ADHD and related outcomes (Barbro, Thernlund, & Nettelbladt, 2006).

Comorbidity between LI and ADHD

The high level of comorbidity between LI and ADHD has been well-established in the literature (Baker & Cantwell, 1987; Cohen et al., 2000; St. Clair, Pickles, Durkin, & Conti-Ramsden, 2011). Mueller and Tomblin (2012) state that the majority of research on the comorbidity of LI and ADHD have been conducted within clinical sample sets,

meaning that the subjects are defined by the presence of the first disorder, and many of these studies have not included control samples; however, ADHD has been one of the most frequently reported co-occurring neurodevelopmental disorders in study samples of children with LI (Beitchman, Hood, & Inglis, 1990; Benasich, Curtiss, & Tallal, 1993; Lindsay, Dockrell, & Strand, 2007; St. Clair, Pickles, Durkin, & Conti-Ramsden, 2011).

Data on the prevalence of ADHD and SLI indicate that the degree of overlap between the two disorders is greater than would be expected by chance; however, the degree of overlap is not significant enough to consider the two disorders the same (Tannock & Schachar, 1996). In a cross-sectional and prospective longitudinal study of 600 children with SLI, the rate of ADHD increased by 21% in a five-year span depending on the language deficit (Baker & Cantwell, 1987). Based on an analysis of the data, children with SLI are two to three times more likely than children with typical developing language abilities to have ADHD, and the same effect is seen if SLI is conditioned on ADHD (Mueller & Tomblin, 2012). As previously mentioned, parent-child interactions of both populations have been broadly studied; however, limited research has been conducted on parent-child interaction of those children who present a LI and are at high risk of ADHD.

Treatment for ADHD and LI

ADHD

The best evidence based treatments for children with ADHD, are family behavioral interventions, such as parent training and/ or pharmaceutical medications; however, better results are seen when both are simultaneously used (Pelham, Wheeler, &

Chronis 1998). A recognized parent training program that has demonstrated many beneficial effects for parents and children is Parent-Child Interaction Therapy (PCIT). PCIT is an empirically-supported parent training program for the treatment of disruptive behaviors in children ages two and a half to seven (Zisser, & Eyberg, 2010). Its emphasis is on improving the quality of the parent-child relationship, and modifying a range of behavioral, emotional, and family difficulties (Eyberg, Funderburk, Hembree-Kigin, McNeil, Querido, & Hood, 2001; Eyberg, Nelson, & Boggs, 2008; Tempel, Wagner, & McNeil, 2008). Treatment outcomes in research have demonstrated significant reduction in noncompliance/ behavioral problems (Nixon, Sweeny, Erickson, & Touyz, 2003; Schuhmann, Foote, Eyberg, Boggs, & Algina, 1998), generalization to home and school (Funderburk, Eyberg, Newcomb, McNeil, Hembree-Kigin, & Capage, 1998), maintenance of gains up to six years after treatment (Hood, & Eyberg, 2003), generalization to untreated siblings (Brestan, Eyberg, Boggs, & Algina, 1997), and changes in parents' interactional styles (Eisenstadt, Eyberg, McNeil, Newcomb & Funderburk, 1993).

PCIT balances out two factors: 1) positive interactions with the child by increasing positive attention and decreasing negative attention, and 2) Setting consistent limits which focuses on consistency, predictability and follow through (Tempel, Wagner, & McNeil, 2008). The training program consists of two phases: a Child-Directed Interaction (CDI) and a Parent-Directed Interaction (PDI). As the name implies, during CDI, the child leads the interactions, and the parent is taught a set of facilitating parenting skills that allow them to reinforce positive behaviors, expand the child's language skills, and enhance playing. The set of skills are called PRIDE, which stands for Praise,

Reflection, Imitation, Description, and Enthusiasm (Eyberg, Nelson, Duke, & Boggs, 2005). The PRIDE skills have characteristics that foster language development, enhance parent-child relationships, reduce frustration/ anger, and improve social skills, self-esteem, attention, and organization. During PDI, parents are taught to give good directions, use contingent consequences, plan responses, and use time-out appropriately (Zisser, & Eyberg, 2010).

Language Impairments

Clinical evidence has documented and supported that children with language impairments benefit from treatment provided by speech-language pathologists. In a systematic review of the literature done by Law, Boyle, Harris, Harkness, and Nye (1998), effectiveness of language intervention for an overwhelming majority of participants was noted in over 200 studies. As with ADHD, parent-implemented language interventions have indicated a significant, positive impact on receptive and expressive language skills of children with and without intellectual disabilities (Roberts & Kaiser, 2011). Given the critical role that parents play in their children's language development, and the differences in parent interaction strategies used with children who have language impairments, teaching parents to support language development is an important component of effective early language intervention.

A recognized and evidence based parent-child intervention program for parents of children with language delays is the "It Takes Two to Talk" program developed by the Hanen Center. Based on a social interactionist perspective of language acquisition, which views the development of communicative competence within a framework of early

caregiver-child interactions (Bohannon & Bonvillian, 1997), the “It Takes Two to Talk” program empowers parents to become their child’s primary language facilitator, thereby, maximizing the child’s opportunities for communication development (Dempsey & Dunst, 2004). Led by a Hanen Certified speech language pathologist (SLP), the “It Takes Two to Talk” program has the following three objectives: educate parents, provide naturalistic early language intervention, and provide social support. It is offered to groups of parents, where they actively participate in the program assessment, videotaping feedback sessions. A minimum of 16 hours of group training is accompanied by parent-friendly guidebook and DVD. Rossetti (2001) states that the program enables parents to make intervention a continual and ongoing process. Tannock, Girolametto and Siegel (1992) conducted a study with 32 preschool children (14-60 months) with developmental delays (mixed etiology) and their mothers. Interactive behaviors of mothers and children taking the “It Takes Two to Talk” program were compared to a matched group in a delayed treatment control group who were wait-listed to take the program. Results of the study included decreased directiveness, and increased responsiveness and assertiveness in those mothers in the experimental group. There were significant increases in verbal turns of children in the experimental group as well as reports of improved family well-being. Additionally, mother-child interactions in the experimental group were more balanced, frequent, and long-lasting.

In conclusion, parent-child interventions such as PCIT and the “It Takes Two to Talk” program, have empirically demonstrated to be an important component for the treatment of both LI and behavioral disorders such as ADHD as well as for the wellbeing

for children and their families. Special considerations should be addressed when a child presents both a behavioral disorder and a language impairment.

Coding Parent-child Interactions

A large number of coding instruments have been developed to measure and assess diverse aspects of the interactions between parents and their child. A well-known coding system used to code behaviors of children with behavioral difficulties and their parents is the Dyadic Parent-Child Interaction Coding System (DPICS) (Eyberg, Nelson, Duke, & Boggs, 2005). This system is a behavioral observation system designed to assess the quality of parent-child social interactions. Since its original publication, clinicians and researchers have used this coding system to guide treatment and evaluate change in parent-child interaction therapy (PCIT) and other parent training interventions for young children with disruptive behavior (Eyberg, Nelson, Duke, & Boggs, 2005).

Instruments to code language behaviors in children with LI have also been developed. The Social Interaction Coding System (SICS) presents an excellent schema to code language behaviors of young children in familiar context, it was designed to describe the continuous verbal interactions of preschool children as a function of play areas, addressees, script codes, and play levels (Rice, Sell, & Hadley, 1990). Law, Barnett, and Kot (1999) used the focus of SICS to design a similar video coding system in order to measure the effectiveness of intervention to improve the language and communication skills of three-year-old children with LI and their parents. The main focus of the “Coding parent/child interaction as a clinical outcome: a research note” is on the nature of the interaction such as initiations, responses and word mapping opportunities;

however, it also includes some aspects of specific structure and content such as interrogatives, repetitions and directives (Law, Barnett, & Kot, 1999).

Current Study

Healthy, constructive and positive parent-child interactions are key components for a child's development and success in the first years of life. Daily functioning of children including relationships with parents, peers, and siblings are pivotal to the emotional and communicational development of every child. Thus, this study was conducted in order to enhance the understanding of these interactions and consequently how they can be fostered by using specific parenting skills. The specific purpose of this thesis was to analyze the discourse structure of both the parent and the child, as well as the communicative function and linguistic behaviors of the parents during the parent-child interactions of children who are at high-risk for developing a behavioral disorder, such as ADHD, with and without a language impairment.

Research Question/ Hypothesis

The research question for this study is: Do parent-child interactions differ in discourse structure, communicative function and linguistic behaviors between children who are at high-risk for developing a behavioral disorder (ADHD) and those who are at high-risk for developing a behavioral disorder with a co-occurring LI (ADHD + LI)?

The hypothesis is that a significant difference is expected, in the parent-child interactions of the children who are at risk of ADHD + LI, in comparison to the children who are at risk for ADHD without any known co-occurring language impairments. It is

expected that there will be more adult only linguistic behaviors, less child verbal initiations, and more child self-verbalizations in the children with LI.

CHAPTER III

METHODOLOGY

The Center for Children and Family (CCF) at Florida International University conducts a yearly Summer Treatment Program (STP) for children who have ADHD or are at high-risk for acquiring it. The videos used to code the data for the following project were recorded as part of a larger study (Pre-K STP) conducted by principal investigator Paulo A. Graziano, Ph.D. alongside Katie Hart, Ph.D. and William E. Pelham, Jr., Ph.D. The videos were utilized to analyze specific language behaviors (discourse structure, communicative function and linguistic behaviors) in parent-child interactions.

Participants

The participants of this study included 20 parents with their biological children ages three to five years old (average age was 4 years, 8 months). All participants took part in the assessment procedures to begin a behavioral intervention program adapted from the evidence-based system used in the Children's Summer Treatment Program (STP) Academic Learning Centers (Pelham, Gnagy, Greiner, Waschbusch, Fabiano, & Burrows-MacLean, 2010). The Pre-K STP is an 8-week summer camp designed for children who are at high-risk for developing a behavioral disorder based on a variety of teacher and parent questionnaires.

Out of the sixty children who participated in the Pre-K STP, thirty-one of them were identified as having communication difficulties. The following study analyzes two groups (G); G1 included 10 randomly selected children from a pool of 31 who were both at high-risk of ADHD plus were identifies as having LI, and group 2 (G2) included ten children who were randomly selected from a pool of 29 children who either passed the language screener or the parents refused to get them screened. Children in group 1 had total language mean standard scores of 73.9 on the Preschool Language Scales 5th Edition (PLS-5; Zimmerman, Steiner, Pond, 2011); raging from mild to moderate mixed (receptive and expressive) language impairments (Table 1). Demographics of participants in group 2 (ADHD) are presented in table 2. Gender distribution was the same in both groups; a total of eight boys and two girls in each group.

Subject	Age	Receptive Language SS	Expressive Language SS	PLS-5 Total Language SS	Language	Gender
1	5y 9m	74	81	76	Spanish	Male
2	4y 5m	94	82	87	English	Male
3	5y 9m	70	59	62	English	Male
4	5y 1m	82	73	76	English	Male
5	4y 2m	73	72	71	English	Male
6	3y 11m	78	76	77	English	Female
7	5y 1m	78	76	77	English	Female
8	4y 11m	82	80	80	English	Male
9	5y 0m	80	63	70	English	Male
10	5y 2m	66	79	71	English	Male

Table 1. Demographics of participants in group 1 (ADHD+LI)

Subject	Age	Language	Gender
1	3y 8m	English	Male
2	5y 0m	English	Female
3	4y 7 m	English	Male
4	4y 5m	English	Male
5	4y 5m	English	Male
6	4y 9m	English	Male
7	4y 2m	English	Male

8	5y 2m	Spanish	Female
9	5y 6m	English	Male
10	5y 6m	English	Male

Table 2. Demographics of participants in group 2 (ADHD)

Recruitment and Eligibility

Participants for the larger study were all preschool children who were about to enter kindergarten, and had been identified as being at high-risk for the development of a behavioral disorders. They were recruited via collaboration with preschool directors, teachers, school counselors, TRUST specialists, and coordinators of parent support/education groups from the local public schools in Miami, Florida. The Miami-Dade County Public Schools is the 4th largest school district in the nation, with approximately 70% Latino children, making it a diverse population. Additionally, flyers were distributed to parents who had children in preschool programs and to those seeking assistance from the CCF. Study enrollment followed a series of three planned development phases across a span of three years. Teachers of all participants were asked to fill out the Externalizing Composites of the BASC-2, Teachers Report. Once the teacher measures were received and scored, parents were informed of their child's eligibility for the study. All participants with t-scores of 60 and above on any of the Externalizing Composites of the BASC-2 Teachers Report clearly meet the IES Social/Behavioral Section's criteria for children at high-risk for the development of behavioral disorders.

Once eligibility was confirmed, families participated in a series of assessments: 1) a baseline diagnostic interview to ascertain the presence of a behavioral disorder or impairment; 2) parents completed questionnaires regarding their child's self-regulation skills and behavioral, social, emotional, and academic functioning; 3) assessment measures of children's intellectual, academic, school readiness and self-regulation skills were obtained; and 4) video-recorded a 15 minute parent-child interaction during play. Exclusion criteria for the study included any children with IQ less than 70, children with a diagnosis of a pervasive developmental disorder (e.g. Autism Spectrum Disorder), and children who were homeschooled.

During the initial interview, parents were offered an optional speech and language screener to rule out any communication difficulties. Out of the 60 participants in the larger study, thirty-one of them were identified as having communication difficulties, and 20 of were randomly selected for this study according to their diagnoses (ADHD+LI or ADHD only). As previously described eligibility for G1 of the current study included children whose total language score on the Pre-School Language Scale 5th Edition (PLS-5; Zimmerman, Steiner, Pond, 2011) was below 80 standard score (SS). An exception was made with one of the participants whose total language score was 87 SS, but his age equivalent scores demonstrated a 10 month delay, due to the significant differences between his auditory comprehension scores and his expressive communication scores.

Measures

As part of the larger study, an extensive number of assessments were used to measure different behaviors. Each participant in the study received scores on the

following behavioral functioning measures: 1) Behavior Assessment System for Children, 2nd Edition (BASC-2; Reynolds & Kamphaus, 2004) to assess externalizing problems and social skills; 2) Impairment Rating Scale (IRS; Fabiano, Pelham, William, Waschbusch, Gnagy, Lahey, & Lopez, 2006) to assess behavioral impairment; 3) behavioral modules of the Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3; Shaffer, Fisher, Dulcan, Davies, Piacentini, Schwab-Stone, & Regier, 1996) to assess for the presence of a behavioral disorder; 4) Student-Behavior Teacher-Response observation system (SBTR; Pelham, Greiner, & Gnagy, 2008) to evaluate classroom behavior; 5) Student-Teacher Relationship Scale (STRS; Pianta, 1996) to assess the Quality of Student-Teacher Relationship.

Emotional and Self-regulation measures were determined by: 1) the Day-Night Task (Gerstadt, Hong, & Diamond, 1994); 2) the Continuous Performance Test–Kiddie Version (K-CPT; Conners, 2001); 3) the Emotion Regulation Checklist (ER Checklist; Shields & Cicchetti, 1997); 4) parenting measures including the Teacher-Parent Involvement Questionnaire (INVOLVE; Webster-Stratton, Reid, & Hammond, 2001); and 5) the Alabama Parenting Questionnaire-Preschool Version (APQ-PR; Shelton, Frick, & Wootton, 1996).

In addition, the following academic measures were used with each participant: 1) the information and matrix reasoning subtests of the Wechsler Preschool and Primary Scale of Intelligence – Third Edition (WPPSI-III; Wechsler, 2002); 2) the Bracken School Readiness Assessment (BSRA; Bracken, 2002); and 3) the Woodcock-Johnson III Tests of Achievement (WJ-III; Woodcock, McGrew, & Mather, 2001).

Speech and language screenings were completed using the Preschool Language Scale-5 Screening Test (PLS-5; Zimmerman, Steiner, Pond, 2011); those participants who received a full speech-language evaluation were assessed with the Preschool Language Scales 5th Edition (PLS-5; Zimmerman, Steiner, Pond, 2011). The Spanish version of the PLS-5 was used for two of the participants who were English/ Spanish bilinguals. Parents filled out the Parent Questionnaire of the PLS-5

Procedures

During the initial intake visit, each participant and their parent (either the mother or the father) were taken into a room for 10 minutes of play time followed by 5 minutes of clean up time. In each room, there was a box filled with Legos and a box with several Mr. Potato Heads to play with during the interaction. Research assistants at the CCF recorded all the interactions using the following time structure. The first five minutes of play were child directed interactions (CDI), and parents were instructed to allow the child to lead the play as they thought appropriate. When time was over, the parent was told, via (in the ear) microphone, that it was their time to lead the play. Parent-directed interactions (PDI) lasted five minutes. Then, the parent was again instructed to tell the child it was time to clean up. Specific scripts were used based on the Dyadic Parent-Child Interaction Coding System (DPICS) (Eyberg, Nelson, Duke, & Boggs, 2005), which is a standardized behavioral observation system designed to assess the quality of parent-child social interaction; It is used by clinicians in PCIT and other interventions for young children and their families. Each participant and their parent were recorded for a total of 15 minutes.

For the current study, the five minutes of child-directed interaction (CDI) were selected to be coded using an adapted version of the instrument described in “Coding parent/child interaction as a clinical outcome: a research note” designed by Law, Barnett, and Kot (1999). The coding system focuses on the nature of the interaction and includes aspects of specific structure and content. It emphasizes the role of both parent and child variables, and particular attention is given to what the parent does to extend the language learning opportunities for the child. The coding system includes the following categories and their sub-divisions. *Discourse Structure* (for both the adult and child) includes: verbal initiations, re-initiations, verbal response, non-verbal initiations, non-verbal response, discourse maintainer, non-verbal discourse maintainer, and self-verbalizations. *Communicative Function* (for adults only) includes: directive interrogative, directive interrogative repetition, topic continuer, and topic continuer with negative effect. *Linguistic Behavior* (for adult only) includes: word mapping opportunities, inappropriate opportunity, and recast. Discourse Structure and linguistic behaviors manage the flow of the conversation, whereas communicative functions refer to the specific semantic input provided by the parent to draw a child into, and retain them, continually within the conversation. (Law, Barnett, and Kot, 1999). For the purpose of this study non-verbal initiations and non-verbal responds were not coded for either the adult or the child. Table 3 displays a descriptive summary of the specific codes.

This coding instrument was used to code the videos of the parent and child behaviors by recording the frequency of their occurrence (in real time). Skills were calculated by adding the total number of behaviors for each, the adult and the child, during the 5-min child-directed play. Four master’s level speech language pathology

students were trained with at least 80% agreement with a criterion tape, and were blind to the group status (ADHD+LI or ADHD only) of the participants. Each student was initially assigned five videos to code. Upon completion of the five videos, each student was assigned three videos (from the pool of 20) to independently re-coded for the purpose of reliability check. The principal investigator of this study re-reviewed the 12 videos for intra-rater reliability and arrived at 81% agreement.

Data Analysis

The data collected and coded from each of the 20 participants were used to analyze the discourse structure, communicative function, and linguistic behaviors of the parent-child interactions of children who are at high-risk for developing a behavioral disorder, such as ADHD with and without a language impairment. Participants were divided into two groups, group one (G1) was named ADHD + LI and group two (G2) was named ADHD. Independent t-tests and the Mann-Whitney U Test were performed to analyze the data.

Table 3. Definitions and descriptions of specific codes.

ADULT AND CHILD		
Discourse Structured	Code	
Verbal Initiations	VI	An utterance or a string of communication acts that move forward the conversation by providing a turn that demands a response.
Re-Initiations	VIR	Persisting in initiating a topic with no change in the content of the utterances.
Verbal Response	VR	An utterance or a string of communication acts in which a partner responds to the preceding request or directive turn.
Discourse Maintainer	DM	When an utterance is being used to sustain conversation or shared interest but which has no other purpose and is not a response to an initiation.
Non-Verbal Discourse Maintainer	DMSV	Nonverbal acknowledgments such as " <i>uh huh</i> "
Self-Verbalizations	SV	When the child or adult is clearly attending to their own activity with no awareness or interest in what the other person is saying or doing.
ADULT ONLY		
Communicative Functions		
Directive/Interrogative	DI	Utterance that indicates an expectation for the child to respond; verbally or non-verbally.
Directive/Interrogative (Repetition)	DIR	Constitute a repetition of the given command.
Topic Continuer	TC	Utterance that are not set to direct the child, or provide a learning opportunity in terms of offering any semantic information.
Topic Continuer (Negative Effect)	TCN	Utterances that cannot be seen as having positive communicative function as well as being empty of semantic information.
Linguistic Behaviors		
Word Mapping Opportunity	WMO	Utterances that scaffold the dialogue by providing specific linguistic information referring to the non-verbal context and thereby provides opportunities for the child to map what he or she hears onto what he or she sees.
Inappropriate Opportunity	MT	Utterance which does not provide the child with a learning opportunity.
Recast	REC	Child's utterance is repeated by an adult with a modification that includes an appropriate syntactic structure.

CHAPTER IV

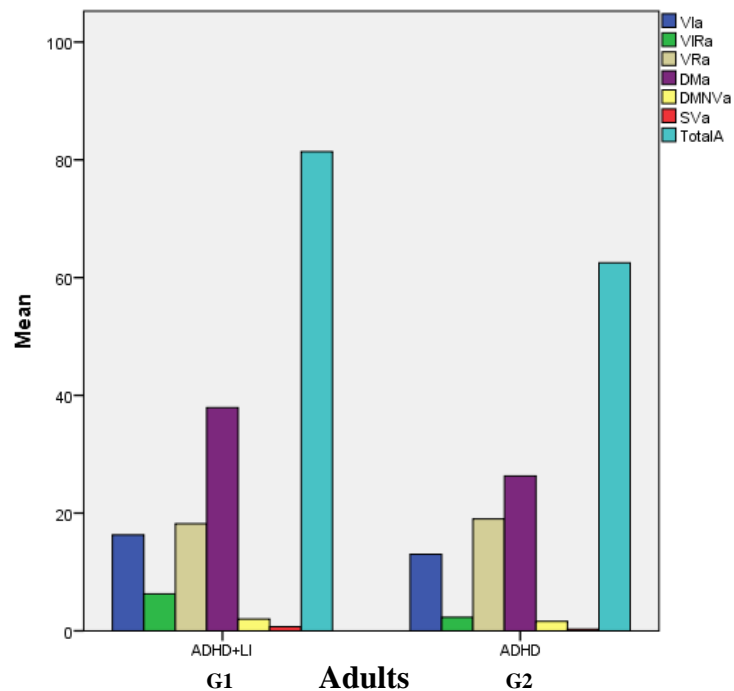
RESULTS

The total number of behaviors within each communication parameter (Discourse Structure, Communicative Function, and Linguistic Behavior) for both the adult and child were coded and counted over a 5 minute period for each participant. The source of significant interactions between group 1 and group 2 were analyzed using an independent t-test, and an analysis of the overall data was done with a Mann-Whitney U Test.

Discourse Structure

Adult. Figure 1 illustrates the total coded amounts of discourse structure behaviors displayed by the parent during the five minutes of the CDI.

Figure 1. Total amounts of discourse structure behaviors coded for adults.



The mean number of coded behaviors were compared between the two groups. Statistical results of the nonparametric Mann-Whitney U test of each individual code for the parents are shown in Table 4. The results of the independent t-test analysis of the total mean difference of all codes are shown in Table 5. No significant comparison was found for any of the mentioned behaviors under discourse structure. However, G1 demonstrated a higher level of total behaviors ($M = 81.40$) versus G2 ($M = 62.50$), showing 30% more of these behaviors. Although, not significant another important difference observed on parents was in discourse maintainer (DM), G1 ($M = 37.90$) and G2 ($M = 26.30$), indicating that those parents whose child had LI and were at risk for ADHD used more discourse maintainer behaviors than the parents whose child did not have LI.

Table 4. Nonparametric Mann-Whitney U test for adult’s individual codes.

	VIa	VIRa	VRa	DMa	DMNVa	SVa
Mann-Whitney U	45.000	34.500	48.000	27.500	33.500	44.000
Wilcoxon W	100.000	89.500	103.000	82.500	88.500	99.000
Asymp. Sig. (2-tailed)	.705	.232	.880	.088	.193	.551
Exact Sig. [2*(1-tailed Sig.)]	.739	.247	.912	.089	.218	.684

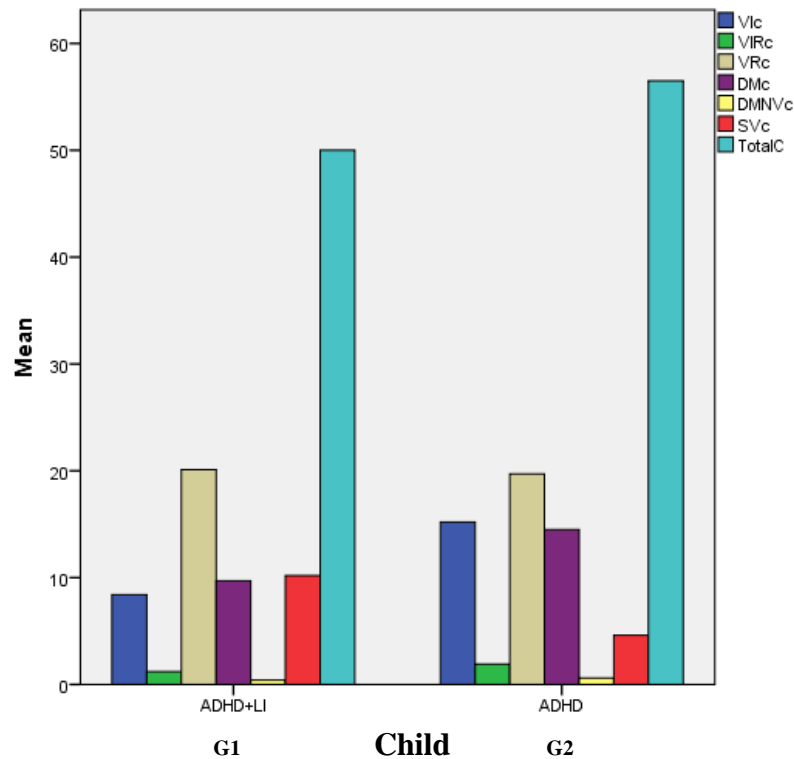
Table 5. Independent t-test statistical analysis for total adult’s individual discourse structure behaviors.

	t-test for Equality of Means (Equal variances assumed)					
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval
Total A	1.514	18	.147	18.900	12.482	-7.325

Child. Figure 2 illustrates the total amounts of discourse structure behaviors coded for each child during the five minutes of the CDI. Independent t-tests were

conducted on the mean number of coded behaviors for each group. G2 demonstrated a significantly higher level of verbal initiations ($M = 15.2$) in comparison to G1 ($M = 8.40$) ($t=-2.215$; $p=.040$). Other important differences were observed in discourse maintainer; G1 ($M = 9.70$) and G2 ($M = 14.50$) as well as in self-verbalizations, G1 ($M = 10.20$) and G2 ($M = 4.60$). However, statistically significance differences were only noted on verbal initiations, with the rest of the codes showing non-significance ($p>.05$).

Figure 2. Total amounts of discourse structure behaviors coded on children.



Statistical results of the independent t-test of each individual code and the total mean of each behavior for the children are shown in Table 6.

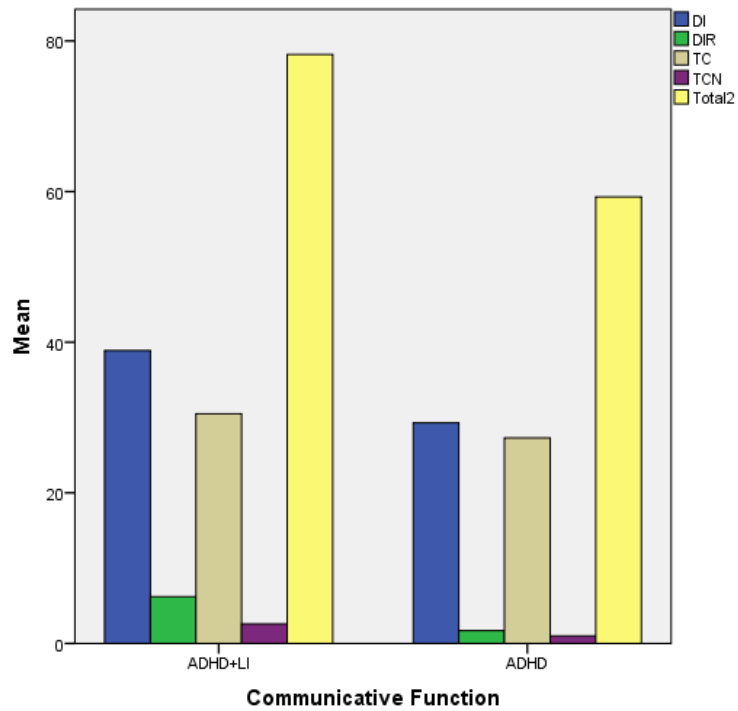
Table 6. Independent t-test statistics for child’s individual codes discourse structure behaviors

	Equal variances assumed			t-test for Equality of Means		
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
VIc	-2.215	18	.040	-6.800	3.070	-13.249
VIRc	-.656	18	.520	-.700	1.067	-2.942
VRc	.081	18	.936	.400	4.948	-9.994
DMc	-.912	18	.374	-4.800	5.263	-15.856
DMNVc	-.577	18	.571	-.200	.346	-.928
SVc	1.356	18	.192	5.600	4.131	-3.079
Total C	-.565	18	.579	-6.500	11.507	-30.675

Communicative Functions

Figure 3 illustrates the total coded behaviors for adult’s communicative functions.

Figure 3. Total amounts of communicative functions coded. (Adult only behaviors)



Parents in G1 demonstrated a higher rate of using communicative functions compared to parents in G2. For example, Directive/ interrogatives in G1 ($M= 11.95$) were higher than in G2 ($M= 9.05$). Additionally, Directive/Interrogative (Repetition) and Topic Continuer in G1 were higher than in G2. However, no statistically significant results were noted in any of the communicative function behaviors. Statistical results of the nonparametric Mann-Whitney U test, of each individual code are shown in Table 7. The results of the independent t-test analysis of the total mean difference of all codes are shown in Table 8.

Table 7. Nonparametric Mann-Whitney U test for child’s individual codes.

	DI	DIR	TC	TCN
Mann-Whitney U	35.500	30.000	35.500	48.500
Wilcoxon W	90.500	85.000	90.500	103.500
Z	-1.097	-1.589	-1.098	-.140
Asymp. Sig. (2-tailed)	.273	.112	.272	.889
Exact Sig. [2*(1-tailed Sig.)]	.280	.143	.280	.912

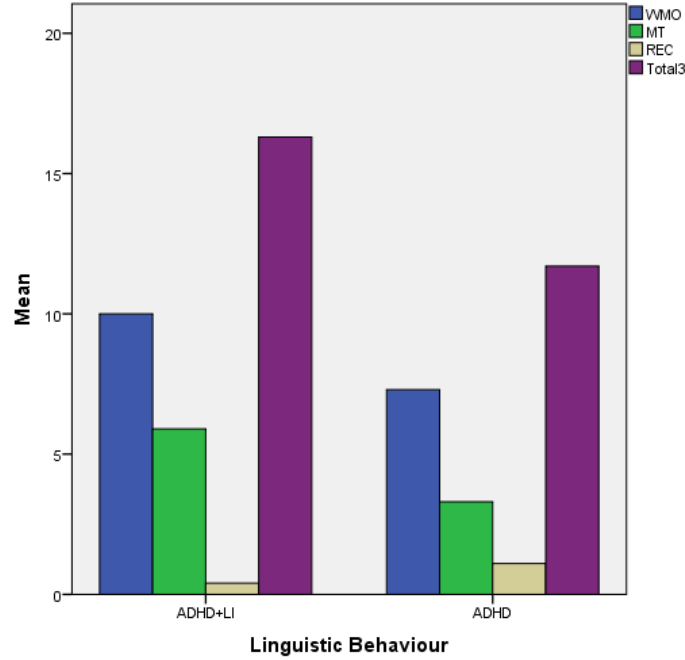
Table 8. Independent t-test statistics for total communicative function codes.

	t-test for Equality of Means			Equal variances assumed		
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
Total 2	1.563	18	.136	18.900	12.095	-6.510

Linguistic Behaviors

Figure 4 illustrates the totals for all the coded linguistic behaviors. Independent t-test were conducted on each individual code as well as for the mean number of coded behaviors for each group.

Figure 4. Total amounts of linguistic behaviors coded. (Adult only behaviors).



A 30% difference between G1 and G2 was noted when coding inappropriate opportunities. Other differences observed were; word mapping opportunities (WMO) in G1 ($M= 11.05$) and G2 ($M= 9.95$), inappropriate opportunities (MT) in G1 ($M=12.35$) and G2 ($M=8.65$), and recast G1 ($M= 10.25$) and G2 ($M=10.75$). However, no statistically significant results were noted in any of the linguistic behaviors. Statistical results of the independent t-test statistics for each individual code and mean totals are shown in Table 9.

Table 9. Independent t-test statistics for parent’s linguistic behaviors and total codes.

	t-test for Equality of Means			Equal variances assumed		
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confid. Interval
WMO	.742	18	.468	2.700	3.639	-4.946
MT	1.055	18	.306	2.600	2.465	-2.579
REC	-.927	18	.366	-.700	.755	-2.286
Total3	.795	18	.437	4.600	5.785	-7.554

CHAPTER V

DISCUSSION

The primary aim of the present study was to examine how parent-child interactions differ in discourse structure, communicative function, and linguistic behaviors between children who are at high-risk for developing a behavioral disorder (ADHD- G2) and those who are at high-risk for developing a behavioral disorder with a known co-occurring LI (ADHD + LI- G1). It was expected that G1 would differ from G2 in adult only linguistic behaviors, as well as, child discourse structure. To accomplish the objective of the study, pre-recorded videos of five minute child directed interactions with their parents were coded and analyzed using a variety of instruments.

Slight differences were recorded in each communication parameter (Discourse Structure, Communicative Function, and Linguistic Behavior) between the two groups; however, statistical results of parametric and non-parametric tests determined that there were no statistically significant differences between the two groups, with the exception of the increased verbal initiations in children of G2 when compared to those in G1. This latter observation was expected since children who have a language impairments demonstrate less verbal initiations, reduced verbal quality, and increased communication difficulties; than those children with typically developing language skills (Allen & Marshall, 2010; Yoder & Warren, 2001)

Although other statistical results did not support the study hypothesis, it is important to discuss the slight differences noted in each communication parameter between the two groups. These differences may provide valuable information on how a

LI impacts the parent-child interactions of those children who are at a high risk for a behavioral disorder such as ADHD. When discussing the results of this study, it's vital to keep in mind that a major problem in investigating parent-child interactions is isolating causal variables as well as interactional concerns such as, genetics and environmental overlap between the child and the parent (Buss, 1981; Delaney, & Kaiser, 2001; Garcia, Bagner, Pruden, & Lopez, 2014). However, to enhance the understanding of these interactions special attention is given to verbal behaviors.

Discourse Structure

Relative to discourse structure which includes those behaviors that manage the flow of the conversation or interaction, parents in G1 had a higher number of total behaviors than parents in G2, supporting the results of Yoder and Warren (2001) that parents of children with LI focus heavily on their spoken language. Parents in G1 had more discourse maintainers (DM) than those in G2, indicating that parents whose child had LI, were using more verbal behaviors in order to maintain the conversation/interaction by either answering their own questions when there was no response from the child, or commenting on what was going on to maintain their shared attention and interest. Previous research has indicated that parents of children with language difficulties are more directive (Allen & Marshall, 2010). DM behaviors in the current study indicate parents' directness due to the lack of response.

The discourse structure of children also presented slight differences. Those children in G2 demonstrated higher numbers of DM behaviors compared to those children in G1 during their interactions, possibly due to the communication difficulties of

those children with LI. These observations are consistent with previous research that demonstrates that children with LI are less likely to sustain an interaction, usually due to their lack of understanding or expressive language skills (Carson, Perry, Diefenderfer, & Klee, 1999). It was also noted that parents in G1 had more re-initiations (VIR). This behavior is coded when the parent persists in initiating a topic because there was no response or the response was either incorrect or not understood. Parents of children with LI are less responsive to their child's non-verbal communication; therefore, it is possible that these parents were re-initiating more than parents in G2 because they did not attend to a possible non-verbal response of their child (Yoder & Warren, 2001). As mentioned before, there was a statistically significant difference between the verbal initiations (VI) of children in G1 versus those in G2. Children in G1 demonstrated less VI, and perhaps this is because of their communication deficit.

Another important code worth mentioning under the category of discourse structure is self-verbalizations; as a group, children in G1 had a higher amount of self-verbalizations (SV) compared to those children in G2. SVs are coded when the child is clearly attending to their own activity with no awareness of interest in what another person is saying or doing. This increase in SVs may be attributed to the known functional behavioral difficulties of the children in G1, and their inability to effectively communicate with their parents due to their LI.

Communicative Functions

Communicative functions refer to the specific semantic input provided by the parent to draw a child into and retain participation continually within the conversation/

interaction. This communication parameter included directive/interrogative (DI), directive/interrogative repetitions (DIR), topic continuer (TC), and topic continuer negative effect (TCN). Parents in G1 had a higher number of these total behaviors, implying that they were constantly trying to draw or retain the child in the interaction. It is important to recall that parents were instructed to allow the child to lead the interaction for the five minutes of video recording that were used to code. Therefore, these results could have been due to the lack of VI by the child or the parent's constant effort to retain the child's engagement in the current activity/ conversation.

Linguistic Behaviors

The last communication domain analyzed was linguistic behaviors. As with discourse structure, linguistic behaviors manage the flow of the conversation by the parents only. Results of the study revealed that parents in G1 demonstrated more linguistic behaviors such as word mapping opportunities (WMO), and had more inappropriate opportunities (MT) than those parents in G2. Word mapping opportunities refer to the process whereby the adult/ parent scaffolds the dialogue by providing specific linguistic information referring to the non-verbal context, thereby providing opportunities for the child to map what he or she hears onto what he or she sees. This behavior was noted for parents of G1; however, it is not clear why this behavior was prominent. Perhaps, the fact that parents were instructed to let the child lead the interaction while the videos were being recorded had an influence in the interaction. However, both parents in G1 and G2 were given the same instructions.

Limitations

A number of limitations must be considered when generalizing the results of the above experiment. Due to the limited time to complete the study, and amount of resources available, the sample size had to be reduced to 20 participants instead of a larger sample size. This is critical to the overall findings of this study because a larger sample size would have possibly yield statistical significant results.

During the assessment procedures for eligibility to the larger study, parent's main concerns were the behavioral difficulties of their children. At the time of recording the parent-child interactions, most parents in group one were not aware of their child's language impairment, many believed that the communication difficulties of their child was due to the disruptive behaviors. This sets a limitation on the results of this study because parental awareness of their child's LI is a precursor to reduced parent-child. Additionally, the instrument used to assess language skills in children of G1 (PLS-5) has recently presented low diagnostic accuracy, in that scores often do not appear to reflect the actual language skills of those assessed (Smith, 2014). Results of the language screener on children in G2, who were screened for language difficulties, might have been a false negative due to the lack of sensitivity of the instrument, and severity of deficit of children in G1 was possibly greater. A study was done to compare the results of the PLS-5, Children's Communication Checklist-2 (CCC-2), and language sample analysis in the same population of children as those in G1 (at risk for ADHD+LI), this study attempted to determine if the three measures would provide convergent or divergent information on the subjects language status. Results concluded that there was very little agreement

between the CCC-2, PLS-5 and MLU/TTR, and it was unclear which measures under- or over-identified language delay in the sample. A detailed analysis of the varying components of each assessment tool did not lead to any conclusive reasons for this lack of agreement (Ramos, Basiletti, Pinillos, Rodriguez, Roiz & Suarez, 2015). Therefore, there is a possibility that there were children with LI in group 2 who were not diagnosed.

Implications for Current Practice and Future Research

The current study has important implications for the current practice of childhood psychological and pathological impairments. The pivotal importance of parenting behaviors in the development of children, as well as their involvement in their child's behavioral and language difficulties must be taken into consideration when treating disorders such as ADHD and LI. Parent coaching and involvement during intervention should be considered by clinicians when establishing a plan of care. Future research using a larger sample size for the same populations and different instrumentation for coding and assessment of language skills may result in higher validity and reliability.

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