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Attention-Deficit/Hyperactivity Disorder (AD/HD) is associated with impairment in many domains of a child's daily functioning, including receptive and expressive language skills. Although there is research evidence suggesting that child AD/HD symptoms contribute to disruptions in the language learning environment, other factors, including adult AD/HD, may also contribute to these difficulties. In this study, maternal symptoms of AD/HD were hypothesized to be associated with lower levels of maternal responsiveness and higher levels of maternal directiveness, which in turn were expected to be associated with child language deficits. An observational research design was used to investigate the association between various child and maternal variables and the outcome variables of interest - maternal Responsiveness, and maternal Directiveness, child receptive language skills, and child expressive language functioning. Stepwise hierarchical regression analyses showed that higher levels of maternal hyperactivity symptoms were associated with increased maternal Directiveness. No relationship, however, was found between maternal AD/HD symptoms and maternal Responsiveness. As predicted, lower levels of child receptive language were associated with higher levels of inattention, while lower levels of child expressive language were associated with higher levels of child hyperactivity-impulsivity. Contrary to expectations, parental AD/HD symptoms were not associated directly with child language functioning. Together, these findings indicate that maternal symptoms of AD/HD are associated with maternal behavior style during mother-child

interactions, suggesting that interventions for mothers who have symptoms of AD/HD should be developed and implemented while considering their specific AD/HD symptom presentation. Also suggested by these findings is the continual need for comprehensive language evaluations for children diagnosed with AD/HD.

PARENTAL SYMPTOMS OF ATTENTION-DEFICIT/ HYPERACTIVITY DISORDER AND MATERNAL RESPONSIVENESS IN MOTHER-CHILD INTERACTIONS: IMPLICATIONS FOR CHILD LANGUAGE FUNCTIONING

by

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CHAPTER I

INTRODUCTION

Language impairments often co-occur in children with Attention-Deficit/Hyperactivity Disorder (AD/HD). Estimates of the comorbidity of AD/HD and language disorders indicate that between 15-75% of the AD/HD population have significant language problems (Tannock, 2000). It is commonly thought that language development is affected by child symptoms of AD/HD. Although this may be true, another possible explanation for this comorbidity is that there are factors in the language learning environment of a child with AD/HD that impact language development. In particular, research on typical language development highlights the important role of maternal responsiveness for child language development to occur (Hart & Risley, 1995; 1997), and there is evidence that maternal psychopathology impacts parental responsiveness in ways that lead to deficits in child language functioning (Carson, Perry, Diefenderfer, & Klee, 1999; Reissland, Shepherd, and Herrera, 2003).

Although there has been some investigation of the impact of parental psychopathology on interactions and language development, no studies have addressed the potential association of parental symptoms of AD/HD on maternal responsiveness. Given that children with AD/HD often have parents with AD/HD, parental symptoms could also affect the language learning environment. The social interactionist theory, a prominent theory of language development, provides a framework for how parental

characteristics might interact with child characteristics for language development (Hulit & Howard, 1997). It is possible that increased frequency and severity of maternal symptoms of AD/HD may decrease parental responsiveness during parent-child interactions. In turn, a decreased level of maternal responsiveness may be a risk factor for the development of language difficulties in children with symptoms of AD/HD.

In response to this situation, the purpose of the present study was to examine the association between maternal symptoms of AD/HD, maternal responsiveness during parent-child interactions, and child language functioning. For readers unfamiliar with these topics, symptoms and associated features of AD/HD in children and adults will first be discussed, highlighting the common occurrence of familial AD/HD diagnoses in parents and children. Research on common language impairments found in children diagnosed with AD/HD will be presented next, along with limitations in the current AD/HD and language disorders literature. The social interactionist theory will then be reviewed, emphasizing the interactive and responsive processes between children and their parents, which are necessary for language development. Specific child and maternal characteristics that may negatively impact the interactive language processes will be addressed. Finally, the directive and negative interactions common among children diagnosed with AD/HD and their parents will be covered.

Characteristics of AD/HD

Diagnostic Criteria of AD/HD

Symptoms of inattention, impulsivity, and hyperactivity are common in all children and often signify a wide range of normal developmental processes. However,

when symptoms of inattention, impulsivity, and hyperactivity become excessive, this occurrence may suggest the presence of Attention-Deficit/Hyperactivity Disorder (AD/HD; APA, 1994). AD/HD is diagnosed in children and adults when multiple criteria are met, including displaying 6 or more symptoms of either inattention (e.g., difficulty giving close attention to details or making careless mistakes in schoolwork, work, or other activities; difficulty sustaining attention in tasks or play activities; failure to listen when being spoken to directly; difficulty following through on instructions thus failing to finish homework or chores) or hyperactivity-impulsivity (e.g., fidgets with hands or feet or squirms in seat; often has difficulty awaiting turn; or often interrupts or intrudes on others). These symptoms must cause clinically significant impairment in home, school, or social functioning. The onset of these symptoms must be before the age of seven. In addition, symptoms must be present in two or more settings; and the symptoms must not be due to any other disorder.

Within the diagnosis of AD/HD there are three major subtypes. The first is the AD/HD, Combined Type. This diagnosis would be given if 6 or more symptoms from the inattention symptom list and 6 or more symptoms from the hyperactivity-impulsivity symptom list were displayed and all other criteria were met. The second subtype is the AD/HD, Predominantly Inattentive Type, where 6 or more inattentive symptoms are evident, but fewer than 6 hyperactive-impulsivity symptoms exist. The last subtype is the AD/HD, Predominantly Hyperactive-Impulsive Type, where the child exhibits 6 or more hyperactivity-impulsivity symptoms, but 5 or fewer of the inattention symptoms and all other criteria are met.

Prevalence of AD/HD

Estimates of AD/HD range from 2-5% of the general child population (APA, 1994). The prevalence rate of AD/HD in adults is thought to be nearly 1 to 3 percent providing evidence that AD/HD may decline with age. In terms of gender differences, AD/HD is 2 to 9 times more prevalent in males compared to females. The distribution of AD/HD across socioeconomic classes is not well understood. Similarly, the connection between AD/HD and ethnicity is not clearly documented; however, research suggests that AD/HD is a disorder found world-wide across ethnicities (Anastopoulos & Shelton, 2001).

Developmental Course

Although AD/HD was once thought to be a disorder primarily affecting children and adolescents, there has been evidence in recent years suggesting that many children previously diagnosed with AH/HD continue to experience impairment related to AD/HD symptoms in adulthood. Infants with AD/HD have been found to have difficult temperaments, such that they often have colic or have sleep disturbances. In toddlers with AD/HD, they continually get into things, display an inability to listen and do not respond to parental discipline. During the preschool period, children with AD/HD often display high levels of hyperactivity, low frustration tolerance, and temper tantrums, making sustained play and school participation difficult. In school-aged children, symptoms of inattention are highlighted, given the increasing demands of the school setting when demands for academic productivity increase. In addition to academic difficulties, school-aged children have problems with social functioning and self-esteem. During

adolescence, there are widespread effects of AD/HD on all aspects of life, including academic, psychosocial, behavioral and emotional functioning. About 75-85% of AD/HD children and adolescents diagnosed with AD/HD continue to meet diagnostic criteria for AD/HD into adulthood (Barkley, Fischer, Edelbrock, & Smallish, 1990; Barkley & Gordon, 2002).Given the relatively recent recognition of the persistence of AD/HD into adulthood, there is not extensive research on adult AD/HD.

Developmental trends are also evident among subtyping categories, which varies with the informant. Parent ratings have suggested that the Hyperactive-Impulsive subtype occurs more often among children 5-7 years of age; then, with a decline in hyperactive-impulsive symptoms, the Inattentive subtype increases for children above the age of seven. In contrast, teacher rated 5-10 year olds are much more likely to be identified with the Combined subtype. Furthermore, according to teacher ratings for children 11-18, the Inattentive subtype becomes more prevalent (Anastopoulos & Shelton, 2001).

Comorbid Features

Many children with AD/HD also have comorbid psychiatric conditions. In particular, 32% to 40% of children with AD/HD have comorbid Oppositional Defiant Disorder (ODD) and 12% to 30% have comorbid Conduct Disorder (CD; Barkley, 2005). Elevated rates of other disorders, including learning disabilities and internalizing disorders, have also been reported in the child AD/HD population (Barkley, 1998). Furthermore, the rates of language disorders in the AD/HD population are higher than those in the general population, ranging from 15% to 75% with an average estimate of 45% (Beitchman, Tuckett, & Batth, 1987; Tannock, 2000). In addition, research suggests

that there are some gender differences across comorbid features of AD/HD, such that girls with AD/HD show lower rates of conduct disorder and oppositional defiant disorder but also slightly lower intellectual, reading and math scores (Barkley, 1998).

Psychosocial Impact

In terms of psychosocial functioning, children with AD/HD often display impairments in areas of social, academic, and behavioral domains. In a longitudinal study of children with AD/HD, Barkley, Fischer, Edelbrock, & Smallish (1990) found that in children with AD/HD, as many as 46% were suspended from school, 10% dropped out of school, 32.5 % were in special education classes for learning disabilities, 35.8% had emotional disorders, and 16.3% had speech and language disorders. In terms of speech and language difficulties, it is speculated that these difficulties prompt children to use other means of communication, such as impulsive, negative and aggressive behaviors, during social interactions (Ellison, 2002).

The different subtypes of AD/HD are often associated with different areas of impaired functioning. For example, in a study of female adolescent twins who were diagnosed with AD/HD, Inattentive subtype, they had academic problems, family problems, and referral to health care providers, while those with the Hyperactive-Impulsive and Combined subtypes had impairment in social relations (Lewis, 2001). Children with the Inattentive subtype of AD/HD may also be at reduced overall risk, given that the absence of impulsivity appears to be associated with a better outcome (Barkley, 1997b; Lewis, 2001).There is some speculation that children with Combined Type or Inattentive Type of AD/HD are more likely to continue to meet criteria for these

subtypes as adults (Wender, 2000). Consistent with the impact of AD/HD subtype in children, there is also evidence that different subtypes of AD/HD in adults may put them at risk for different comorbid psychopathology (Millstein, Wilens, Biederman, & Spencer, 1997).

Adult AD/HD

In adults, symptoms of inattention, hyperactivity and impulsivity have been well documented. Symptoms of inattention are the most frequently endorsed symptoms of AD/HD in adults. Rather than truly an inability to pay attention, adults with AD/HD suffer from an inability to pay attention to appropriate things, to distinguish relevant from irrelevant details, and to persist in attention demanding tasks. Manifestations of inattention in adult AD/HD include difficulty in directing and sustaining attention, problems in completing projects, becoming easily overwhelmed by tasks of daily living, difficulty maintaining an organized living space or work space, inconsistent work performance, and poor attention to detail. Inattention and difficulty concentrating also often result in a failure to encode new information into memory effectively, which may result in apparent forgetfulness. Attentional difficulties may also manifest as frequently losing things such as keys or wallets, being late for appointments, and forgetting plans (Wender, 1995).

Impulsivity in adulthood is expressed as acting on the spur of the moment, difficulty with delayed gratification, purposeful pursuit of stimulating or risky activities, making comments without considering their impact, impatience, and low frustration tolerance (Leimkuhler, 1994; Wender 1995). Impulsivity can also manifest as making

important decisions without reflection or with insufficient information. or "jumping to conclusions" without sufficient evidence (Leimkuhler, 1994). In adults, hyperactivity persists in symptoms such as feeling uncomfortable sitting still, finding it difficult to "relax," and being unable to persist in sedentary activities such as watching a movie or reading. "Quiet" hyperactivity, such as mental restlessness and distracting internal thoughts, is also present and may manifest as muscle tension or sleep disturbance (Leimkuhler, 1994). Fidgeting is also a common expression of hyperactivity. Impulsivity in adulthood may manifest in social and interpersonal situations and in decision making, whereas motor manifestations are more common in childhood.

Associated Features in Adults with AD/HD

Like many children with AD/HD, adults with AD/HD also have impaired functioning in many domains. In general, the lives of adults with AD/HD are characterized by chaos that persists from childhood to adulthood affecting various domains, including behavioral, social, academic, occupational, and executive functioning. One unique domain to adulthood AD/HD is the family domain, which includes both marital and parental functioning. AD/HD often can have a strong impact on marital and parent functioning for adults diagnosed with the disorder. Further complicating the family picture is the fact that when there is one parent with AD/HD, it is more than likely that there will be one or more children with AD/HD. Some have reported up to a 57% chance of this occurring (Phelan, 2002). The reverse is also true, when there are children with AD/HD, more than likely one or both parents will also have AD/HD. Walker (1999) found up to an 83% chance of this occurring. Furthermore, the presence of more than one

person with AD/HD in a family is likely to have a detrimental impact on family functioning, and this combination often intensifies the effects of AD/HD related problems. AD/HD in parents often reduces their ability to find workable solutions for problems and these families often get overwhelmed. When under stress, parents with AD/HD often regress to less adaptive forms of thought and behavior (Phelan, 2002).

Adult AD/HD is found to have a significant negative impact on the climate of the interactions the AD/HD adult has with their spouse and/or children. Furthermore, AD/HD in parents and children has significant implications for the parent-child relationship (Phelan, 2002). AD/HD symptoms and associated features also impact parental demands that center around organization, managing behavior, setting limits, providing discipline, accomplishing specific tasks, and meeting emotional needs of the child and the parent. Parental AD/HD makes it difficult for the parent to employ proper parenting skills, given the difficulties with organization, consistency, unpredictability, and temper outbursts. A parent with AD/HD may have difficulty parenting a child with typical behavior; however, a greater degree of difficulty is often observed when parents with AD/HD attempt to discipline children with AD/HD (Phelan, 2002). Often parents with AD/HD have a difficult time providing the necessary accommodations for appropriate interactions, such that they have a difficult time structuring interactions and providing the appropriate consequences. These parents often have a difficult time maintaining their own structure and organization, without the added duty of maintaining consistency and constancy for their own children. An AD/HD parent, who is impatient, moody, inconsistent, and easily frustrated, is presented with a child who is impulsive, demanding, defiant, aggressive,

overactive, inattentive, and undercontrolled. Thus, interactions between a parent with AD/HD and a child with AD/HD are often filled with increased friction; and instead of appropriately handling problems, conflicts are often explosive and unresolved. The combination of these characteristics makes having a positive interaction difficult for these parents and children. It is likely that children with AD/HD experience the same difficulties during their attempts to communicate. Taken together, when there is a child and a parent with AD/HD, communication between these two individuals is likely to be disrupted, incomplete, and chaotic (Phelan, 2002).

Summary

Inattention, hyperactivity, and impulsivity are the primary symptoms of AD/HD. In addition to these symptoms, comorbid language, learning, behavioral, mood, and anxiety disorders exist. These primary and secondary symptoms associated with AD/HD often persist into adulthood and impact social, academic, and behavioral domains. Unique to adult functioning, however, are marital and parenting domains, which are also negatively impacted by parental symptoms of AD/HD. Adults diagnosed with AD/HD are more likely to have children with AD/HD, and the presence of more than one person in a family with AD/HD is likely to have a detrimental impact on family functioning and family interactions, and this combination often intensifies the effects of AD/HD related problems, including child language impairments.

AD/HD and Language Impairments

Although the symptoms and associated features of child and adult AD/HD were discussed, a closer look will now be directed to the types of language impairments

commonly found in this population to better understand the potential relationship between AD/HD and communication difficulties. Communication disorders include both speech and language disorders. Within the realm of speech problems, deficits include problems with motor production of speech sounds (articulation and dysfluency), which serve to interrupt the normal rhythm of speech, speech rate, and altered voice quality. Language disorders encompass problems with understanding and/or producing the conventional system of arbitrary signals and rules used for communication (Tannock, 2000). In general, speech problems are less strongly associated with AD/HD than language problems (Cantwell & Baker, 1987). The rates of language disorders in the AD/HD population are higher than those in the general population, ranging from 15% to 75% with an average estimate of 45% (Beitchman, Tuckett, & Batth, 1987). The underlying mechanism for this association is unknown (Lewis, 2001). Furthermore, it is suspected that the rate of language impairments in the AD/HD population may be higher than actually reported, given that Cohen and colleagues (1993; 2000) found high rates of unsuspected language impairments in their samples of AD/HD children. Many studies have also found that children diagnosed with AD/HD have a more delayed onset of language in early childhood than normal children (Westby & Cutler, 1994). Given that language impairments occur often in children with AD/HD and because they are thought to be associated with greater behavioral, social, and academic impairment than speech disorders, they will be the subject of further discussion.

Not only has the relationship between AD/HD and language impairments been examined in the AD/HD population, the association between AD/HD and language

impairment has been examined more extensively among children referred to clinics primarily for speech and language concerns (Benasich, Curtiss, and Tallal, 1993; Cantwell & Baker, 1987; Love and Thompson, 1988). For example, studies of children referred to community language clinics found that AD/HD was the most frequently found psychiatric diagnosis for language-disordered children (Benasich, Curtiss, and Tallal, 1993; Cantwell & Baker, 1987). Love and Thompson (1988) reported that three-fourths of children with a diagnosis of a language disorder at a child and family clinic were also diagnosed with AD/HD. Consistent with these findings, Beitchman et al. (1989a) found approximately 30% of children with speech or language impairment also had AD/HD.

Among the language impairments found in children with AD/HD, there are problems in receptive, expressive, and pragmatic language (Cohen, Vallance, Barwick, Im, Menna, Horodezky, & Isaaacson, 2000; Damico, Damico, & Armstrong, 1999; Giddan and Milling, 1999; McGee, Partridge, Williams, & Silvia, 1991; Tannock, 2000). Expressive language, which includes the ability to choose and develop ideas, appears to be impaired almost twice as often as receptive language, which includes the ability to comprehend the meaning of words (Baker & Cantwell, 1992; Beitchman, Tuckett, & Batth, 1987; Beitchman et al., 1996; Giddan and Milling, 1999). Consistent with this idea, Baker and Cantwell (1992) found that 58% had expressive language impairments, while only 34% had receptive language impairments in a sample of 65 school-aged children diagnosed with AD/HD. Within the literature, there are inconsistent findings at times, such that children with AD/HD performed similar to controls on receptive

measures of language while children with AD/HD performed significantly worse than controls on measures of expressive language (Kim and Kaiser, 2000).

Another type of language dysfunction evident in a majority of children with AD/HD is pragmatic difficulty, which includes the ability to use language appropriately within a social situation. Within AD/HD, a wide range of pragmatic deficits have been demonstrated. Studies indicate that children with AD/HD exhibit: excessive verbal output during spontaneous conversations, task transitions, and in play settings; decreased verbal output and more dysfluencies when confronted with tasks that require planning and organization of verbal responses, story retelling and giving directions; difficulties in introducing, maintaining, and changing topics appropriately and in negotiating smooth interchanges or turn taking during conversation; problems in being specific, accurate and concise in the selection and use of words to convey information in an unambiguous manner; and difficulties in adjusting language to listener and specific contexts (Beitchman et al., 1996). In a study comparing language functioning between a group of children with AD/HD and a group of controls, Kim and Kaiser (2000) found greater pragmatic difficulties in the group of children diagnosed with AD/HD. Evidence for pragmatic difficulties was also demonstrated in a study by Tirosh and Cohen (1998), where 16% of an AD/HD group had pragmatic deficits.

Summary

Speech and language difficulties occur in children diagnosed with AD/HD; however, speech problems are less strongly associated with AD/HD than language problems. In terms of language difficulties, children diagnosed with AD/HD often have

difficulties with expressive, receptive, and pragmatic language functioning. Expressive difficulties are found twice as often as receptive difficulties in the AD/HD population. Although there is strong research evidence supporting the true occurrence of language difficulties in the AD/HD population, some researchers speculate that the current prevalence rates reported are actually an underestimate. Thus, there would seem to be many inconsistencies in the literature.

Limitations of the Current Literature

Most studies examining children with AD/HD and language impairments focus on school-aged samples (Cohen et al., 1998; Cohen et al., 2000; Landau & Milich, 1988; McInnes, Humphries, Hogg-Johnson & Tannock, 2003). This raises conceptual concerns, given that it is during preschool years that an optimal window of opportunity is available to promote overall development, including language. A limited number of studies has focused on AD/HD symptoms and language functioning in preschool children (Beitchman, Tuckett, & Batth, 1987; Cohen et al., 1993; Love & Thompson, 1988; McGee, Partridge, Williams & Silvia, 1991). Given the importance of early detection, and measuring attention, language and behavior in preschool-aged children for treatment, further research is warranted.

There is a growing body of research suggesting that genetics, as well as environmental factors, may contribute to some speech and language disorders and AD/HD (Billeaud, 1995; Lewis, 2001; Smith & Morris, 2005). A family history of language difficulties is thought to be predictive of a child's language skills at age 3 and likewise, heredity is thought to be one of the major risk factors for attention problems

(Billeaud, 1995; Lewis, 2001). Currently, there are no studies in the AD/HD and language disorder literature that address familial or environmental factors, such as parental psychological history or language history, representing a conceptual difficulty. Gathering family history about behavioral and language functioning might help to inform researchers of the familial and environmental factors possibly contributing to a child's functioning in the behavioral and language domains. Parental characteristics are likely to contribute to language development.

Within the literature there is also a large amount of variability in the methods used to define AD/HD and language impairments. Some studies employed standardized guidelines for making an AD/HD or language disorder diagnosis, while others failed to adequately address the multiple diagnostic criteria of these disorders. Furthermore, several different diagnostic measures (e.g., different parent, teacher, pediatrician rating scales, different structured and unstructured interviews, and various language measures) have been used across studies to measure the behavioral and language constructs. The different measures used in each study may be responsible for the inconsistencies in the types and rates of behavioral and language disorders found within the AD/HD and language literature. Also in the current literature, there are no studies reviewing specific AD/HD diagnostic subtypes in relation to language functioning. Evidence for subtyping predicting language functioning was noted in a study yet to be published by Schouest (2003), who found that children with AD/HD, Combined Type had more expressive, receptive, and pragmatic language impairments than children in the AD/HD, Predominantly Inattentive group. Very few studies have looked simultaneously at

receptive and expressive language disorders as well as pragmatic disorders, all of which are common in children with AD/HD.

Some research teams managed to measure many additional areas of functioning and comorbidity including, academic, cognitive, and behavioral functioning (Cohen et al., 1998; Cohen et al., 2000; McInnes, Humphries, Hogg-Johnson & Tannock, 2003). However, some researchers failed to measure comorbidities among samples of children with AD/HD and language disorders, which is another potential methodological confound. Among the studies reviewed, all addressed AD/HD symptoms and language impairments; however, 26% of the studies failed to address any additional comorbidites (Beitchman, Tuckett, & Batth, 1987; Cherkes-Julkowski, 1998; Funk & Ruppert 1984; McGee, Partridge, Williams, Silvia, 1991).

In summary, the current AD/HD and language impairment literature highlights potential methodological and conceptual difficulties. For example, there have been inconsistencies in the diagnostic criteria used to diagnose AD/HD and language impairments, in the measures used to diagnose language disorders, in the measurement of comorbidities, and in the age of the research sample used. Researchers have also failed to measure familial history or environmental factors for children in their projects, despite evidence that these factors may have a potential impact on children's behavioral and language functioning. Also missing is any conceptual explanation regarding how AD/HD and deficits in child language functioning might be linked. In order to understand how parent or child symptoms of AD/HD might impact language development, it is first necessary to know how typical language development unfolds.

Language Development and Parent-Child Interactions

Theories of Language Development

Numerous theories have been put forth to explain the development of language in children. These theories vary according to the emphasis they place on innate variables versus environmental variables influencing language development. The first of these theories is the behaviorist interpretation. Behaviorists agree that the environment is the critical and most important factor in the acquisition formula, such that external stimuli shape the child's verbal behaviors into language. At the other end of the nature-nurture spectrum is the nativist interpretation. In the nativist interpretation of language development, language is viewed to be innate or biologically based, such that language development requires little assistance from the environment.

The social interactionist perspective, one of the most prominent theories at this time, combines many aspects of both the traditional behaviorist and linguistic positions. This perspective shares both the linguistic view, which contends that language has a structure and follows certain rules and the behaviorist view, which emphasizes the environment playing a role in producing such structure. Furthermore, social interactionists adhere to both sides of the nature-nurture debate, such that they agree that the child cannot acquire language until a certain level of innate cognitive development has been attained and that the environment is the place where language emerges, which is largely due to both verbal (imitation) and non-verbal (turn-taking, mutual gaze, joint attention, context and cultural conventions) parental input. In this view, the child cues the parent into supplying the appropriate language experience that the child requires for

language advancement. The intent of the child leads him to communicate with those who can then respond to the intent. Interactionists see children and their language environment as a dynamic system, both requiring the other for efficient communication at any point in development and for improving the child's linguistic skills. Social interactionists measure a child's language competence through what the child says and understands in the context of social conversation (Bohannon & Bonvillian, 2001).

Vygotsky (1978) is one of the most widely known social interactionist theorists. He argued that for a young child, language is a tool for social interaction. He believed that each child was shaped by the social influences of important adults and peers. Adults often assist in the social and linguistic development of a child by providing information, which is at a level slightly above the child's given potential at that time, known as the zone of proximal development. In order for the adult to provide information at the appropriate child level, the child and adult working together must merge what they know into a shared understanding of the task. The adult attempts to provide the appropriate information in a manner that the child can understand and that does not exceed the child's ability to understand. In other words, the adult provides scaffolding for the child during their interactions, in order to provide information that is slightly above the child's level in order to increase language competence. Vygotsky also highlights the role of joint attentional episodes, where the child and adult jointly attend to an object or situation at the same time. Joint attentional episodes are an important component in the process of scaffolding and language development in parent-child interactions (Tomasello, 1996). Vygotsky has emphasized the role of language in setting the stage for many forms of

thinking, including reflecting, self-regulating, goal setting, problem solving, and managing emotions (Greene, 1998; Vygotsky, 1978). The interactions between a child and his caregiver are thought to provide the basic context for all of the child's later interpersonal interactions (Sachs, 2001).

In the social interactionist perspective it is understood that parents usually provide communication structure. According to James (1990), when caregivers talk to very young children they use short, simple sentences, talk about objects that the child is attending to or actions being engaged in, repeat their own utterances, repeat the child's utterances, use a slightly higher pitch and exaggerated intonation pattern, introduce significant pauses between utterances and use a lot of questions and commands. The communicative structure that parents provide is also known as scaffolding, where a parent might respond to an utterance made by a child by expanding the utterance at a slightly higher level appropriate for the child. Scaffolding allows efficient communication from a parent to a child at the child's developmental level. The parent must attend to the child's verbal and non-verbal cues during interactions in order to be aware of the child's level of comprehension during the interaction. Language eventually becomes the source of structure for the child's actions and eventually directs the child's thoughts. The role of language changes over the course of development from a social tool to a private tool, as the child internalizes language.

In this perspective, a child's caregiver deduces intentions and meaning from the child's speech, regardless of what the child says. The parent and child often negotiate the meaning of the child's speech through social interaction. Children often deduce

grammatical rules from their environment, thus it is important for parents to make the child's task easier by pacing the complexity of the data or problem to be solved with the child's language level. As the child grows older, the data provided by the environment also increases in complexity. Often if a child fails to comprehend a parental utterance, the statement is usually simplified and repeated. The level of complexity of the information presented by parents is largely determined by cues from the child, thus indicating that this is similar to a self-paced lesson. It is also important for the parent to provide language information about things in the child's immediate environment and to objects to which the child is attending in order to allow for vocabulary development. Overall, language development is viewed as an orderly interactive process where social interaction assists language acquisition and the acquisition allows more mature social interaction. Therefore, innate linguistic predispositions must interact with the environment in order for language to develop (Bohannon & Bonvillian, 2001).

Parent-Child Interactions and Language Development

In keeping with the social interactionist perspective of language development, there are aspects of the parent-child interactions that facilitate language development. More specifically, children adapt to and learn from their parents' interaction styles and part of what they learn concerns whether parents are often responsive, helpful or demanding, or approving versus negative. Hart & Risley (1995) set forth features of the parent-child interaction that added to the quality of the interactions and language development. The first aspect is the type of vocabulary and sentences that parents use. It is important that the parent let the immediate circumstance determine the words to use, in

order to expose the child to hearing the word used with the object. Another important aspect of parent-child interactions purported by Hart and Risley (1995) is the sequence of responses between the parent and child during an interaction. Parents and children take turns speaking and listening during interactions, thus giving children experience with contingent conversation. During interactions, parents can choose to model language that elaborates the child's chosen topic, they can prompt the child to elaborate or to practice remembered words, or they can correct by rephrasing immature language. Parental responses that reflect active listening and sensitivity to the child's interests may be most important in helping children learn words and meanings. Perhaps the most influential aspect of parent behavior is their interaction initiations. A combination of all of the positive aspects of language and interactions mentioned may be seen as incidental teaching at the zone of proximal development. Thus, the parent is attending to the child in his environment and selecting objects or topics that are of interest to the child, and then interacting with the child in a manner that supports and enhances the child's current language ability (Hart & Risley, 1995).

Joint attention, as used by Vygotsky (1978), is another component necessary to achieve language development, which refers to the triadic interaction between a child, caregiver, and an object of interest in the environment. Thus, the child and caregiver share attention as they reference an object of mutual interest. Joint attention can occur by a shared gaze between the child and the caregiver or by pointing to an object. It is believed that through increased periods of joint attention and engagement, children's linguistic skills become more sophisticated (Tomasello & Todd, 1983).

Additional evidence for the impact of parental input in language interactions was discussed by Girolametto, Weitzman, Wiligs & Pearce (1999). In this study, a language intervention known as the interactive model of language intervention (IMLI) was used with toddlers with expressive vocabulary delays. This model was based on the social interactionist model. The authors found that maternal linguistic input was an important predictor of the child's outcome following intervention. Specifically, mothers who spoke quickly were likely to have children with lower language scores. Maternal imitation was also found to positively correlate with child utterances, and mother interpretation and expansion were also associated with language development. Thus, maternal contingent responsiveness and the rate of parental speech were most related to children's vocal and verbal output. Thus, the authors suggest that there are two central aspects of language-modeling techniques for parents, including increasing contingent responsiveness (imitations, labeling objects, expansions) and structural modifications (using a slower rate of speech and simplifying the complexity of semantic and syntactic input). Responsiveness includes the parent being aware of the child's current interest, providing redundancy, and increasing the saliency of the input such that more cognitive resources can be available for language learning. In terms of structural aspects of the maternal speech, this includes language that is slightly more advanced than the child's language abilities and may facilitate language development because it provides models that are one step ahead of the child's abilities, but still at a level that can be mastered. The authors also suggest that the mother and child characteristics can impact each other; in fact, if one member of the relationship is non-responsive during interactions, this would negatively

impact language development (Girolametto, Weitzman, Wiligs & Pearce, 1999). The responsiveness and structural approach are compatible with the social interactionist theory.

There is additional research evidence highlighting the role of parent recasts or expansions in language development (Camarata & Nelson, 1994; Nelson & Camarata, 1996). Recasts occur when the mother follows a child's production and then includes some contrasts in semantic, syntactic, or morphological structures. Thus, the adult recast provides a challenge to the child's current language level but maintains the child's central meaning in the recast. For example, if the child says "The pony running," one adult recast might be "Yes, the pony is running." Recasts have been shown to directly facilitate acquisition of language structures when presented to normally developing children (Camarata & Nelson, 1994). In addition, Nelson and Camarata (1996) found that more rapid growth in spontaneous productions for target responses were observed under the conversational recast treatment.

Parent and Child Characteristics

Linguistic components of parent-child interactions may be impacted by the special needs of the child in question (Davis, Stroud, & Greene, 1988). For instance, in a study with mothers of children diagnosed with autism compared to controls, it was found these mothers used more affectionate remarks, elaborated more, and were more neutral and less negative in the tone of voice when disapproving, providing a more responsive linguistic environment than controls (Cantwell, Baker, & Rutter, 1977). In another study, mothers of children with language delay talked less, used a smaller variety of words,

were less repetitive and were less inclined to make more than one utterance, suggesting a less than optimal language learning environment (Davis, Stroud, & Greene, 1988). In an additional study by Davis, Stroud & Greene (1986), they looked at parent-child interactions across groups of different diagnoses: Down syndrome, cerebral palsy, miscellaneous (hydrocephalus), and non-specific (developmental delays). The authors found relatively no differences with maternal language between the children with Down syndrome and cerebral palsy; however, they found that the mothers of the miscellaneous and non-specific diagnoses showed the least responsiveness (i.e., most complex, least repetitive and most complete language) with their children. Nonetheless, it is important to note that the reciprocal communication and parental responsiveness between children and their parents is at times affected by characteristics of the child.

Parental characteristics during parent-child interactions may also play a role in language development. For example, there is evidence that mothers diagnosed with depression differ in their interactions with their children and provide less linguistic and cognitive stimulation (Carson, Perry, Diefenderfer, & Klee, 1999; Reissland, Shepherd, and Herrera, 2003). When assessing the speech of depressed mothers, there was more negative affect and less acknowledgement of child activity. The speech of non-depressed mothers was characterized by shorter utterances and focused on the child's experience, demonstrating a greater level of responsiveness. Mothers with depression are thought to exhibit flatter, unmodulated, and negative affect and to be less playful with their children. Depressed mothers also demonstrate longer vocalizations with variable pauses, suggesting disruptions in the synchrony of responsive and coordinated linguistic

behavior. In a project by Reissland, Shepherd, and Herrera, (2003) depressed mothers did not adjust their speech to the age of the child and read the same number of words to younger infants and older children, thus providing inappropriate scaffolding. This indicates that depressed mothers are less attuned to their children's linguistic level and what information might be appropriate for language learning, negatively impacting children's linguistic development. Often infants of mothers who are diagnosed with depression fail to achieve social contingency because of the mothers' lack of response and inability to repair the interaction. In addition, children of depressed mothers are also found to speak less than children of non-depressed mothers. Given the nature of the interaction described between depressed mothers and their infants, it is possible that without the proper responsiveness and structure, the children of depressed mothers are often forced into a self-regulatory pattern, which could negatively affect development (Reissland, Shepherd, and Herrera, 2003). Parental stress is also thought to be associated with delays in children's language development (Carson, Perry, Diefenderfer, & Klee, 1999).

Family Demographics

The role of parent-child communication differs across families of different socioeconomic status and different cultures. As documented by Hart & Risley (1995), different levels of parental input across socioeconomic classes exist, with the low SES families having the lowest level of parental utterances to the child. Further complicating the matter is the fact that parents of children from low SES often perceive that they cannot provide appropriate teaching to their children. These differences in the amount of

early family experience across SES (the number and variety of words a parent said per hour) correlate with child characteristics at age 3, such as IQ scores, vocabulary growth rates, and vocabulary use (Hart & Risley, 1999). Furthermore, some families even maintain the perceptions that children should be seen and not heard and language is used predominantly to direct or constrain the child's physical activities. Thus, children are not seen as communication partners and their input is strongly discouraged or even punished due to the constraints of the unidirectional communication, where the parent is thought to direct the communication to the child.

Apart from SES, culture and the emphasis of language within that culture can have an impact on a child's language development. Depending on cultural demands, parent's interactions with their child could be mostly directive. For example, in the Mayan culture, a culture where children perform important economical tasks at a young age, parents often provide directives to the child in order to request that a task be done. In some cultures children are discouraged from speaking, and speaking is seen as showing lack of respect to adults or being a bother to adults. This fits within the larger cultural values of obedience and respect in the African American culture and it is often thought that mothers in this culture are much less responsive to their children's utterances (Moerk, 2000).

Summary

There have been various theories of language development put forth, each with their own emphasis on the role of genetics and the environment. The current perspective of language development, the social interactionist perspective, incorporates both nature

and nurture into the language development equation through social interaction. In this perspective, children bring their innate abilities to the language learning situation and parents play an important role in creating an environment that fosters language development. Within parent-child interactions there are characteristics that facilitate language development. Across the literature reviewed responsiveness and scaffolding (i.e., imitation, expansion, commenting on child's current interest, listening) appear to be associated with positive language development. In keeping with the interactionist theory, child psychopathology is likely to have a negative impact on the parent-child interactions necessary for language development. There is also evidence that parental psychopathology, specifically depression, is likely to disrupt the processes necessary for child language development. Across cultures, there are varying views of the role of parent-child interactions for language development, such that SES and culture are thought to be significant factors in the language learning environment. Taken together, not only are child characteristics important in the language learning environment for children but parent characteristics and/or psychopathology are equally important during parent-child interactions and likely to impact language development.

AD/HD and Child Language Development

Parent-Child Interactions and AD/HD

It is widely known that children with AD/HD have difficulties in interactions with their parents (Johnston, Murray, Hinshaw, Pelham, & Hoza, 2002). Lack of synchrony in mother-child interactions is often common among children who have AD/HD (Danforth, Barkley, & Stokes, 1991). In a study of parent-child interactions in children with AD/HD

(DuPaul, McGoey, Eckert, & VanBrakle, 2001), it was found that during free play situations, parent-supervised situations, and parent directed situations, parents of children with AD/HD displayed more frequent negative behavior towards their children, three times more than the controls. Furthermore, children with AD/HD displayed more noncompliant and inappropriate behavior, possibly presenting the most interaction difficulties. Parents of the children with AD/HD also reported higher levels of stress, and have also been found to use more commands, more control, and more negative statements and less praise (Johnston, Murray, Hinshaw, Pelham, & Hoza, 2002). Therefore, this suggests that symptoms of AD/HD in children may have an impact on maternal responses and attempts at controlling child behavior during parent-child interactions, suggesting less than optimal conditions for language development with children diagnosed with AD/HD.

Because of the difficult nature of the interactions between parents and their AD/HD children, mothers of children with AD/HD reportedly feel less competent than control mothers. A closer look at this issue was provided in a study by Pelham et al. (1997), where they had parents assigned to a condition with a confederate displaying externalizing behavior and normal behavior. Parents paired with the child displaying externalizing behavior reported feeling less successful, less effective, more hostile, more anxious, and more depressed than parents randomly assigned to interact with non-problem child actors. Thus, the child's behavior may directly contribute to the lower self-competence of parents. Parents of children with AD/HD often report higher scores of depression (Pelham et al., 1997; Phelan, 2002). One explanation for this is that these

parents have an attributional bias created by the child's externalizing behavior, which may in turn impact their parenting behavior, creating a negative parent-child response pattern. Also important is that parents with a child at risk for AD/HD suggest more controlling or negative suggestions to problems instead of positive or preventative solutions. In terms of gender, parent-child interactions differ across boys and girl, such that when observing boys and girls at risk for AD/HD and ODD, mothers deliver more praise to girls and notice more positive behavior. It is therefore important to note that previous studies suggest that early unresponsive or rejecting parenting may place boys at greater risk than girls for subsequent behavior problems (Barkley, 1998), suggesting that child symptoms of AD/HD function to negatively impact parental attributions and behavior, creating negative interaction styles between children with AD/HD and their parents.

In another study, Barkley (1989) indicated that family interaction patterns of hyperactive children are different than those of normal children. The differences in interaction styles were most notable in a structured task, such that hyperactive children were less compliant with immediate commands, less able to sustain compliance, and more oppositional. Their parents also provided more commands and reprimands and seemed less responsive to their children's general social interaction. Mothers of hyperactive boys were also found to be more controlling and directive of their children's independent play than mothers of hyperactive girls. A unique aspect of this study was that parent-child interactions of hyperactive boys and girls were observed across medication conditions. During situations where hyperactive children were not on

medication, parental behavior was more controlling and when these children were in the medication condition parental behavior changed in response to the child's behavior change. On the highest dose condition hyperactive children showed increases in their sustained compliance to commands, and mothers gave fewer commands to their children and were less controlling of their compliance during the medication condition than during the placebo conditions. In this condition, mothers increased their levels of observation and nondirective interactions with hyperactive children. Thus, the interactions gravitated towards a "typical" mother-child interaction when the hyperactive children were on medication. This speaks to the reciprocal nature of parent-child interactions, in that normalization of child behavior was associated with a positive change in parental behavior. Furthermore, some might speculate in the other direction—interactions between mothers and children both with symptoms of AD/HD may be the most negative and controlling.

Parental characteristics also impact child behavior and parent-child interactions. In a study by Johnston, Murray, Hinshaw, Pelham, & Hoza (2002) maternal responsiveness was related to maternal depressive symptoms, which was related to child conduct problems. For example, the authors suggest that unresponsive parenting may be associated with increased difficulties in child self-regulation that lead to behavioral problems and these child problems in turn challenge responsive parenting. Mothers of children with AD/HD reportedly experience elevated levels of depressive symptoms and the study by Johnston, Murray, Hinshaw, Pelham, & Hoza (2002) suggests that responsiveness in parenting may function as a mediating mechanism through which

depressive symptoms are linked to conduct problems in children with AD/HD. The mothers' depressive symptoms may interfere with maternal ability to respond appropriately and sensitively and monitor child behavior. This lack of responsiveness may create or exacerbate problematic child behavior. Thus, it is likely that such a pattern of parental behavior is likely to affect child behavior and in turn these behaviors continue to interact over time, fueling the maintenance of each other. Johnston et al. (2002) suggest that maternal responsiveness is also related to demographic variables such as child age, mother age, mother education and maternal marital status. Older and better educated mothers are thought to be more responsive with their children, while single mothers were less responsive to their children. These results are consistent with the language development literature, such that responsiveness and other parental characteristics are related to maternal depression and maternal demographic variables. Furthermore, maternal responsiveness may be differentially associated with decreased child functioning (Hart & Risley, 1995; Reissland, Shepherd, and Herrera, 2003). Thus, there are many parental characteristics (i.e., depression, age, education) empirically associated with decreased responsiveness in parent-child interactions necessary for child development, including behavior and language. Research on additional parental characteristics, such as AD/HD, is of interest.

Summary

Currently, research studies investigating the impact of AD/HD on parent-child interactions have focused on interactions where the child is identified as having AD/HD and maternal AD/HD status is not assessed or is unknown. Current research literature on

parent-child interactions of children with AD/HD has found that mothers of children with AD/HD behave more negatively, give more commands, feel less competent, and have higher rates of stress. There is some evidence that mothers give more praise and notice more positive behaviors with girls with AD/HD over boys. Research also suggests that maternal characteristics, such as depression, are associated with negative child behaviors and conduct problems. One proposed pathway is that maternal depression may negatively impact maternal responsiveness, leading to conduct problems in children with AD/HD. Thus, it is also possible that maternal symptoms of AD/HD may negatively impact maternal responsiveness during mother-child interactions, leading to a less than optimal language learning environment.

Possible Association of Maternal Symptoms of AD/HD and Child Language Deficits

To date, most explanations of the common occurrence of AD/HD and language disorders focus on child symptoms of AD/HD and how these impact language learning. They have ignored the potential impact of maternal symptoms of AD/HD, even with the theoretical conceptualization that mothers also play an important role in the language learning environment. According to the social interactionist perspective, parental input plays a vital role in child language development. Given that children with symptoms of AD/HD often have parents with AD/HD, maternal AD/HD symptoms could be a factor in the common occurrence of AD/HD and child language disorders. For example, maternal symptoms of inattention, hyperactivity and impulsivity may negatively impact the language learning environment between a child and mother. The fact that the language literature cites that maternal factors, such as depression, are associated with delays in

language development, the lack of investigation of the role of maternal symptoms of AD/HD and child language development represents a deficit in the literature. There is no direct research evidence addressing whether maternal symptoms of AD/HD might influence necessary language aspects of mother-child interactions needed for language learning. It is speculated, however, that maternal symptoms of AD/HD (inattention, impulsivity, hyperactivity) may differentially impact the language learning environment at several key points, reducing responsiveness and increasing directiveness, negatively affecting the child's language learning environment and language development.

Inattention

A mother with symptoms of inattention may have a difficult time being responsive to the child and, therefore, could have difficulty providing praise or corrective feedback when necessary. The mother may miss cues from the child during interactions and may be unable to respond appropriately to the child's utterance. Given that conversational cues may be missed, it is likely that an inattentive mother would not appropriately take turns during language interactions. An inattentive mother may also have a difficult time providing imitations or expansions for her child. Although an inattentive mother may be able to provide feedback at the appropriate valence or tone, this feedback may be at an inappropriate time. Joint attention is also likely to be disrupted, given that the mother may miss that her child is interested in the environment. The mother may not notice that her child is interested in one object and instead they may try to engage the child in another task or activity. An inattentive mother may also begin to jointly engage with her child, but then get distracted by something else in the

environment, thereby disrupting the language learning interaction. Finally, a mother with inattention may have difficultly providing scaffolding at an appropriate level during language interactions, given that it is necessary to understand the child's level and then organize a linguistic structure appropriately. An inattentive mother may also begin scaffolding during an interaction with her child and then discontinue because she gets distracted by something in the environment.

Impulsivity

A mother with symptoms of impulsivity may have an extremely hard time waiting for her child to provide responses and may also have a difficult time restraining from interrupting her child. Therefore, impulsive parents may have a difficult time being appropriately responsive. An impulsive mother may not take the time to provide imitations, expansions, or feedback to her child. She may provide her child with excessive information (i.e., labeling everything) about the environment and may not pay attention to the child's cues. In terms of joint attention, an impulsive mother may be more directive, not attending to the child's interest in an object, and instead pointing out her own objects of interest and interrupting the child's attempts at joint attention. A mother with symptoms of impulsivity may also give the child the object that he/she is interested in without any linguistic interaction. An impulsive mother may have difficulty with scaffolding, such that she may have difficulty providing a communicative structure at the child's appropriate level and instead may provide information that is too high or too low for the child. Also, an impulsive mother may have a hard time organizing language and

therefore may have a hard time providing the appropriate linguistic structure that would promote language development.

Hyperactivity

A mother with symptoms of hyperactivity might be less responsive due to missing child utterances during their own excessive physical or mental activity. Thus, the mother may have difficulty appropriately imitating or expanding these utterances. Likewise, a mother with excessive hyperactivity may have difficulty providing an opportunity for the child to take a turn during the conversation, and with providing responses to child utterances at an appropriate valence or tone. Joint attention episodes are also likely to be difficult for a mother with hyperactivity, given that joint attention requires a parent and child to attend at the same time, which would be extremely difficult for a mother with physical hyperactivity. Finally, a mother with symptoms of hyperactivity might have the most difficulty providing appropriate scaffolding during language interactions. Specifically, the mother may have a difficult time providing the appropriate rate and structure of speech, given that hyperactive individuals have a tendency to have an increased speech rate.

Comorbid Features

Just as children with AD/HD have additional comorbidities that can often exacerbate their difficulties; mothers with symptoms of AD/HD may have additional difficulties or symptoms that could disrupt the child language learning environment to an even greater degree. Maternal symptoms of AD/HD were discussed separately; however, adults with AD/HD often display more than one type of AD/HD symptom. With this in

mind, mothers displaying more than one type of AD/HD symptom are likely to have even greater difficulty providing an appropriate language learning environment for her child. Given the increased incidence of both AD/HD and depression in parents of children with AD/HD, is it is likely that a mother with this pattern of comorbidity would have the greatest amount of difficulty providing the necessary components of language development. Specifically, difficulties with responsiveness are expected, and therefore many of the child's language utterances may go unnoticed, resulting in language impairment.

Summary and Hypotheses

In the absence of research, it was predicted that adult symptoms of AD/HD would likely be associated with a disruption in specific components of a mother-child interaction necessary for language development. The potential impact of comorbidities was also discussed, given that parents with AD/HD often have additional difficulties. Taken together, it is likely that the high occurrence of AD/HD and language impairments in children with AD/HD is not only due only to the impact of child factors during language interactions, but that parental symptoms of AD/HD may also substantially impact the language learning environment. Further research is warranted to investigate the relationship of these factors to the language development of children with AD/HD.

Therefore, the purpose of this project was to investigate the association between maternal symptoms of AD/HD and components of mother-child interactions that are hypothesized to be associated with language development (i.e., responsiveness). In addition, the association between maternal symptoms of AD/HD and child language

functioning was investigated. A summary of the proposed associations is displayed in Figure 1. In particular, the study will address the following questions:

1. Are maternal symptoms of AD/HD associated with maternal responsiveness and directiveness during parent-child interactions? It was hypothesized that more frequent and severe maternal symptoms of AD/HD would be associated with lower levels of responsiveness and higher levels of directiveness.
2. Does having a parent with symptoms of AD/HD place a child with symptoms of AD/HD at increased risk for receptive and expressive language deficits? It is hypothesized that maternal and child symptoms of AD/HD put a child at a greater risk for language difficulties, given that the combination of the symptoms of these symptoms of AD/HD is more likely to disrupt the language learning environment.

Insert Figure 1 approximately here

CHAPTER II

METHOD

Participants

Fifty preschool children and their mothers participated in the project. These mother-child pairs were recruited from several sources, including the AD/HD Clinic at UNCG, the UNCG Psychology Clinic, Guilford Child Development preschools, and social nomination. In addition to age requirements, child participants had to have an estimated IQ score of $\geq$ 85 on the Wechsler Primary and Preschool Scale of Intelligence-Third Edition (WPPSI-III; Wechsler 2002).

Fifty children were in the study sample. Demographic characteristics are presented in Table 1. Among the children in the sample, 25 were girls and 25 were boys, ranging in age from 3 years, 1 month to 5.9 years (M= 4.4). Approximately 48% of the children were Caucasian, 44% were African American, and 8% were from other ethnic backgrounds. Most of the children were in a preschool setting (64%), while some were in a kindergarten classroom (10%) or a day care setting (2%). Twenty-four percent were not in any day care or academic placement outside of the home. No children took long-acting medication for AD/HD, but there was one child in the sample taking short-acting stimulant medication for symptoms of AD/HD. He refrained from taking medication the day of the assessment with permission from his primary care physician

Female caretakers ranged in age from 22 years to 63 years (M= 33). Most of the female caretakers, who had served as primary caregiver since infancy, were biological mothers (88%) with the remaining being adoptive mothers (12%). In terms of education level, 20% of the mothers attended some high school or graduated from high school, 42% attended trade school or some college, 24% attended four years of college, and 14% attended Master's programs. Family income ranged from less than $10,000 to greater than $100,000, with the average approximately $40,000. No parents were taking long-acting or short-acting medication for AD/HD.

Insert Table 1 approximately here

Independent/ Predictor Measures

Several measures were used to assess child and maternal demographic, behavioral, pragmatic, and intellectual variables. A summary of all independent/predictor measures is shown in Table 2.

Insert Table 2 approximately here

Independent/ Predictor Child Measures

The following measures were used to assess the psychological functioning of children participating in the project:

Computerized Diagnostic Interview Schedule for Children – IV Parent Version (DISC-IV, NIMH, 1997). The DISC-IV is a computerized, highly structured diagnostic interview that assesses a broad range of child psychopathology. Responses to the interview questions are given in a yes or no format. Only the AD/HD module was used in this project. The AD/HD module of the DISC-IV has been demonstrated to have adequate test-retest reliability in clinic samples (.79, Fisher et al., 1997). Research on a previous version of the DISC-IV investigated reported adequate criterion validity ($\kappa = .72$) for the AD/HD module (Schwab-Stone et al., 1996). Maternal responses to the AD/HD module of the DISC-IV were used in conjunction with child behavior rating scales to determine the frequency of child symptoms of AD/HD.

Behavior Assessment System for Children – Parent Rating Scale (BASC, Reynolds & Kamphaus, 1992). The BASC is a psychometrically sound broad band behavior rating scale, which contains 131 items for preschool children. Each item is rated on a four-point scale, ranging from 1 (never) to 4 (almost always). The BASC yields eight behavioral subscales including, Hyperactivity, Aggression, Anxiety, Depression, Somatization, Atypicality, Withdrawal, and Attention Problems. T-scores from Attention Problems and Hyperactivity were used to assess the overall severity level of child inattention and hyperactivity-impulsivity, and t-scores from the Aggression subscale were used to assess the severity of aggressive behavior.

Attention Deficit Hyperactivity Disorder Rating Scale-IV (DuPaul, Power, Anastopoulos & Reid, 1998)). The ADHD Rating Scale is an 18 item scale based on the *DSM-IV* AD/HD diagnostic criteria. The ADHD Rating Scale includes two subscales,

Inattention (odd-numbered items) and Hyperactivity/Impulsivity (even-numbered items), and produces a symptom count and a severity score for each of these subscales. Each item is rated on a 0 to 3 scale ("never or rarely," "sometimes," "often," or "very often"). Symptoms rated as occurring "often" or "very often" are considered to be present, and are calculated in the symptom count total. The severity score was computed by adding up each item's rating (0 to3) across both subscales. The ADHD Rating Scale has been reported to have adequate test-retest reliability (Inattention = .78, Hyperactivity-Impulsivity = .86) and predictive validity (DuPaul et al., 1998). The ADHD Rating Scale was used to assess child inattention and hyperactivity-impulsivity symptom counts and overall severity. Preschool norms were used to establish these scores in a developmentally appropriate manner (McGoey, DuPaul, Haley, & Shelton, 2003).

Oppositional Defiant Disorder Rating Scale (ODD RS; Anastopoulos, 1995). The ODD RS (see Appendix A) is an eight item parent-completed rating scale used to determine the frequency and severity of child symptoms of Oppositional Defiant Disorder defined by DSM-IV. Each item is rated on a 0 to 3 scale ("never or rarely," "sometimes," "often," or "very often"). Symptoms rated as occurring "often" or "very often" are considered to be present and are calculated in the symptom count total. The severity score is computed by adding up each item's rating (0 to3). The ODD RS was used to assess the frequency and overall severity of child oppositional symptoms.

Wechsler Primary and Preschool Scale of Intelligence-Third Edition (WPPSI-III, Wechsler 2002). The WPPSI-III is an individually administered assessment device used to determine the level of intellectual functioning of children between the ages of 2 years 6

months and 7 years 3 months. It provides composite scores that represent intellectual functioning in the Verbal and Performance IQ domains, as well as a child's general intellectual ability. The Receptive Vocabulary and Block Design subtests were administered to children between the ages of 3 years and 3 years 11 months 29 days to estimate a child's Full Scale IQ. For children between the ages of 4 years and 5 years 11 months 29 days, the Vocabulary and Block Design subtests were administered. These short form subtest combinations have strong reliability (.91-.91) and validity (.71-.86; Sattler & Dumont, 2004). The scaled scores were used to estimate the child's Full Scale IQ.

Independent/ Predictor Parent Measures

The following measures were used to assess the psychological functioning of the mothers participating in the project:

Conners' Adult ADHD Rating Scale – Self Report Long Form (CAARS, Conners et al., 1999). The CAARS is a 66 item scale designed to assess AD/HD symptoms in adults ages 18 to 50. Each item is rated on a four-point scale, ranging from 0 (not at all) to 3 (very much). The CAARS yields scores for three primary symptom dimensions, three DSM-IV symptom indices, and the AD/HD Index. The CAARS has been reported to have good test-retest reliability (.88 to .91, Conners et al., 1999) and discriminant validity (Erhardt, Epstein, Conners, Parker, & Sitarenios, 1999). T-scores from the DSM-IV: Inattentive Symptoms and DSM-IV Hyperactive-Impulsive Symptoms subscales were used to assess the overall degree and severity of maternal inattention, hyperactivity-impulsivity.

Adult ADHD Rating Scale (Murphy & Barkley, 1996). A modified version of the Adult ADHD Rating Scale was used. The self report measure required participants to rate the extent to which each of the 18 DSM-IV ADHD symptoms was present during childhood, defined as prior to the age of twelve, and during recent adulthood, defined as the past six months. As with the ADHD Rating Scale, each item is rated on a four-point scale. Symptoms rated as occurring "often" or "very often" are considered to be present, and are calculated in the symptom count total. The severity score was computed by adding up each item's rating (0 to3) across both subscales. There is some evidence of criterion validity for the Adult ADHD Rating Scale, as symptom severity scores on the scale are positively associated with certain measures of functional impairment (Murphy & Barkley, 1996). The Adult ADHD Rating Scale was used to assess current and past maternal Inattention and Hyperactivity-Impulsivity symptom counts and severity levels.

Symptom Checklist 90 Revised (SCL-90-R, Derogatis, 1992). The mother of each participant completed the SCL-90R. This form is a 90-item self-report scale reflecting a wide range of adult psychopathology and somatic complaints. This measure served as a screener for additional maternal psychopathology above and beyond symptoms of AD/HD. Each item is rated on a 5-point scale according to how distressing it is for the respondent, ranging from 0 (not at all) to 4 (extremely). The SCL-90 R yields scores for nine primary symptom dimensions and for three global indices of distress. The SCL-90 R has been used extensively in clinical research and has excellent reliability and validity (Derogatis, 1992). T-scores from the General Severity Index and the Depression domain were used to assess general psychopathology and depression among mothers participating

in the project.

Wechsler Adult Intelligence Scale-Third Edition (WAIS-III; Wechsler, 1997). The WAIS-III is an individually administered intellectual assessment device used to determine the level of intellectual functioning of adolescents and adults between the ages of 16 through 89 years. This measure provides composite scores that represent intellectual functioning in the Verbal, Perceptual, Working Memory, and Processing Speed domains, as well as a Full Scale IQ score. There are 14 subtests making up the various intellectual domains. Raw scores for each subtest are converted to a scaled score ranging from 1 to 19, with a mean of 10 and a standard deviation of 3. In this study, the Vocabulary Subtest was used to estimate the mother's Full Scale IQ, given that this subtest is most highly correlated with the Full Scale IQ score (r = .80; Sattler, 2001).

Demographic and Developmental Questionnaire. This form (see Appendix B) was created for the current project. The mother of each participant completed the form that included information on the child's age, gender, ethnicity, mother's age and education level, the family's socio-economic status, and mother and child history of psychological and speech/language service involvement. In the second portion of the form, mothers answered questions regarding their children's language and behavioral development. In terms of behavioral development, parents provided a brief history of the child's behavioral functioning in the home and school domains. In addition, parents were asked to provide information on their own behavioral functioning and language development.

Independent/ Predictor Child and Parent Measure

Pragmatic language functioning was also measured in children and mothers participating in the project.

Systematic Analysis of Language Transcripts (SALT, Miller & Chapman, 1992). SALT is a package of programs used in the transcription and analysis of language samples. This program allows the investigator to assess specific linguistic phenomena using standard program measures or by inserting codes into the transcription (Caygill, 1998). Consistent with the method used by Girolametto et al. (1999) and Nelson & Camarata (1996), language samples from the mother-child interaction were transcribed and analyzed to measure pragmatic aspects of this interaction. Child and maternal rate of speech and mean number of words per turn in the conversation during the mother-child interaction were used to investigate the association between these variables and outcome measures. The SALT has sufficiently high temporal reliability for both research and diagnostic activities, if the number of complete and intelligible utterances approaches 175, which translates into a 20 to 30 minute speech sample. In this study, standard measures from the SALT analyses of the transcription of the mother-child interaction were used to assess the association between child and maternal rate of speech and mean number of words per turn in the conversation during the mother-child interaction and child receptive and expressive language.

Dependent/ Criterion Measures

Several child and maternal domains were assessed, including child expressive and receptive language and maternal responsiveness and directiveness. Data from these

domains was collected via language scales, and transcribed and coded mother-child interactions.

Mother-Child Interactions. The mother-child interactions took place during a free play situation, where mothers and children were asked to play with toys for 30 minutes in an 18 by 10 foot room with a one-way mirror, a 4 foot round table, two adult-sized chairs, and one child-sized chair. This room was set up for naturalistic play and was grouped into three activity centers with toys appropriate for children ages 3-5, separated by a short distance, consistent with the procedure used by Girolametto et al. (1999). The items included a toy farm with miniature people and animals, a dollhouse with people and house accessories, and an assortment of vehicles and blocks. Before the interaction, mothers and children were instructed to, "Play as they normally do." The mother-child interactions were videotaped by a camera behind a one-way mirror and audiotaped by a recorder set up in the room. The interactions were transcribed and coded to assess for maternal responsiveness and directiveness.

Coding System. The 30-minute mother-child interaction was coded using a system based on definitions of parental linguistic facilitation (responsiveness) and constraint (directiveness) set forth by Hubbell (1977). More specifically, responsive linguistic behaviors include: parental repetition of child utterances, parental expansion and extension of child utterances, parallel talk or parental description of child behavior, parental answer to a child question, and parental listening to child utterances. Directive parental linguistic behaviors include: parental questions, positive and negative parental commands, parental shift of the conversation topic, and parental interruption of the

conversation (see Table 3). The 30-minute interaction was coded using ninety 20-second intervals. If the mother engaged in a responsive or directive linguistic behavior during the interval, one mark was placed in the interval for the specific linguistic behavior. These numbers were tallied across all intervals, with 90 being the maximum amount of times a maternal linguistic behavior could occur during the interaction (see Appendix C).

Insert Table 3 approximately here

Clinical Evaluation of Language Functioning-4: Preschool, Second Edition (CELF-4: Preschool, Second Edition; Semel, Wiig, & Secord, 2004)**.** The CELF-4 Preschool is an individually administered instrument used for the identification, diagnosis, and follow-up evaluation of language deficits in children ages 3-7 years. The CELF- 4 Preschool explores the foundations of language form and content: word meanings (semantics), word and sentence structure and recall of spoken language (auditory memory). Three of the six subtests examine receptive language, whereas the remaining three assess expressive language skills. The Receptive and Expressive Standard Scores were used to assess the overall language functioning of children participating in the project.

Procedure

Recruitment. Participants were recruited through several sources. Nineteen (19) of the participants were recruited through Guilford Child Development preschools, where the program director sent flyers to children in local Head Start preschool programs (see

Appendix D). Parents responded via mail or phone call if they were interested. Clients evaluated for AD/HD in the UNCG AD/HD Clinic were another source of participants. Subsequent to the completion of child evaluations, mothers of child clients age three to five years were asked to participate in the project. Subsequent to the completion of adult evaluations, adult clients who displayed symptoms of AD/HD and who had at least one child between the age of three and five were asked to participate in the project. Thirteen (13) subjects were recruited through this mechanism. In addition to recruiting through the AD/HD Clinic, one (1) participant was also recruited through the UNCG General Clinic with a flyer posted in the clinic. Subjects were also recruited via social nomination, such that each project participant had the option of nominating mothers with children between the ages of three and five, whom they thought might be interested in participating in the project. The participant first contacted the nominated mothers, and if they expressed interest in the project and consent to be contacted, they were then contacted by the principal investigator and the project was explained. Thirteen (13) agreed to participate after being contacted. Four (4) called about the project after hearing about it during a talk in the Greensboro community.

Study. Mothers were required to come to a university psychology department to participate in the project. Before beginning the project the consent form for the project was explained, mothers completed the form, and were then given a copy (see Appendix E). Given the age of the children participating in the project, no formal child assent was obtained.

Mothers then completed the independent measures, administered by the principal

investigator, while their children completed the language evaluation. The language evaluation for each child was conducted by one of three graduate students in the Communication Sciences and Disorders Department. After the mother and child completed these tasks, they were asked to play for 30 minutes in an 18 by 10 foot room with a 4 foot round table, two adult-sized chairs, and one child sized chair. At the completion of the play period, mothers were asked whether the interaction was representative of a typical play interaction with their children.

The mother-child interactions were then coded by two undergraduate students in Psychology blind to the status of the participants in the study. Intrarater and interrater reliability was established for 20% of the coding data. One graduate student in the Communications Sciences and Disorders Department also transcribed the dialogue of the mother-child interaction, while another graduate student transcribed 20% of the interactions to establish interrater reliability of the transcripts. Intrarater reliability was also established for 20% of the transcripts.

Compensation and Parent Education Sessions. Children in the project were given two small toys for participation. All mothers were sent a feedback letter with the results of their child's language testing (see Appendix F). In addition, each parent was contacted via phone/mail to attend a free parent education session, conducted by the principal investigator and three graduate students from the Communication Sciences and Disorders Department. Parents were given information on facilitating behavioral and linguistic development in preschool-aged children. In addition, they were entered into a drawing for twenty-five dollars.

CHAPTER III

RESULTS

Preliminary Analyses

The means, standard deviations, and ranges of the mother and child variables are presented in Table 4. An examination of the distributions of each variable, along with skewness and kurtosis statistics, indicated that almost all of the variables were approximately normally distributed. One exception to this was found among the maternal Responsive and Directive codes, which were positively skewed. These codes were therefore standardized into z-scores. Consistent with prior research (Hubbell, 1977), parental repetition of child utterances, parental expansion and extension of child utterances, parallel talk, parental answer to a child question, and parental listening to child utterances were added together to create an overall maternal Responsiveness score. Similarly, parental questions, parental positive and negative parental commands, parental shift of the conversation topic, and parental interruption of the conversation were summed together to create an overall maternal Directiveness score. Because two of the Directive codes did not occur in any of the mother-child interactions - comment topic shift and interruption - they were excluded from the overall Directive score and all subsequent analyses.

Insert Table 4 approximately here

Reliability

For the maternal Responsiveness and Directiveness coding system, two undergraduate assistants were trained to independently code the interactions. Interrater reliability was computed for 20% of the data, which were selected at random. To compute interrater reliability, the undergraduate's coding of each Responsive and Directive code for a mother-child interaction was compared to the principal investigator's coding for the same mother-child interaction. Kappa was computed for each of the maternal Responsive and Directive codes. For interrater reliability, Kappas ranged from .78 to 1.0, with a mean of .87. Intrarater reliability was also computed for 20% of the data, which were selected at random. To compute this statistic, the undergraduates' coding of each Responsive and Directive code was compared to their own coding of the same mother-child interaction on a second occasion. Intrarater kappas ranged from .74 to 1.0, with a mean of .85.

Interrater and intrarater reliability were also computed for selected variables (i.e., maternal words per minute, maternal mean turn length, child words per minute, child mean turn length) from the SALT analysis of the transcripts of the mother-child interactions. Two graduate students from the Communication Sciences and Disorders Department were trained to transcribe the mother-child interactions. One graduate student acted as the primary transcriber, while the other acted as the secondary transcriber by

providing the interrater reliability ratings. Pearson correlations were computed for each of the selected SALT variables. Interrater and intrarater reliability were computed for 20% of the data, which were selected at random. Interrater agreement ranged from .95 to .98. Intrarater agreement was ascertained for the primary transcriber and ranged from .98 to 1.0.

Intercorrelations Among Predictor and Outcome Variables

Intercorrelations among predictor and outcome variables are presented in Table 5. Surprisingly, no maternal symptoms of AD/HD or general maternal psychopathology were significantly correlated with the maternal Responsive score. Lower levels of maternal Responsiveness were, however, associated with lower rates of maternal speech production (r = .30). Lower levels of Responsiveness were also found among mothers of boys in the study (r = -.29).

Insert Table 5 approximately here

In line with study expectations, higher levels of maternal Directiveness were associated with more frequent and severe levels of maternal inattention (r = .30) and more severe levels of maternal hyperactivity-impulsivity (r = .29). Higher levels of maternal Directiveness were also associated with increased rates of maternal speech production (r = .58) and longer maternal turns in conversations (r = .40) with their children during the mother-child interactions. Consequently, higher rates of maternal Directiveness were also associated with children producing fewer words per minute (r = -

.34) and children having shorter conversational turns (r = -.50). Finally, higher levels of Directiveness were found among mothers of girls in the study (r = -.37). It is also important to note that higher levels of maternal Directiveness were associated with higher levels of maternal Responsiveness (r = .33).

Lower levels of child receptive language functioning were associated with more severe maternal symptoms of inattention (r = -.31). Similar associations emerged for child AD/HD symptoms, such that lower levels of receptive language functioning were associated with more frequent and more severe symptoms of inattention and hyperactivity-impulsivity (r's from -.29 to -.46). Lower levels of child receptive language functioning were also associated with increased severity of child oppositional defiant symptoms (r = -32). In terms of demographics, lower levels of child receptive language functioning were associated with mothers who were unmarried, (r = -.37), who had lower scores on the WAIS (r = .42), fewer years of education (r = to .53), lower family incomes (r = .43), and minority backgrounds (r = -.32).

As was the case for receptive language, lower levels of child expressive language functioning were associated with increased frequency and severity of maternal inattention and hyperactivity-impulsivity symptoms (r's from -.32 to -.38). Likewise, lower levels of expressive language functioning were associated with increased levels of general maternal psychopathology (r = -.38). In terms of child behavioral variables, lower levels of expressive language functioning were associated with increased frequency and severity of inattention, hyperactivity-impulsivity, oppositional behavior, and aggressiveness (r's from -.36 to -.47). Finally, lower rates of expressive language functioning were

associated with mothers who were unmarried, (r = -.31), who had lower scores on the WAIS (r = .33), fewer years of education (r = .40), and lower family incomes (r = .36).

AD/HD Symptoms and Maternal Responsiveness and Directiveness

To determine which maternal and child variables might be associated with maternal Responsiveness and Directiveness, hierarchical stepwise regressions were conducted separately for each of the outcome measures. For each regression, predictor variables were entered into the model in a conceptually driven manner, with demographics entered first, followed by child variables, and maternal variables entered last.

A summary of the results of the regression analysis for maternal Responsiveness is presented in Table 6. In step one, ***family demographics*** were entered including: child age, grade, gender, race, mom age, mom education, household income, and marital status. Child gender emerged as the only significant predictor variable ($R^2 = .08$, $p < .05$) and was retained in all subsequent steps. ***Child behavioral*** (i.e., BASC Hyperactivity, BASC Attention Problems, DISC Inattention Symptom Count, DISC Hyperactivity-Impulsivity Symptom Count, ODD severity) and ***intellectual*** (i.e., estimated child IQ) variables were entered into the second step. None of these variables exerted a significant effect above and beyond that accounted for by child gender. Thus, they were excluded from all subsequent steps. In the third and final step, ***maternal behavioral*** (i.e., CAARS DSM Inattention, CAARS DSM Hyperactivity-Impulsivity, ADHD RS Inattention Symptom Count, ADHD RS Hyperactive-Impulsive Symptom Count, SCL 90 R GSI) and ***intellectual*** (i.e., WAIS-III vocabulary subtest) variables were entered. None of these

variables exerted a significant effect above and beyond that accounted for by child gender. Thus, only child gender was associated with maternal Responsiveness, accounting for 8 % of the variance. As evident from an inspection of the regression coefficient, mothers of males were less Responsive than mothers of females.

Insert Table 6 approximately here

The same ordering of predictor variables used for the maternal Responsiveness regression was used for the regression analysis of maternal Directiveness. A summary of these results is presented in Table 7. In step one, child gender emerged as the only significant predictor variable ($R^2 = .13$, $p < .01$) and was retained in all subsequent steps. In the second step, none of the various child ***behavioral*** *and* ***intellectual*** variables exerted a significant effect above and beyond that accounted for by child gender, and were excluded from subsequent steps. In the third and final step, maternal CAARS DSM Hyperactivity was found to be a significant predictor, accounting for an additional 7% of the variance (R^2 change = .07, $p < .01$). Together, child gender and maternal hyperactivity were highly associated with maternal Directiveness, accounting for 20% of the variance. As seen from the final model, higher levels of maternal Directiveness were associated with increased frequency of maternal hyperactivity. Finally, higher levels of maternal Directive behavior were evident in mothers of females.

Insert Table 7 approximately here

AD/HD Symptoms and Child Receptive and Expressive Language

To determine which maternal and child variables might be associated with child receptive and expressive language, hierarchical stepwise regressions were conducted separately for each of these outcome measures. For each regression, the ordering of predictor variables was nearly identical to the regressions for maternal Responsiveness and Directiveness, except that child estimated full scale IQ was not entered into the second step, child pragmatic variables (i.e., child words per minute, child mean turn length) were entered into the second step, maternal pragmatic variables (i.e., maternal words per minute, maternal mean turn length) were entered into the third step, and maternal Responsiveness and maternal Directiveness were added as fourth and fifth steps.

A summary of the results of the regression analysis for receptive language is presented in Table 8. In step one, maternal education was the only significant predictor variable that emerged ($R^2 = .28$, $p < .01$) from the ***family demographic*** variables and was retained in all subsequent steps. Among ***child behavioral*** and ***pragmatic*** variables, DISC Inattention symptom count was found to account for an additional 7% of the variance (R^2 change = .07, $p < .01$) and was included in all subsequent steps. In the third step, none of the ***maternal behavioral, pragmatic,*** *or* ***intellectual*** variables exerted a significant effect above and beyond maternal education and DISC Inattention symptom count. Thus, they were excluded from all subsequent steps. In the fourth step, the maternal Directiveness

score was entered into the model, with no significant effect. In the fifth and final step, the maternal Responsiveness score was entered and was not found to exert a significant effect. Overall, maternal education and child inattention symptom count were significantly associated with child receptive language, accounting for 36 % of the variance. Upon examination of the regression coefficients, it was evident that lower levels of receptive language functioning were associated with higher levels of child inattention symptoms and lower levels of maternal education.

Insert Table 8 approximately here

A summary of the regression analysis for expressive language is presented in Table 9. In step one, maternal education was the only significant variable that emerged ($R^2 = .15$, $p < .01$) from the family ***demographic*** variables, and was retained in all subsequent steps. Among the ***child*** variables, BASC Hyperactivity was the only variable that emerged and was found to account for an additional 14 % of the variance (R^2 change $= .14$, $p < .01$). In the third step, none of the ***maternal*** variables exerted a significant effect above and beyond maternal education and BASC Hyperactivity. Thus, they were excluded from all subsequent steps. In the fourth and fifth step, the maternal Directiveness score and maternal Responsiveness score did not exert a significant effect and were both excluded from the model. Thus, maternal education and child BASC Hyperactivity were found to be associated with child expressive language, accounting for 30 % of the variance. As seen from the final model, lower levels of expressive language

were associated with more severe child hyperactive-impulsive symptoms and lower levels of maternal education.

Insert Table 9 approximately here

Maternal and Child AD/HD Symptoms and Language Deficits

A categorical approach was also taken to investigate whether there was an association between parent and child AD/HD and child language functioning. To determine AD/HD diagnostic status, children had to display 6 or more symptoms of inattention or hyperactivity-impulsivity on the DISC or the ADHD Rating Scale. In addition, they were required to have developmentally deviant levels (above 93rd percentile) of inattention and/or hyperactivity-impulsivity according to the BASC and/or the ADHD Rating Scale. Mothers met AD/HD criteria if they were found to have 4 or more symptoms of inattention or hyperactivity-impulsivity according to the ADHD RS. In addition, they were required to have developmentally deviant levels (above 90th percentile) of inattention or hyperactivity-impulsivity on the CAARS. Approximately 40% of the children (N= 20) and 18% of the mothers (N=9) met these criteria for AD/HD. Children who scored below 85 on the CELF-4 Receptive or Expressive language scales were considered to meet the study criteria for a language deficit. Twenty-eight percent of the children (N=14) met criteria for a receptive language deficit, while 12% (N=6) were found to meet criteria for an expressive language deficit. In the overall sample, 8 % of the children (N=4) met criteria for both a receptive and expressive

language deficit. Children who scored between 85 and 89 on either the receptive or expressive language scales were excluded from further analyses in order to ensure the actual presence or absence of a language deficit.

A series of Chi-square tests were conducted to determine if maternal AD/HD diagnosis was associated with child language deficits. A summary of this distribution can be seen in Table 10 for receptive language deficits and in Table 11 for expressive language deficits. No significant patterns or trends emerged for maternal AD/HD diagnosis and child receptive or expressive language deficits. Also investigated was the association of child AD/HD diagnosis and child language deficits. Results for receptive language deficits appear in Table 12 and for expressive language deficits in Table 13. A significant relationship was found with receptive language deficits, such that these deficits were more frequent among children with AD/HD (χ^2=9.3, p <.01). Similarly, a significant relationship was found with expressive language deficits, which were also more frequent among children with AD/HD (χ^2=6.2, p <. 01).

Insert Tables 10, 11, 12, and 13 approximately here

CHAPTER IV

DISCUSSION

Children diagnosed with AD/HD often have comorbid language disorders. It is commonly thought that these language difficulties are associated with child symptoms of AD/HD. Although this may be true, another possible explanation for this comorbidity is that there are factors in the language learning environment of a child with AD/HD that impact language development. The social interactionist theory provides a framework for how parental characteristics might interact with child characteristics for language development (Hulit & Howard, 1997). Thus, given that children with AD/HD often have parents with AD/HD, parental symptoms could be associated with less than optimal language interactions, specifically related to maternal responsiveness and directiveness. Although there has been some investigation of the impact of parental psychopathology on interactions and language development, no studies have addressed the potential association between parental symptoms of AD/HD and maternal responsiveness and directiveness. It is possible that increased frequency and severity of maternal symptoms of AD/HD may be associated with a decrease in maternal responsiveness and an increase in directiveness during parent-child interactions, which in turn may be associated with language difficulties in children with symptoms of AD/HD.

The purpose of the project was to examine the association between maternal symptoms of AD/HD, maternal Responsiveness and Directiveness, and child language

functioning. More specifically, the question of whether maternal symptoms of AD/HD are associated with maternal behavior during mother-child interactions and whether this maternal behavior was associated with child language functioning was posed. It was expected that mothers with higher levels of AD/HD symptoms would display decreased Responsiveness and increased Directiveness. Maternal symptoms of AD/HD, in combination with child symptoms of AD/HD were also expected to be associated with decreased child language functioning. More specifically, given that there is empirical support suggesting an association between child symptoms of AD/HD and child language deficits, the combination of mother and child symptoms of AD/HD was expected to be most detrimental to child language functioning (see Figure 1).

Maternal AD/HD Symptoms and Responsiveness and Directiveness

Maternal symptoms of AD/HD were found to be associated with maternal Directiveness, but no association was found with maternal Responsiveness. More specifically, in the hierarchical regression, increased levels of maternal hyperactivity were associated with increased levels of maternal Directiveness. Thus, when interacting with their children, hyperactive mothers were found to be more Directive, asked more questions, and made more commands, more requests, and more judgments. Child gender was also found to be associated with maternal Directiveness, such that mothers of girls were found to be more Directive. Although maternal symptoms of AD/HD were not associated with Responsiveness, child gender was found to be associated with this maternal interaction style in the hierarchical regression. Thus, mothers of boys were found to be less Responsive. Overall, higher levels of maternal symptoms of AD/HD

were found to be associated with higher levels of maternal Directiveness. Both maternal interaction styles were associated with child gender, such that mothers were more Directive with girls and less Responsive with boys.

The association found between maternal symptoms of hyperactivity and maternal Directiveness has not yet been reported in the literature. Although studies have documented higher levels of maternal Directive behavior among mothers interacting with AD/HD children (DuPaul, McGoey, Eckert, & VanBrakle, 2001), no prior research studies have measured maternal symptoms of AD/HD in relation to this aspect of maternal functioning. Thus, it is possible that maternal symptoms of hyperactivity lead to overly Directive maternal behavior. The finding that mothers of girls were more Directive is inconsistent with the literature, which suggests that mothers are typically more directive with boys. However, given that maternal judgment was a Directive code, which includes positive maternal judgments or praise, this finding could be explained by existing literature (Barkley, 1998), suggesting that mothers of girls notice more positive behavior and deliver more praise.

It was surprising that maternal symptoms of AD/HD were not associated with decreased levels of Responsiveness. Given the research evidence that maternal depression is associated with decreased levels of maternal responsiveness, leading to deficits in child language functioning (Carson, Perry, Diefenderfer, & Klee, 1999; Reissland, Shepherd, and Herrera, 2003), the lack of findings was not expected. There may be several reasons for the lack of this association. It is possible that maternal symptoms of AD/HD do not disrupt maternal Responsive behaviors. More specifically,

depression is associated with factors such as depressed mood, decreased energy, and decreased self-esteem. It is possible that the symptoms AD/HD (i.e., decreased ability to sustain attention, increased level of mental and physical activity, decreased inhibition) do not disrupt Responsive behaviors at the same level as maternal depression, resulting in fewer negative child outcomes. It is also possible that with maternal symptoms of AD/HD there is some disruption to maternal Responsive behaviors; however, these disruptions may be quite minimal, decreasing their association with child language deficits. In fact, given the significant positive correlation found between maternal Responsiveness and maternal Directiveness, it is possible that increased levels of maternal symptoms of AD/HD are also associated with higher levels of Responsiveness, although not found to be significant in this study. More specifically, maternal symptoms of AD/HD may be associated with mothers being better able to meet their children's linguistic needs, allowing them to repeat child language.

Maternal and Child AD/HD Symptoms and Child Language

Child symptoms of AD/HD were found to be associated with decreased child language functioning; however, no association was found between maternal symptoms of AD/HD and child language. More specifically, in the hierarchical regression child inattention symptoms were found to be associated with child receptive language. Thus, increased child inattention symptoms of AD/HD were associated with decreased receptive language functioning. Decreased maternal education was also associated with decreased child receptive language functioning. Chi-square analyses revealed a significant distribution of receptive language deficits among children meeting criteria for

AD/HD. No significant distribution among mothers diagnosed with AD/HD and children with receptive language deficits was found. Furthermore, in the hierarchical stepwise regression, child symptoms of hyperactivity were found to be significantly associated with child expressive language, but no maternal behavioral variables were significant. Children who had more severe symptoms of hyperactivity had lower levels of expressive language functioning. Maternal education was also significant, in that children with lower expressive language scores had mothers with lower education levels. Chi-square analyses revealed a significant distribution of expressive language deficits among children meeting criteria for AD/HD; however, no significant distribution among mothers diagnosed with AD/HD and children with expressive language deficits. Twenty eight percent of the children in the sample met criteria for a receptive language deficit and 12 % for an expressive language deficit. In summary, increased child symptoms of inattention and hyperactivity-impulsivity and lower levels of maternal education were found to be associated with decreased child language functioning, consistent with prior research (Beitchman, Tuckett, & Batth, 1987; Hart & Risley, 1999).

These findings are consistent with the current research literature, in that child symptoms of AD/HD are significantly associated with decreased child language functioning. It is surprising, however, that maternal symptoms of AD/HD were not significantly associated with either child receptive or expressive language deficits. Maternal symptoms of AD/HD, coupled with child symptoms of AD/HD, were expected to be associated with decreased child language functioning. Thus, children with symptoms of AD/HD were expected to have greater language deficits with the addition of

maternal symptoms of AD/HD. However, this was not found to be true. In terms of explanations, there are a large number of children with symptoms of AD/HD who do not develop language disorders. Thus, the addition of maternal symptoms of AD/HD for a child with symptoms of AD/HD may not be associated with decreased language functioning as well. In this case, it is possible that children with symptoms of AD/HD who have mothers with symptoms of AD/HD have additional environmental influences (e.g., maternal education, father, siblings, teachers, peers) that help to promote language development, decreasing the potential for a negative relationship between child and maternal AD/HD symptoms on child language development. It is possible that a child with AD/HD symptoms who interacts with a mother who also has AD/HD symptoms, but more years of education, would be less likely to have interactions that would disrupt language development. Likewise, it is possible that interactions with a parent, without symptoms of AD/HD, could be associated with typical language development for children with symptoms of AD/HD or for those who have mothers who have symptoms of AD/HD. Additional interactions with siblings, teachers, and peers may also be associated with more normal language functioning for a child with symptoms of AD/HD.

Summary of Findings

This study adds additional unique findings to the AD/HD literature. More specifically, maternal hyperactivity symptoms of AD/HD were found to be associated with increased Directiveness during mother-child interactions. This is a unique contribution to the research literature. Previously, no studies assessed maternal behavior, pragmatic, and intellectual functioning in relation to maternal behavior during mother-

child interactions, and whether this behavior was associated with child language deficits. Consistent with prior research, child inattention and hyperactive-impulsive symptoms were associated with decreased child language functioning. Initially, it was proposed that maternal symptoms of AD/HD would be associated with decreased Responsiveness and increased Directiveness, and decreased child language functioning. In addition, maternal symptoms of AD/HD were expected to be associated with greater levels of decreased language functioning in children with symptoms of AD/HD. A summary of the actual associations found in this study is presented in Figure 2. Although maternal symptoms of hyperactivity were found to be associated with increased maternal Directiveness, there was no relationship found between maternal Directiveness and child language functioning. Also, no association was found between maternal symptoms of AD/HD and Responsiveness. As predicted, child symptoms of ADHD were associated with decreased child language functioning, however, no association was present between maternal symptoms of AD/HD and child language.

Insert Figure 2 approximately here

Given the findings, a closer look will be directed to the lack of associations found between maternal symptoms of AD/HD, decreased maternal Responsiveness, increased maternal Directiveness, and decreased child language functioning. More specifically, there was a significant positive association found between maternal hyperactivity and Directiveness. In addition, maternal Responsiveness and Directiveness were significantly,

positively correlated. Although not found to be significant in this study, maternal symptoms of AD/HD could be positively associated with maternal Responsiveness, suggesting that maternal symptoms of AD/HD may not disrupt maternal Responsive behavior as once thought. Although increased maternal Directiveness was found for mothers with symptoms of AD/HD, it is possible that this maternal behavior also does not create significant difficulties in a child's language learning environment, explaining the lack of association between maternal Directiveness and child language functioning.

In addition, few studies to date have measured symptoms of AD/HD and child language functioning in preschool children. Thus, this study also made a unique contribution to the literature because it examined receptive and expressive language functioning, along with pragmatic and behavioral features, of these children. Although it was initially proposed that maternal symptoms of AD/HD would compound child symptoms of AD/HD, which would then be associated with decreased child language functioning, this hypothesis was not confirmed. This study did confirm the strong association between child symptoms of AD/HD and child language deficits.

Although not found to be significant predictors of child language functioning, child and maternal pragmatic variables do offer significant contributions to this project. More specifically, the examination of these variables suggests a bi-directional relationship between child and parent pragmatic variables. In summary, mother's were found to have greater words per minute and increased turn length during mother-child interactions, while their children produced fewer words per minute and had shorter turns during their conversations with their mothers. Thus, a bi-directional relationship exists

between these variables during mother-child interactions, consistent with the social interactionist theory of language development.

Theoretical Implications

The social interactionist theory suggests that child and parent characteristics interact in the child's environment during child language development. Thus, this study has important theoretical implications in that it is possible that if mothers have symptoms of AD/HD additional influences in the child's environment may help to continue to regulate child language development. More specifically, other influences such as maternal education, fathers, siblings, teachers, and peers could help to counterbalance a language learning environment that may be otherwise disrupted by maternal symptoms of AD/HD. Thus, even with elevated levels of Directiveness, as with mothers with symptoms of hyperactivity in this study, child language could continue to develop in a mostly typical fashion. It is also possible that maternal symptoms of AD/HD are not associated with a decrease in maternal Responsive behavior. In fact, maternal symptoms of AD/HD may assist the parent in being Responsive (i.e., repetition) to the child's linguistic needs.

Evidence for the social interactionist theory was found in the bi-directional nature of mother and child pragmatic language features measured. These findings highlight the association and interaction between maternal and child linguistic variables, as suggested by the social interactionist theory. Thus, children of mothers who were producing more words per minute and who had longer turns during their conversations were found to produce fewer words per minute and had shorter turns during conversations with their

mothers, due to the increased production of maternal speech. The interaction between maternal and child characteristics is highlighted by the study's findings. Also evident are the multiple factors within the language-learning environment for children, which potentially function to promote typical child language development, despite the presence of variables that may be potentially harmful to language development.

Research Implications

Based on some of the methodological challenges within this study, additional research may help to further measure the constructs of interest. More specifically, research utilizing additional measures of maternal Directiveness and Responsiveness is warranted. Additional parent-report or other-report measures assessing this construct may help to provide a clearer picture of the potential association between these maternal behaviors and additional maternal behavioral and child language functioning. Additional variables should also be investigated to assist in determining whether there are other factors in the child's language learning environment that may be associated with language functioning. More specifically, the role of other caregivers, siblings, peers, and their association with child language functioning should be investigated. It is possible that factors such as these are associated with child symptoms of AD/HD and more typical language functioning. In addition, research assessing Responsive and Directive behavior with children and their fathers may help to provide much needed insight into the potential association between paternal characteristics and child language functioning.

Observational methods are thought to produce representative samples of behavior, however, it may be necessary to do observations of mother-child interactions on multiple

occasions to get an accurate measure of maternal Responsive and Directive behavior. Thus, a longitudinal research design may better answer the questions posed by the current study. It is not possible to determine which factors caused child language deficits. Thus, following a child and his/her mother and family over time, while measuring constructs of interest (i.e., demographics, behavioral, pragmatic, intellectual, responsiveness, and directiveness) may shed much needed light on child language development. It is possible that factors may be identified that help to explain the strong association between child symptoms of AD/HD and child language deficits. Furthermore, future studies should include a larger sample size, utilizing a clinical sample, in order to gain an accurate representation of both maternal and child AD/HD symptoms and their associations with child language functioning.

Finally, given that maternal symptoms of AD/HD were not found to be associated with child language functioning, environmental variables may not be the best explanation of child language deficits in children with symptoms of AD/HD. Given the growing body of research suggesting that genetics, as well as environmental factors, may contribute to some speech and language disorders and AD/HD (Billeaud, 1995; Lewis, 2001; Smith & Morris, 2005), future investigations should also include measures that assess genetic influences on child language functioning in addition to environmental factors.

Clinical Implications

The association between increased levels of maternal hyperactivity and maternal Directiveness is important to consider when in a clinical setting. Although maternal Directiveness was not associated with decreased child language functioning, it is possible

that this type of maternal behavior could negatively impact other child domains of functioning. Decreased parental responsiveness is associated with impaired child self-control and child conduct problems (Johnston, Murray, Hinshaw, Pelham, & Hoza, 2002). Thus, it is possible that maternal directive behavior could also lead to similar difficulties related to child self-control and behavior problems. Thus in a clinical setting, when working with mothers with AD/HD symptoms of hyperactivity, it may be necessary to specifically address maternal directive behavior. Such behaviors may negatively impact treatment delivery and treatment compliance. Thus, treatment for mothers with symptoms of AD/HD (i.e., medication monitoring, cognitive-behavioral therapy) and treatment for their children, who also have symptoms of AD/HD(i.e., parent training), may need to be specifically tailored to the mother and child's AD/HD symptom presentation, in order to achieve the best treatment outcomes.

In addition, the significant relationship between child language deficits and child symptoms of AD/HD is highlighted in this project, suggesting the continual need for appropriate screenings by psychologists and speech and language pathologists. The detection of language deficits is important because language, achievement, and cognitive functioning fall along a continuum, and for the most part language plays the central role. Impaired language systems are a strong risk factor for learning disabilities, particularly reading disorders (Beitchman et al., 1996).

Consistent with prior research, demographic variables were significantly correlated with maternal Directiveness, Responsiveness, and child receptive and expressive language. Clinicians working with mothers of boys may need to address the

typical propensity for these mothers to be less responsive. Additional strategies may need to be employed, such as Special Time (Barkley, 1997), where the mother spends time with her child while providing undivided attention and positive feedback. Additionally, a clinician's awareness of the association between lower levels of child language functioning and decreased maternal education, decreased maternal intelligence, single mothers, lower family incomes, and minority status is important in understanding the level of risk for a child, with similar demographics, to developing language difficulties.

Limitations

In this study, only 18% of the mothers met research criteria for AD/HD. Thus, it is possible that some of the negative findings are due to the lack of representation of maternal symptoms of AD/HD in this sample. A clinical sample, providing a higher occurrence of maternal and child symptoms of AD/HD, may have shed additional light on the proposed research questions. Another limitation is the potential reactivity of mothers during the mother-child interaction, given their awareness that they were being video and audio taped. Although many attempts were made to create a naturalistic environment for the play interaction, it is possible that mothers altered their behavior during the interaction. Furthermore, given that the measure of maternal Responsiveness and Directiveness occurred during the interaction, this behavior may not have been representative of the mother's true interaction style with her child.

In terms of methodological considerations, there may not have been enough statistical power within the current sample to find many of the significant associations that were expected. Also, maternal Responsiveness and Directiveness being measured

through only one observational measure is also a limitation. Thus, in order to better measure this construct, it may have also been important to include additional parent-report or other-report measures when assessing maternal Responsive and Directive behavior. As mentioned earlier, the duration of the observation, although similar to other parent-child interaction studies, may not have allowed for a representative sample of maternal and child behavior. In addition, given the observational research design of this study, it is not possible to infer which variables impact causation.

Conclusions

Despite limitations, the present study replicated and extended previous research findings. The association between child symptoms of AD/HD and child language deficits represents a replication of the well-established AD/HD and language functioning literature. The finding that mothers with symptoms of AD/HD were more Directive has not yet been reported in the literature, and provides additional insight into the interaction style between mothers with symptoms of AD/HD and their children. Consistent with the social interactionist theory, bi-directional relationships were found among mother and child pragmatic variables. However, this was not true for the relationship between maternal and child symptoms of AD/HD, maternal Responsiveness and Directiveness, and child language functioning. Findings suggested that, despite leading to increased Directiveness, maternal symptoms of AD/HD are not associated with decreased child language functioning

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APPENDIX A.

ODD RATING SCALE

ODD RS

Circle the number that best describes YOUR CHILD'S behavior over the past 6 months.

		Never	Sometimes	Often	Very Often
1.	Loses temper.	0	1	2	3
2.	Argues with adults.	0	1	2	3
3.	Actively defies or refuses to comply with adults' rules or requests.	0	1	2	3
4.	Deliberately annoys people.	0	1	2	3
5.	Blames others for his/her mistakes or misbehavior.	0	1	2	3
6.	Is touchy or easily annoyed by others.	0	1	2	3
7.	Is angry and resentful.	0	1	2	3
8.	Is spiteful or vindictive.	0	1	2	3

APPENDIX B.

DEMOGRAPHIC AND DEVELOPMENTAL QUESTIONNAIRE

Please Provide Information About You and Your Family:

Your Age: _____

*Date of Birth*_____

Current Marital Status (Check one):

- ❑ Single, never married
- ❑ Married
- ❑ Separated
- ❑ *Divorced*

You and your child's other parent are (Check one):

- ❑ Married
- ❑ Separated
- ❑ *Divorced*
- ❑ *Together but not married*

Ethnic Group (Check one):

- ❑ Asian
- ❑ African-American/Black
- ❑ Hispanic
- ❑ Caucasian/white
- ❑ Native American
- ❑ Other _____

Education Level (Check *highest* level completed):

- ❑ Some high school
- ❑ High School Graduate
- ❑ Trade school/ professional school
- ❑ Some College
- ❑ 2-year College Graduate
- ❑ 4-year College Graduate (B.A/B.S.)
- ❑ M.A./ M.S.
- ❑ Ph.D.
- ❑ Medical/ Law School Graduate

Employment Status (Check one):

- ❑ Work out of the home, Full-time
- ❑ Work out of the home, Part-time
- ❑ Stay-at-home mom
- ❑ *Unemployed*
- ❑ On disability
- ❑ Other: _____

Your Gender: Male Female

Household Income (yearly gross income) (Check one):

- ❑ < $10,000
- ❑ $10,001 - $20,000
- ❑ $20,001 - $30,000
- ❑ $30,001 - $40,000
- ❑ $40,001 - $50,000
- ❑ $50,001 - $60,000
- ❑ $60,001 - $70,000
- ❑ $70,001 - $80,000
- ❑ $80,001 - $90,000
- ❑ $90,001 - $100,000
- ❑ > $100,000

Number of *children* (birth –18 years) currently living in your home (Check one):

- ❑ 1
- ❑ 2
- ❑ 3
- ❑ 4
- ❑ 5
- ❑ 6 or more (indicate actual number here _____)

List children's ages/genders here:

_____

_____

_____

Number of *adults* in your household (including yourself) (Check one):

- ❑ 1
- ❑ 2
- ❑ 3 or more (write the actual number here_____)

Have YOU <u>ever</u> received any of the following services? (Check *all* that apply):

- ❑ Counseling or individual therapy
- ❑ Marital counseling or therapy
- ❑ Hospitalization for psychological problems
- ❑ Parent training (for children with behavior problems)
- ❑ Support group
- ❑ Antidepressant medication (Prozac, Zoloft, Paxil, etc).
- ❑ Medication for any other psychological problem (ex. AD/HD) Please list name and reason:_____

  _____
- ❑ None of the above

Have YOU received any of the following services <u>in the past year</u>? (Check *all* that apply):

- ❑ Counseling or individual therapy
- ❑ Marital counseling or therapy
- ❑ Hospitalization for psychological problems
- ❑ Parent training (for children with behavior problems)
- ❑ Support group
- ❑ Antidepressant medication (Prozac, Zoloft, Paxil, etc).
- ❑ Medication for any other psychological problem (ex. AD/HD) Please list name and reason: _____

  _____
- ❑ None of the above

Are YOU <u>currently</u> receiving any of the following services? (Check *all* that apply):

- ❑ Counseling or individual therapy
- ❑ Marital counseling or therapy
- ❑ Parent training (for children with behavior problems)
- ❑ Parenting support group
- ❑ Antidepressant medication (Prozac, Zoloft, Paxil, etc).
- ❑ Medication for any other psychological problem (ex. AD/HD) Please list name and reason:_____

  _____
- ❑ None of the above

Have you ever been formally evaluated and told by a professional that you have any of the following problems? (Check *all* that apply):

- ❑ Attention-Deficit/Hyperactivity Disorder (AD/HD or ADD)
- ❑ Learning Disability
- ❑ Depression or Major Depressive Disorder
- ❑ Bi-Polar Disorder or Manic-Depression

- ❑ Schizophrenia or Psychosis
- ❑ Anxiety Disorder
  - ❑ What type? _____
- ❑ Personality Disorder
- ❑ Language Disorder
- ❑ Other: _____
- ❑ None of the above

CHILD's age: _____

Gender: Male Female

Child's Date of Birth:_____

Is the child you completed the forms about adopted?

- ❑ No
- ❑ Yes (at what age? _____)

Child's current grade: _____

Has your child ever repeated a grade?

- ❑ No
- ❑ Yes (which grade(s)? _____)

Child's position in the family:

- ❑ 1st born
- ❑ 2nd born
- ❑ 3rd born
- ❑ 4th born
- ❑ 5th born
- ❑ other _____

Has your child <u>ever</u> received any of the following services? (Check *all* that apply):

- ❑ Counseling or individual therapy
- ❑ Family Therapy
- ❑ Group Therapy (Social Skills Training/ Anger Management)
- ❑ Medication for AD/HD or ADD (Ritalin, Methylphenidate, Adderall, Dexedrine, Strattera etc). Please indicate: _____
- ❑ Medication for any other emotional or behavioral difficulty(s) Please list name and purpose:_____ _____
- ❑ School-Based interventions/ Individualized Education Plan
- ❑ None of the above

Is your child <u>currently</u> receiving any of the following services? (Check *all* that apply):

- ❑ Counseling or individual therapy
- ❑ Family Therapy
- ❑ Group Therapy (Social Skills Training/ Anger Management)
- ❑ Medication for AD/HD or ADD (Ritalin, Methylphenidate, Adderall, Dexedrine, Strattera etc). Please indicate: _____
- ❑ Medication for any other emotional or behavioral difficulty(s) Please list name and purpose:_____ _____
- ❑ School-Based interventions/ Individualized Education Plan
- ❑ None of the above

Has your child ever been formally diagnosed with any of the following problems? (Check *all* that apply):

- ❑ Attention-Deficit/Hyperactivity Disorder (AD/HD or ADD) (fill in both)
  1. Age symptoms began ____
  2. Age of Diagnosis of AD/HD ____
- ❑ Oppositional Defiant Disorder
- ❑ Conduct Disorder
- ❑ Learning Disability
- ❑ Depression or Major Depressive Disorder
- ❑ Bi-Polar Disorder or Manic-Depression
- ❑ Schizophrenia or Psychosis
- ❑ Anxiety Disorder
  - ❑ What type? _____
- ❑ Mental Retardation
- ❑ Adjustment Disorder
- ❑ Language Disorder
- ❑ Chronic Medical/Health Problems (please specify_____)
- ❑ Other: _____

Has your child **ever** received any services to help with speech, language, or reading skills?

- ❑ **No**
- ❑ **Yes (Please Explain)**_____
  _____
  _____
  _____
  _____

Is your child **currently** receiving any services to help with speech, language, or reading skills?

- ❑ **No**
- ❑ **Yes (Please Explain)**_____
  _____
  _____
  _____

Has any of your child's SIBLINGS been formally diagnosed with Attention Deficit/ Hyperactivity Disorder?

Yes
No

 # siblings with ADHD
_____

Has any of your child's SIBLINGS been formally diagnosed with a Specific Language Impairment?

Yes
No

 # siblings with a SLI _____

Your Partner's Education Level (Check *highest* level completed):

- ❑ Some high school
- ❑ High School Graduate
- ❑ Trade school/ professional school
- ❑ Some College
- ❑ 2-year College Graduate
- ❑ 4-year College Graduate(B.A/B.S.)
- ❑ M.A./ M.S.
- ❑ Ph.D.
- ❑ Medical/ Law School Graduate
- ❑ Not applicable/no significant other

Your Partner's Age: _____

What is your relationship to the child you completed the forms about ?

- ❑ **Biological Parent**
- ❑ **Step Parent**
- ❑ **Adoptive Parent**
- ❑ **Foster Parent**
- ❑ **Grandparent**

Other _____

CHILD LANGUAGE DEVELOPMENT

Before talking how did your child communicate?

At what age did your child say his/her first words?

What was his/her first word?

At what age did your child say two-word combinations?

What were they?

At what age did your child say phrases or short sentences?

What were they?

At what age did your child follow simple directions?

Did your child ever stop talking?
When?
Under what circumstances

CHILD BEHAVIORAL DEVELOPMENT

Has your child had any difficulty in preschool or kindergarten because of his/her behavior?

Please Describe (What kind of difficulties did she/he have? When did they begin?)

Have there been any accommodations in the classroom to address these difficulties?

If yes, what are they?

PARENT LANGUAGE DEVELOPMENT

As a child did you have any difficulty with language?

If yes, please describe these difficulties (when did it begin, what were the specific difficulties).

Were you diagnosed with a language disorder as a child?

Diagnosis: _____

Age of Diagnosis: _____

PARENT BEHAVIORAL DEVELOPMENT

As a child did you have any behavioral or emotional difficulties?

At home?

Please describe.(What were the difficulties? When did they begin?, etc).

At school?

Please describe. (What were the difficulties? When did they begin?, etc).

With friends?

Please describe. (What were the difficulties? When did they begin?, etc).

Were you diagnosed with a behavior disorder as a child?

Diagnosis: _____

Age of Diagnosis: _____

Were you diagnosed with an emotional disorder as a child?

Diagnosis: _____

Age of Diagnosis: _____

APPENDIX C.

CODING SYSTEM EXAMPLE

	MINUTES			1			2			3			4			**5**			6			7			8			9			**10**	**Pg1**
	Coding Behaviors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	**Tot**
Q. R. R.	Yes/No																															
	Single word																															
	Open-ended																															
	Clarification																															
Directives																																
	Pos. Imperative																															
	Neg. Imperative																															
	Requests																															
Judgment																																
	Pos. Judgment																															
	Neg. Judgment																															
	Comment-Topic Shift																															
	Interruption																															
	Repetition																															
Rel. Com.																																
	Expansion																															
	Extension																															
	Parallel talk																															
	Answer																															
Listening																																
	Neutral acknowl.																															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	**15**	16	17	18	19	20	21	22	23	24	25	26	27	28	29	**30**	
	MINUTES			1			2			3			4			**5**			6			7			8			9			**10**	

APPENDIX D.

RECRUITMENT FLYER

Volunteers Needed
Research Project on Parent-Child Interactions and
Child Language Functioning

Mothers and their children (ages 3 to 5) are needed for a research project. The purpose of this project is to learn more about mother-child interactions and child language development. The project will involve completing questionnaires and answering interview questions about your child and yourself. It will also involve your child receiving a free language evaluation. In addition, you and your child will be asked to play together while being observed.

The project will take about one hour to complete. You will come to the University of North Carolina at Greensboro to complete the project.

All families who participate in the project will receive written feedback regarding their child's language. In addition, parents will be given the opportunity to participate in a free parent educational session that will provide information on parent-child relationships.

This project is being conducted by Cryshelle Schouest Patterson, a doctoral student in clinical psychology working under the supervision of Dr. Arthur D. Anastopoulos at UNCG.

Your participation in this project is voluntary. All information that you provide will remain confidential. This project has been approved by the Institutional Review Board at the University of North Carolina at Greensboro.

If you are interested in participating in this project or in getting more information, mail the bottom of this form back in the addressed, stamped envelope or call Cryshelle at 336-256-0063. Thank you for your time.

Check One:

- ❑ **I AM interested in participating in your project.**
- ❑ **I would like more information about your project.**
- ❑ **I am NOT interested in participating.**

Parent Name: _____ Age:_____
Child's Name: _____ Age: _____
Address: _____
_____
Phone Number: _____
Best time to contact: _____

APPENDIX E.

CONSENT FORM

THE UNIVERSITY OF NORTH CAROLINA
GREENSBORO

CONSENT TO ACT AS A HUMAN PARTICIPANT: LONG FORM

Project Title: Parent-Child Interactions and Child Language Functioning

Project Director: Cryshelle Schouest, M.A.

Participant Names: _____ and _____
(Parent) (Child)

You and your child have been asked to participate in a project looking at parent-child interactions and child language functioning. This project will assess how parents and children behave together. The project will also look at your child's language.

If you decide to participate in this project, you will first answer questions about your child's behavior and your behavior. In addition, you will answer questions about your child's language and your own language development. Your child will then undergo a brief language evaluation by a graduate student in the communication sciences department. Finally, you and your child will be asked to play, as you normally would, in a room for thirty minutes. This interaction will be video and audio taped to see and hear how you interact with each other. The project will take one and a half to two hours to complete.

You will receive written feedback about your child's language. You will also be given the opportunity to participate in a parent education session, addressing parent-child relationships and parent-child interactions. If you are interested in this session, you will be contacted before the start of the session by the principal investigator. The parent education session will be conducted by the principal investigator and graduate students in communication sciences. Your child will get a small toy for participating in the project.

By participating in this project, you will help us to learn more about the families and child language functioning. This information may help professionals who work with children and families.

There are minimal risks associated with this study. There is a possible risk that you could become upset by questions that you are asked. Your child could become upset or frustrated during the language evaluation or during your interaction period. Although this type of frustration rarely occurs, steps will be taken to lessen it. If you become upset or distressed by a question, you do not have to answer than question. If your child becomes upset during the language evaluation, he/she will be allowed to take a break from testing. After a break, the examiner will try to get the child to continue the test; however, if your child continues to be upset, the testing will be stopped.

All of the information that you provide during this project will be kept confidential. To ensure confidentiality, your name will not be recorded on any of the questionnaires that you complete. These questionnaires and video and audio tapes will be marked with an identification number. A list of participants and identification numbers will be kept in a secure location and accessed only by the project director. The data collected from this project will be destroyed two years after the completion of the project. Although all of your information will remain confidential, the project director is required by law to release information regarding you and your child without your consent if there is evidence of child abuse or parental suicidal ideation.

By signing this consent form, you agree that you understand the procedures and any risks and benefits involved in this research. You are free to refuse to participate or to withdraw your consent to participate in this research at any time without penalty or prejudice; your participation is entirely voluntary. Your privacy will be protected because you will not be identified by name as a participant in this project.

The research and this consent form have been approved by the University of North Carolina at Greensboro Institutional Review Board, which insures that research involving people follows federal regulations. Questions regarding your rights as a participant in this project can be answered by calling Mr. Eric Allen at (336) 256-1482. Questions regarding the research itself will be answered by calling Cryshelle Schouest (256-0063) or Dr. Arthur Anastopoulos (256-0006). Any new information that develops during the project will be provided to you if the information might affect your willingness to continue participation in the project.

By signing below, you are agreeing to participate in the project described to you by _____

_____ and you are acknowledging that you have received a copy of this form.

_____ _____

Participant's Signature* Date

*If participant is a minor or for some other reason unable to sign, complete the following:

Child participant is _____ years old and unable to sign.

_____ _____

Custodial Parent(s)/Guardian Signature(s) Date

APPENDIX F.

PARENT FEEDBACK LETTER

Language Functioning Study

Child's Name:
Date of Birth:
Chronological Age:

Date of Evaluation:
Examiner:
Supervisor:

The Clinical Evaluation of Language Fundamentals: Preschool-2 (CELF: Preschool-2) was administered to assess 058's receptive and expressive language skills. Its purpose is to identify language skill deficits, the nature and the degree of the deficit and strengths within the language. A summary of the results were as follows:

	Scaled Score	Standard Score	Percentile Rank
Expressive	**17**	**75**	**6**
Receptive	**23**	**85**	**7**

The expressive portion of the CELF Preschool-2 measured 058's ability to use and produce language appropriately, while the receptive portion measured her comprehension ability. Your child's Expressive Language score indicates that she scored as well or better than 6 out of 100 children of the same age who took the same test. Her receptive score indicates that she performed better than 7 out of 100 children her age. A standard score of 100 is considered the average for these two sections of the CELF-Preschool-2. These scores indicate that 058's has a moderate difficulty with expressive language when compared to other children her age. In addition, her receptive language score place her in the mildly impaired range. It is recommended that she receive further testing in the areas of expressive and receptive language.

An assessment of literacy skills was also completed to evaluate your child's developing pre-literacy skills. The tests administered were used to examine your child's early reading/writing skills as well as her knowledge of sound structure and ability to manipulate sound (phonological awareness) through such activities as (a) rhyming, (b) sound blending and (c) counting syllables. The results are as follows:

	Raw Score	Skill Level
Pre-Literacy	63	Inadequate pre-literacy skills
Phonological Awareness	8	Inadequate phonological awareness skills

Hearing Screening Results: Passed __X__ or Failed ____

APPENDIX G.

TABLES AND FIGURES

Table 1.

Demographic Characteristics of the Sample

	N	Percentage
Child Gender		
Male	25	50.0
Female	25	50.0
Child Race		
African American	22	44.0
Caucasian	24	48.0
Other	4	8.0
Child Education		
Kindergarten	5	10.0
Preschool	32	64.0
Day care	1	2.0
Not In School	12	24.0
Mother's Marital Status		
Married	22	44.0
Separated	6	12.0
Divorced	6	12.0
Single	16	32.0

Maternal Education		
≤ High school	10	20.0
Trade School/Some College	21	40.0
4 Year College	12	24.0
Advanced Degree	7	14.0
Yearly Family Income		
Less than $10,000	9	18.0
$10,000 to $30,000	15	30.0
$30,001 to $50,000	11	22.0
$50,001 to $70,000	6	12.0
$70,001 to $90,000	5	10.0
Above $90,000	4	8.0

Table 2.

Summary of Independent/ Predictor Measures

Construct	Measure	Type
Child Symptoms of AD/HD	(C DISC-IV)	*Parent completed interview*
	BASC	*Parent completed rating scale*
	ADHD Rating Scale-IV	*Parent completed rating scale*
Child Oppositional Behavior	ODD Rating Scale	*Parent completed rating scale*
Child IQ	WPPSI-III- Vocabulary and Block Design Subtests	*Clinician administered*
Maternal Symptoms of AD/HD	CAARS	*Adult self-report*
	Adult ADHD Rating Scale	*Adult self-report*
Maternal Symptoms of Psychopathology	SCL-90 R	*Adult self-report*
Maternal IQ	WAIS Vocabulary subtest	*Clinician administered*
Child and Maternal History	Demographic Measure	*Parent completed form*
Child and Maternal Pragmatics	SALT	*Transcription analysis*

Table 3.

Codes Used for Mother-Child Interactions

Maternal Linguistic Behavior	Codes of Maternal Functioning	Definition of the Codes
Maternal Responsiveness	*Repetition*	Complete or partial repetition of child utterance
	Related Comment *(Expansion)*	Partial repetition of child utterance and *adds to it*
	Related Comment *(Extension)*	Conceptual extension of child utterance, without repetition
	Related Comment *(Parallel Talk)*	Adult describes what the child is doing
	Related Comment (*Answer)*	Adult answer to child question
	Listening *(Neutral Acknowledgement)*	Short adult utterances interjected during child speech
Maternal Directiveness	Questions (*Yes/No, Single Word response, Open-ended response, Clarification)*	Types of adult questions
	Directives *(Positive and Negative Imperatives)*	Positive and negative adult commands
	Directives *(Requests)*	Adult requests made to the child
	Judgment *(Positive and Negative Judgment)*	Verbal adult praise and reinforcement, placing value on the child's behavior
	Comment-Topic Shift	Adult introduces a new topic or shifts back to and old one
	Interruption	Adult interruption of child speech

Note. Levels of Responsiveness and Directiveness were derived from examining the frequency of the above codes across the 30-minute mother–child interactions, broken down into 90 twenty second intervals.

Table 4.

Means, Standard Deviations, and Ranges of Predictor and Outcome Variables

Domain	Variable	Mean	SD	Range
Child AD/HD	C-DISC IA Count	4.0	2.96	0.0 - 9.0
	C-DISC H/I Count	4.7	2.91	0.0 - 9.0
	ADHD RS IA Count	2.1	2.54	0.0 - 8.0
	ADHD RS H/I Count	3.0	3.23	0.0 - 8.0
	BASC Attention Problems	55.3	18.25	21.0 - 97.0
	BASC Hyperactivity	55.9	15.87	26.0 - 85.0
Maternal AD/HD	CAARS DSM IA	52.7	15.18	20.0 - 87.0
	CAARS DSM H/I	47.8	13.63	29.0 - 80.0
	Adult RS Current IA Count	1.7	2.60	0.0 - 9.0
	Adult RS Current H/I Count	1.8	2.55	0.0 - 9.0
Child Behavior	BASC Aggression	50.3	13.44	30.0 - 93.0
	ODD RS Severity	6.4	5.66	0.0 - 23.0
Maternal Behavior	SCL-90 R GSI	53.5	13.56	30.0 - 81.0
Child IQ	WPPSI Estimated FS IQ	100.0	8.67	85.0 - 121.0
Parent IQ	WAIS Vocabulary	10.1	2.36	4.0 - 14.0
Child Pragmatic	SALT Words Per Minute	28.7	11.68	6.4 - 72.1
	SALT Mean Words per Turn	4.9	1.95	2.0 - 13.0

Maternal Pragmatic	SALT Words Per Minute	50.2	16.46	18.7 - 99.4
	SALT Mean Words per Turn	8.7	2.87	4.0 - 17.5
Child Language	CELF Receptive	92.9	14.02	67.0 - 127.0
	CELF Expressive	97.5	12.40	75.0 - 132.0

Notes. C-DISC = Computerized Diagnostic Interview Schedule for Children – IV; IA = Inattention; H/I = Hyperactivity-Impulsivity; ADHD RS = Attention-Deficit Hyperactivity Disorder Rating Scale; BASC = Behavior Assessment System for Children; CAARS = Conners' Adult ADHD Rating Scale; Adult RS = Adult ADHD Rating Scale; ODD RS = ODD Rating Scale; SCL-90 R GSI = Symptom Checklist 90-Revised General Severity Index; WPPSI Estimated Full Scale IQ = Wechsler Primary and Preschool Scale of Intelligence Estimated Full Scale IQ; WAIS Vocabulary = Wechsler Adult Intelligence Scale Vocabulary Subtests; SALT = Systematic Analysis of Language Transcripts; CELF = Clinical Evaluation of Language Functioning-4: Preschool, Second Edition.

Table 5. Intercorrelations Among Predictor and Outcome Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Gender	--																						
2. Mom Ed.	-.19	--																					
3. Race	.24	.42**	--																				
4. C-DISC IA	.14	.38**	.27	--																			
5. C-DISC H/I	.17	-.29*	.11	.82””	--																		
6. BASC Att.	-.13	-.17	-.16	.67**	.65**	--																	
7. BASC Hyp.	-.06	-.26	.04	.59**	.70**	.65**	--																
8. ODD Sev.	-.05	-.35*	-.04	.41**	.48**	.46**	.64**	--															
9. Est. FS IQ	.21	.39**	-.13	-.23	-.10	-.13	-.14	-.31*	--														
10. Rec. Lang.	.03	.53**	-.32*	-.46**	-.40**	-.30*	-.29*	-.32*	.48**	--													
11. Exp. Lang.	-.03	.40**	-.26	-.47**	-.46**	-.40**	-.47**	-.37**	.42**	.77**	--												
12. DSM IA	-.00	-.35*	.01	.54**	-.53**	.43**	.49**	.43**	-.25	-.31*	-.38**	--											
13. DSM H/I	-.08	-.28	-.14	.40**	.46**	.47**	.51**	.47**	-.17	-.25	-.33*	.80**	--										
14. ADHD IA	-.08	-.31*	-.00	.54**	.53**	.46**	.54**	.35*	-.20	-.27	-.34*	.85**	.74**	--									
15. ADHD HI	-.02	-.30*	-.45	.46**	.48**	.48**	.58**	.36*	-.03	-.21	-.27	.73**	.82**	.85**	--								
16. SCL 90-R GSI	-.00	-.37**	.22	.46**	.45**	.54**	.62**	.54**	-.26	-.28	-.38**	.74**	.64**	.65**	.63**	--							
17. WAIS Voc.	.30*	.69**	-.47**	-23	-.17	-.10	-.17	-.30*	.28	.42**	.33*	-.29*	-.18	-.14	-.15	-.28	--						
18. Mom WPM	-.29*	.23	-.26	-.19	-.20	-.04	-.04	-.07	.03	.06	-.03	-.05	.10	-.03	-.05	.04	12	--					
19. Mom MTL	-.27	.19	-.20	-.02	-.01	.05	.12	-.03	-.04	.05	-.05	.12	.16	.11	.03	.11	.06	.76**	--				
20. Child WPM	.09	.04	-.19	-.15	-.13	.00	-.11	.06	.06	.20	.21	-.23	-.19	-.19	-.21	-.13	.20	-.28	-.56**	--			
21. Child MTL	.13	.07	-.14	-.08	-.03	.02	-.05	.11	.09	.24	.28	-.15	-.17	-.17	-.17	-.16	.19	-.53**	-.51**	.85	--		
22. Mat. Res.	-.29*	.15	-.07	-.16	-.22	-.05	-.10	-.02	.10	.10	.04	-.18	-.03	-.02	-.09	-.07	.23	.30*	-.01	.08	-.20	--	
23. Mat. Dir.	-.37*	-.03	-.05	.07	.09	.20	.23	.19	-.11	-.21	-.21	.16	.29*	.30*	.28	.25	-.14	.58**	.40**	-.34*	-.50**	.33*	--

Notes. Mom Ed. = Maternal Education; C-DISC IA = C-DISC Inattention Symptoms, C-DISC H/I = C-DISC Hyperactivity-Impulsivity Symptoms; BASC Att. = BASC Attention Problems; BASC Hyp. = BASC Hyperactivity; ODD Sev. = ODD Symptom Severity; Est. FS IQ = Child Estimated Full Scale IQ; Rec. Lang. = Child Receptive Language; Exp. Lang. = Child Expressive Language; DSM IA = CAARS DSM Inattention Severity; DSM H/I = CAARS DSM Hyperactivity-Impulsivity Severity; ADHD IA = Adult ADHD Rating Scale Inattention Symptoms; ADHD HI = Adult ADHD Rating Scale Hyperactive-Impulsive Symptoms; SCL 90-R GSI = Symptom Check List 90-Revised General Severity Index; WAIS Voc. = WAIS Vocabulary Subtest; Mom WPM = Mom Words Per Minute; Mom MTL = Mom Mean Turn Length; Child WPM = Child Words Per Minute; Child MTL = Child Mean Turn Length; Mat. Res. = Maternal Responsiveness; Mat. Dir. = Maternal Directiveness; *p < .05; **p < .01.

Table 6.

Final Model of Hierarchical Stepwise Multiple Regression Predicting Maternal Responsiveness

Variable Entered	Cumulative R^2	Change in R^2	Final β
Child Gender	.08	.08	-.29

Table 7.

Final Model of Hierarchical Stepwise Multiple Regression Predicting Maternal Directiveness

Variable Entered	Cumulative R^2	Change in R^2	Final β
Child Gender	.13	.13	-.19
CAARS DSM Hyperactivity	.20	.07	.27

Note. CAARS = Conners' Adult ADHD Rating Scale

Table 8.

Final Model of Hierarchical Stepwise Multiple Regression Predicting Child Receptive Language

Variable Entered	Cumulative R^2	Change in R^2	Final β
Maternal Education	.28	.28	.41
DISC Inattention Count	.36	.07	-.30

Note. C-DISC= Computerized Diagnostic Interview Schedule for Children – IV.

Table 9.

Final Model of Hierarchical Stepwise Multiple Regression Predicting Child Expressive Language

Variable Entered	Cumulative R^2	Change in R^2	Final β
Maternal Education	.15	.15	.29
BASC Hyperactivity	.30	.14	-.39

Note. BASC = Behavior Assessment System for Children.

Table 10.

Chi Square Analysis of the Relationship Between Maternal AD/HD and Child Receptive Language

	Child Receptive Language Deficit		
	Present	Absent	Total
Maternal AD/HD			
Present	3	2	5
Absent	11	25	36
Total	14	27	41

Table 11.

Chi Square Analysis of the Relationship Between Maternal AD/HD and Child Expressive Language

	Child Expressive Language Deficit		
	Present	Absent	Total
Maternal AD/HD			
Present	0	6	6
Absent	6	32	38
Total	6	39	44

Table 12.

Chi Square Analysis of the Relationship Between Child AD/HD and Child Receptive Language

	Child Receptive Language Deficit		
	Present	Absent	Total
Child AD/HD			
Present	10	6	16
Absent	4	21	25
Total	14	27	41

Table 13.

Chi Square Analysis of the Relationship Between Child AD/HD and Child Expressive Language

	Child Expressive Language Deficit		
	Present	Absent	Total
Child AD/HD			
Present	5	11	16
Absent	1	27	28
Total	14	38	44

Figure 1.

Predicted Association between Maternal Interaction Style, Maternal AD/HD, Child AD/HD, and Child Language

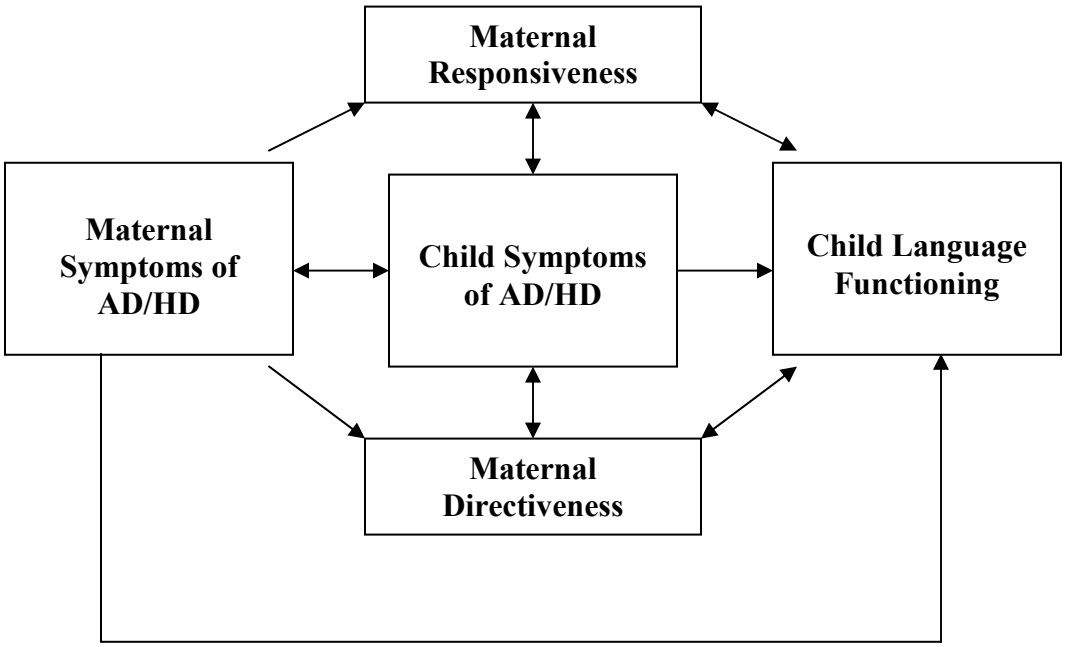

Figure 2.

Actual Association Found between Maternal Interaction Style, Maternal AD/HD, Child AD/HD, and Child Language