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FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

THE EFFECT OF A MULTI-COMPONENT CONSULTATION INTERVENTION ON
THE PRAGMATIC LANGUAGE SKILLS OF STUDENTS WITH SYMPTOMS OF
ATTENTION DEFICIT HYPERACTIVITY DISORDER

A thesis submitted in partial fulfillment of the

requirements for the degree of

MASTER OF SCIENCE

in

SPEECH LANGUAGE PATHOLOGY

by

Brittney Marie Cooper

2014

To: Dean Ora Strickland
College of Nursing and Health Sciences

This thesis, written by Brittney Marie Cooper, and entitled The Effect of a Multi-Component Consultation Intervention on the Pragmatic Language Skills of Students with Symptoms of Attention Deficit Hyperactivity Disorder, having been approved in respect to style and intellectual content, is referred to you for judgment.

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

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Date of Defense: July 3, 2014

The thesis of Brittney Marie Cooper is approved.

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University Graduate School

Florida International University, 2014

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DEDICATION PAGE

This thesis is written in dedication to my wonderful family. To my Mom and Dad, I would like to say, ‘Thank you’. Without your unwavering support during trying times, this project would not have been possible. To my big brother Tony, thank you for instilling in me a love for knowledge. To my younger siblings, Eric and Megan, I hope this inspires you to always push yourselves because you can do anything you set your mind to.

With love,

Brittney

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ABSTRACT OF THE THESIS

THE EFFECT OF A MULTI-COMPONENT CONSULTATION INTERVENTION ON
THE PRAGMATIC LANGUAGE SKILLS OF STUDENTS WITH SYMPTOMS OF
ATTENTION DEFICIT HYPERACTIVITY DISORDER

by

Brittney Marie Cooper

Florida International University, 2014

Miami, Florida

Professor Eliane Ramos, Major Professor

The purpose of this research was to determine if a multi-component consultation intervention was effective in improving pragmatic performance in students with ADHD. Participants for this study consisted of 7 children for whom 3 data points were obtained by a parent or 2 data points by a teacher. Changes in pragmatic performance were measured by comparing reports provided by parents or teachers pre- and post- intervention. Descriptive analysis procedures were completed to summarize changes in pragmatic behavior.

Results revealed the mean overall change in pragmatic behavior for children in the MCC condition ($X=1.133$) was greater than the change seen in the CAU condition (.334) after 2 months of intervention as per parent reported data. Data indicated improvement in each behavior but incongruence between teachers and parents was found. Results support the hypothesis that the multi-component consultation intervention is effective in improving the pragmatic language performance of children with ADHD.

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CHAPTER I

REVIEW OF THE LITERATURE

Introduction

Attention-Deficit Hyperactivity Disorder, or ADHD, is a behavioral disorder affecting over 10% of school-aged children in the United States (Visser, Danielson, Bitsko, Holbrook, Kogan, Ghandour, Perou, & Blumberg, 2013). Children with ADHD display inappropriate verbal behavior resulting in a plethora of social difficulties. ADHD is one of the most commonly studied pediatric disorders and extensive research on treatment has been published. Various intervention strategies such as medication, counseling, and behavior modification have been empirically studied. Although medication is currently the most widely used form of treatment for ADHD, behavior modification interventions have been found to improve the behavioral symptoms of the disorder (Fabiano, Vujnovic, Pelham, Waschbusch, Masseti, Pariseau, & Volker, 2010). Behavioral modification interventions have been shown to provide additional benefits in areas related to social skills and relationships than observed with medication alone (Jensen, Hinshaw, Kraemer, Lenora, Newcorn, Abikoff, ... & Vitiello, 2001).

Since ADHD/ADD was listed as a qualifying condition under the Other Health Impaired category in 1991, the number of children receiving services in public school has increased dramatically (Forness & Kavale, 2001). This increase has resulted in a need to develop effective school-based interventions and improve training for teachers. The review of the literature will provide detailed information about ADHD and the social, or pragmatic language characteristics displayed by these children. Next, current theories about the cause of the disorder will be discussed along with a description of how ADHD affects the

classroom environment. The following section will be used to introduce a behavior modification technique known as The Daily Report Card (DRC). Further review of literature will be used to explain the importance of, and barriers to, treatment integrity with respect to interventions such as the DRC. Finally, chapter I will conclude with a summary of ongoing research being completed at Florida International University related to the DRC, as well as the plan of study, hypothesis, rationale, and research questions presented by this thesis.

Attention-Deficit Hyperactivity Disorder

Attention-Deficit Hyperactivity Disorder is a psychiatric disorder characterized by inattention, often coexisting with hyperactivity and/or impulsivity (Bostic & Prince, 2008; Fabiano, et al., 2010; Leonard, Milich, & Lorch, 2011; Merrill, 2013). In a meta-analysis conducted by Polanczyk, Silva de Lima, Horta, Biederman, and Rohde (2007) the worldwide prevalence of ADHD in children under 18 was found to be 5.29%. In the United States, the disorder affects approximately 11% of school-aged children and the number of affected children has been increasing by approximately 5% per year (Visser, et al., 2013). Adults and children with ADHD show a chronic impairment in the ability to attend and focus, control behavior, regulate activity level, or any combination of these symptoms (Merrill, 2013). Some of the diagnostic characteristics of ADHD found in the DSM-V include difficulty in sustaining attention even during play activities; those diagnosed may often appear to not listen when spoken to and talk excessively. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) (2013), the symptoms must be present in two or more settings (e.g. home, school/work, with friends etc.) and be significant enough to cause obvious interference with age-appropriate social and/or

academic functioning. Many children with the disorder exhibit disruptive, impulsive behaviors such as interrupting or intruding in conversation or games. These children often have trouble waiting their turn and may often blurt out answers before being called upon to answer or before the question has even been completed (American Psychiatric Association, 2013; Leonard et al., 2011; Loney & Milich, 1982; Timler, 2014; Walen & Henker, 1985). There are also repeated findings that many hyperactive children demonstrate aggressive behaviors (Erhardt & Hinshaw, 1994; Walen & Henker, 1985). These characteristic features found in many children with ADHD result in a magnitude of pragmatic difficulties.

Pragmatic Language

The term *pragmatics* is defined as how language is used in social context and in social interactions; it involves the purpose and frequency of speech, the ability to modify speech for different listeners and situations, and the use of discourse skills, which can be defined as turn-taking, topic maintenance, and topic change (Adams, 2002; Paul & Norbury, 2012; Prutting & Kirchner, 1987). McTear (1985) separated the aspects of pragmatic language into two categories: A transactional component and an interactional component. The transactional component involves the content of discourse; it includes relevance, cohesion, and coherence. The interactional component of pragmatics involves turn-taking and exchange structure. Definitions of pragmatic language frequently emphasize the use of appropriate content in conversational settings as well as socially acceptable turn-taking abilities during a discourse (Adams, 2002; Bostic & Prince, 2008; Fabiano et al., 2010; McTear, 1985; Merrill, 2013; Paul & Norbury, 2012; Prutting & Kirchner, 1987; Roth & Spekman, 1984). According to Prutting and Kirchner (1987), turn-

taking is a key factor in verbal aspects of pragmatics. Turn-taking includes responding during one's turn, refraining from interrupting the communication partner(s), and appropriate 'quantity' and conciseness of speech during one's turn (Prutting & Kirchner, 1987). Although some children with ADHD may present with impairments in other language areas, problems related to discourse and social skills, as a result of impulsivity and inattention, are a key component in the diagnosis for ADHD (Kim & Kaiser, 2000; Leonard, 2009; Timler, 2014).

ADHD and Language

As Leonard et al. (2011) point out, much of the diagnostic criteria for ADHD described above include behaviors that suggest pragmatic dysfunction (e.g. interrupting or intruding in conversation). According to Camarata and Gibson (1999), pragmatic difficulties are defined as disruptions in the social interaction that are not caused by deficits in other language areas such as phonology, semantics, and syntax. Individuals with pragmatic language difficulties demonstrate reduced comprehension of language in conversational context more so than with the semantic or syntactic aspects of language alone. For example, teachers and parents of children with ADHD sometimes report that these children incorrectly interpret figurative language, such as expressions, in a literal manner. However, children with ADHD do not differ from controls on formal tests of semantic knowledge, such as those that require defining words in various context (Bignell & Cain, 2007; Bishop, 1998; Purvis & Tannock, 1997).

A diagnosis of ADHD does not imply specific language impairment (SLI), however there is a high level of comorbidity between ADHD and SLI (Bruce, Thernlund, & Nettelbladt, 2006; Cohen, Vallance, Barwick, Im, Menna, Horodezky, & Isaacson, 2000;

Mueller & Romblin, 2012; Snowling, Bishop, Stothard, Chipchase, & Kaplan, 2006; Tannock & Schachar, 1996; Timler, 2014; Trautman, Giddan, & Jurs, 1990). Although as many as 35-50% of children with an ADHD diagnosis have been reported to have language impairments (Cohen et al., 2000; Timler, 2014), the language profile of children with ADHD is noticeably different from children with specific language impairments, as well as from their typically developing peers. When the language samples of children with ADHD are analyzed for the presence of clinical markers of SLI, which include reduced mean length of utterance, inaccurate verb tense, and limited lexical diversity, significant differences were not found between children with ADHD and their typically developing peers. Children with a diagnosis of SLI demonstrated a significantly higher frequency of these clinical markers, which can be used to differentiate children with ADHD from those with SLI (Redmond, 2004). Furthermore, children with SLI often exhibit phonological disorders as well as disorders related to expressive and receptive semantics and syntax. Although a diagnosis of ADHD alone does not indicate SLI, some children with ADHD exhibit comorbid language issues. Data on the prevalence of ADHD and SLI indicate that the degree of overlap between the two disorders is greater than would be expected by chance however the degree of overlap is not so great that the two disorders should be considered the same (Tannock & Schachar, 1996).

Poor performance specifically on language tasks involving verbal working memory is a unique feature in the language profiles of children with ADHD. Studies indicate that these children score below typically developing peers in language tasks requiring repetition of non-words and sentences (Cohen et al., 2000; Timler, 2014). In congruence with this finding, children with ADHD were found to perform below average on the Sentence Recall

and Sentence Formulation subtests of the Clinical Evaluation of Language Fundamentals-Third Edition (CELF-3; Semel, Wiig, & Secord, 1995). It is important to note that despite low scores on these subtests, the children with ADHD were not found to have a general language impairment as indicated by composite scores that were within the normal range (Kim & Kaiser, 2000; Timler, 2014).

Similar findings relative to children with ADHD have been documented in research utilizing the Oral and Written Language Scales (OWLS; Carrow-Woolfolk, 1995). This test compares receptive language skills to expressive language skills using the Listening Comprehension Scale and the Oral Expression Scale. Upon administering the two subtests to children with and without ADHD, Leonard (2005) found no significant difference between the groups within the domain of receptive language. Results, however, did show that children affected with ADHD performed more poorly on the Oral Expressive Scale than typical children. The most noticeable differences in performance were related to pragmatic language; specific deficits involved inappropriate conversation and questioning.

Kim and Kaiser (2000) also conducted a study to identify differences between children with and without ADHD in terms of receptive and expressive language. Their research also sought to compare the affected children's pragmatic knowledge versus their pragmatic performance. Kim and Kaiser (2000) found no difference between typically developing children and children affected with ADHD on receptive language skills as measured by the Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn & Dunn, 1981). They did find that children with ADHD scored lower than typical peers in subtest areas measuring expressive language using the Test of Language Development-2 (TOLD-2; Newcomer & Hammill, 1988). The most significant expressive language difference

involved pragmatic behaviors observed during free play with an adult conversational partner as measured by Prutting and Kirchner's (1987) Pragmatic Protocol. The children with ADHD demonstrated less appropriate pragmatic behavior and more inappropriate pragmatic behavior than typically developing children. The most frequent inappropriate behaviors demonstrated by children with ADHD included no response to a question or request, interruptions, less feedback to the listener, and lack of cohesion. Interestingly, children with ADHD did not differ from typically developing peers in measures of pragmatic knowledge as indicated by the Test of Pragmatic Language (TOPL; Phelps-Terasaki & Phelps-Gunn, 1992). When presented with alternative responses, the affected children in the study demonstrated an understanding of socially appropriate behavior, but they had difficulty generating those appropriate responses independently in a social situation. Unfortunately, this lack of congruency between the conceptual understanding of social rules that these children often demonstrate on tests, and the ability to follow them in real life situations, can lead to frustration felt by the child, caregivers, and peers.

Social Behavior

Prevalent abnormalities in the social behavior of children with ADHD are a cause of concern for many caregivers and adults involved with these children (Barkley, 1981; Campbell & Paulauskas, 1979; Erhardt & Hinshaw, 1994; Leonard et al., 2011; Løkke, 2011; Timler, 2014; Walen & Henker, 1985). In fact, parents and teachers of children with ADHD most frequently report social troubles as a major behavior issue (Løkke, 2011; Timler 2014; Walen & Henker, 1985). A study conducted by Barkley (1981) found that 81% of parents with hyperactive children reported their child as having significant deficits in situations involving play with other children.

Erhardt and Hinshaw (1994) conducted a study to identify attributes that have the greatest effect on social status among school-aged boys. They found that children who are observed to be well liked among peers demonstrate higher rates of cooperative play, norm-setting behaviors, appropriate social conversation, and have better social approach skills. Popular children are less likely to engage in disruptive activities or demonstrate aggressive behavior. Children who are rejected by peers are frequently found to be involved in inappropriate and disruptive activities, engage in off-task behavior, as well as demonstrate higher rates of aggression, argumentativeness, and hostile comments. Loney and Milich (1982) found that 65% of children meeting the criteria for hyperactivity also demonstrated issues with aggression. Kim and Kaiser (2000) propose that reduced language and pragmatic skills may increase the likelihood that a child act out instead of speak when frustrated. Unfortunately, children with ADHD readily demonstrate many of the peer-rejecting behaviors identified by Erhardt and Hinshaw (1994). In addition, poor social approach and conversation skills are further barriers towards peer acceptance. Because of these behavioral characteristics, it is not surprising that Erhardt and Hinshaw observed an overwhelming rejection of boys with ADHD in a naturalistic summer-camp setting.

Due to difficulties adapting to social communication behavior norms, many of these children have significant trouble forming friendships and gaining peer acceptance (Erhardt & Hinshaw, 1994; Leonard, 2009; Leonard et al., 2011; Løkke, 2011). Intervention is critical for these children as their social setbacks tend to be “durable, recurrent, and often escalating” (Whalen & Henker, 1985, p. 448), and unfortunately often increase as opposed to improve over time. Furthermore, negative peer relationships have been found to be predictive of problems in other domains of life, including academic and occupational

achievement (Campbell & Paulauskas, 1979; Løkke, 2011; Whalen & Henker, 1985). Limitations in language and the ability to follow verbally mediated social rules may continuously “exacerbate their failures and frustrations in academic, social, and family settings” (Kim & Kaiser, 2000, p. 2).

The Altered Reward System in Children with ADHD

Although a diagnosis of ADHD is based on overt behavioral characteristics, there is a growing consensus that the behavior symptomatology of ADHD is the result of an underlying neurological impairment related to dysfunctional regulation of dopamine in the brain (Johansen et al., 2009; Leonard et al., 2011; Løkke, 2011; Sonuga-Barke, 2005; Tannock & Schachar, 1996). Dopamine is involved in long term, short term, and working memory. Dopamine also plays a role in the selection and strength of behavioral responses that result in reinforcement by strengthening or weakening the synaptic connections in neural circuits of the prefrontal cortex (Johansen et al., 2009). Thus, abnormal regulation of dopamine has been shown to alter the performance of the reward system in the brain, which can affect learning and memory (Johansen et al., 2009; Løkke, 2011; Sonuga-Barke, 2005). The dynamic developmental theory of ADHD proposes that dopamine hyperfunction in ADHD results in a narrower window for associating a stimulus with a behavior and its consequence (Sagvolden, Johansen, Aase, & Russell, 2005). Reduced attention to preceding stimuli and more rapid memory decay further affect the child’s ability to make these associations leading to flawed learning and depressed extinction processes (Johansen et al., 2005; Johansen et al., 2009). Johansen et al. (2009) attributes the inattention, hyperactivity, impulsivity, and behavioral variability found in children with ADHD to this altered reinforcement learning. Findings from an experiment conducted by Aase and

Sagvolden (2006) support Johansen et al.'s claim. The study found no difference in behavior of children with ADHD and controls when reinforcement was delivered frequently. However, infrequent reinforcement was associated with reduced sustained attention and increased variability of responses in boys with ADHD.

Løkke (2011) proposes that the neurobiological disorder causing the behavioral manifestations of ADHD also results in the pragmatic difficulties seen in these children. The development of appropriate social skills requires that rule-governed behaviors become automatic. Automatic behaviors are initiated by environmental stimuli, e.g. the behavior or verbalizations of others, and are mediated by social norms and expectations. Appropriate social behavior becomes automatic through repetition and reinforcement, however, children with ADHD appear less able to establish this automaticity. Reduced automaticity, due to fewer response repetitions and poor attention to stimuli, may be the cause of social deficits found in children with ADHD. The dynamic developmental theory of ADHD can be used to explain why these children behave abnormally despite having the knowledge needed to function appropriately in social situations. The hyper-function of dopamine reduces the child's ability to accurately recognize the antecedents of positive social reinforcement in the immediate environment. Dopamine hyper-function also causes difficulty in identifying the behaviors that precede negative consequences. This altered learning style and poor ability to comply with social expectations results in dysfunctional relationships between the child with ADHD and others around him.

ADHD in the Classroom

Whalen and Henker (1985) state that children with ADHD may be described as “negative social catalysts” (p.448) whom elicit maladaptive behaviors from teachers,

parents, and peers around them. For example, their tendency to not respond to verbal warnings and instructions by caregivers may possibly result in physical punishment more often (Kim & Kaiser, 2000). Parents of hyperactive children tend to be more intrusive, less responsive, and less positive when interacting with their children (Whalen & Henker, 1985). In classroom settings, overall rates of negative teacher-child interactions involving typical children were higher in classrooms containing a hyperactive child (Campbell, Endman, & Bernfeld, 1977). Teachers in classrooms containing a hyperactive child were also reported to be more intense and controlling, suggesting that the presence of a child with ADHD has a negative effect on the classroom environment as a whole (Whalen & Henker, 1985).

As of 2011, 6.4 million school-aged children have received a diagnosis of ADHD by a health care provider (Visser et al., 2013). The effects of behavior difficulties on the learning environment and the high cost of educating students with ADHD (Fabiano et al., 2010; Noell, Witt, Gilbertson, Ranier, & Freeland, 1997) are important reasons for intervention in school. Behavior modification is one example of an evidence-based intervention for children with ADHD that focuses on functional domains such as social and academic performance. This type of behavioral intervention is commonly implemented in the school setting for children with ADHD who qualify to receive school-based services (Evans, Serpell, Schultz, & Pastor, 2007; Fabiano et al., 2010; Han & Weiss, 2005; Jones, Wickstrom, & Friman, 1997; Noell et al., 1997; Pelham & Fabiano, 2008; Witt, Noell, LaFleur, & Mortenson, 1997). Many successful behavioral modification strategies implement contingency management, or manipulation of consequences. This strategy involves the use of clear reinforcement or punishment contingent on the child's behavior.

The consequences may include positive or negative teacher attention, token economies, home-based rewards, or time-out from reinforcing activities (Abramowitz & O'Leary, 1991).

The Daily Report Card

The Daily Report Card (DRC) (Kelley, 1990) is a widely accepted and effective classroom intervention for children with ADHD that incorporates contingency management techniques (Fabiano et al., 2010; Kelley, 1990; Owens, Holdaway, Zoromski, Evans, Himawan, Girio-Herrera, & Murphy, 2012; Vujnovic, Holdaway, Owens, & Fabiano, 2014). The DRC contains a list of operationally defined behaviors of interest, such as completing assignments, interrupting, and productivity. It also includes criteria for meeting specific behavioral goals that are chosen based on the baseline behaviors of the child (e.g. interrupting fewer than three times throughout a lesson). Target behaviors frequently include social expectations such as following classroom rules and interacting appropriately with adults and peers.

When implemented correctly, teachers provide immediate feedback to the child regarding the target behavior. The purpose is to make the child explicitly aware of the behavior(s) that resulted in reinforcement or punishment. The student's progress is documented on the DRC daily and he or she is given significant praise for working towards or meeting DRC goals. One critical and unique aspect of the DRC is that it is sent home with the student daily. This allows parents to implement home-based rewards for goals earned, such as time spent on the computer or other desired items or actions. Fabiano et al. (2010) suggest that feedback regarding behavior and progress towards goals may lead to increased appropriate behavior in the future as the child becomes more readily able to

identify antecedent stimuli in the environment. It is also suggested that increased frequency of communication with the teacher about behavior may contribute to better overall communication skills in the child (Fabiano et al., 2010; Pelham & Fabiano, 2008).

Although immediate feedback about behavior and its consequence is crucial in helping the child acquire more typical patterns of reinforcement learning, the implementation of home-based rewards for meeting daily goals may help to train longer reinforcement windows. Children with ADHD tend to exhibit deficiencies in response inhibition (Barkley, 1997). This involves the ability to delay responding, interrupt responding when given feedback, and refraining from responding to sources of distraction when engaged in goal-directed activities (Leonard, 2009). Barkley (1999) summarized the symptoms ADHD as a general inability to delay responding to the environment. Correct implementation of the DRC may be a valuable tool in training response inhibition in affected children, thus reducing the interruptive and impulsive behaviors that adults and peers find undesirable. Gradually lengthening the delay between the target behavior and its reinforcement can help improve working memory as well as assist the child in learning longer behavior chains that result in desirable consequences (Løkke, 2011). Ideally, correctly implemented contingency management programs like the DRC will improve the child's capacity to delay responding to sources of distraction and make them better equipped at identifying stimuli in the environment that precede appropriate social verbal behavior. Given the relationship between impulsive and inattentive behaviors of children with ADHD and the pragmatic abnormalities they cause (e.g. interrupting others, not responding to a question), improvements in behavior resulting from the DRC intervention

should generalize to communicative discourse, thus having a significant positive affect on the pragmatic abilities of children with ADHD.

Implementation Integrity

Evidenced-based classroom interventions, such as the Daily Report Card, have been found to be effective in treating the peripheral symptoms of ADHD (DuPaul & Eckert, 1997; Fabiano et al., 2007; Fabiano et al., 2010; Pelham & Fabiano, 2008; Pelham Jr., Wheeler, & Chronis, 1998). However, implementation of the DRC in naturalistic settings is variable and poor intervention integrity can have a negative effect on children's performance (Fabiano et al., 2010). Unfortunately, as Heward (2003) explains, there is often a gap between what research finds to be an effective intervention and what is practiced in the classroom. Although The Daily Report Card has been shown to contribute to improved academic performance and behavior (Fabiano et al., 2007; Fabiano et al., 2010; Pelham & Fabiano, 2008; Owens et al., 2012), faulty or inconsistent implementation integrity may limit potential gains. Integrity, or strict adherence to the principles and procedures of a program, is important to the success of an intervention. The intensity level of contingency management approaches have been found to affect behavioral outcomes in that more intensive contingency management has a greater affect on behavior than less intense implementation (Pelham & Fabiano, 2008). Thus, variables that affect the integrity of behavior modification techniques, such as the DRC, will result in variable gains seen in the child for whom it is intended.

Barkley et al. (2000) conducted a study comparing the efficacy of different implementation strategies for an intervention previously found to be effective in improving behavior of children with ADHD. Researchers compared changes in performance between

students who received the intervention via a full-day classroom treatment to those who received the intervention through parent training and found that, when implemented in the classroom, the intervention reduced hyperactive, impulsive, and aggressive behavior in the children with ADHD. These results, however, were not found in the group provided with parent training. Although this study did not find parent training to be effective, previous research has found parent training of the same intervention to result in positive behavior changes (Barkley, 1997). Barkley et al. (2000) note that the variable affecting the results is likely related to parents' motivation for adhering to the treatment. In the 1997 study, parents approached the clinic in search of treatment options for their children. In the 2000 study, the treatment was offered to parents who did not seek out services for their children's behavior problems. Those families who sought treatment were likely to be more prepared and willing to strictly follow a treatment protocol than those parents who did not seek intervention. Thus, those children whose parents sought help likely experienced a more intensive intervention program, which resulted in noticeable improvement compared to no improvement found in children who did not experience intensive treatment. This finding supports the notion that less intense intervention due to poor treatment integrity will have a negative effect on outcomes.

The effect of inconsistent treatment administration has been found in other research as well. In a study evaluating the effectiveness of a secondary-school based intervention for children with ADHD, the researchers found a great deal of variability in the amount of service received by the students in the treatment group. Some teachers were found to go above and beyond what they were asked to do, while others expressed resistance to

providing the intervention. Furthermore, many teachers wrongly believed that they adhered to the program more strictly than they actually did (Evans et al., 2007).

A further barrier to positive treatment outcomes involves lack of on-going and consistent implementation. Even when teachers are found to demonstrate high levels of integrity at the onset of an intervention, a rapid decline in adherence is found if additional consultation is not provided (Han & Weiss, 2005; Noell et al., 1997; Witt et al., 1997). Witt et al. (1997) examined four teachers' integrity to an academic intervention for elementary school students. They found that all the teachers demonstrated 100% treatment integrity on the first day after receiving training. However, after two days, none of the teachers maintained integrity above 80%. These findings were replicated by a later study wherein three teachers exhibited high levels of integrity for two to four days after training, followed by a marked decline in treatment integrity until feedback was provided (Noell et al., 1997). Variability and lack of long-term adherence to interventions in real world settings compromises the cost-effective nature of these programs. Due to limited resources in school systems, teacher-implemented intervention programs are commonly utilized, often relying on the classroom teacher to provide IEP services (Fabiano et al., 2010; Han & Weiss, 2005). These teacher-implemented models allow a large number of students to be treated by a small number of staff members, rendering it cost-effective (Noel et al., 1997). However, teacher-implemented strategies lose their financial benefit if implementation integrity diminishes shortly after training, as indicated by Noel et al. (1997) and Witt et al.'s (1997) research.

In order to sustain an effective intervention, classroom teachers must not only continue to implement the program, but must also adhere to the core principles. If the

fidelity of intervention cannot be maintained over time, the effects will likely be negligible even if the teacher continues to use it (Han & Weiss, 2005). Fortunately, the experiments completed by Noel et al. (1997) and Witt et al. (1997) reveal the promising effect of ongoing consultation in maintaining the integrity of an intervention (Han & Weiss, 2005; Jones et al., 1997). Witt et al. (1997) reported that all of the teachers demonstrated significant improvement in integrity when given feedback about their performance in implementing the program. Research suggests that instruction, in conjunction with performance feedback, consistently produces a strong effect in changing the classroom behavior of teachers. Feedback provided by a consultant can promote the use of the intervention program, improve fidelity, and produce greater improvement in children's outcomes (Han & Weiss, 2005; Jones et al., 1997; Noel et al., 1997; Rose & Church, 1998; Witt et al., 1997). Despite marked improvement in integrity when given feedback, performance feedback alone does not guarantee adherence to a program. Jones et al. (1997) found that although the frequency of contingent reinforcement by teachers increased when given daily performance feedback, the mean level of integrity remained below 83% for all participants.

Barriers to Treatment Integrity

There is agreement in the literature that consultation involving feedback for the teacher improves adherence, or a teacher's ability to continually implement the treatment as intended (Evans et al., 2007; Han & Weiss, 2005; Jones et al., 1997; Noel et al., 1997; Pelham & Fabiano, 2008; Rose & Church, 1998; Witt et al., 1997). However, many other factors can affect treatment adherence and much less research has been conducted to determine and evaluate these mediating factors. Because adherence to interventions, such

as the DRC, has been found to have such a great effect on treatment outcomes for students, discovering and mediating the variables affecting adherence is essential to maximizing improvement in the behavior and language of children it is intended for.

Han and Weiss (2005) identified three elements at the level of the classroom teacher that are most likely to affect ongoing adherence to a program. In order for program fidelity to be maintained, a teacher must first have sufficient knowledge about the intervention. Second, he or she needs to demonstrate adequate skills in order to implement the program as intended. Last, it is imperative that the classroom teacher maintains a belief that the program will have positive results and that they have the capacity to affect a student's performance.

Thorough and high quality training at the onset of an intervention is needed to ensure that teachers have sufficient understanding of the core principles, objectives, and rationale of a program. Achieving high levels of fidelity during a training phase increases the likelihood that a teacher will implement the intervention as intended after training. The amount and quality of training a teacher receives also plays a major role in the success of the program (Han & Weiss, 2005; McCormick, Steckler, & McLeroy, 1995). McCormick et al. (1995) found that teachers trained by consultants are more likely to continue with a treatment than teachers who only receive program materials without training. Furthermore, teachers who are more familiar with an intervention and have more knowledge about behavior treatments, such as contingency management, are more likely to rate a program as acceptable. Teachers' acceptability of an intervention also improves when they are made aware of the program's reported effectiveness (Han & Weiss, 2005). Thus, to maximize a teacher's willingness to adhere to a behavior intervention, training should focus on

increasing familiarity with the program's principles and educating about its documented success.

Given the changes that often occur in classrooms throughout a school year, the adaptability of a behavioral intervention plays a significant role in the likelihood that it will be maintained over time. Training focused on maximizing a teacher's in-depth understanding of a program is necessary to ensure that they will be able to adapt the intervention to the ongoing demands of a dynamically changing classroom. According to Han and Weiss (2005), in order for adherence to be maintained, a teacher "must understand the program well enough so that they are able to modify it without sacrificing the core principles and central intervention techniques" (p.673).

In order for the teacher's knowledge to be applied successfully, training and consultation also needs to focus on building the skills necessary to implement the intervention as intended. Training procedures that use modeling, rehearsals, and feedback to increase skill have been found to improve fidelity (Sterling-Turner, Watson, & Moore, 2002). In addition to direct training, providing the implementer with access to resources including successful strategies and techniques will increase the likelihood of long-term adherence (Han & Weiss, 2005). Emphasizing skill development during the training and consultation phases of an intervention will improve the teacher's ability to effectively implement the intervention over time.

The third factor identified by Han and Weiss (2005) as being a potential barrier to treatment fidelity involves the personal beliefs held by the teacher. The way a teacher perceives a disorder, an intervention, or his/her own self-efficacy is likely to affect adherence to a program. A teacher with high levels of self-efficacy will judge him or herself

as having a strong influence in students' performance. Self perceived capability to effectively alter a child's behavior by using an intervention is an important form of self-motivation to adhere to a program. Increased self-efficacy in teachers appears to result in higher levels of initial interest, and more willingness to experiment with a new model of education. Furthermore, self-efficacy affects the amount of effort an implementer uses to maintain treatment fidelity and those who view themselves as efficacious tend to sustain higher levels of persistence even when setbacks occur. Conversely, teachers with lower levels of self-efficacy are more likely to reduce or all together stop investing effort into a treatment if they perceive it to be ineffective early on (Bandura, 1997; Han & Weiss, 2005).

In addition to the beliefs held by teachers regarding themselves, it is important to address the beliefs they hold about the intervention they are asked to implement. A teacher's perception about a program will influence their willingness to implement it as well as the degree to which they maintain treatment fidelity. Teachers are likely to find an intervention acceptable if they consider it appropriate for the child and problem (Han & Weiss, 2005). Prior to initiating a teacher-implemented classroom intervention, it is necessary to address the educator's preexisting belief about the effectiveness and appropriateness of the treatment program. Addressing a teacher's preexisting perception about a program will have a positive effect on their initial interest as well as the amount of effort they will invest in sustaining adherence to the program's principles (Han & Weiss, 2005).

To maximize feelings of self-efficacy and acceptability of a program, teachers need to be able to attribute positive changes in the classroom to their adherence to the program. In order to increase the motivation necessary to sustain their efforts, teachers need to be

able to identify behavioral changes that have resulted from the intervention they are following. Thus, during the training phases for teacher-implemented programs, it is important that consultants make teachers aware of even small improvements in the behavior patterns of children in the classroom. Helping teachers to recognize improvement and attribute the improvement to the program will increase their feelings of self-efficacy, their acceptability of the program and the likelihood that they will continue to implement the treatment with high levels of integrity (Han & Weiss, 2005).

Current Research and Rationale

Current research being conducted within the Psychology Department at Florida International University in Miami, Florida is evaluating the effectiveness of a multi-component consultation intervention on teachers' ability to accurately implement a Daily Report Card (DRC) intervention for children at risk for ADHD in their classrooms. The teacher-directed intervention aims to address and mediate barriers known to affect treatment integrity- knowledge, skills and beliefs- in order to maximize the DRC's affect on behavior of children with ADHD. It is hypothesized that the consultation intervention will result in better treatment fidelity, leading to a more intense and effective implementation of the DRC. Given the relationship between the intensity of contingency management interventions, such as the DRC, and behavior outcomes, marked improvement in the behavior of children with ADHD can be anticipated as a result of the consultation intervention. It can be further hypothesized that the reduced frequency of impulsive and inattentive behavior demonstrated by the children with ADHD will lead to improvement in their pragmatic language competency.

The pragmatic differences of children with ADHD often present themselves in the form of inappropriate or excessive talking, impulsivity and disruptiveness. These behaviors have been found to negatively affect the learning environment. The rationale for conducting this study is to determine if the intervention is effective in reducing inappropriate pragmatic behavior of children with ADHD as observed by their parents and teachers.

Hypothesis

The current study hypothesizes that the multi-component consultation intervention will have a positive effect on the pragmatic language abilities of children with ADHD as measured by improved ratings given by parents and teachers on the children's use of the following behaviors pre- and post-treatment: a) interrupting or intruding on others, b) excessive talking, and c) blurting out answers before the question has been completed.

Plan of Study

The purpose of this research was to determine if the multi-component consultation intervention was effective in improving the pragmatic performance of students with ADHD by reducing the frequency of a) interrupting or intruding on others, b) excessive talking, and c) blurting out answers before the question has been completed. Furthermore, the study sought to identify differences in the degree of change for each inappropriate pragmatic behavior pre- and post- intervention. The following experimental questions were answered:

- 1) Were differences in the degree of change in overall pragmatic performance found between the treatment condition and the control subject?
- 2) Were differences found in the degree of change for each pragmatic behavior pre- and post- intervention?

CHAPTER II

METHODOLOGY

The following study utilizes the participant pool and intervention methodology carried out by researchers affiliated with the Psychology Department at Florida International University. Data gathered by these researchers was used to analyze the effect of their multi-component consultation intervention on the pragmatic language skills of the children included in this study.

Participants

The participants for this study consisted of all 7 participants for whom 3 data points (start, 1 month, and 2 months) were obtained by a parent or 2 data points (start and midpoint) by a teacher at the time of this writing¹. Upon the onset of writing, 3 data points (start, 1 month, and 2 months) were obtained from parents of four children in the Multi-Component Consultation (MCC) group (participants 1-4). An additional participant from the MCC group with 2 data points (start and 2 months) from a parent was included (participant 5). The sixth participant in the MCC group was included after obtaining 2 data points (start and midpoint) through teacher responding (participant 6). Teachers for participants 3, 4, and 6 provided data at the start of the study and at the midpoint.

Data was collected from the parent of a single participant in the Consultation-As-Usual (CAU) Control Condition. Two data points (start and month 1) were obtained. This participant served as the control subject for this experiment when comparing severity ratings provided by parents for three behaviors selected from the Disruptive Behavior

¹ More participants were anticipated at the onset of the study. However, due to circumstances beyond the author's control, fewer participants were able to be included.

Disorders Rating Scale (DBD; Pelham, Gnagy, Greenslade, & Milich, 1992). Start and midpoint data by teachers in the CAU condition could not be obtained for more participants. Thus, no control subject is available to compare reports provided by teachers between groups.

Recruitment

To recruit participants for the primary study, flyers describing the classroom intervention and its benefits were sent home with all the children in the study school. Parents who responded to the flyer were asked to fill out the Disruptive Behavior Disorders Rating Scale (DBD; Pelham et al., 1992). The DBD requires parents to rate the frequency of 18 behaviors demonstrated by their child on a scale of 1-4 (1=Not at all; 2=Just a little; 3=Pretty much; 4=Very much). Parents who reported their child to demonstrate four or more symptoms of inattention or four or more symptoms of hyperactivity/impulsivity with a frequency of *pretty much* or *very much*, were scheduled for an eligibility assessment. Once the child was found eligible and parents provided consent, the student's teacher was invited to participate. Once all parties provided consent, the student-teacher dyad was randomly assigned to either the Consultation-As-Usual (CAU) Control Condition or the Multi-Component Consultation Condition.

Procedures

Teachers from both groups attended an initial Daily Report Card (DRC) training, in which information was provided about ADHD, principles of behavior modification, and DRC procedures. The teachers collaborated with consultants to identify and operationally define three to five target behaviors to include on the DRC. The teachers conducted baseline tracking of these behaviors for a minimum of five school days. After baseline

measures were gathered, a goal criterion was assigned to each target behavior. The child, teacher, and consultant met to review the definitions of the target behaviors, their goal criteria, and the reward system prior to beginning the DRC intervention. Both groups of teachers were instructed to provide daily reinforcers (i.e. stickers) for goals earned and all teachers participated in bi-weekly Problem-Solving Consultation Sessions. Consultants observed each dyad for thirty minutes every two weeks to make observations about integrity.

Multi-Component Consultation (MCC) Condition

Prior to beginning the consultations, teachers in the MCC group were asked to complete *Value Interviews* in order to identify the barriers- knowledge, skills, and beliefs- most prevalent in each individual implementer. The bi-weekly multi-component consultations were customized to address the barrier(s) each teacher faced. During each consultation the teacher was provided with DRC data and explicit feedback regarding her integrity as observed by the consultant. Feedback included graphs of the child's performance, review of the teacher's performance, and praise for correct implementation.

In addition to adherence feedback, strategies that addressed the barriers to integrity were incorporated into the sessions. To address the knowledge barrier, teachers were provided with additional information and resources about ADHD, comorbid disorders, the effectiveness of the DRC, etc. They also had the opportunity to discuss questions about the intervention with the consultant.

Those teachers who expressed a need for more skills training were encouraged to participate in role-playing activities and watch videos that trained various implementation techniques. Teachers in the MCC group were also given suggestions on how to implement

the intervention more effectively. Furthermore, these teachers were instructed on how to assist the consultant in making data-based changes to the DRC goals. This gave the implementers the opportunity to apply their knowledge about the intervention and gain the skills necessary to adapt the DRC to new situations.

Finally, multiple strategies were utilized to address issues of low acceptability, low self-efficacy, and negative attitudes about children with ADHD. Alternative belief approaches were used during the consultation to help teachers change their perceptions about ADHD and understand the reasons for their own behavior. To address low acceptability and low self-efficacy, consultants engaged in motivational interview techniques, which are aimed at promoting changes in the teacher's behavior by increasing *change-talk*. Further self-efficacy strategies included highlighting student successes and attributing them to implementation changes, problem solving discussions, and activities to increase empathy towards the child's differences.

Consultation-As-Usual (CAU) Control Condition

Teachers who were randomly assigned to the CAU Condition also participated in bi-weekly problem-solving meetings with a consultant. During these meetings the consultant and teacher discussed issues related to the intervention brought up by the teacher. The consultants were instructed to engage in active listening without providing suggestions or attempting to modify the teachers' attitudes. The teachers in the CAU group had the same number of integrity observations and were provided DRC data, but they were not provided guidance or performance feedback.

Analysis of Data

Data from a subset of participants in the primary study was used to analyze the multi-component consultation intervention's effect on pragmatic language skills. Parent and teacher responses to three items on the Disruptive Behavior Disorders Rating Scale that relate to social and pragmatic language skills were used to answer the research questions set forth in this experiment. The items selected were (1) "often interrupts or intrudes on others, (7) often talks excessively and (19) often blurts out answers before questions have been completed," (Pelham et al., 1992). These items are ideal for use as indicators of pragmatic dysfunction as they imply difficulty with response inhibition and impulsivity when interacting with others.

Changes in the children's pragmatic language performance were measured by comparing the reports provided by parents or teachers on the three DBD items over time. Both teachers and parents were asked to rate the child's behavior prior to the start of treatment. Parents were asked to rate their child's performance after one month of intervention and again after two months. Teachers were asked to re-score the child's behavior after four consultation sessions, or two months after the start of the experiment.

The data collected was organized into tables, bar charts, and line graphs. Descriptive analysis procedures were completed to summarize the pragmatic behavior profiles reported by both parents and teachers. In order to compare the changes in behavior, mean scores were calculated for the children in the MCC group and compared to the control subject. The rate of change observed for each of the 3 pragmatic behaviors was also analyzed to allow for within subject and between subject comparisons. Finally,

comparisons were made to describe the differences found between teacher and parent reporting of inappropriate pragmatic behavior

CHAPTER III

RESULTS

The results presented in this chapter are based on data collected by parents and teachers who were asked to rate the severity of three inappropriate pragmatic behaviors selected from the Disruptive Behavior Disorders Rating Scale. The information provided was organized and analyzed using descriptive statistics procedures in order to reveal changes in the frequency of the target behaviors. The purpose of this analysis is to determine if positive changes in pragmatic behavior can be attributed to the multi-component consultation intervention.

Reported Responses by Parents:

Parents rated their children on a scale of 1 through 4 (1=Not at all; 2=Just a little; 3=Pretty much; 4=Very much) on the following items from the Disruptive Behavior Disorder Rating Scale (DBD) (Pelham et al., 1992):

#1: often interrupts or intrudes on others

#7: often talks excessively

#19: often blurts out answers before questions have been completed.

The DBD was sent home with each child before the study, after 1 month and again after 2 months. Table 1 and Figure 1 show the responses provided by the parents of participants 1 through 5 as well as the control subject. The table fields labeled “NR” indicate that data could not be obtained at month 1 for participant 5 or at month 2 for the control subject.

Table 1 and Figure 1 demonstrate that all of the children experienced improvement in at least one pragmatic behavior over two months of intervention. The majority of scores for each target item either remained the same or improved by one point on the 1-4 scale.

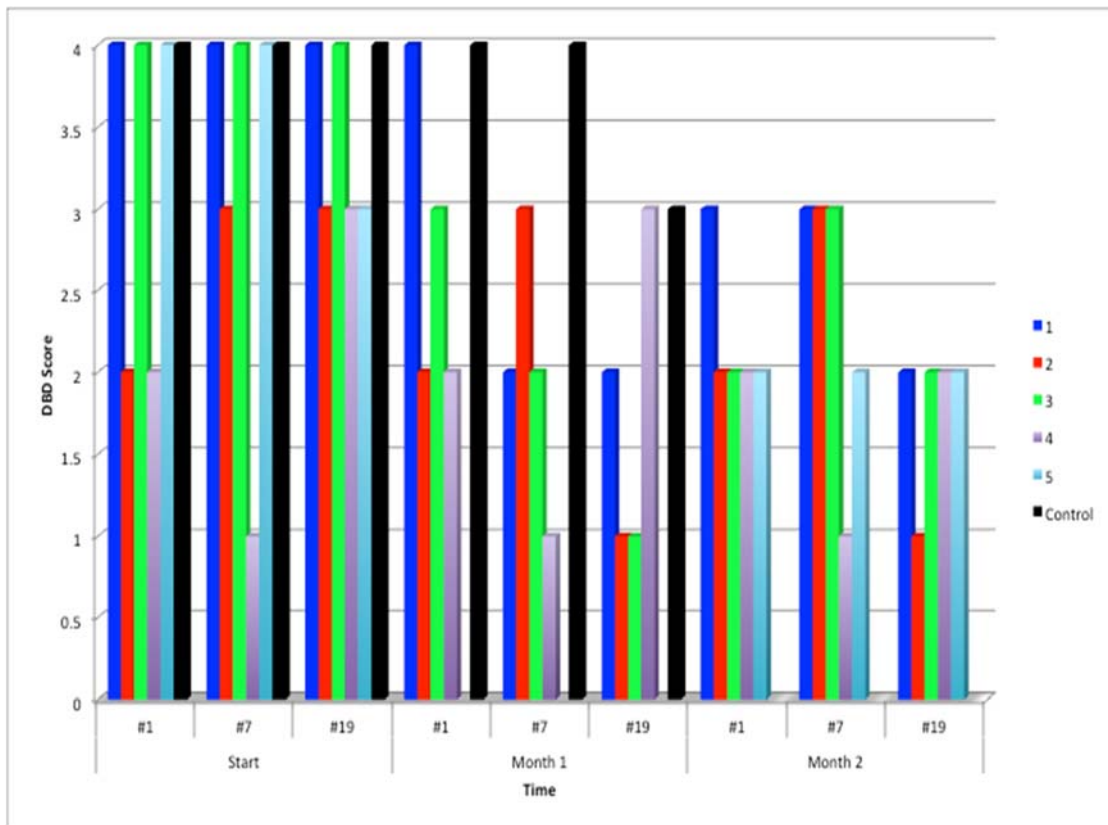
Data for item 7 from participants 1 and 3, however, are exceptions. Both participants were reported by parents to demonstrate an increase in excessive talking (#7) between month 1 and month 2. Additionally, the score for item 19 (often blurts out answers before questions have been completed) from participant 3 increased from “not at all” to “very little” from month 1 to month 2.

The control subject and participants 1 and 2 from the MCC group began the study with scores of 4 (“very much”) in all 3 pragmatic language markers. After the first month of intervention, participant 1 demonstrated improvement in 2 areas (#7: often talks excessively, #19: often blurts out answers before questions have been completed), and improved in all 3 areas after 2 months of intervention. Participant 3 experienced positive changes in all the target behaviors between the start of the experiment and month 1. Although this child’s pragmatic behavior reportedly worsened in 2 areas (#7 and #19) between month 1 and 2, overall improvement can still be seen between the onset of the study and after two months of intervention. Change in the control subject’s pragmatic behavior was noted after one month of intervention in regards to item 19 (blurting out answers). The response for this item decreased from “very much” to “pretty much.” No other change was noted in the control participant after 1 month of intervention and further change could not be measured due to lack of response in the second month.

Table 1. Parent responses for items 1, 7, and 19 of the DBD over time

	Start			Month 1			Month 2		
	#1	#7	#19	#1	#7	#19	#1	#7	#19
1	4	4	4	4	2	2	3	3	2
2	2	3	3	2	3	1	2	3	1
3	4	4	4	3	2	1	2	3	2
4	2	1	3	2	1	3	2	1	2
5	4	4	3	NR	NR	NR	2	2	2
Control	4	4	4	4	4	3	NR	NR	NR

Figure 1. Parent responses for items 1, 7, and 19 of the DBD over time



Total Pragmatic Score by Parent Report

In order to analyze trends in the overall pragmatic behavior of each child, a *total pragmatic score* was calculated by finding the mean rating of items 1, 7, and 19 from the Disruptive Behavior Disorders Rating Scale (DBD) (Pelham et al., 1992). For example, participant 2 was given a rating of 2 for item 1, 3 for item 7, and 3 for item 19. These three scores were averaged to create a total pragmatic score of 2.666. Finding a total score allowed the overall change in pragmatic ability reported by parents to be calculated after two months of intervention. Table 2 is a display of the total pragmatic score calculated for each child at the start of the study, after 1 month of treatment and after 2 months of treatment. The far right column displays the overall degree of change. This was calculated by subtracting the total pragmatic score listed in month 2 from the total pragmatic score found at the start of the study. Figure 2 is provided to further demonstrate the overall pragmatic behavior change.

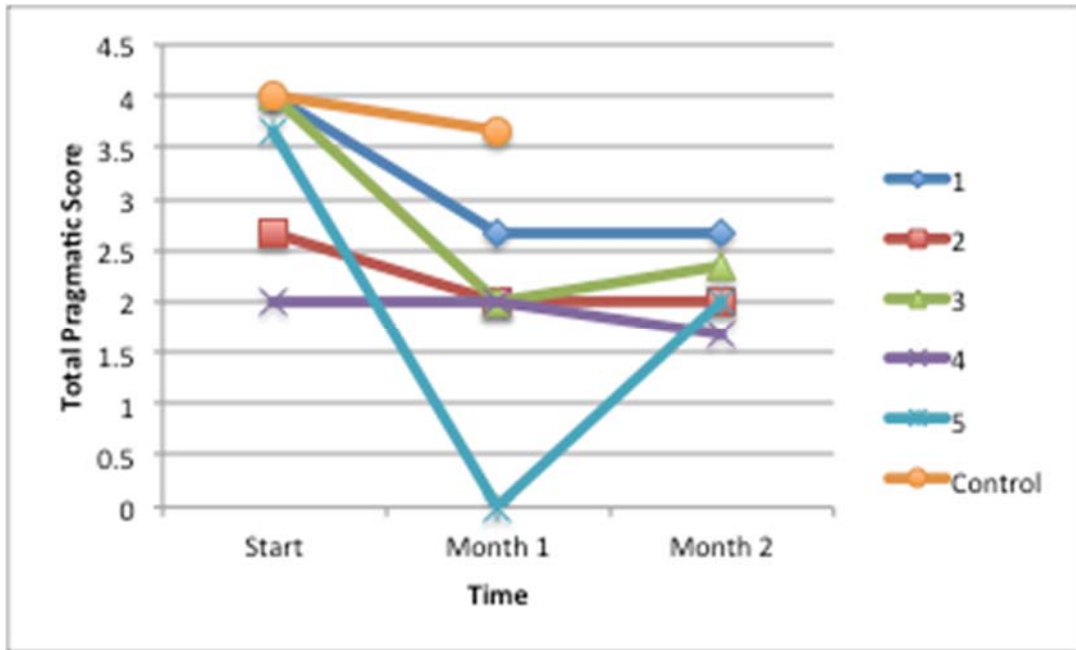
In order to compare the intervention's effect on the total pragmatic score between the MCC condition and the CAU condition as reported by parents, the mean overall change for participants 1-5 was calculated and compared to the overall change seen in the control subject. The mean overall change in the total pragmatic score for children in the MCC condition is 1.133, compared to an overall change of .334 seen by the subject in the CAU condition.

Table 2. Total pragmatic scores and overall change based on mean rating of items 1, 7, and 19 of the DBD at Start, Month 1 and Month 2 (parent report)

	Start	Month 1	Month 2	Overall Change
1	4	2.666	2.666	-1.334
2	2.666	2	2	-0.666
3	4	2	2.333	-1.667
4	2	2	1.666	-0.334
5	3.666	NR	2	-1.666
Control	4	3.666	NR	-0.334

Note: The minus (-) sign before the rate of change indicates that the reported frequency was reduced, meaning the child showed improvement in behavior.

Figure 2. Line graph displaying total pragmatic scores based on mean rating of items 1, 7, and 19 of the DBD over time (parent report)



The information gathered in Table 2 indicates that the greatest degree of change was seen in participant 3 and the smallest amount of change was seen in participant 4 and the control subject (both experienced a positive overall change in rating of .334). Improvement was found in all but two of the participants between the start point and month 1. No change was found for participant 4 after one month of intervention. Change after one month could not be confirmed for participant 5 due to a lack of reporting by parents during

the first month of data collection. The lack of data for participant 5 in month 1 resulted in the drop shown in Figure 2 at Month 1. This data point for participant 5 should be treated as a no response, as seen in Table 2.

Participants 1, 3, and control all began the experiment with a total pragmatic score of 4. At month 1, participant 3 experienced the greatest amount of change, improving from a total pragmatic score of 4 to 2. Participant 1 also demonstrated positive improvement after one month of intervention. At month 1, participant 1 had a total pragmatic score of 2.666, an improvement of 1.334 from the start of the experiment. The control subject's total pragmatic score improved by .334 after one month of treatment. Further improvement in the control subject after 2 months cannot be evaluated due to lack of reported data.

Of the four participants with data for month 1 and 2 (participants 1-4), two did not display any change in overall pragmatic behavior (participants 1 and 2). Improvement was found in participant 4 between the first and second month (.334). Despite participant 3 showing the greatest amount of improvement between the start point and month 1, this student demonstrated an increase in inappropriate verbal behavior between month 1 and month 2. The total pragmatic score for this child increased by .333. Despite this increase, participant 3 experienced the highest rate of positive overall change in pragmatic behavior from the onset of the experiment to month 2.

Although all the of the participants experienced some change over the course of two months, none of the participants demonstrated consistent improvement in behavior from one month to the next. The data collected in Table 2 for participants 1-4 indicates that each participant experienced no change for at least one month. Participant 5 and the control

subject cannot be included in this observation due to lack of responses in month 1 and month 2 respectively.

Effect on Specific Pragmatic Behaviors as Reported by Parents

In addition to studying the overall behavior change of each participant, the intervention's effect on each inappropriate pragmatic behavior was also analyzed. To do this, the mean score reported for participants in the MCC condition was calculated for each of the three target behaviors measuring pragmatic performance (items 1, 7, and 19 from the Disruptive Behavior Disorders Rating Scale²). For example, at the start of data collection, participants 1-5 were rated as 4, 2, 4, 2, 4, respectively, for item number 1 (often interrupts or intrudes on others). The mean of these numbers, 3.2, is used to describe the overall severity of this behavior (interrupting or intruding) among all the children in the treatment group. With this type of descriptive analysis, the interventions effect on a specific pragmatic behavior over time can be observed. Table 3 is a display of the average score the participants in the Multi-Component Consultation condition received for items 1, 7, and 19 of the DBD at the start of intervention, at month 1 and at month 2.

The data collected for Table 3 reveals decreased frequency in all three inappropriate pragmatic behaviors by children in the MCC group. The greatest amount of change was seen in the frequency of students blurting out answers before questions have been completed (item 19). Over the course of two months, the severity ranking of this behavior

² #1: often interrupts or intrudes on others, #7: often talks excessively, #19: often blurts out answers before questions have been completed.

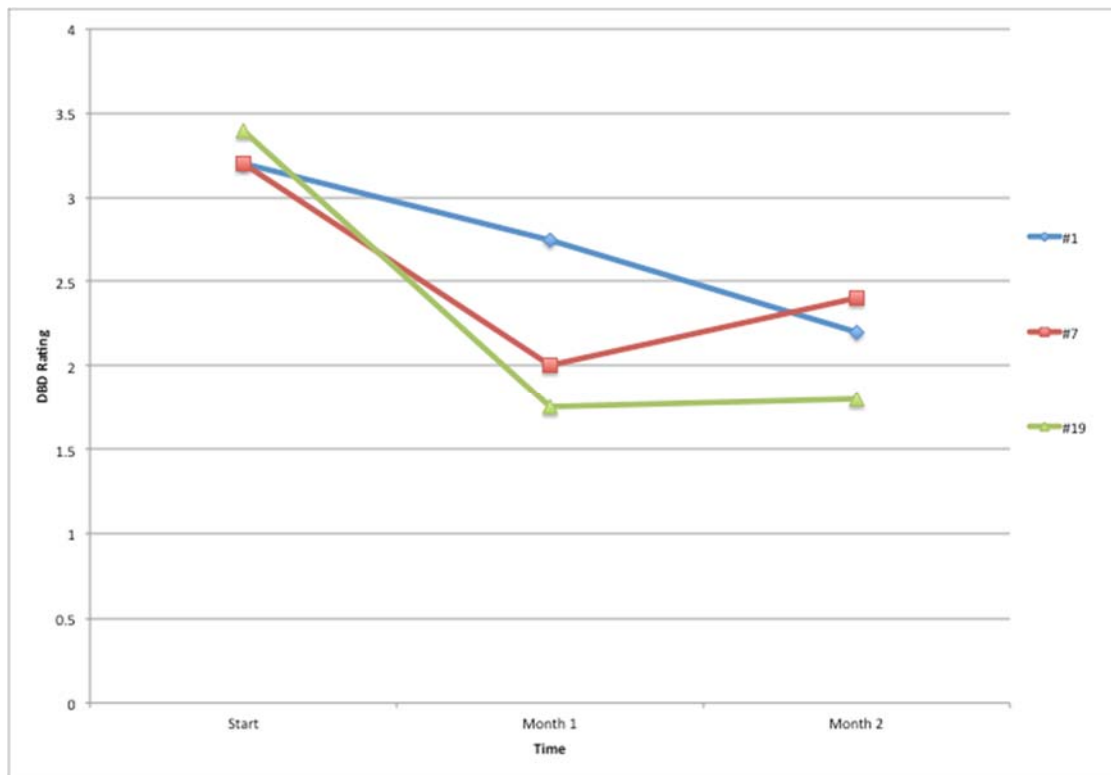
decreased by 1.6. According to parents, the behavior least affected by the intervention was excessive talking, which corresponds to item 7 of the DBD.

	Start	Month 1	Month 2	Total Change
#1	3.2	2.75	2.2	-1
#7	3.2	2	2.4	-.8
#19	3.4	1.75	1.8	-1.6

Figure 3 is used to display this information in a line graph to better observe the trends in behavior over time. Item 1 on the DBD corresponds to interrupting or intruding on others. Although this behavior was not reported to have the greatest change after 2 months, Figure 3 shows that the frequency of this behavior decreased more consistently over time than did excessive talking (#7) or blurting out answers (#19). The frequency of excessive talking (#7) and blurting out answers (#19) decreased more substantially in the first month than did interrupting/intruding (#1). However, the frequency of excessive talking and blurting out answers rose between month 1 and month 2, whereas interrupting/intruding continued to decrease as the intervention continued. When comparing the data gathered in month 1 to month 2 for items 7 and 19, a much higher increase in severity is observed for item 7, or excessive talking. The parents of children in the MCC condition reported a slight increase in the frequency of blurting out answers (#19) during the second month, however the participants in the treatment condition experienced the greatest improvement in that behavior after two months of intervention.

Table 3. Mean score reported by parents for items 1, 7, and 19 of the DBD at the start of intervention, at month 1 and at month 2 (MCC Condition)

Figure 3. Line graph displaying the mean score reported by parents for items 1, 7, and 19 of the DBD at the start of intervention, at month 1 and at month 2 (MCC Condition)

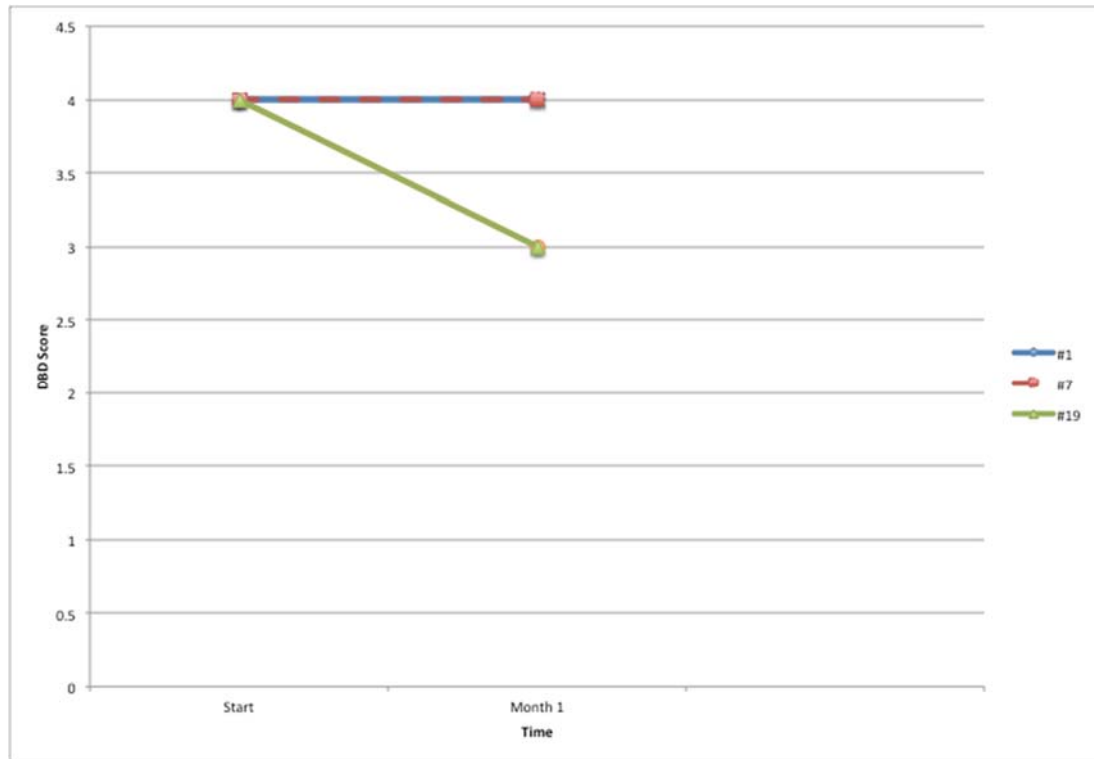


The frequency of inappropriate pragmatic behaviors displayed by the child in the CAU condition was reported by a parent at the onset of the study and after one month of intervention. Parent responses were not provided at month 2. Because data was only obtained for one participant in the CAU condition, mean scores were not calculated for the individual behaviors. Information about the occurrence of pragmatic markers (items 1, 7, and 19 of the DBD) demonstrated by the control subject at the start point and at month 1 is provided in Table 4 and Figure 4. The participant in the CAU condition did not display any change in the frequency of interrupting/intruding on others (#1) or excessive talking (#7) after one month of intervention. The control subject was reported to show improvement in item 19, blurting out answers before questions have been completed. The severity rating for this behavior decreased from “very much” (4) to “pretty much” (3).

Table 4. Scores reported by a parent of the control subject for items 1, 7, and 19 of the DBD at the start of intervention and at month 1 (CAU Condition)

	Start	Month 1	Month 2	Total Change
#1	4	4	NR	No Change
#7	4	4	NR	No Change
#19	4	3	NR	1

Figure 4. Line graph displaying scores reported by a parent of the control subject for items 1, 7, and 19 of the DBD at the start of intervention and at month 1 (CAU Condition)



The last table of this section was designed to easily display the changes observed in the pragmatic behavior of the 6 participants with parent reported data after 2 months of intervention³. The table summarizes the change in scoring seen in the 5 MCC condition children and the one CAU subject for items 1, 7 and 19 of the Disruptive Behavior Disorders Rating Scale. The number in parenthesis represents the degree of change in terms of the score provided by parents. For example, the number 2 enclosed in parenthesis at participant 1's data point for #19 indicates that this child's score on item 19 of the DBD increased by two points. When participant 1's parent was asked to score the child's frequency of blurting out answers (#19 on the DBD) prior to intervention, they reported "very much," which corresponds to a score of 4. When asked to report the frequency of this behavior after two months of intervention the parent reported, "just a little," giving a score of 2. For the purposes of this study, participant 1's performance in item 19 is said to have improved by 2 points after 2 months of intervention.

Table 5 is useful for distinguishing the inappropriate pragmatic behaviors that were affected by the intervention in individual participants, and to what extent. Table 5 indicates that 3 children (participants 1, 3, and 5) experienced improvement in all three markers of pragmatic performance after two months of intervention. The remaining 2 children in the MCC condition (participants 2 and 4) and the 1 child in the CAU condition demonstrated no change in behavior for items 1 and 7 of the DBD (#1: often interrupts or intrudes on others, #7: often talks excessively). However, participants 2, 4 and the control subject all

³ The information displayed for the control subject in Table 5 is based on 1 month of intervention. Data for month 2 was unable to be obtained due to lack of parent reporting.

showed improvement on item 19 (often blurts out answers before questions have been completed).

Table 5 can also be used to determine how consistently a target behavior was affected after two months of treatment across participants. It is clear that improvement was noted by all the parents in respect to item 19, or blurting out answers before questions have been completed, after 2 months of intervention. Changes in behavior corresponding to DBD items 1 and 7 were reported in half of the participants (participants 1, 3, and 5).

Table 5. Summary of change observed after 2 months of intervention for items 1, 7 and 19 of the DBD for all participants with parent reported data

Note: Changes in performance for the control subject is based on data collected after one month of intervention.

	#1	#7	#19
1	Positive (1)	Positive (1)	Positive (2)
2	No Change	No Change	Positive (2)
3	Positive (2)	Positive (1)	Positive (2)
4	No Change	No Change	Positive (1)
5	Positive (2)	Positive (2)	Positive (1)
Control	No Change	No Change	Positive (1)

Reported Responses by Teachers

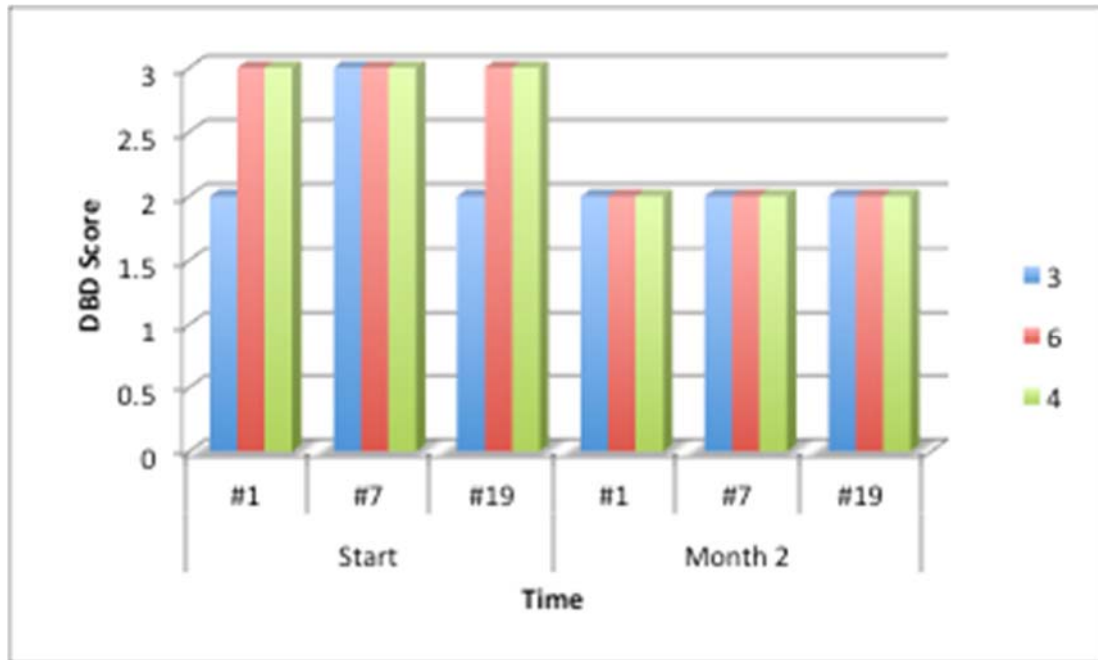
The research experiment also sought to observe the intervention's effect on pragmatic language performance from the teachers' perspectives. Unfortunately, little data was obtained through teacher report. The teachers were asked to complete the same Disruptive Behavior Disorders Rating Scale form as parents, with data only collected pre-treatment and after 4 consultation appointments, or about 2 months. Both data points (start and month 2) were obtained for 3 participants. Two of these participants (participants 3 and 4) also have data provided by parents and are included in the previous section. The third participant (participant 6) does not have data from parent responses. All three of these participants were in the Multi-Component Consultation group. Two points of teacher reported data could not be obtained for any children in the CAU condition due to lack of responding from teachers in the control condition.

Table 6 is a display of the classroom teachers' responses for items 1, 7, and 19 from the Disruptive Behavior Disorders Rating Scale for participants 3, 4, and 6 prior to the intervention and after 2 months of treatment. Over the course of 2 months, participants 6 and 4 demonstrated improvement in all three behaviors used to measure pragmatic performance. The teachers reported that the severity of all inappropriate pragmatic behaviors demonstrated by participants 6 and 4 decreased from "pretty much" (3) to "just a little (2)." Data for participant 3 indicates that the same reduction was observed for item 7, often talks excessively, but no change was found in participant 3's rate of interrupting or intruding on others (#1) or blurting out answers before questions have been completed (#19).

Table 6. Teacher responses for items 1, 7, and 19 of the DBD before treatment and after 2 months of intervention

	Start			Month 2		
	#1	#7	#19	#1	#7	#19
3	2	3	2	2	2	2
6	3	3	3	2	2	2
4	3	3	3	2	2	2

Figure 5. Bar graph displaying teacher responses for items 1, 7, and 19 of the DBD before treatment and after 2 months of intervention



Total Pragmatic Score by Teacher Report

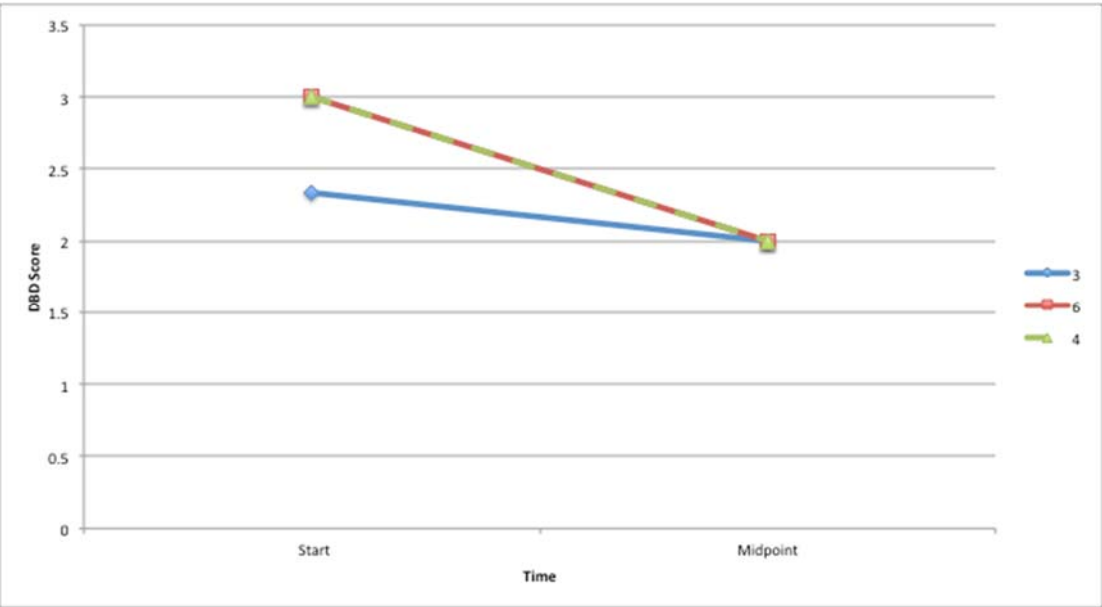
To evaluate the overall changes in pragmatic performance reported by teachers for each child, a total pragmatic score was calculated. As with the parent provided data, the total pragmatic score was calculated by finding the mean rating for the three target DBD behaviors within each participant. The overall change in each child's pragmatic performance was calculated by subtracting the total pragmatic score generated for month 2 from the pragmatic score recorded at the start of the study. The measure of overall change is listed in the right most column of Table 7. Figure 6 is a line graph displaying the change in total pragmatic scores for participants 3, 6, and 4 at the start of the experiment and after 2 months of treatment.

Review of the total pragmatic scores in Table 7 indicates that participant 3 demonstrated the least amount of change in pragmatic behavior as observed by the teacher. Interestingly, participant 3 displayed the highest rate of change in pragmatic performance when compared to the other participants (participants 1, 2, 4, 5, and the control subject) with regards to parent reported data. Participants 6 and 4 were both reported to have total pragmatic scores of 3 at the start of the study. After 2 months of intervention, both students displayed improvement in pragmatic behavior resulting in an overall change of 1 point. Figure 6 displays the total pragmatic scores based on responses provided by teachers for participants 3, 6, and 4 at the start point and after 2 months. The dashed line in Figure 6 represents the identical data reported for participants 6 and 4.

Table 7. Total pragmatic score for participants 3, 6, and 4 based on teacher report data of items 1, 7, and 19 of the DBD at the start point and at month 2

	Start	Month 2	Overall Change
3	2.333	2	-.333
6	3	2	-1
4	3	2	-1

Figure 6. Line graph displaying the total pragmatic scores for participants 3, 6, and 4 based on teacher report data of items 1, 7, and 19 of the DBD at the start point and at month 2



Effect on Specific Pragmatic Behaviors as Reported by Teachers

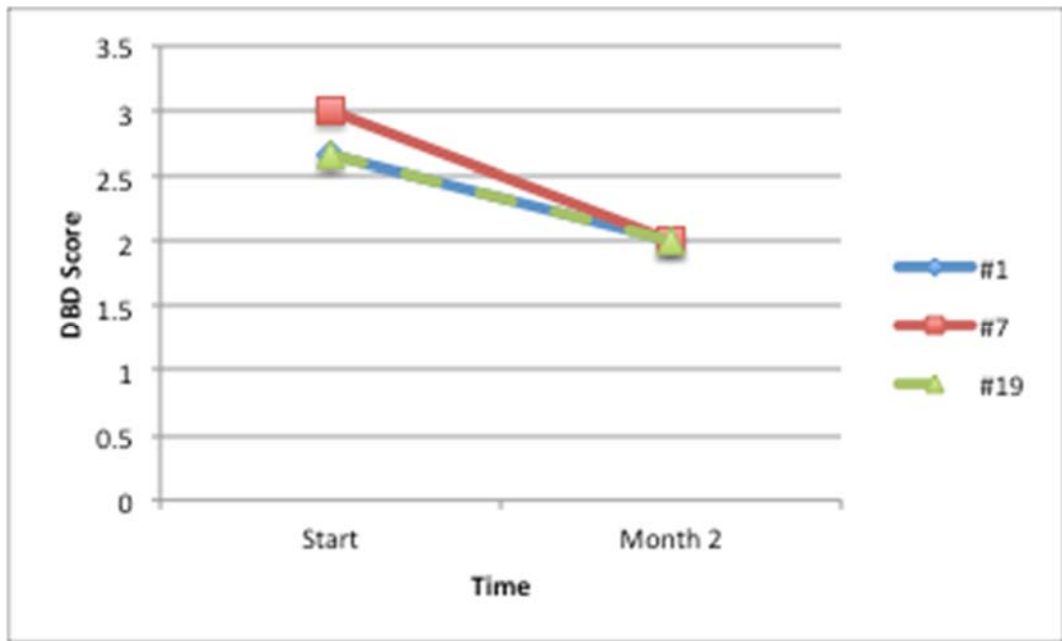
As with the parent responses, information was gathered to describe the changes teachers reported in each of the three DBD behaviors related to pragmatic performance across subjects. To determine the interventions separate effect on the inappropriate behaviors, the responses for the three participants were averaged for each pragmatic marker (items 1, 7, and 19 of the DBD). Table 8 provides the mean scores for items 1, 7, and 19 of the Disruptive Behavior Disorders Rating Scale across participants at the start point and after 2 months of intervention based on teacher reported information.

Teachers reported the same level of severity for items 1 and 19 (#1 often interrupts or intrudes on others, #19: often blurts out answers before questions have been completed) at the onset of the experiment with a mean rating of 2.666. These items were also reported to decrease in severity at the same rate resulting in a total change of .666 for both behaviors after two months of intervention. The dashed line in Figure 7 represents the identical data reported by teachers in regards to items 1 and 19 of the DBD. Table 8 indicates that the greatest amount change observed by teachers across participants after two months of intervention was in the frequency of excessive talking (#7).

Table 8. Mean scores for items 1, 7, and 19 of the DBD across participants as reported by teachers

	Start	Midpoint	Total Change
#1	2.666	2	-0.666
#7	3	2	-1
#19	2.666	2	-0.666

Figure 7. Line graph displaying mean scores for items 1, 7, and 19 of the DBD across participants as reported by teachers



Summary of Results

Comparison of the total pragmatic scores between the MCC condition and the CAU subject as reported by parents, revealed the mean overall change in pragmatic behavior for children in the MCC condition ($X=1.133$) was greater than the overall change in pragmatic behavior seen in the CAU condition (.334). This result indicates that the participants in the MCC group, on average, experienced more positive changes in pragmatic behavior than the student in the CAU condition after 2 months of intervention as per parent reported data⁴.

When the degree of change reported by teachers and parents in the MCC group are averaged for each behavior, improvement in all 3 inappropriate behaviors can be seen. However, the information regarding the amount of change seen in each behavior after treatment provided by teachers contrasts with the data provided by parents. Data gathered by parents indicates that the pragmatic behavior with the highest amount of change across participants involves blurting out answers to a question (#19 on the DBD). Furthermore, parent data revealed similar rates of change for behaviors 1 and 7 (#1: often interrupts or intrudes on others; #7: often talks excessively) between the start of the study and after one month. The total amount of change calculated was 1 and .8 respectively.

Data collected from teachers indicates that the pragmatic behavior with the greatest improvement across participants involves excessive talking (#7). Based on the information provided by the teachers, they found the frequency of behaviors 1 and 19 (#1: often interrupts or intrudes on others; #19 often blurts out answers before questions have been

⁴ Change recorded for the control participant in the CAU condition is based on 1 month of intervention due to lack of reporting in the second month

completed) to be the same at the start of the study and decrease at the same rate after 2 months of intervention.

Data provided by parents and teachers also differed in terms of the interventions consistency in affecting pragmatic behaviors across participants. Based on the teacher reported data displayed in Table 9, the intervention consistently resulted in improvement across all participants for item 7, or excessive talking, but was less consistent in improving pragmatic behaviors 1 and 19. Conversely, the parent reported data collected in Table 5 demonstrates that item 19 from the DBD (often blurts out answers before questions have been completed) showed improvement across all the participants after 2 month of intervention. Table 5 also shows that excessive talking (#7) was not observed to improve across all participants as per parent responses.

Table 9. Summary of change observed after 2 months of intervention for items 1, 7, and 19 of the DBD for all participants with teacher reported data

	#1	#7	#19
3	No Change	Positive (1)	No Change
6	Positive (1)	Positive (1)	Positive (1)
4	Positive (1)	Positive (1)	Positive (1)

CHAPTER V

DISCUSSION

The purpose of this research was to determine if the multi-component consultation intervention was effective in improving the pragmatic performance of children with ADHD by reducing the frequency of a) interrupting or intruding on others, b) excessive talking, and c) blurting out answers before the question has been completed. To accomplish this objective, parents and teachers were asked to report on the severity of these behaviors before and after intervention.

The data provided by parents pre- and post- intervention were used to determine if there were differences in the degree of pragmatic behavioral change between the treatment group and the control group over the course of intervention. Parent and teacher responses were also used to examine differences in the amount of change observed for each pragmatic behavior.

Total Pragmatic Scores

The first experimental question relates to changes in overall pragmatic performance. To answer this question, total pragmatic scores were calculated for each child by finding the mean score of items 1, 7, and 19 of the DBD as reported by parents. The difference in total pragmatic scores reported at the start of the study and after 2 months of intervention was used to identify the overall degree of pragmatic performance change. The mean overall change was calculated for the 5 participants in the MCC condition and compared to the overall degree of change observed in the one control participant. This comparison revealed that the children in the MCC condition experienced more improvement in pragmatic performance than the child in the control condition. The

average total pragmatic score for the children in the MCC condition changed from 3.266 at the start of the study to 2.133 after 2 months of intervention. This change can be interpreted as an overall reduction in problematic pragmatic behavior from “*pretty much*,” to “*just a little*,” on the DBD rating scale.

This finding supports the hypothesis that the multi-component consultation intervention is effective in improving the pragmatic performance of children with ADHD by reducing the frequency of the inappropriate verbal behaviors studied. The observation is in congruence with the findings summarized by Han and Weiss (2005), which state that sufficient training and ongoing support for teachers is needed to maximize the benefits of contingency management programs. The improvement in behavior demonstrated by the children in the MCC condition helps to further establish the positive effect of on-going consultation on teachers’ integrity to an intervention (Noell et al., 1997; Witt et al., 1997). By addressing and mediating the barriers known to affect treatment integrity, the multi-component consultations presumably increased the intensity level with which the DRC intervention was carried out. The observations recorded in this study coincide with previous research affirming that more intensive contingency management has a greater affect on behavior (Pelham & Fabiano, 2008).

Findings in the literature suggest that children with ADHD are less able to associate a stimulus with a behavior, or a behavior with its consequence resulting in poor social awareness (Løkke, 2011; Sagvolden et al., 2005). However, studies have also found that frequent reinforcement dramatically improves the appropriateness of responses provided by children with ADHD (Aase & Sagvolden, 2006). The reduced frequency of inappropriate pragmatic behaviors seen in this study supports the idea that children with

ADHD have flawed learning processes in regards to socially expected verbal behavior (Johansen et al., 2009; Løkke, 2011), but that improvement in performance can be expected when contingency management programs, such as the DRC, are implemented as intended (Fabiano et al., 2007; Fabiano et al., 2010; Pelham & Fabiano, 2008; Owens et al., 2012).

Although the data presented by this experiment supports the hypothesis, the results must be interpreted cautiously. The small number of participants and the amount of unreported data make application of these results limited. Having a single control subject with only one month of reported data makes it impossible to draw conclusions about the trends in behavior for children in the Consultation-As-Usual Condition.

Interventions Effect on Each Target Behavior

The second experimental question answered by this study involves the interventions separate effect on three pragmatically inappropriate behaviors found on the Disruptive Behavior Disorders Rating Scale pre- and post- intervention. The results of the experiment indicate that the frequency of all three inappropriate pragmatic behaviors demonstrated by children in the MCC condition was reduced after two months of intervention. The child in the CAU condition was only found to show improvement in the area of blurting out answers before questions have been completed. The lack of change in the other two target behaviors demonstrated by the control subject further supports the hypothesis that the multi-component consultation intervention is effective in reducing problematic pragmatic behaviors. Unfortunately, the support provided by this result is not very strong, as the control subject's parent(s) did not provide data after the second month. It cannot be assumed that the control subject would not have displayed improvement in the other

behaviors after a second month of intervention. Also, the lack of additional participants in the CAU condition makes comparison of between group behaviors weak.

Although the data provided by parents and teachers in the MCC condition is in agreement that all three problem behaviors decreased in frequency, there is a mismatch in which behaviors were affected most. Data provided by parents alone indicate that the children in the MCC condition demonstrated the greatest reduction in blurting out answers before the questions have been completed. The parents noted less improvement in the children's rate of interrupting others and the least amount of improvement in the rate of excessive talking. Teachers, on the other hand, seemed to experience nearly opposite results, with excessive talking displaying the greatest degree of change after two months of intervention. Based on the information provided by teachers, the frequency of interrupting/intruding on others and blurting out answers was reduced to a lesser extent after the treatment.

Further comparison of teacher and parent responses reveals differences in the intervention's consistency in affecting a target behavior in every child. Teachers in the MCC group reported that every child displayed a reduction in excessive talking. The rate of blurting out answers and interrupting/intruding on others was reduced in two out of the three children. Again, the information provided by teachers lacks cohesion with the data provided by parents. According to the parent data, every child demonstrated improvement in terms of blurting out answers. The frequency of this behavior was reported to improve by two points on the DBD (e.g. from 4=*very much* to 2=*just a little*) for 3 out of the 5 children in the MCC condition. Change in the level of excessive talking and

interrupting/intruding on others was less consistent, with changes noted in 4 out of the 5 students in the MCC condition.

Discrepancies between different raters are a recurring issue in clinical research involving children. A meta-analysis revealed that ratings of social, emotional or behavioral problems in children by different informants are very often dissonant. Moreover, findings show that divergence between raters is consistently found regardless of the assessment method chosen to study abnormal behavior in children (Achenbach, McConaughy, & Howell, 1987; De Los Reyes & Kazdin, 2005).

Although the reason for why there is such disagreement between teachers and parents in the reported changes of each behavior is unknown, the environment in which the respondents observe the behaviors may play a role. In the classroom, excessive talking is a major behavioral issue for teachers and even the slightest improvement in this area is likely to be noticed. This may explain why teachers in the MCC condition reported improvement in this area across all three students. Unfortunately, no teacher reported data could be obtained for children in the CAU condition so excessive talking in the classroom cannot be compared between groups. Teachers in the MCC condition reported the same scores for interrupting/intruding on others and blurting out answers to questions both pre- and post-assessment. It is possible that teachers consider these two behaviors more closely related than parents do. In the classroom, there is more opportunity for the child to impulsively answer the teacher's questions before it is appropriate and is interrupting the teacher in doing so. The teacher may be less inclined to notice if the child is interrupting or intruding on other students and so her perceived frequency of these behaviors is the same.

Parents, on the other hand, ranked the frequency of interrupting/intruding on others and excessive talking similarly at all three points of data collection. Parents may have more opportunity than teachers to observe and engage their child in conversation as well as observe the child's conversations with others. In the domain of discourse, interrupting others and excessive talking are very related and may explain why parents in the MCC group described the frequency of these behaviors over time similarly. This idea is further supported by the fact that the child in the control group was not reported to show change in either of these behaviors by a parent but did show improvement in the rate of blurting out answers. Unfortunately, no data was obtained from this child's parent after the first month of intervention so it cannot be determined if the controls subjects behavior remained the same.

Moreover, no data was collected from the control subject's teacher. In fact, none of the teachers initially included in the CAU condition provided data for this experiment by the time of writing. Although there is little data to make inferences about the pragmatic performance of children in the CAU condition, the lack of participation from teachers in the control group may be interpreted as supporting evidence that ongoing consultation focused on (1) increasing teachers' knowledge about ADHD and behavior modification programs, (2) providing training to improve implementation skills and (3) modifying the beliefs that teachers have about ADHD and the intervention, will lead to ongoing treatment integrity (Han & Weiss, 2005; McCormick, et al., 1995; Pfiffner, Barkley, & DuPaul, 1998; Sterling-Turner, et al., 2002). The teachers in the CAU condition may have become unmotivated to continue with the intervention or to contribute to the research experiment due to the same barriers known to affect treatment integrity.

Issues related to self-efficacy and prior perceptions may have affected the teachers' motivation to participate in the study. There is evidence in the literature that high amount of self-efficacy in teachers promotes initial interest in interventions, while low levels of self-efficacy lead to reduced effort. Research has also shown that teachers with lower self-efficacy are more likely to be deterred if they feel an intervention is ineffective (Bandura, 1997). Han and Weiss (2005) found that teachers are more likely to adhere to a program if they are made aware of even small changes in behavior that result from their actions. The lack of reporting by teachers in CAU condition is further evidence for these claims. It is likely that the same barriers known to reduce teachers' fidelity to an intervention also resulted in decreased motivation to participate in this research experiment.

Limitations

Several limitations became evident over the course of the experiment. The most significant limitation was lack of responding from parents and teachers in both the MCC condition and the CAU condition. Conducting research that required teachers and parents to complete surveys at multiple points throughout the year made data collection difficult. The low rate of responding created several limitations. First, many fewer participants were able to be included in both groups than initially expected, resulting in a small number of participants. Data was obtained from a parent for one child in the CAU condition. The largely uneven number of participants in each group makes interpretation of data provided by parents difficult. Additionally, data for this child was only collected from a parent at the start of the experiment and after one month of intervention, whereas the other participants had data for two months of intervention. Due the low and uneven number of participants and small amount of data collected, inferential statistics could not be completed for this

experiment. Additionally, teachers in the CAU condition provided no data, thus comparisons about pragmatic behavior could not be made between groups based on reports provided by teachers. In addition, the majority of the participants only had data from either a parent or a teacher, but not both. Ideally, total pragmatic scores for each child would have incorporated responses provided by both teachers and parents but this kind of analysis was not possible with the data provided.

There was also a great deal of contrast between the data provided by parents and teachers. First, lack of agreement was found when comparing the changes observed by parents and teachers for each behavior. There is also disagreement in the baseline data for participants 3 and 4, the two participants for whom teacher and parent data is provided. At the start of the experiment, participant 3's behavior was rated as 4, 4, and 4 (items 1, 7, and 19 of the DBD, respectively) by a parent. This same child's teacher provided scores of 2, 3, and 2 at baseline. Participant 4 was given scores of 2, 1, and 3 by a parent at the beginning of the study, but rated as 3, 3, and 3 by his teacher. The lack of coherence between the raters may negatively impact the accuracy of conclusions drawn from this experiment.

Another limitation of this experiment involves the behaviors chosen to evaluate pragmatic performance. Due to reasons beyond the author's control, a more comprehensive pragmatic language assessment tool could not be utilized for this research. The behaviors evaluated in this study were selected from the DBD as the best indicators of pragmatic performance available to the researcher. Although all three of the target behaviors are highly related to pragmatics, they can be difficult to distinguish from one another in certain situations, such as blurting out answers before questions are completed and interrupting others.

Finally, the nature of the data generated by the 4-point likert scale makes it difficult to draw conclusions about overall changes in behavior and make comparisons between groups and between behaviors. Using means to analyze the data was useful in observing small amounts of change over time in terms of descriptive statistics. However, the changes in mean performance are likely too small to reflect actual behavioral change in realistic settings. For example, a difference of .667 in the mean frequency of interrupting others between the start of the study and after 2 months is considered an improvement in this experiment. However, a teacher would most likely not consider such a change detectable.

Future Research

Given the relationship between ADHD and poor pragmatic performance, future research is needed to determine if contingency management programs such as the DRC are effective in improving pragmatic skills. As many symptoms of ADHD imply pragmatic dysfunction, future research should utilize comprehensive pragmatic assessment tools. Furthermore, due to the ever-increasing number of students with ADHD receiving services in school, research should continue to focus on evidenced-based interventions implemented by classroom teachers. Additional experiments involving consultations that address the barriers to treatment integrity should be conducted in order to find ways to keep teachers motivated. Additional incentives for teachers should be considered to ensure ongoing participation in the research process. Future research should also focus on collaboration and communication between teachers, and parents so that treatment effects can be captured more accurately. Because children with ADHD often experience peer rejection as well as dysfunctional relationships with adults, research that compares the pragmatic improvement seen by peers, parents and teachers will be valuable.

Summary

The purpose of this research was to determine if a multi-component consultation intervention was effective in improving the pragmatic performance of students with ADHD by observing the frequency of three inappropriate pragmatic behaviors selected from the Disruptive Behavior Disorders Rating Scale (DBD). The results indicate that the participants in the Multi-Component Consultation group, on average, experienced more positive changes in pragmatic behavior than the student in the Consultation-As-Usual condition after 2 months of intervention as per parent reported data.

On average, parents reported the greatest improvement in the frequency of blurting out answers before questions have been completed (#19 of the DBD). This behavior was positively affected in all of the children with parent-report data. Data collected from teachers indicated that the pragmatic behavior with the greatest improvement across participants involved excessive talking (#7 of the DBD). This behavior was found to decrease in all of the children for whom teacher-reported data was provided.

In conclusion, the results of this research experiment support the hypothesis that the multi-component consultation intervention is effective in the improving the pragmatic language performance of children with ADHD. The results also support data in the literature, which states that consultations addressing known barriers to integrity-knowledge, skills and beliefs-are useful in maximizing the benefits of contingency-management programs in schools.

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