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THE RELATION BETWEEN PARENT-CHILD INTERACTIONS AND COMORBID PROBLEMS AMONG ATTENTION-DEFICIT/HYPERACTIVITY DISORDER CHILDREN

A Thesis Presented
by
JULIE L. FRIEDMAN

Submitted to the Graduate School of the University of Massachusetts Amherst in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE
May 2002
Clinical Psychology
THE RELATION BETWEEN PARENT-CHILD INTERACTIONS AND COMORBID PROBLEMS AMONG ATTENTION-DEFICIT/HYPERACTIVITY DISORDER CHILDREN

A Master’s Thesis Presented
By
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I would like to thank my advisor, Lisa Harvey, for all her support and guidance, throughout this project. I do not know if I would have been able to complete this project without your continuous feedback and hard work. I would also like to thank my committee members Maureen Perry-Jenkins and Paula Pietromonaco for your challenging ideas and questions. I feel that my project was definitely improved through your different insights and perspectives. This project is part of a larger project assessing a parent-training program for school-aged ADHD children. There are a number of people involved in the larger study who deserve thanks, including Professor Harvey’s students at UConn, Professor Danforth at Eastern Connecticut State University, and all the families who participated in this study and allowed themselves to be audiotaped in order to help us learn more about the parent-child interactions of families with ADHD children. I would also like to give a huge thanks to all the undergraduate coders involved in the project. You did amazing work under sometimes very difficult coding conditions. Last, I would like to thank my friends, family, and Aaron, for your endless support throughout this long process.
ABSTRACT

THE RELATIONSHIP BETWEEN PARENT-CHILD INTERACTIONS AND COMORBID PROBLEMS AMONG ATTENTION-DEFECIT/HYPERACTIVITY DISORDER CHILDREN

OCTOBER 2001

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The present study examined how parent-child interactions among ADHD children may vary depending on the degree of comorbid symptoms present. The participants included 47 school-aged ADHD children with their 45 mothers and 27 fathers. Both observation and self-report questionnaires of parent and child behavior were collected before and after a parent-training intervention. All children received a DSM-IV diagnosis of ADHD. Comorbid symptoms of Aggression, Anxiety, Depression, and Social Skills deficits were assessed through parental responses on the Behavior Assessment Schedule for Children (BASC). Comorbid Aggression was associated with more conflictual family relations, marked by high levels of overreactive and restrictive parenting. Comorbid Anxiety was associated with firm, but nurturant parenting, and a trend towards children's greater compliance with fathers. Comorbid Depression was associated with greater negativity among fathers, and comorbid Social Skills deficits were associated with low nurturant parenting both before and after the intervention. Change scores in parent and child behavior from pre to post intervention were generally
not associated with the comorbid variables. The results support the validity of examining the variability of parent-child interactions among ADHD children.
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CHAPTER I

INTRODUCTION

Attention-deficit/hyperactivity disorder (ADHD) is a chronic developmental disorder that is characterized by inattention and/or hyperactivity-impulsivity (American Psychiatric Association, 1994). Although these symptoms can be problematic in and of themselves, they also put children at considerable risk for developing other psychiatric disorders. Numerous studies employing a range of clinical, community, and epidemiological samples have found that ADHD children as a group have a higher probability of developing comorbid symptoms of oppositional and conduct disorders, and to a lesser degree, anxiety and mood disorders (e.g. Anderson, Williams, McGee, & Silva, 1987; August, Realmuto, MacDonald, Nugent, & Crosby, 1996; Biederman, Newcorn, & Sprich, 1991; Bohline, 1985; Jensen, Shervette, Xenakis, & Richters, 1993; Margalit & Arieli, 1984; Willcutt, Pennington, Chhabildas, Friedman, Alexander, 1999). In addition to comorbid disorders, the core characteristics of ADHD also increase these children’s risk for negative social interactions, and potentially peer rejection (Frederick & Olmi, 1994).

A number of studies have examined family interactions among ADHD children; however, few have studied them in the context of comorbid problems. In general, this research has found that ADHD children are more talkative, negative and defiant, and less compliant and cooperative in interactions with their mothers. Their mothers have been found to be less responsive, more negative and directive, and less rewarding of their child’s behavior (for a review see Danforth, Barkley, & Stokes, 1991). Originally, these findings led researchers to suggest that the primary symptoms of ADHD, inattention and/or overreactivity-impulsivity, result in negative parent-child behaviors observed
during interactions (Barkley, Anastopoulos, Guevremont, & Fletcher, 1992). However, further investigation has revealed that these negative parent-child relationships may not be inherent to the diagnosis of ADHD, but rather may be associated with the comorbid presence of Oppositional Defiant Disorder (ODD; Barkley et al, 1992, Barkley, 1998).

The results of these studies highlight the importance of examining the variability of parent-child interactions among ADHD children. However, most previous studies have compared ADHD to non-ADHD children without addressing the heterogeneity within ADHD families.

One important source of heterogeneity is the degree to which ADHD children have additional comorbid problems. However, little is known regarding whether parent-child interactions vary depending on ADHD children’s comorbid symptomatology, including anxiety, depression, aggression, and social skills deficits. A more complete understanding of these potentially different relations may provide insight into how specific parenting styles may contribute to the development of comorbid problems among ADHD children, and how the presence of different comorbid symptoms may influence the relationship between parents and children with ADHD. A review of the literature highlights the considerable attention different comorbid symptoms have received in recent years, but also points out that there is a void in the research. For example, the majority of the studies (Barkley et al., 1992, Barkley, 1998) have focused on comorbid externalizing symptoms with comparatively few studies addressing other comorbid problems (Biederman et al., 1991). In addition, naturalistic observational methods have rarely been used to examine the relations between family functioning and comorbid symptoms.
ADHD and Conduct Problems

There have been a number of recent studies addressing ADHD and comorbid
externalizing disorders, including both Conduct Disorder (CD) and ODD. CD is
characterized by a repetitive pattern of behaviors that violate the rights of others and/or
age-appropriate societal norms/rules, and ODD is characterized by a pattern of negative,
hostile, and defiant behaviors. Although similar in symptomatology, ODD is considered
less severe than CD, and is not diagnosed if criteria for CD are met (American
Psychiatric Association, 1994). Due to the high rate of overlap between disorders, and
because it is often confounded in the literature, ODD and CD will be grouped together as
conduct problems (CP) in this review.

Based on the high prevalence for both disorders in the clinical population, there
was originally some debate regarding whether ADHD and CP actually reflected distinct
disorders, and therefore whether or not a comorbid condition could in fact exist
(Biederman, 1991). However, more recent studies have found that the two disorders do
exist independently, and are likely to have different correlates associated with each. For
example, children with CP without ADHD are likely to come from more severely
disturbed psychosocial environments, including families with higher rates of antisocial
personality disorder and alcoholism, than children with ADHD alone (Lahey, Piacentini,
McBurnett, Stone, Hartdagen, & Hynd, 1988). On the other hand, Children with ADHD
without CP are more likely to experience developmental delays and cognitive deficits
than those children who have CP without ADHD (Szatmari, Boyle, & Offord, 1989).
Research also suggests that a comorbid condition does exist between the two disorders,
and those children experience the cognitive deficits associated with ADHD as well as the
psychosocial adversity associated with CP (Barkley, 1990; Jensen, Martin, Cantwell,
1997). In general, it is thought that these children are at greater risk for family
dysfunction, social disadvantage, and long-term antisocial outcomes than children with
ADHD alone (Lahey at al., 1987; Moffit, 1990; Reeves, Werry, Elkind, & Zamekkin,
1987).

There have been a few studies conducted using semi-structured observational
methods examining the variability in parent-child interactions among ADHD adolescents
with comorbid ADHD and CP (specifically ODD was targeted in these studies). Barkley
(1990) and Barkley et al. (1992) have found that although greater than average family
conflict was associated with ADHD alone, the comorbid condition was associated with
even greater risks for negative communication patterns, angry family exchanges, and
unreasonable, extreme beliefs about parent-teen relations. A sequential analysis
conducted by Fletcher, Fischer, Barkley, and Smallish (1996) provided additional support
for distinguishing the ADHD/ODD group from both the ADHD only and normal teen
group. In their use of response strategy to their parents' immediately preceding behavior,
the ADHD/ODD group were more likely to match the tone (positive, neutral, or negative)
of their parent's immediately preceding behavior, while both other groups were more
likely to respond with positive or neutral behaviors regardless of their parents' preceding
statement.

In addition to Barkley and colleagues' work with adolescents, Johnston (1996)
utilized semi-structured observational methods to examine the parent-child interactions of
ADHD children with higher and lower levels of oppositional-defiant (OD) behavior. The
results from her study provide some support for the previous research suggesting that
difficulties in parent-child interactions are more common among families with ADHD
children with higher levels of CP. However, she also found that the same difficulties
often occur among families of ADHD children with lower levels of OD. In fact only three dimensions distinguished the two groups: mothers' reports of severity of child problems, observed child oppositional behavior, and parenting self-esteem. Johnston (1996) reported that the results from her study were inconclusive in differentiating parenting behaviors of children with higher or lower levels of OD, and suggested that future research may benefit from the use of less structured observational methods.

**ADHD and Internalizing Symptoms**

In contrast to externalizing disorders, few studies have focused on ADHD and internalizing symptoms, and there have been no observational studies examining parent-child interactions among ADHD children with these types of problems. A review of the literature conducted by Biederman and colleagues (1991) suggests that ADHD and mood disorders (MD) share a common genetic vulnerability. In addition, comorbid ADHD and MD has been found to be associated with greater long-term psychiatric morbidity and disability, and a potentially greater risk for suicide than other children with ADHD (Biederman et al., 1991). Studies examining comorbid ADHD and anxiety disorders (AD) generally find that AD and ADHD are transmitted independently in families, and that children with the comorbid condition have lower levels of impulsivity as measured by laboratory procedures than children with ADHD alone (Barkley, 1998; Biederman et al., 1991; Epstein, Goldberg, Conners, & March, 1997; Pliszka, 1989; 1992). The comorbidity of ADHD with both anxiety and depression have also been found to be associated with greater history of familial stress, greater parental symptoms of anxiety and mood disturbance, and reduced response to stimulant medication (Jensen, et al., 1993; Jensen et al., 1997; Pliszka, 1989).
There have also been relatively few studies addressing the parent-child interactions of non-ADHD children with internalizing problems (Sanders, Dadds, Johnston, & Cash, 1992), and the majority of those have focused primarily on childhood depression. It is generally believed that disturbed family interactions play a role in the development and maintenance of childhood depression (Cole & Rehm, 1986). Depressed children have poorer communication and less affectionate interactions with mothers, receive less contingent positive reinforcement, and have parents who are more dominant and controlling in decision-making than nondepressed psychiatric controls (Amanat & Butler, 1984; Cole & Rehm, 1986; Puig-Antich, Lukens, Davies, Goetz, Brennan-Quattrock, & Todak, 1985). Their family environments have been characterized by lower rates of rewarding interactions, higher rates of solitary behavior, and a higher degree of critical expressed emotion (Asarnow, Tompson, Hamilton, Goldstein, & Guthrie, 1994; Messer & Gross, 1995). In addition, some studies have linked low family cohesion to childhood depression, while others support the link between high family cohesion/enmeshment with depressive symptomatology in children (Kashani, Allan, Dahlmeier, Rezvani, & Reid, 1995). In a direct observational study, Dadds, Sanders, Morrison, and Rebgetz (1992) found that while depressed children engaged in low levels of aversive behavior with their mothers, their mothers displayed levels of aversive behaviors that approached the intensity of coercion displayed by mothers of the comparison conduct-disordered group. It is important to note that relatives of depressed children are at greater risk for having major depression themselves (Kovacs, Devlin, Pollock, Richards, & Mukerji, 1997). Therefore, parent-child interactions among depressed children may be highly influenced by parental depressive symptomatology.
In addressing children with comorbid anxiety and depression, studies have found these symptoms to be associated with major family problems, more open conflicts, overprotection, and a perceived family environment that is less supportive, more enmeshed, contains higher levels of conflict, engages in fewer recreational activities, and provides less child involvement in the decision-making process (Nilzon & Plamerus, 1997; Stark, Humphrey, Crook, & Lewis, 1990). Anxiety without depression in children has been found to be associated with a family environment characterized by parental overcontrol, and less child independence (Chorpita, Brown, & Barlow, 1998; Messer & Beidel, 1994). In an observational study, LaFreniere and Dumas (1992) found that mothers of anxious/withdrawn children were less likely to reciprocate the positive behavior expressed by their child, and in general showed significant increases in aversive behavior following both child compliance and noncompliance.

**ADHD and Social Skills Deficits**

Relatively few studies have addressed the social interactions of children with ADHD (Frederick & Olmi, 1994). These studies consistently find that ADHD children have serious disturbances in relations with peers (Pelham & Milich, 1984). ADHD children have been found to exhibit deficits in social knowledge, specifically in terms of maintaining relationships and effective conflict resolution strategies, as well as in the performance of some social skills (Grenell, Glass, & Katz, 1987). Due to their skills deficits and inattentive, disruptive behaviors, ADHD children elicit from peers a pattern of interaction that is more controlling, and less cooperative and academically productive (Cunningham & Siegel, 1987). Given these findings, it is not surprising that ADHD in children has also been linked with peer rejection, particularly among children with comorbid hyperactivity and aggression (Milich, Landau, Kilby, & Whitten, 1982). The
subgroup of Hyperactive/Aggressive children have also been found to exhibit deficits in social information processing, particularly in their encoding and recall of neutral social cues, hostile interpretation of ambiguous social situations, and decision to respond aggressively when provoked (Milich & Dodge, 1984).

In view of the considerable difficulties these children experience in peer relationships, it is likely that similar problems would transcend into the family relationship. There have been no studies specifically examining the parent-child interactions of ADHD children with comorbid social skills deficits. There are, however, a number of studies examining the relation between children's social skills and parent-child interaction of non-ADHD children. This research has focused on understanding how family relations influence the development of children's social competence and peer acceptance versus rejection. In general, these studies find that social competence and peer acceptance in children is related to secure attachment with both parents and teachers, mothers who are more skilled in social knowledge and monitoring behavior, and parents who initiate multiple peer contacts outside of school for their children (Finnic & Russel, 1998; Howes, Matheson, & Hamilton, 1994; Ladd & Golter, 1988). Furthermore, parents who are more engaged, use more warmth and positive expressiveness, and consistently and clearly enforce rules have children who are more socially accepted by peers. In contrast, parents who are more rejecting, angry, uninvolved, employ physical punishment, and more obtrusive forms of monitoring peer interactions tend to have children who are more likely to be rejected by peers (Boyum & Parke, 1995; Kennedy, 1992; Ladd & Golter, 1988; MacDonald & Parke, 1984). It is already established that ADHD children are likely to experience peer rejection (Milich et al., 1992), and that non-ADHD children who experience peer rejection tend to have parents who are less warm
and engaged but more rejecting and directive (MacDonald & Parke, 1984). What remains to be established is how ADHD symptomatology and social skills deficits in children relates to family interaction.

**Parenting Styles**

There is a large literature in developmental and child clinical psychology that points to several parenting dimensions that appear to play a key role in children’s development. In her seminal work, Baumrind (1971) summarized three distinct parenting styles that are associated with differential socialization outcomes in children: Authoritarian, Authoritative, and Permissive parenting. The Authoritarian parent attempts to control the behavior of the child through forceful means, and values obedience above all in their children. In contrast, the Authoritative parent attempts to direct the child’s activities in a rational, nurturant manner establishing a give and take relationship between parent and child. The Permissive parent makes few attempts to control the behavior of the child, and is completely accepting of the child’s actions and desires. Baumrind (1978) found that both Authoritarian and Permissive Parenting were linked to various problem behaviors in children, while Authoritative parenting was associated with more favorable child outcomes. More recent research have supported Baumrind’s work, finding a number of parenting behaviors associated with the Authoritarian and/or Permissive parenting style that have been linked to children’s disruptive behavior including overreactivity, restrictiveness, negative emotionality, coercion, and lax/inconsistent parenting (Arnold, O’Leary, Wolff, & Acker, 1993; Dix, 1991; Gardner, 1989; Rothbaum & Weisz, 1994). Similarly, specific parenting behaviors that parallel the dimensions identified by Baumrind have been associated with ADHD.
For example, Danforth and colleagues (1991) found mothers of ADHD children to be less responsive and more negative and controlling than mothers of control children.

**Parent-Training**

Stimulant medication therapy is the most commonly used treatment for ADHD children. However, 10-20% of ADHD children do not respond well to stimulant medication (Barkley, 1998). In addition, there are also a number of ADHD children whose parents do not want their children to receive stimulants. Parent-training interventions for parents of ADHD children has emerged has a viable alternative to medication. Parent-training programs teach parents how to manage their children’s inappropriate behaviors, while also encouraging the enhancement of children’s prosocial behaviors (Danforth, 1998a). Although considerably less research has been conducted with ADHD families, parent-training has been found to be effective with noncompliant children and conduct disorder populations (for a review see Barkley 1998). ADHD treatment studies have generally supported the effectiveness of parent-training for many families of ADHD children, but also reported that there are some families who do not benefit from parent-training, and that little is known about the predictors of these differential outcomes (Anastopoulos, Shelton, DuPaul, & Guevremont, 1993). A better understanding of how different parent and child characteristics may influence their responsiveness to a particular parent-training intervention may be important for increasing the effectiveness of parenting programs, and more generally the treatment of ADHD children.

**The Present Study**

The present study focused on understanding how parent-child interactions among ADHD children vary depending on the degree of comorbid symptoms. Based on
previous research of the interactions between parents and children with comorbid ADHD and CP, it was predicted that these interactions would be characterized by the highest levels of child noncompliance, as well as higher levels of parental negativity and overreactivity; a pattern generally reflecting greater familial adversity and conflicts. In contrast to the externalizing disorders, relatively little is known about the relationship between parents and ADHD children with comorbid internalizing disorders. There is some evidence that suggests that the presence of anxiety within ADHD children seems to reduce their overall level of impulsivity (Biederman et al, 1991). Therefore, it was hypothesized that these children would demonstrate lower levels of noncompliance. On the other hand, parents were expected to respond with less negative affectivity, and a general decrease in level of controlling statements; however, this hypothesis was tentative given the lack of theory and research on this topic. Additionally, very little is known about the family interaction patterns of children with ADHD and comorbid social skills deficits. Given the increased probability of peer rejection among this population, and the literature describing parent-child interaction of socially rejected children, it was hypothesized that these children would experience considerable difficulties in their relations with parents. Although there is no evidence to base hypotheses regarding child behavior, it was predicted that parental behavior will be characterized by high levels of negativity, and low levels of nurturance and positive statements.

In addition, this study also examined whether patterns of interactions would change as a function of a parent-training intervention. All associations were examined both before and after the parenting intervention (described in the method section). These associations addressed whether certain patterns of comorbidity were more likely to be associated with change among parents and ADHD children, and what types of children
benefited more or less from the behavioral intervention techniques taught in parent-training. These analyses were conducted to potentially provide some insight into the effectiveness of the standard parent-training program among heterogeneous ADHD families.

Finally, this study explored how contextual variables may influence both parent and child behaviors, and hence, any associations found among parent-child interactions and comorbid symptoms. It was expected that certain contextual variables including parental level of depression and relationship status (cohabitating or not), number of children per family, and severity of ADHD symptomatology may be related to both the independent and dependent variables of interest to this study. For example, it was predicted that parental depression would be related to both parent negativity and child depression. If that was the case, then a significant correlation found between parental negativity and child depression may be due largely to the presence of parental depression (the context/third variable), and when parental depression is statistically controlled, the relationship between parental negativity and child depression would no longer be significant. Analyzing and controlling for context was expected to provide a more complete picture of the results.
CHAPTER II

METHOD

Participants

Data was analyzed from 47 ADHD children with their 45 mothers and 27 fathers, who participated in a study of a parenting program for school-aged ADHD children. The participants were recruited through advertisements in local papers and schools. All but two participants included in the study were Caucasian. The children (43 boys and 4 girls) ranged in age from 3 to 12 (mean = 7.2). Mothers ranged in age from 24 to 53 (mean = 37.5), and fathers ranged in age from 25 to 58 (mean = 38.5). The reported family income ranged between $1,200 and $188,000 per year (mean = $54,502.3). The average number of years of education for fathers was 13.7 and 15.0 for mothers. 79.5% of the parents were married, 7.7% were cohabiting but not married, and 12.8% were divorced. 85.1% of the children were biologically related to at least one parent, and 14.9% of the children were adopted. The number of children per family ranged between 1 and 6 (mean = 2.3).

All children included in the study met the following eligibility requirements: (a) a score of at least 80 on the Peabody Picture Vocabulary Test-Revised (Dunn & Dunn, 1981); (b) met DSM-IV criteria for ADHD, either combined or hyperactive type, based on the Diagnostic Interview Schedule for Children-IV (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000); and (c) had a T-score of at least 65 on the Hyperactivity subscale and either the Aggression or Conduct Problems subscales of the Behavior Assessment Schedule for Children-Parent Report Scale (Reynolds & Kamphaus, 1992).
Procedure and Measures

Child and parent behavior was measured both before and after the parent-training program using both parental self-report questionnaires and audiotaped parent-child interaction. The parent-training program used was the Behavioral Management Flow Chart (Danforth, 1998a), and it consisted of teaching parents behavioral contingency management and time-out techniques with the goal of increasing prosocial behavior and reducing noncompliance and disruptive behavior in children. The parent-training entailed eight weekly 1 1/4-hour sessions with one lasting 2-hours.

The Behavioral Assessment System for Children-Parent Report Scale (BASC-PRS). Although all children received a DSM-IV diagnosis of ADHD, comorbidity was not assessed at the diagnostic level. The degree to which ADHD children presented with comorbid symptoms was measured using parental responses on the BASC-PRS (Reynolds & Kamphaus, 1992), a questionnaire designed to assess the degree of multiple problem behaviors in children. This measure yields 12 subscales and 4 composite scales. Of interest to this study is parental response on the individual scales of Anxiety, Depression, Aggression, and Social Skills Deficits.

Parenting Scale (PS). Discipline was measured through parental self-report on this 30-item scale, which yields factor scores for both Lax and Overreactive parenting (Arnold et al., 1993). This scale has demonstrated good reliability and validity among parents of preschool and elementary school-aged children (Arnold et al., 1993; Harvey, Danforth, Ulaszek, & McKee, in press). Scores on the two factors will be computed for both mothers and fathers using the factor structure reported by Harvey et al. (in press), before and after the parent-training program.
Modified Child Rearing Practices Report (CRPR). Parenting behavior was also measured using a modified version of the Block CRPR (Block, 1965). This scale consists of 40 self-report items, and yields two factors: Nurturance and Restrictiveness. These two factors demonstrated high internal consistency and test-retest reliability across samples of different socioeconomic status parent groups (Rickel & Biasati, 1982). Scores on the two factors will also be computed for both mothers and fathers, before and after the intervention.

Audiotape Assessment of Parental and Child Behavior. Observational data of parent and child behavior was measured by having each parent audiotape three, one-hour sessions of interaction with their child. Parents were asked to choose times during which the parent typically experienced difficulty disciplining the child such as morning, bedtime, or dinner routines. One hour of tape was selected for each parent and coded by trained undergraduate research assistants. Only one of the three hours was coded for a number of reasons. First, interactions were much richer than initially expected based on prior experience with videotaped interaction. A preliminary review of the tapes suggested that one hour was sufficient for capturing a wide variety of parent and child behavior that was representative of the entire three hours. Coding one hour rather than three hours of tape allowed for a more in depth, complex coding system to be used. Even coding one hour per tape required a total of 700 coding hours, not counting training time. Second, not all parents were able to complete all three hours of recording, whereas all parents completed at least one hour of tape. The parent variables coded include negative and lax tone, repeat commands, argues, positive/praise statements, and the use of consequences. The child variables coded include compliance, noncompliance, verbal misbehavior, and ignores commands (see Appendix A for a complete list and description
of parent and child behaviors coded). Undergraduate research assistants were trained in the coding system, and two raters overlapped on 27% of the pre and post tapes. Intraclass correlations for the independent raters ranged from .70 to .94 on the parent behavior variables, and from .74 to .84 on the child behavior variables.
CHAPTER III
RESULTS

Analyses were conducted for mothers and fathers separately before and after the parent-training program.

Descriptive Statistics

Table 1 presents means and standard deviations for the mothers’ and fathers’ self-report of parenting styles and child behavior (BASC variables), observed parent and child behavior, and change scores. Before parent-training, mothers used significantly more negative tone than fathers ($t (20) = 2.73, p < .01$), and children were observed to show more noncompliance ($t (20) = 2.48, p < .05$) and ignoring of commands ($t (19) = 2.25, p < .05$) with mothers than fathers. Post intervention, fathers’ self-reported significantly more lax ($t (20) = -2.37, p < 05$) and restrictive ($t (20) = -3.69, p < .001$) parenting styles than mothers. In addition, over the course of parent-training fathers changed significantly less than mothers in their level of overreactivity ($t (20) = -2.07, p < .05$) and laxness ($t (20) = -3.11, p < .001$), and children showed less of a decrease in noncompliance ($t (17) = -2.99, p < .001$) and ignoring of commands ($t (16) = -2.1, p < .05$) with fathers than mothers. There were no other differences between mothers and fathers on any of the independent or dependent variables.

Intercorrelations Among BASC Variables

Intercorrelations among the BASC subscales are presented in Table 2. Mothers’ reports of aggression in their children were moderately and positively correlated with mothers’ reports of anxiety symptoms, depression, and social skills deficits. In addition, mothers’ reports of anxiety symptoms in their children were moderately and positively correlated with their report of their children’s depression. Significant associations were
not found between mothers’ self-report of social skills deficits and their report of anxiety or depressive symptoms. For fathers, moderate and positive correlations were found between their report of aggression and depression, and their report of anxiety symptoms and increased social skills. There were no significant associations found between fathers’ report of aggression and anxiety or social skills deficits, anxiety and depression, and depression and social skills deficits.

Correlations Between Comorbid Symptoms and Parent-Child Behavior

Correlations were computed between BASC subscales (Aggression, Anxiety, Depression, and Social Skills Deficits), and both self-report questionnaire data and observational measures of parent and child behavior (See tables 3 and 4).

Before treatment, Aggression was associated with mothers’ self-report of greater restrictiveness, fathers’ self-report of lower nurturance, and both parents’ self-report of higher overreactivity. In addition, fathers tended to self-report higher levels of restrictiveness (p=.10), and mothers tended to use more praise/positive statements with aggressive children (p=.08) at probability levels that approached significance. Following treatment, Aggression was associated with both parents’ self-report of higher restrictiveness, fathers’ report of lower nurturance, fathers’ greater use of arguing with their child, and a trend for children to more frequently use verbal misbehavior with mothers (p=.10).

Before treatment, Anxiety was associated with mothers’ self-report of less lax parenting, fathers’ self-report of greater nurturance, and trends for mothers to self-report more restrictive parenting behaviors (p=.10), and more child compliance with fathers (p=.07). Following treatment, Anxiety was associated with fathers’ greater use of
praise/positive statements, and a trend for fathers to self-report greater nurturance (p=.08).

Depression before treatment was associated with a trend for fathers to self-report greater overreactivity (p=.09). Following treatment, Depression was associated with mothers’ self-report of greater restrictiveness (p=.09) at a probability level that approached significance.

Social Skills deficits before treatment were associated with both mothers’ and fathers’ self-report of less nurturance, less paternal use of praise/positive statements, and a trend for mothers to engage in less arguing (p=.10). Following treatment, Social skills deficits were associated with both parents’ self-report of less nurturance, maternal self-report of less restrictiveness, and less paternal use of praise/positive statements.

Controlling for Context Variables

Before controlling for context, correlations were conducted to examine associations between contextual variables of interest and all the dependent and independent variables. The context variables included parental relationship (cohabitating or not), number of siblings in the family, parental depression (according to the BDI), and level of child hyperactivity. Mothers in cohabitating couples reported greater overreactivity before treatment (r = .33, p < .05), and were observed to praise less following treatment (r = -.42, p < .05) than did single mothers. Having more siblings in the family was associated with mothers’ report of less restrictiveness before parent training (r = -.30, p < .05), and less parental use of praise following treatment (r = -.32 for mothers; r = -.47 for fathers, ps < .05). Maternal depression was associated with reports of greater aggression in children (r = .30, p < .05) and more maternal lax parenting (r = .39, p < .01) pre treatment, and more observed maternal arguing (r = .33, p < .05) and
noncompliance in children ($r = .37, p < .05$) following treatment. Paternal depression was associated with fathers' self-report of greater overreactivity ($r = .47, p < .05$) and laxness ($r = .45, p < .05$), more observed paternal arguing ($r = .44, p < .05$) and negativity ($r = .41, p < .05$) pre treatment. Following parent-training, paternal depression was associated with fathers' self-report of greater overreactivity ($r = .62, p < .001$), laxness ($r = .58, p < .01$), and restrictiveness ($r = .42, p < .05$), and fathers’ greater use of repeat commands with children ($r = .52, p < .05$). Mothers’ report of high levels of hyperactivity in children was associated with mothers’ self-report of greater depression ($r = .33, p < .05$) and social deficits ($r = -.35, p < .05$) in their children, and greater observed maternal negativity ($r = .35, p < .05$) pre treatment. Hyperactivity before treatment was associated with mothers’ self-report of less nurturance ($r = -.33, p < .05$), but greater observed use of praise ($r = .52, p < .001$) following treatment. Prior to treatment, fathers’ report of high levels of hyperactivity in children was associated with fathers’ self-report of greater aggression ($r = .46, p < .05$) and greater depression in their children ($r = .48, p < .05$).

To determine if the associations observed between comorbid problems and parent and child behavior were due to the effects of context-specific variables, multiple regressions were conducted for each significant and trend finding. Each contextual variable was entered with each BASC subscale as independent variables and each parent/child behaviors was entered as a dependent variable. These regressions revealed that slightly more than half of the associations were no longer significant when context variables were taken into account, and that context mostly affected pretreatment associations (see Tables 3 and 4).
Relation of BASC Variables to Change in Parent and Child Behavior

In order to facilitate interpretation of the results, correlations were computed between BASC subscales (Aggression, Anxiety, Depression, and Social Skills Deficits), and change in report of parental discipline and observations of parent and child behavior over the course of the parent-training program for mothers and fathers separately (see Table 5). Change scores were calculated by subtracting pre scores from post scores. The majority of the change scores were not significantly associated with the BASC subscales. For mothers, children’s aggression was associated with less increase in praise, and children’s anxiety was associated with less increase in compliance from pre to post treatment at probability levels that approached significance. For fathers, children’s anxiety was associated with trends towards a greater increase in paternal praise and a greater decrease in proportion of parent negativity from pre to post treatment. In addition, children’s social skills deficits were significantly associated with a greater increase in paternal nurturance, but were also significantly associated with less decrease of a in arguing with fathers, and a trend towards less decrease in child verbal misbehavior from pre to post intervention.
CHAPTER IV

DISCUSSION

The present study examined how parent-child interactions among ADHD children may vary as a function of comorbid symptoms, and whether these patterns would change as a function of a parent-training intervention. Unique patterns of interactions emerged among parents and children with ADHD and comorbid anxiety, depression, aggression, and social skills deficits. The relations between comorbid symptoms and parent-child behavior were similar before and after parent training, though fewer significant relations were found post parent-training. Comorbid symptoms did not predict change in parent-child behavior from pre to post parent training.

The pattern of correlations found in this study supports previous research (Barkley, 1990; Barkley et al., 1992; Fletcher et al., 1996) suggesting that more conflictual family relationships are related to the comorbid presence of ADHD and aggression. For example, in the present study the children with ADHD and aggressive symptoms had parents’ who self-reported high levels of overreactivity, restrictiveness, and less nurturance. It may be that conflictual parent-child interactions lead to aggression among ADHD children and it may also be that aggressive ADHD children elicit negative parenting practices.

Unique parenting styles were found among the other comorbid symptoms as well. Comorbid anxiety tended to be associated with more nurturant fathers and more firm mothers. It is possible that parents are more nurturant and consistent with these children, because they show less severe behavior problems. In fact, although this finding did not quite reach significance, children with comorbid anxiety tended to behave more compliantly with fathers before the treatment intervention. This result is consistent with
research suggesting that children with ADHD and comorbid anxiety tend to show decreased impulsivity on laboratory tasks (Biederman et al., 1991).

Comorbid depressive symptoms were not generally associated with mothers’ parenting, but were associated with greater negativity among fathers before treatment. The fact that there is more negativity within these families is consistent with research examining the parent-child interactions of depressed children without ADHD (e.g. Dadds et al., 1992); however, it is interesting that negativity was only significant for fathers given that research in this area has predominately focused on interactions with mothers.

Comorbid social skills deficits were associated with both parents’ use of less positive, nurturant parenting before and after the parent-training intervention. Although very little is known about the parent-child interactions of ADHD children with social skills deficits, research suggests that children who experience peer rejection tend to have parents who are less warm and engaged (MacDonald & Parke, 1984). The results suggest that ADHD children with social skills deficits experience similar difficulties with their parents.

Although multiple unique patterns of associations were found among the different comorbid symptoms and parent and child variables, these results should be interpreted with caution given the impact of context on these relationships. Contextual variables including parental relationship, family size, parental depression, and child hyperactivity were examined. Approximately half of the associations were significant after controlling for these four variables. Interestingly, the majority of these significant associations were found post treatment. It is possible that the intervention itself serves as a powerful context post treatment, thereby, limiting the effects of the other contextual variables analyzed. In addition, contrary to expectations, a cohabiting parental relationship (two-
parent family) contributed to parents’ greater report of negativity and child aggression. Although this finding cannot be explained by this study, it is possible that the quality of the parental relationship moderated this association.

Overall, change in parent and child behavior following treatment was not associated with the comorbid symptoms. However, there are a few associations that merit discussion. Interestingly, for mothers, children’s aggression was related to a smaller increase in praise. Praise is an important component to any parenting intervention, and it may be important to know if mothers have a more difficult time learning to use praise with aggressive children. In addition, parents of children with anxiety tended to show greater improvement over the course of the program. ADHD children with anxiety seem to be more compliant in general, and it may be easier to employ parent-training techniques with more compliant children. Lastly, social skills deficits were associated with a greater increase in paternal nurturance. Fathers of children with social skills deficits were less nurturant than all other subgroups of ADHD children both before and after the parent-training; however, it is encouraging that this effect decreased significantly over the course of the intervention.

There are a number of limitations to consider in interpreting this study. First, the comorbidity of symptoms was not addressed at a diagnostic level. Second, the subscales assessing comorbid symptoms were moderately to strongly intercorrelated. Therefore, many of the children who scored high on aggression also scored high on depression, anxiety, and social skills deficits, or some combination of the four. In addition, the sample size, particularly for fathers, was small, limiting generalizability and the power for detecting effects. However, even with a small sample, a number of significant effects were found suggesting the importance of examining comorbid symptoms among ADHD
children. Finally, although this study examined families over time, this was a correlational study and caution should be taken in drawing causal conclusions; it is possible that a third variable (besides the context variables already considered) may be contributing to the unique patterns of interaction found among parents and children with ADHD and different comorbid symptoms. It is also difficult to predict how much specific parenting styles and patterns of parent-child interaction influence the development of comorbid symptoms among ADHD children, or, on the other hand, how much the comorbid symptoms have influenced the relational qualities.

Despite these limitations, this study provides support for research to continue to examine the parent-child interactions of ADHD children with different comorbid symptoms. The patterns of associations found among the different comorbid symptoms suggest the need to develop parent-training interventions tailored to meet the needs of heterogeneous ADHD families. In particular, it seems that this intervention was most effective with families of ADHD children with comorbid symptoms of anxiety and social skills deficits. This study found unique patterns of parent-child interaction associated with having ADHD and comorbid symptoms of Aggression, Anxiety, Depression, and Social Skills deficits; however, further research is needed to gain a better understanding of the process by which comorbid symptoms and parent-child behavior affects one another.
Table 1: Means and Standard Deviations for the Independent and Dependent Variables

<table>
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<tr>
<th>Variable</th>
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<tr>
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<td><strong>Observed-Parent Behavior</strong></td>
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</tr>
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<td>8.21</td>
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<td>10.33</td>
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CONTINUED
### TABLE 1: CONTINUED

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**Change Scores**

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<tr>
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<td>Restrictiveness</td>
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<td>.46</td>
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<td>Nurturance</td>
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<td>.54</td>
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<td>6.99</td>
<td>-.61</td>
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<td>-4.10</td>
</tr>
<tr>
<td>Noncompliance</td>
<td>-16.34</td>
<td>27.92</td>
<td>-5.05</td>
</tr>
<tr>
<td>Verbal Misbehavior</td>
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<tr>
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<td>-7.50</td>
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<td>-1.50</td>
</tr>
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</table>

N = 42

N = 24

*p < .05; **p < .01; ***p < .001

Note: The significance of dependent t-tests comparing mothers and fathers are indicated above using *’s and are based only on families where both parents participated (N = 24). Thus, this subset means are slightly different from those reported in the table.
Table 2: Intercorrelations Among BASC Subscales (Aggression, Anxiety, Depression, & Social Skills Deficits) for Mothers and Fathers Separately

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<tr>
<td>2. Anxiety</td>
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<td>1.00</td>
<td>.53***</td>
</tr>
<tr>
<td>3. Depression</td>
<td>--</td>
<td>--</td>
<td>1.00</td>
</tr>
<tr>
<td>4. Social Skills Deficits</td>
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*p < .10
* *p < .05
** *p < .01
*** *p < .001
Table 3: Correlations Between BASC Subscales (Aggression, Anxiety, Depression, & Social Skills Deficits) and Parent Behavior Measured Through Self-Report Questionnaire, and Parent and Child Behavior Measured Through Audiotaped Interactions-Pre Treatment

<table>
<thead>
<tr>
<th></th>
<th>Mothers</th>
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<th>Fathers</th>
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<th></th>
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<tbody>
<tr>
<td></td>
<td>N=42</td>
<td>N=25</td>
<td></td>
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</tr>
<tr>
<td><strong>Self-Report-Data</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Overreactivity</td>
<td>.29*AC</td>
<td>.07</td>
<td>.01</td>
<td>.39*AC</td>
<td>-.08</td>
<td>.34*AC-.00</td>
</tr>
<tr>
<td>2. Laxness</td>
<td>-.05</td>
<td>-.32*A</td>
<td>-.16</td>
<td>.06</td>
<td>-.01</td>
<td>.01</td>
</tr>
<tr>
<td>3. Restrictiveness</td>
<td>.31*A</td>
<td>.26*AB</td>
<td>.16</td>
<td>.32*BC</td>
<td>.00</td>
<td>.08</td>
</tr>
<tr>
<td>4. Nurturance</td>
<td>-.08</td>
<td>.20</td>
<td>-.08</td>
<td>.44*</td>
<td>-.43*BD</td>
<td>.45*B-.04</td>
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<tr>
<td><strong>Observational-Data</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parent Behavior</strong></td>
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<td>N=24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Negative Tone</td>
<td>-.03</td>
<td>-.19</td>
<td>-.07</td>
<td>.00</td>
<td>.17</td>
<td>.30</td>
</tr>
<tr>
<td>2. Repeat Command</td>
<td>.02</td>
<td>-.09</td>
<td>.07</td>
<td>.02</td>
<td>.16</td>
<td>.13</td>
</tr>
<tr>
<td>3. Argues</td>
<td>-.06</td>
<td>-.13</td>
<td>.00</td>
<td>.27*AB</td>
<td>-.02</td>
<td>.20</td>
</tr>
<tr>
<td>4. Praise/Positive</td>
<td>.27*AC</td>
<td>.16</td>
<td>.23</td>
<td>.21</td>
<td>-.23</td>
<td>.30</td>
</tr>
<tr>
<td>5. Negative/Total</td>
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<td>-.14</td>
<td>.04</td>
<td>-.22</td>
<td>.29</td>
<td>.01</td>
</tr>
<tr>
<td><strong>Child Behavior</strong></td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>1. Compliance</td>
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<td>.24</td>
<td>.22</td>
<td>.20</td>
<td>-.04</td>
<td>.38*AC .11</td>
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<td>-.18</td>
<td>-.04</td>
<td>.04</td>
<td>.08</td>
<td>.15</td>
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<td>3. Verbal Misbehavior</td>
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<td>.00</td>
<td>-.13</td>
<td>-.00</td>
<td>.30</td>
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<tr>
<td>4. Ignores Commands</td>
<td>-.11</td>
<td>-.21</td>
<td>.01</td>
<td>.26*ABC</td>
<td>.26</td>
<td>.09</td>
</tr>
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</table>

*a p<.10  
*p <.05  
**p<.01  
***p<.001

A= Correlation no longer significant when parental relationship is controlled for
B= Correlation no longer significant when sibling number is controlled for
C= Correlation no longer significant when parental depression is controlled for
D= Correlation no longer significant when child hyperactivity is controlled for
Table 4: Correlations Between BASC Subscales (Aggression, Anxiety, Depression, & Social Skills Deficits) and Parent Behavior Measured Through Self-Report Questionnaire, and Parent and Child Behavior Measured Through Audiotaped Interactions-Post Treatment

<table>
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<td>1. Overreactivity</td>
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<td>2. Laxness</td>
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<td>-.16</td>
<td>-.00</td>
<td>.11</td>
</tr>
<tr>
<td>3. Restrictiveness</td>
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<td>.13</td>
<td>.27^CD</td>
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<td>4. Nurturance</td>
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<td>.20</td>
<td>.03</td>
<td>.52***</td>
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<tr>
<td><strong>Observational-Data</strong></td>
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</tr>
<tr>
<td>Parent Behavior</td>
<td></td>
<td></td>
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</tr>
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<td>1. Negative Tone</td>
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<td>4. Praise/Positive</td>
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<td>-.20</td>
<td>-.24</td>
<td>.17</td>
</tr>
</tbody>
</table>

^p < .10 *p < .05 **p < .01 ***p < .001

A = Correlation no longer significant when parental relationship is controlled for
B = Correlation no longer significant when sibling number is controlled for
C = Correlation no longer significant when parental depression is controlled for
D = Correlation no longer significant when child hyperactivity is controlled for
Table 5: Correlations Between BASC Subscales (Aggression, Anxiety, Depression, & Social Skills Deficits) and Change Scores of Parent and Child Behavior

<table>
<thead>
<tr>
<th></th>
<th>Mothers</th>
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<th></th>
<th>Fathers</th>
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<tr>
<td>1. Overreactivity</td>
<td>-.15</td>
<td>-.05</td>
<td>.03</td>
<td>.22</td>
<td>-.32</td>
<td>-.03</td>
<td>-.13</td>
<td>.14</td>
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<tr>
<td>2. Laxness</td>
<td>-.05</td>
<td>.22</td>
<td>.19</td>
<td>.07</td>
<td>-.26</td>
<td>-.10</td>
<td>-.25</td>
<td>-.01</td>
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<tr>
<td>3. Restrictiveness</td>
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<td>-.17</td>
<td>.16</td>
<td>.05</td>
<td>.12</td>
<td>-.35</td>
<td>.32</td>
<td>-.17</td>
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<tr>
<td>4. Nurturance</td>
<td>.02</td>
<td>.10</td>
<td>.00</td>
<td>.10</td>
<td>.05</td>
<td>-.15</td>
<td>-.01</td>
<td>-.47*</td>
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<td>.14</td>
<td>.03</td>
<td>-.04</td>
<td>.11</td>
<td>-.21</td>
<td>-.22</td>
<td>-.28</td>
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<tr>
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<td>-.09</td>
<td>-.07</td>
<td>.14</td>
<td>-.21</td>
<td>-.01</td>
<td>-.06</td>
<td>.03</td>
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<td>3. Argues</td>
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<td>.01</td>
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<td>.02</td>
<td>-.62*</td>
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<td>4. Praise/Positive</td>
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<td>-.05</td>
<td>-.01</td>
<td>.05</td>
<td>-.15</td>
<td>.44*</td>
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<td>-.23</td>
<td>-.05</td>
<td>.11</td>
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<td><strong>Child Behavior</strong></td>
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<td></td>
<td></td>
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<tr>
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<td>-.28*</td>
<td>-.07</td>
<td>-.00</td>
<td>-.00</td>
<td>.26</td>
<td>-.07</td>
<td>-.01</td>
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<td>.08</td>
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<td>-.24</td>
<td>-.07</td>
<td>-.04</td>
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<td>-.10</td>
</tr>
</tbody>
</table>

p* < .10  *p < .05  **p < .01  ***p < .001
Summary of Parent Codes

Negative Tone- Rates the parents’ tone from very harsh to slightly annoyed.

Lax Tone- Is a rating of the firmness of parents’ statements from firm to wimpy/coaxing.

Repeat Commands- Is a summary of how many times the parent repeats a command.

Argues- This code is used when the parent argues with the child over whether the child can do something, whether the child has done something, or whether the child has misbehaved in the past.

Positive/Praise Statements- This code is used when the parent says or does something that conveys affection for the child, or expresses a favorable judgment concerning a behavior, attribute, or product of the child.

Use of Consequences- This code is used when the parent tells the child he/she can’t do something or has to do something because the child has misbehaved. The code includes warning of a consequence, disbursing a consequence/time-out, or offering an incentive for the child to behave.

Summary of Child Codes

Complies- The child follows the parent’s direction or request.

NonComplies- Child does not comply with the parent statement.

Ignores commands- The child does not respond to parent, or child’s response is completely unrelated to parent commands.

General Verbal Misbehavior (GVM)- Child engages in verbal misbehavior including talking back, defiance, arguing, swearing, pesterling, etc.


