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THE INTERACTIONS BETWEEN EARLY CHILD CHARACTERISTICS, PARENTING, AND FAMILY STRESS IN PREDICTING LATER ODD

A Thesis Presented

by

Lindsay A. Metcalfe

Submitted to the Graduate School of the
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Clinical Psychology

THE INTERACTIONS BETWEEN EARLY CHILD CHARACTERISTICS, PARENTING, AND FAMILY STRESS IN PREDICTING LATER ODD

A Thesis Presented

by

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ABSTRACT

THE INTERACTIONS BETWEEN EARLY CHILD CHARACTERISTICS, PARENTING, AND FAMILY STRESS IN PREDICTING LATER ODD

SEPTEMBER 2009

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The present study examined the interactions between early child behavior, early parenting, and early family stress (parent psychopathology, socioeconomic status, and stressful life events) in predicting later Oppositional Defiant Disorder (ODD) symptoms. Participants were 223 three-year-old children and their parents who participated in a four-year longitudinal study. It was predicted that there would be a stronger relationship between children's early behavior characteristics and later ODD in the presence of less parental overreactivity/negative affect, more paternal warmth, and less family stress and a stronger relationship between early family stress and later ODD in the presence of less parental overreactivity/negative affect and more paternal warmth. Although early child behavior, early parenting, and early family stress were predictive of later ODD, they did not significantly interact in the predicted direction. In fact, contrary to prediction, only one interaction proved to be significant and it was in the unexpected direction: the relationship between early child behavior and later ODD was stronger among parents who displayed more warmth with their three-year-old children.

TABLE OF CONTENTS

Page

ABSTRACT.....iii

LIST OF TABLES.....v

LIST OF FIGURES.....vi

CHAPTER

1. INTRODUCTION.....1

2. METHOD….....10

3. RESULTS...….....15

4. DISCUSSION.....19

TABLES…….....24

FIGURES...…….....26

REFERENCES….....29

LIST OF TABLES

Table Page

1. Intercorrelations Among All Variables 37

2. Regression Coefficients and Significance Levels for Interactions Predicting Age 6 ODD 38

LIST OF FIGURES

Figure Page

1. A Conceptual Framework of the Relationships Between Early Variables and Later ODD 34

2. Five Regression Equations Constructed 35

3. Relationship Between Paternal Child Characteristics and Time 4 ODD at Low, Medium, and High Levels of Paternal Warmth 36

CHAPTER 1

INTRODUCTION

Oppositional Defiant Disorder (ODD) is one of the most common childhood behavior disorders, affecting approximately 2-16% of children (APA, 2000). It is characterized by a recurring pattern of negative, hostile, disobedient, and defiant behavior, lasting for at least six months without serious violation of the basic rights of others. ODD first appeared in the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III; APA, 1980) as "Oppositional Disorder" and only minor changes have been made to the diagnostic criteria in subsequent versions of the DSM. Estimates of the ratio of boys to girls among school-aged children with ODD are about 1.5:1 (Loeber, Burke, Lahey, Winters, & Zera, 2000). The male to female ratio may be larger during preschool years with girls representing approximately 30% of children with externalizing problems (Campbell, 1990). ODD symptoms often cause disruption in a number of domains, including social (Frankel & Feinberg, 2002), family (Loeber, Lahey, & Thomas, 1991), and academic functioning (Gadow & Nolan, 2002). Moreover, children with ODD are at very high risk for developing more serious behavior problems as they get older in the form Conduct Disorder (CD; Burke, Loeber, Lahey, & Rathouz, 2005). Behavior disorders are typically diagnosed in elementary-aged children, but symptoms associated with ODD often emerge at younger ages (Keenan & Wakschlag, 2004). The nature and etiology of ODD has been widely studied, although much of the literature has not historically used the DSM criteria for ODD, but rather has focused on children who were described as antisocial, aggressive, or as having conduct problems.

Etiological models suggest that interactions between early child characteristics, family stress, and parenting lead to the development of ODD (Barkley, DuPaul, & McMurray, 1990; Lahey & Waldman, 2003; Moffitt, 1993). While each of these sets of variables has been associated with behavior problems, few studies have examined their interplay. The present study examined the interaction between early behavior (both hyperactivity and defiance), early family stress (parent psychopathology, single parenthood, socioeconomic status, and stressful life events), and early parenting in predicting later ODD symptoms.

Etiological Models of ODD

Research suggests that environments (Burt, Krueger, McGue, & Iocono, 2001) and biological factors, including genetics and prenatal and perinatal complications (Brennan, Grekin, & Mednick, 2003) play a role in the development of ODD. Moreover, etiological models have posited that the interaction among these factors is critical. In particular, several researchers have suggested that largely heritable characteristics, including negative emotionality, daring, lack of prosociality, and low verbal IQ, increase children's propensity to exhibit behavior problems by contributing to and interacting with family stressors, which leads to certain negative parenting behaviors (Lahey & Waldman, 2003; Barkley, 1990; Moffitt, 1990).

These models, however, do not directly address the fact that there is considerable overlap between ODD and Attention Deficit Hyperactivity Disorder (ADHD). ADHD is characterized by clinically significant levels of inattention, hyperactivity, and impulsivity (APA, 2000), and it shows high heritability (Barkley, 2006). It is estimated that as many as 80% of children with ODD also meet criteria for ADHD (Abikoff, 1987), although

estimates vary widely. It is important that etiological models identify specifically why many children with ODD also have comorbid ADHD, as children with both ODD and ADHD symptoms have a significantly higher risk for psychiatric disorders (Speltz, McClellan, DeKlyen, & Jones, 1999) and this comorbidity presents a worse prognosis than either of the two disorders alone (Lahey & Loeber, 1994).

Barkley (1990) proposed a model of the development of comorbid ODD/ADHD that emphasizes the importance of early family characteristics. His model suggests that the impulsivity and hyperactivity of children with ADHD produce more instances of coercive interactions with caregivers, which, in turn, put these children at higher risk of developing comorbid ODD. He argues that these coercive interactions are most likely to occur when families experience additional stressors such as marital difficulties, parental psychopathology, and low SES. This model is similar to other models of the etiology of ODD, but articulates ADHD symptoms as a specific child characteristic that puts children at risk for ODD. Moreover, like other models of ODD, Barkley's suggests that family stressors may interact with children's behavioral disinhibition and disrupt parenting, which in turn contributes to the development of comorbid ODD/ADHD symptoms (Barkley, DuPaul, & McMurray, 1990).

Figure 1 integrates Barkley's model with previous etiological models of ODD (Lahey & Waldman, 2003; Moffitt, 1993; Patterson, 1992; Shaw, Bell, & Gilliom, 2000; Dodge & Pettit, 2003) and outlines how early child and family factors may interact in contributing to later behavior problems.[1] As articulated in a number of models, when early child behavior problems are coupled with high levels of family stressors, children

[1] Note that the figure only outlines how these variables interact and does not include some direct and mediating processes which may also be important but are beyond the scope of this study.

are proposed to be more likely to develop or maintain later behavior problems. Children with early behavior problems whose families experience lower levels of family stress may be more likely to outgrow and/or less likely to develop oppositional defiant behaviors. Moreover, while previous models have proposed that parenting likely mediates the effects of early child behavior and family stress on later ODD, it is also proposed here that parenting likely serves as a moderator in the prediction of ODD. In particular, when early child behavior problems are paired with negative parenting, those problems are likely to evolve into later ODD, whereas children with early behavior problems whose parents are able to avoid using negative parenting practices should be more likely to outgrow their problems. Similarly, family stressors may be more likely to lead to subsequent ODD in the presence of negative parenting, than in the absence of negative parenting.

Empirical Literature on Key Etiological Factors

Very few studies have directly tested the prediction that early behavior, family stress, and parenting would interact in predicting later behavior problems. However, there is considerable research linking each of these factors individually with later behavior problems. First, research indicates that early child characteristics put children at risk for later behavior problems. Seventy to 80% of older preschool-aged children with ADHD or ODD (Lahey, Pelham, & Loney, 2004; Speltz, McClellan, DeKlyen, & Jones, 1999) and approximately half of younger preschool-aged children with behavior problems (Campbell, Breaux, Ewing, & Szumowski, 1986; Lavigne et al., 1998) continue to show clinically significant behavior problems when they reach school-age. Other early child characteristics that have been linked with later behavior problems include difficult

temperament (Keenan, Shaw, Delliquadri, Giovannelli, & Walsh, 1998), low language skills (Beitchman, Wilson, Johnson, Atkinson, Young, Adlaf, et al., 2001), deficits in social skills (Dodge & Pettit, 2003), compromised cognitive development (Lavigne, Gibbons, Christoffel, Arend, Rosenbaum, Binns, 1996), and neuropsychological functioning (Moffitt, 1993). More specifically, Moffitt (1993) argued that "early starters" (i.e., children who develop conduct problems prior to adolescence) often have impairments in early neuropsychological functioning, as manifested by cognitive deficits seen with ADHD. These impairments are thought to elicit ineffective parenting strategies and put children on a trajectory of ongoing conduct problems. Shaw, Bell, and Gilliom (2000) confirmed this model of conduct problem trajectory and emphasized the significance of reducing conduct problems early on in child development.

Second, parenting practices have been consistently linked to children's behavior problems. More specifically, disruptive behavior problems have been associated with parenting that is harsh, overreactive, coercive (Dodge, 2002; Eddy, Leve, & Fagot, 2001; Patterson, 1982), rejecting/unresponsive (see Rothbaum & Weisz, 1994, for a review), permissive, and inconsistent (Gardner, 1989; Patterson, 1986). Moreover, dysfunctional parenting practices, including negativity and lack of warmth (Barkley, Fischer, Edelbrock, & Smallish, 1991; Kashdan, et al., 2004; Pfiffner, McBurnett, & Rathouz, 2005; Taylor, Schachar, Thorley, & Wieselberg, 1986), permissiveness/inconsistency (Taylor et al., 1986), and lack of responsiveness (Johnston, Murray, & Hinshaw, 2002; Seipp & Johnston, 2005) appear to be specifically related to aggression and defiance rather than to hyperactivity, although some studies have linked certain parenting practices specifically with ADHD (Lindahl, 1998; Stormshak, Bierman, McMahon, & Lengua,

2000; Woodward, Taylor, & Downdey, 1998). Research that has focused on preschool-aged children is consistent with studies of older children, as children's disruptive behavior problems are associated with negative parent-child interactions (Shaw, Keenan, & Vondra, 1994), overreactive and lax/permissive parenting (Calkins, Smith, Gill, & Johnson, 1998; Keown & Woodward, 2002; Cunningham & Boyle, 2002), and lower maternal warmth/sensitivity (Eiden, Edwards, & Leonard, 2007). Moreover, longitudinal studies have associated mothers' overreactive/harsh parenting (Campbell & Ewing, 1990; Heller et al., 1996) and controlling behavior (Campbell et al., 1991) during the preschooler years to later externalizing problems. Early harsh and negative paternal parenting has also been shown to predict later conduct problems (DeKluyen, Speltz, & Greenberg, 1998).

Third, family stressors, including low SES, negative life events, and parental depression, have been well established correlates of behavior problems in children. Preschool children who live in poverty are at greater risk for the development of behavior problems than are children from higher SES backgrounds, with almost 30% of children from low-SES backgrounds reported to have behavior problems, compared to 3% to 6% of children in the general population (Qi and Kaiser, 2003). Similarly, research suggests that experiencing stressful life events during the preschool years puts children at greater risk of developing behavior problems (Crnic, Gaze, & Hoffman, 2005).

Both maternal depression (Elgar et al., 2004) and paternal depression (Spector, 2006) have been linked with conduct problems in children. Research has most commonly examined the relationship between maternal depression and non-specific externalizing behavior problems among elementary school-aged children (e.g., Henderson, Sayger, &

Horne, 2003; Schaughency & Lahey, 1985; Spieker, Larson, Lewis, Keller, & Gilchrist, 1999), but links between maternal depression and behavior problems have also been well-established during the preschool years. A smaller body of research has also linked paternal depression with behavior problems among both school-aged and preschool-aged children (Shaw, Winslow, Owens, & Hood, 1998; West & Newman, 2003). A handful of longitudinal studies have also documented a link between maternal depression when children are very young and later externalizing problems (e.g., Cummings & Davies, 1994; Downey & Coyne, 1990; Goodman & Gotlib, 1999; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). In addition, parental depression has specifically been identified as a risk factor for the development of conduct problems among children with ADHD (Chronis, Lahey, Pelham, Williams, Baumann, Kipp, Jones, & Rathouz, 2007).

Interactions Between Early Child Characteristics, Parenting, and Family Stressors

While early child characteristics, parenting, and family stressors have all been linked with ODD, only a handful of studies have directly examined interactions among these variables, which lie at the heart of many models of ODD. Shaw, Winslow, Owens, Vondra, Cohn, and Bell (1998) followed children from the age of 1 to 3 1/2, using observational measures of developmentally pertinent parenting and child behavior to predict externalizing behavior. They found that high maternal rejection and high child noncompliance interacted in predicting higher externalizing behavior scores. Similarly, a link between biological influences (i.e., perinatal risk factors) and aggression was shown to depend upon the presence of other risk factors (such as SES and family functioning) in a child's environment; there were stronger relationships between the biological influences and aggression when coupled with low SES and family functioning (Brennan et al.,

2003). Finally, Moffitt (1990) found that the relationship between early behavior characteristics and later behavior problems was moderated by family adversity such that there was a stronger relationship between early and later behavior problems in the presence of higher levels of family adversity. Thus, the few studies that have examined interactions between early risk factors for later behavior problems suggest that this area warrants further study.

The Present Study

Given the growing evidence that ODD symptoms can emerge at young ages, it is important to identify what variables contribute to these symptoms and how they interact with each other. While research suggests that there are links between early child characteristics, parenting, and family stressors with ODD, there is a gap in the literature regarding the moderating relationships among these variables. The proposed study seeks to examine the interaction between early behavior (both hyperactivity and defiance), early parenting, and early family stress (parent psychopathology, socioeconomic status, and stressful life events) in predicting later ODD symptoms. The study will address three possible interactions:

1) The relationship between early behavior problems and later ODD symptoms is moderated by early parenting, such that there is a stronger relationship between early behavior and later ODD in the presence of negative parenting.
2) The relationship between early behavior problems and later ODD symptoms is moderated by early family stressors, such that there is a stronger relationship between early behavior and later ODD in the presence of more stressors.

3) The relationship between early family stressors and later ODD symptoms is moderated by early parenting, such that there is a stronger relationship between early stressors and later ODD in the presence of negative parenting.

CHAPTER 2

METHOD

Participants

Participants were drawn from 258 children and their 258 mothers and 178 fathers who participated in a longitudinal study from age 3 to 6. The children were all 3 years old at the time of initial screening and were 36 to 50 months (M = 44.15 months, SD = 3.37) at the time of the first home visit. The sample consisted of 55% European American children, 18% Latino children (predominantly Puerto Rican), 12% African-American children, and 15% multiethnic children. One hundred ninety-nine of these children had significant externalizing problems (hyperactivity and/or aggression) at the time of screening and 59 of the children did not have behavioral problems. The median combined family income was $48,000. Most mothers (87.5%) and fathers (89.4%) had a high school diploma and 33.5% of mothers and 28.7% of fathers had bachelor's degrees.

Procedure

Participants were recruited by distributing questionnaire packets through birth records, pediatrician offices, childcare centers, and community centers throughout Western Massachusetts (Springfield, Northampton, and Greenfield). The questionnaire packet contained an informed consent form, a Behavioral Assessment System for Children-Parent Report Scale (BASC-PRS, described in more detail below), a questionnaire assessing for exclusion criteria, parental concern about externalizing symptoms, and demographic information. Criteria for all participants included no evidence of mental retardation, deafness, blindness, language delay, cerebral palsy, epilepsy, autism, or psychosis. Criteria for the externalizing group were: (a) parent

responded “yes” or “possibly” to the question, “Are you concerned about your child’s activity level, defiance, aggression, or impulse control?” and (b) BASC-PRS hyperactivity and/or aggression subscale T scores fell at or below 65 (approximately 92nd percentile). Criteria for the non-problem comparison children were: (a) parent responded “no” to the question, “Are you concerned about your child’s activity level, defiance, aggression, or impulse control?” and (b) T scores on the BASC-PRS hyperactivity, aggression, attention problems, anxiety, and depression subscales fell at or below a T score of 60. Parents whose children met criteria listed above for either the externalizing group or nonproblem group (who were matched to the externalizing group on age, gender, maternal education, and ethnicity) were invited to participate in yearly home visit assessments from age 3 to age 6.

The present study focuses on data collected at Time 1 (age 3) and Time 4 (age 6). Time 1 assessments consisted of two home visits, each lasting 2½ to 3 hours and Time 4 consisted of one 3 hour home visit. Families were paid for their participation. Two hundred twenty three of the original 258 children completed Time 4 assessments and these children were the focus of this study.

Time 1 Measures

Demographic information. Parents provided information about their income, ethnicity, years of education, age, and marital status at Time 1.

Early child behavior. The Behavioral Assessment System for Children-Parent Report Scale (BASC-PRS) is a comprehensive rating scale that assesses a broad range of psychopathology in children ages 2-6 and older (Reynolds & Kamphaus, 1992). The BASC-PRS demonstrates good reliability and validity for children (Reynolds &

Kamphaus, 1992). Mothers and fathers independently completed the BASC-PRS Preschool Version at Time 1. An average of mothers' and fathers' Behavior Symptom index (BSI) was computed as a measure of children's overall behavioral and emotional functioning.

SES. A measure of mother's education level was used as a proxy for SES.

Parental depression. The Center for Epidemiological Studies Depression scale (CES-D; Radloff, 1977) is a 20-item measure used to assess depressive symptomatology among parents. Parents rated themselves on a four-point scale (1, rarely or none of the time, to 4, most or all of the time) at Time 1, and responses were averaged across the 21 items. The scale has excellent internal consistency, as Cronbach's Alpha scores of .80 or higher have been reported for many different samples (Radloff, 1977).

Negative life events. The Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978) is a 57-item measure of family stress. Parents rated the valence and severity of positive and negative events that occurred within the last calendar year. The severity of negative events on the LES was calculated by summing across the negative valence ratings. The LES negative events scale has moderate test-retest reliability (average r = .72) and has been found to correlate with anxiety, depression, and locus of control (Sarason et al., 1978). The severity of events on the LES was used as a measure of negative life events.

Videotaped assessment of parenting. Children were videotaped at age 3 interacting with their mothers during three tasks: a five minute play task, a clean-up task, and a 10-minute forbidden object task. Each tape was coded twice by independent raters (whose ratings were averaged) on three global ratings of parent behavior: warmth,

negative affect, and laxness. This study focused on warmth and negative affect. Warmth referred to the extent to which the parent was positively attentive to the child; used praise, encouragement, and terms of endearment; conveyed affection; was supportive and available; was cheerful in mood and tone of voice; and/or conveyed interest, joy, enthusiasm, and warmth in interactions with the child. Negative affect ratings indicated irritation, annoyance, frustration, whininess, and/or an angry tone. High scores represented high frequencies of these behaviors. Ratings were correlated across the tasks for warmth (r = .69 to .84, p < .001) and negative affect (r = .70 to .84, p < .001). Intraclass correlations were .81 for warmth and .75 for negative affect.

Audiotaped assessment of parenting. Mother and fathers were each asked to use a micro-cassette player to record 2 hours of interaction with their children at age 3, selecting times of day that tended to be challenging for them as parents. A preliminary review of the tapes suggested that 30 minutes of tape was sufficient for capturing a wide variety of behavior that was representative of the entire 2 hours, and all parents who took part in this assessment completed at least 30 minutes. Two raters overlapped for 88 participants and intraclass correlations (*ICC*s) were calculated to determine reliability for each code. The coding system included both event-based and global coding. In this study, the codes for parent warmth and parent negative affect were used (using definitions described earlier in the description of the videotaped code). Global ratings of parent warmth (*ICC* = .53) were made every 5 minutes and ranged from 1 (not warm) to 7 (extremely warm). Each instance of parent negative affect was rated on a scale from 1 (slight) to 6 (strong), and these ratings were summed across the 30 minutes of interaction to create a parent negative affect score (*ICC* = .60).

Parenting scale. Mothers and fathers completed the Parenting Scale at Time 1 (Arnold, O'Leary, Wolff, & Acker, 1993) which is a 30-item self-report scale that yields scores for laxness and overreactivity. Ratings are made using a 7-point likert scale. The Parenting Scale has demonstrated good internal consistency (α = .83 for laxness and .82 for overreactivity), and has been found to correlate with observations of parenting and child behavior (Arnold et al., 1993).

Time 4 Outcome Measure

Diagnostic interview (DISC). The NIMH-Diagnostic Interview Schedule for Children-IV (NIMH-DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) is a structured diagnostic interview designed for children age 6 and up and has demonstrated adequate test-retest reliability with older children for ADHD (.79) and ODD (.54; Shaffer et al., 2000). A complete computerized version of the NIMH-DISC-IV was administered to parents. The number of ODD symptoms endorsed was used to assess Time 4 ODD.

CHAPTER 3

RESULTS

Data Reduction

Intercorrelations among variables were examined and variables assessing the same or similar constructs were standardized and averaged if they were correlated with each other: (1) Self-reported overreactivity and audiotaped and videotaped observations of parent negative affect were significantly intercorrelated (r's ranged from .20 to .34, $p's < .01$) and were combined to create an overeactivity/negative affect variable; (2) Observed ratings of mothers' warmth based on audiotaped and videotaped interactions were significantly correlated ($r = .34$, $p < .001$) and were combined to create an observed maternal warmth variable; and (3) SES, parental depression, and stressful life events were significantly correlated (r's ranged from .18 to .37, p's $< .05$) and were combined to create a family stress variable.

Analytic Plan

Regression analyses with product terms were used to test the three hypotheses (see Figure 2). There were two regression analyses for the interaction between early behavior and parenting (since there were two measures of parenting—warmth and overreactivity/negative affect—separate analyses were run for each measure). Similarly, there were two regression analyses for the interaction between early stressors and parenting. Finally, there was one regression analysis for the interaction between early behavior and early stressors. Each of these five analyses was run for mothers and then for fathers, yielding ten total analyses.

Visual inspection of the data indicated that there was one bivariate outlier who was very high on maternal negative affect/overreactivity, but was very low on maternal report of early child behavior. This case was therefore removed before conducting analyses.

Descriptive Statistics

Table 1 displays intercorrelations among each of the independent variables as well as the dependent variable. As expected, parental reports of child characteristics at Time 1, parental reports of family stressors, and maternal overreactivity/negative affect were each significantly associated with Time 4 ODD. Contrary to prediction, maternal warmth and both paternal warmth and overreactivity/negative affect were not significantly correlated with Time 4 ODD. To examine the proportion of variance in the Time 4 ODD symptoms accounted for by Time 1 parenting, family stressors, and early child characteristics, a multiple regression was conducted with Time 4 ODD as the dependent variables and all nine Time 1 variables as independent variables. These Time 1 variables accounted for 13% of the variability in Time 4 ODD symptoms (adjusted R-squared = .13, $p < .01$).

Does Parenting Moderate the Relationship Between Early Behavior Problems and Time 4 ODD Symptoms?

Contrary to prediction, paternal warmth interacted with early child characteristics in predicting later ODD such that the relationship between early child characteristics and later ODD was stronger for children with warmer fathers (see Table 2). The relationship between early child characteristics and later ODD became stronger as paternal warmth increased from low to high (see Figure 3). There was no comparable significant effect for

maternal warmth. There were also no significant interactions between early child characteristics and maternal or paternal overreactivity/negative affect in predicting later ODD.

Do Family Stressors Moderate the Relationship Between Early Behavior Problems and Time 4 ODD Symptoms?

Neither maternal nor paternal reports of early behavior problems interacted significantly with family stressors in predicting later ODD symptoms.

Does Parenting Moderate the Relationship Between Early Family Stressors and Time 4 ODD Symptoms?

Neither maternal nor paternal warmth significantly interacted with family stressors in predicting later ODD symptoms. Similarly, neither maternal nor paternal overreactivity/negative affect significantly interacted with family stressors in predicting later ODD symptoms

Examination of Behavior Group Status

The sample used in the above regression analyses included children in both the behavior group and control group. The ten regression analyses were subsequently ran with just the control group and again with just the behavior group. The only different result was that the interaction between paternal report of child behavior and paternal warmth did not significantly predict age 6 ODD for either the control or behavior group independently.

Differences Across Gender and Ethnicity

Three-way interactions were examined to determine whether gender or ethnicity had moderating effects on the above interactions. The gender variable and a product term

consisting of the two variables being addressed and the gender variable were added to each of the ten interactions named above. For example, “Gender” and “Early behavior*Maternal Warmth*Gender” were added to the regression equation testing the interaction between early behavior and maternal warmth. This process was repeated to test the moderating effect of ethnicity. There were no significant Gender X Variable or Ethnicity X Variable interactions—all found $p > .05$ (to avoid type 1 error, an alpha of .01 was used for gender and ethnicity analyses because these were exploratory).

Time 2 and Time 3 ODD

The lack of support for interactions among Time 1 variables may have been due to the long timeframe between Time 1 and Time 4. In order to explore whether the Time 1 variables interacted to predict either Time 2 or Time 3 DISC ODD, regression analyses were repeated with Time 2 ODD as the outcome variable as well as with Time 3 ODD as the outcome variable. Of the 20 analyses, 3 were found to be significant: Both maternal warmth ($\beta = .03$, $p < .05$) and paternal warmth ($\beta = .03$, $p < .05$) were found to significantly moderate the relationship between child behavior and Time 2 ODD such that the relationship between early child characteristics and later ODD was stronger for children with warmer parents. Also, maternal warmth was shown to significantly moderate the relationship between early child characteristics and Time 3 ODD such that the relationship between early child characteristics and later ODD was stronger for children with warmer mothers ($\beta = .04$, $p < .05$).

CHAPTER 4

DISCUSSION

The present study examined the interplay among early child characteristics, family stress, and parenting in predicting later behavior problems. Based on existing theory that suggests that interactions between early child characteristics, family stress, and parenting lead to the development of ODD (Barkley, DuPaul, & McMurray, 1990; Lahey & Waldman, 2003; Moffitt, 1993), it was expected that there would be a stronger relationship between children's early behavior characteristics and later ODD in the presence of less parental overreactivity/negative affect, more paternal warmth, and less family stress. It was also anticipated that there would be a stronger relationship between early family stress and later ODD in the presence of less parental overreactivity/negative affect and more paternal warmth. The only significant interaction was between early child characteristics and parental warmth in predicting later ODD. However, this interaction was in the opposite direction as expected: the relationship between early child characteristics and later ODD was stronger for children with warmer parents.

These results fail to support existing theory which argues that early child characteristics interact with early family stressors in the development of antisocial behavior (Lahey & Waldman, 2003). There are several possible explanations for this discrepancy. First, it is possible that this process unfolds even younger than age 3. The fact that Shaw et al. (1998) who studied children beginning at age 1 has been one of the few studies supporting interactions between parenting and early child characteristics in predicting later behavior supports this possibility. Second, it is possible that power was insufficient to detect significant interactions. However, the sample size in this study

should have been sufficient to detect reasonable size interactions. Moreover, interaction coefficients in the present study were in fact in the opposite direction than would be predicted from theory, suggesting that it is unlikely that our failure to support existing theory was due to low power. Finally, it is possible that early child characteristics, parenting, and family stressors do not interact with one another, but instead have simple effects on the development of behavior problems in young children. It may be that so few published studies have addressed these interactions because of the well-documented "file drawer" phenomenon (Dickersin, 1990). Perhaps other studies that have analyzed such interactive effects have failed to publish due the nonsignificance of the findings. In the context of a reasonably large sample size, it can be argued that the nonsignificant findings of the present study tell a very important piece of the story regarding the factors that contribute to the development of ODD in young children. While these findings indicate that there is no interactive effect of early childhood behaviors, family stress, and parenting in predicting ODD, there is support for the simple effect of each variable.

As anticipated, parental reports of child characteristics at age 3 were significantly associated with age 6 ODD. Previous studies had shown that more than half of preschool-aged children with behavior problems continue to show clinically significant behavior problems when they reach school age (Campbell, Breaux, Ewing, & Szumowski, 1986; Lahey, Pelham, & Loney, 2004; Lavigne et al., 1998; Speltz, McClellan, DeKlyen, & Jones, 1999), which fits with the significant correlation between early child characteristics and later ODD found in the present study. Also, as expected, there was a significant association between early family stressors and later ODD, which falls in line with previous work that showed that low-SES (Qi and Kaiser, 2003), stressful life events

(Crnic, Gaze, & Hoffman, 2005), and both maternal depression (Elgar et al., 2004) and paternal depression (Spector, 2006) are linked with later behavior problems. In addition, the present study found a significant association between early maternal overreactivity/negative affect and later ODD, which also confirms previous studies, which have shown that mothers' overreactive/harsh parenting (Campbell & Ewing, 1990; Heller et al., 1996) and controlling behavior (Campbell et al., 1991) during the preschool years are associated with later externalizing problems. This provides further evidence that there is, in fact, a relationship between these early variables and later ODD—it just appears to be additive, not interactive. In fact, these variables accounted for 13% of the variability in age 6 ODD symptoms. While this proportion is notable given the fairly large time lag, there remains a large percentage of unexplained variance, a large percentage of which may be explained by factors that occur between age 3 and age 6.

Because interactive effects may not have been evident over the fairly long time frame from age 3 to age 6, exploratory analyses were conducted to test whether interactive effects were evident over a shorter time period. Using age 4 and age 5 ODD symptoms as the outcome, findings were similar to age 6 results. The significant interaction between paternal warmth and early child characteristics was again found in predicting age 4 ODD, and interactions between maternal warmth and early child characteristics emerged at age 4 and age 5, again in the opposite direction as would be expected. Thus it appears that the failure to support existing theory regarding the interaction between early child and family characteristics was not due to the long time frame between age 3 and age 6. Furthermore, interactions between parental warmth and

early child characteristics that were in a direction that was opposite to prediction were fairly robust across the preschool years.

The finding that parental warmth moderates the relationship between early child characteristics and later ODD such that there is a there is a stronger relationship in the presence of more warmth, stands in contrast to existing theory, but suggests interesting possibilities. For example, it is possible that fathers whose children are on a trajectory for later behavior problems recognize that warmth could improve their children's behaviors, and therefore increase their use of warmth. This interactive pattern may also reflect individual differences across children in etiological factors that account for their behavior problems. Children with very warm fathers at age 3 who are nonetheless displaying challenging behaviors may be children who have strong biological predispositions to develop behavior problems. These children then have a very high probability of having later ODD symptoms. In contrast, children with fathers who lack warmth may be displaying challenging behaviors at age 3 in response to low paternal warmth, rather than due to a biological predisposition. These children's challenging behavior may be more readily altered by positive experiences the child may receive during the preschool years, and therefore light less likely to ultimately develop into ODD symptoms. Future research is needed to explore these possibilities.

The results of the present study should be interpreted in the context of a couple limitations. First, method variance may account for some of the observed simple relations in this study. In cases in which parents reported on both their own parenting/family stress and their children's behavior, shared method variance may have inflated the observed associations. Second, although the sample in this study was ethnically diverse we were

only able to examine the potential moderating influence of ethnicity on the relations between early family variables and diagnostic outcomes at a very basic level, because sample sizes for individual ethnic groups were too small to examine each ethnic group separately.

Despite these limitations, this study contributes to the literature in several ways. First, it is the first longitudinal study during the critical preschool years to test this widely posited theory that there are interactive relationships between early child and family variables in predicting behavior problems. Second, this study supports existing research pointing to the importance of early child and family characteristics, but challenges existing assumptions about how these variables interact with one another. Third, it further informs clinical practice that there is a need for clear assessment of factors relating to preschool children, parents, and environment in order to best predict necessary interventions. Future research is necessary to continue to better understand the complex early development of behavior disorders.

Table 1

Intercorrelations Among All Variables

	1	2	3	4	5	6	7	8
1. Time 4 DISC	-	-	-	-	-	-	-	-
2. Maternal Warmth	-.063	-	-	-	-	-	-	-
3. Maternal Over./N.Aff	.211**	-.363**	-	-	-	-	-	-
4. Maternal Child Char.	.378**	-.206**	.278**	-	-	-	-	-
5. Maternal Stressors	.204**	-.467**	.236**	.313**	-	-	-	-
6. Paternal Warmth	.071	.221**	-.185*	-.112	-.138	-	-	-
7. Paternal Over./N.Aff	.107	-.076	.230**	.135	-.051	-.331**	-	-
8. Paternal Child Char.	.251**	-.283**	.268**	.588**	.264**	-.161	.105	-
9. Paternal Stressors	.288**	-.247**	.028	.208*	.547**	-.007	.122	.215**

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

Table 2

Regression Coefficients and Significance Levels for Interactions Predicting Age 6 ODD

Interaction Variables	Mothers *B*	Mothers *se*	Fathers *B*	Fathers *se*
Child Char./ Warmth	.02	.01	.03*	.01
Child Char./ Overreact.	-.03	.02	-.01	.01
Child Char./ Stress	-.02	.02	.00	.02
Warmth/ Stress	-.31	.29	-.56	.38
Overreact./ Stress	-.63	.43	-.11	.37

*$p < .05$

Figure 1

A Conceptual Framework of the Relationships Between Early Variables and Later ODD

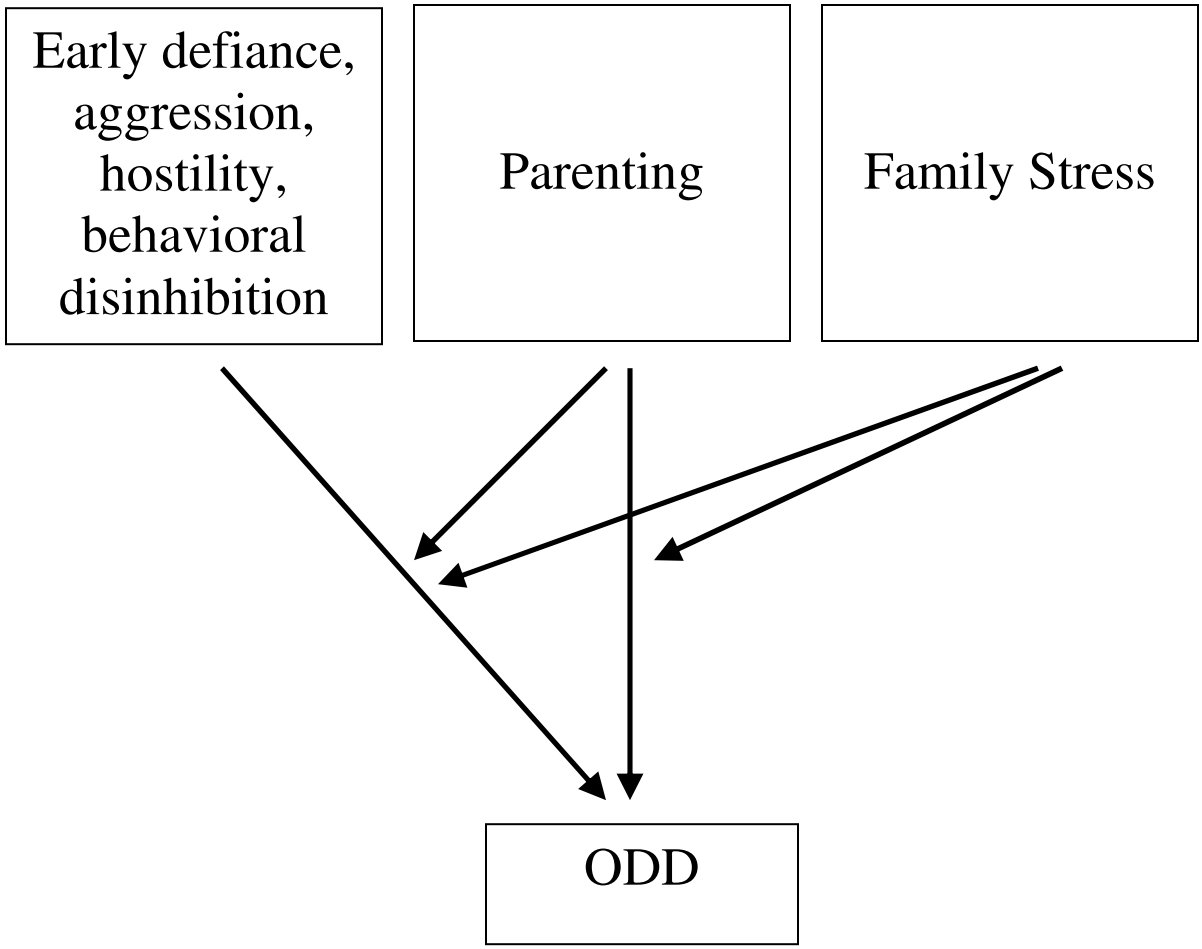


Figure 2

Five Regression Equations Constructed

1. ODD = early behavior + warmth + (early behavior*warmth)

2. ODD = early behavior + overreactivity + (early behavior*overreactivity)

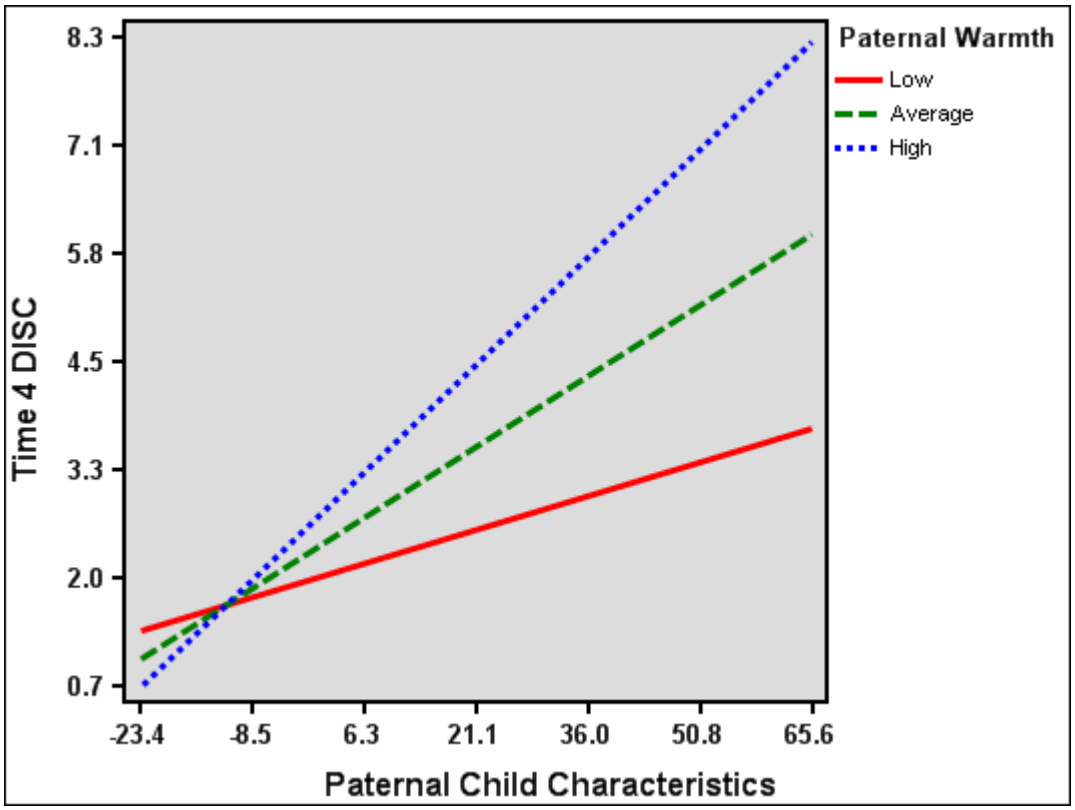
3. ODD = stressors + warmth + (stressors*warmth)

4. ODD = stressors + overreactivity + (stressors*overreactivity)

5. ODD = early behavior + stressors + (early behavior*stressors)

Figure 3

Relationship Between Paternal Child Characteristics and Time 4 ODD at Low, Medium, and High Levels of Paternal Warmth



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