

CONDUCT PROBLEMS AND DEPRESSIVE SYMPTOM FROM AGES 5 – 9:
THE ADDITIVE AND SYNERGISTIC EFFECTS OF PARENTING AND CHILD TEMPERAMENT

A Dissertation by

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The following faculty members have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirement for the degree of Doctor of Philosophy with a major in Psychology.

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DEDICATION

First and foremost, I warrant a thank you to my husband, Bill, for supporting my decision to attend graduate school during our early years of marriage. I appreciate his support, love, and the sacrifices he has made for me over the years. I would also like to extend my gratitude to my sons, Brian and Juan , who endured my many hours and days away from them over the past eight years, and still gave me the love, the support I needed and the patience I often did not deserve, I return my love and appreciation. I truly could not have come this far without all of you.

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ABSTRACT

The present study examined the additive and synergistic effects of parenting quality and the child temperament component, executive frontal control, on the development of conduct problems and depressive symptoms from entry to kindergarten to the 3rd – 4th grade transition. Participants were a community sample of 267 children, 133 girls and 134 boys and their parents. Parenting quality was assessed via two 120 minute videotaped observations and a structured interview. Child executive frontal control was measured via a series of behavioral tasks and classroom observation. Child adjustment was measured with the Child Behavior Checklist and Teacher Report Form (Achenbach, 1991). Ratings of conduct problems and depressive symptoms based on parent and teacher report were examined separately using latent growth modeling and full information likelihood estimation in path analysis. Deficits in executive frontal control were related to chronic levels of both conduct problems and depressive symptoms across settings and related to growth of conduct problems and depressive symptoms only in the school setting. Coercive parenting was related to chronic levels of conduct problems at home and in the school setting while skilled parenting predicted lower chronic levels of school conduct problems and predicted diminution in the growth of conduct problems at school. Parenting and executive frontal control interacted and influenced chronic levels of conduct problems at school. These results support the hypothesis that executive frontal control and unskilled parenting are salient risk factors for the development of conduct problems and depressive symptoms in childhood.

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INTRODUCTION

Conduct problems and depression in childhood are associated with a number of negative developmental outcomes, along with substantial human and economic costs. The social and economic costs of conduct disorder are high and include the costs of treatment, social services, academic failure and involvement in the justice system. The average societal cost of a child diagnosed with conduct disorder is estimated to exceed \$70,000 over a 7 year period (Foster & Jones, 2005). Depression is one of the most prevalent psychological disorders, affecting more than 21 million children and adults annually in the U.S. Annual costs of depression in the U.S. can be measured in the billions of dollars and include direct costs, costs related to depression-related suicides, and costs related to loss of workplace productivity (Greenberg et al., 2003).

The onset of conduct problems and of depressive symptoms and their persistence or recurrence are influenced by a wide range of malleable risk and protective processes that take root as early as the first year of life. Examining and understanding these processes can have important implications for the prevention of conduct problems and depression and assist in the identification of youth who are at risk and would benefit from intervention. Decades of research have identified a number of family, child, and social processes and risk factors that predict conduct and affect problems in childhood. However, research on conduct and depressive problems has proceeded in a relatively independent manner. The present study examines the relationship of parenting practices and the child temperament characteristic,

executive frontal control, to the onset and growth of both conduct problems and depression during childhood.

Phenomenology and Prevalence of Conduct Problems and Depressive Symptoms

Epidemiological studies indicate a substantial proportion of children display features of some type of psychological or behavior problem. The most frequently occurring disorders in childhood are classified in one of two broadband categories, internalizing problems and externalizing problems, with yearly prevalence rates reaching as high as 5% for both (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Depression falls within the internalizing cluster whereas disruptive behavior problems, such as oppositional defiant disorder and conduct disorder, are part of the externalizing cluster. Both conduct problems and depression are associated with multiple negative correlates and sequelae, along with the increased use of mental health services. Specifically, academic failure, peer rejection, delinquency and substance abuse are well-established correlates of externalizing problems (Capaldi & Stoolmiller, 1999; Moffitt, 1993; Fergusson, Horwood, & Ridder, 2007; Nock, Kazdin, Hiripi, & Kessler, 2006). Furthermore, behavior problems with onset in childhood are well-established markers for the development of delinquency and antisocial personality disorder (Patterson, DeBaryshe, & Ramsey, 1989; Loeber, 1990; Loeber, Burke, Lahey, Winters, & Zera, 2000).

Child onset depression is associated with increased risk of subsequent major depression, academic problems, neglect by peers, substance abuse later in adolescence, and is a critical factor in suicidality (Gould, King & Greenwald, 1998; Kovacs, Goldstone, & Gatsonis, 1993). Childhood onset depression is also associated with impaired functioning and high level, long-

term use of medical and psychiatric services in adulthood (Angold, Costello, & Worthman, 1998; Weissman et al., 1999). Sub-syndromal depressive episodes in childhood are associated with significant psychosocial impairment, indicating the importance of early identification and prompt treatment to prevent recurrence and chronicity (Birmaher, Arbelaez, & Brent, 2002; Kovacs, 2001).

Conduct problems represent a broad range of disruptive or acting out behaviors by youth that vary from oppositional acts such as temper tantrums and yelling to more serious forms of antisocial behavior such as physical aggression, property destruction, lying, and stealing. Disruptive behavior problems in early childhood can involve whining, aggression, and disobedience. Evidence indicates that 5% to 10% of children 8-16 years of age show conduct disorder or oppositional defiant disorder (Angold & Costello, 2001). Prevalence estimates from 1% to 9% for conduct disorder and from 2% to 10% for oppositional defiant disorder have been reported in community samples (Essau, 2003).

In childhood, depressed and irritable mood are observed more frequently than are the syndromes consistent with the DSM diagnostic criteria for depression (4th ed., text rev; *DSM-IV-TR*; American Psychiatric Association, 2000). Therefore, it is not uncommon for children to experience subthreshold levels of depression that are none the less are relevant clinically (Lewinsohn, Rohde, Seeley, Klein, & Gotlib, 2003). There are indications sub-syndromal levels of depressive symptoms increase the probability of subsequent depression (Judd, Akiskal, & Paulus, 1997). Depressive symptoms and disorders are now widely recognized as occurring in early and middle childhood. Depression has been identified in preschool children in four

independent study samples (Luby et al., 2002; Luby, Belden, Pautsch, Si, & Spitznagel, 2009; Egger & Angold; 2006; Lavigne et al., 1998). Prevalence estimates of major depression have been found to be less than 1% in preschool children but as high as 2.5% among prepubertal children (Kashani & Carlson, 1987; Costello et al., 1996; Fleming & Offord, 1990). By adolescence, prevalence estimates of major depression range from 0.4% to 6.4% (Fleming et al., 1990). Researchers estimate that by the end of adolescence between 16.8% and 18.5% of youths will have experienced an episode of depression (Newman et al., 1996; Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993). Furthermore, epidemiological studies using parent report reveal that 10% to 20% of children under the age of 11 are rated as feeling sad, miserable or depressed (Achenbach, Howell, Quay, & Conners, 1991; Rutter, Tizard, & Whitmore, 1970).

Developmental Course

Better understanding of the developmental origins and risk factors associated with the onset of conduct problems and depression is an important issue for child clinicians. Specifically, prevention can more usefully delivered during childhood as the risks for antisocial behavior and depression take root at an early age. That is, although depressive symptoms and disorders are more prevalent in adolescence, the risk factors for depression start to operate much earlier in childhood (Cicchetti & Toth, 1998; Cole & Turner, 1993). Additionally, conduct and affective problems may be more malleable when they first appear developmentally, prior to their full clinical manifestation and cumulative negative sequelae.

Although depression and conduct problems are influenced by risk factors early in development, depression and conduct problems may have different developmental pathways.

The evidence suggests that antisocial behavior can have an onset as early as in the first 3 years of life (Aguilar, Sroufe, Egeland, & Carlson, 2000; Shaw, Gilliom, Ingoldsby, Nagin, 2003). Diagnostically, the childhood-onset subtype of conduct disorder involves the display of criterion features prior to the age of 10 (*DSM-IV-TR*, 2000). However, the average onset age of conduct disorder occurs between 8 to 9 years of age. There is also evidence that the overt manifestations of conduct problems, evident to parents or other adults, peak at a very early age followed by a general decline between the ages of 2 and 9 (Shaw et al., 2003). However, these researchers also describe a chronic group of “externalizers” who evidence a slower decline in problem behaviors. The early onset of conduct problems, often referred to as the early starter pathway, has been shown to be a significant predictor of the persistence of conduct problems through childhood on to adolescence and adulthood (Loeber, 1982; Loeber, Green, Lahey, Christ, & Frick, 1992; Moffitt, Caspi, Harrington, & Milne, 2002; Patterson, Reid, & Dishion, 1992).

In contrast, depressive symptoms typically become apparent somewhat later in childhood and then increase during adolescence (Twenge & Nolen-Hoeksema, 2002). Prospective studies indicate a considerable increase in the prevalence rates of depressive symptoms and major depressive episodes after the age of 11 and then another increase in prevalence in youth 15 years of age and older (Newman et al., 1996). Whereas some studies have shown little continuity from child to adult depression, other research indicates children with major depression continue to show high rates of depression onto adulthood (Birmaher et al., 2004). There is evidence that earlier manifestations of depression and depressive symptoms, occurring as early as age 4, show continuity over a 2-year period and a chronic and

recurrent course similar to that of school-age depression (Luby, Si, Belden, Tandon, & Spitznagel, 2009).

Thus, while a number of studies indicate that conduct problems tend to appear at an early age and then decrease in rate, rates of depressive problems tend begin later and then increase (Gilliom & Shaw, 2004; Achenbach et al., 1991). However, it important to note that conduct problems and depression tend to co-occur throughout childhood and adolescence at rates higher than would be expected by chance alone (Angold, Costello, & Erkanli, 1999; Rutter, 1997). Studies of this co-occurrence suggest that each disorder is associated with heightened risk for the other (Wolf & Ollendick, 2006). Given that conduct problems and depression have their origins in early to middle childhood, gaining a better understanding of underlying risk factors common and unique to both types of problems is important for designing optimally efficient and efficacious preventive interventions targeting these very risk factors.

Risk

Multiple risk factors are associated with the occurrence of conduct problems and depression/depressive symptoms in early to middle childhood. There is evidence from twin studies of genetic influences on the development of conduct problems (Eaves et al., 1993; Hudziak, Rudiger, Neale, Heath, & Todd, 2000; Rhee & Waldman, 2002) and depressive symptoms (Rice, Harold, & Thapar, 2002; Glowinski, Madden, Bucholz, Lynskey & Heath, 2003). Other mechanisms of risk include child characteristics, such as temperament, and ongoing social experiences in relationships with parents and peers. The evidence indicates that similar types of unskilled parenting involving coercive and hostile interactions are found in the families

of children with conduct problems as well as in families of children with depression. Unlike adolescent-onset depression, the heritability of depression in childhood is low (Thapar & McGuffin, 1996). There are indications that prepubertal depression is more strongly associated with environmental risk factors such as parenting behaviors, family disadvantage, and stressful life events (Cicchetti et al., 1998; McCauley, Pavlidis, & Kendall, 2001; Thapar et al., 1996).

Numerous risk factors are associated with the development of conduct problems and depression as child development is engendered by multiple interconnecting influences. While the early development of conduct problems and depressive symptoms are both complexly determined, parenting practices and child temperament are two central factors or processes that are likely to be associated with both affective and behavior problems. Previous research has consistently provided evidence that synergistic interactions between parenting and child temperament also affect child outcomes. Despite this extensive research base, there are still significant gaps in the literature.

The goal of the present study is to add to extant research about the contribution of parenting and child temperament to negative outcomes in childhood. Specifically, the present study examines the additive and synergistic relationships of (1) skillful parenting and child executive frontal control, and (2) coercive parenting and child executive frontal control, to trajectories for conduct problems and depressive symptoms during childhood each taken separately. Additive models of risk assess whether individual risk factors have an independent effect on the dependent variable in a cumulative, linear pattern. The effect of the risk factors would be equal to the sum of the effect of the combined risk factors measured separately.

Synergistic effects result when the effect of the combined risk factors is greater than the sum of their separate effects. The effect would be synergistic if the increase due to the combined effect was substantially greater than that expected from the additive model. As such, the present study examines whether parenting, child executive frontal control and their synergistic interaction contribute in similar ways to childhood developmental trajectories for conduct problems and depressive symptoms.

CHAPTER 2

LITERATURE REVIEW

Child Temperament

Children do not respond equally to similar opportunities and challenges in their environment, and a portion of the risk associated with the development of conduct problems and depression has to do with child temperamental characteristics. Specifically, some children exhibit a positive approach to novel situations, can adapt to change quickly, and accept frustration without protest. On the other hand, there are other children who react negatively to new situations, are slow in adapting to change, and throw tantrums when frustrated. It is widely accepted that individual child characteristics influence pathways to successful outcomes, and to conduct problems and depression. Individual differences in temperament have implications for socialization in that children with different temperaments respond to similar environments in ways that are distinctly different.

Temperament refers to biologically based “individual differences in reactivity and self-regulation” (Rothbart, Ellis, & Posner, 2004, p.357). Temperament is embodied in the manner situations are approached, and includes a number of characteristics, such as impulsivity and negative emotionality (Rothbart et al., 2004). Temperament has an important role in the multi-factorial model for the etiology of depression and disruptive behavior disorders (Frick & Morris, 2004; Goodyer, 2001). Although temperament is biologically based, its behavioral expression is shaped over time by maturation and by environmental experience.

Two fundamental dimensions of child temperament are negative emotionality and executive frontal control. Negative emotionality refers to a bottom-up reactive system which is apparent in individual differences in the rates and intensity of the arousal of fear, anger and sadness, and in sensitivity to negatively perceived cues in the environment (Gray, 1991; Rothbart, 1989). Children characterized by frequent and intense displays of negative emotions and high levels of activity are frequently described as “difficult”. Children with an “easy” temperament typically display high levels of emotion regulation and a moderate activity level.

Executive frontal control refers to top-down regulatory systems which include processes involved in executive attention (Rothbart, Derryberry, & Posner, 1994) and in effortful control – or intentional and voluntary regulation of attention, and management of emotions and behavior (Derryberry & Rothbart, 1997). Specifically, executive frontal control is defined as the ability to override a dominant or reactive response, such as impulsivity in response to short term reward and negative emotional arousal in response to threat or frustration (Rothbart & Bates, 1998). As a case in point, an angry or frustrated child rated high in executive frontal control would be able to stop before hitting another child while on the playground. Executive frontal control also refers to the ability to suppress inhibitory tendencies, such as in approaching a peer or the teacher for help with an assignment despite feelings of apprehension.

Research suggests risk for psychopathology is characterized by a combination of high levels of negative emotionality and low levels of effortful control (Calkins & Fox, 2002; Lonigan & Philipps, 2001). However, research is less clear as to how high levels of negative emotionality

and low executive control interact with socialization experiences such as parenting to confer similar risk for the early development of conduct problems and depressive symptoms. This study assess the manner in which the parenting environment experienced by children and children's executive frontal control additively and synergistically contribute to risk for early trajectories for conduct problems and depressive symptoms.

Social Experience

It is widely accepted that child social-emotional development is influenced by socialization in the family, peer group, school and other out of home environments such as child care. During earlier periods of development, parents generally spend the most time with children over extended periods of time and are typically responsible for controlling the features of the child's out of home experiences (Maccoby, 1992). Thus, a large body of research has described the role of parents in the process of childhood socialization. There are some indications that parenting variables account for as much as 20% to 50% of the variance in child outcomes (Conger & Elder, 1994; Reiss et al., 1995). However, less than 6% of the variance in externalizing problems was accounted for by parenting in one meta-analytic study (Rothbaum & Weisz, 1994). In another meta-analysis, McLeod, Wood, and Weisz (2007) calculated that parenting explained 8% of the variance in childhood depression. Despite the inconsistent findings of the role of parenting on child adjustment, there is considerable evidence for the efficacy of parenting and parenting skills interventions in the prevention and treatment of youth conduct problems and depression (Barlow, 1997; Woolfenden, Williams, & Peat, 2002; Forgatch, Bullock, & Patterson, 2004; Kazdin, 1997; Webster-Stratton & Herman, 2008).

Research has long emphasized parenting as an important environmental risk factor in the development and maintenance of psychosocial problems in childhood (Shaw & Bell, 1993; Collins, Maccoby, Steinberg, Hetherington, Bornstein, 2000). Baumrind (1991) categorized the socialization strategies of parents into specific styles, with each category referring to a broad pattern of child rearing behaviors. Social learning theories evolved from this general, dimensional view of parenting as a style to elaborate more specific parenting behaviors, such as discipline, positive involvement, problem solving and monitoring. Research suggests both overlapping and distinct associations of specific parenting practices with childhood behavior and depressive problems. That is, harsh discipline has been found to be a common risk factor for externalizing and internalizing problems in children, while physical punishment has been associated primarily with child aggression and lack of parental warmth with oppositional behaviors (Snyder & Stoolmiller, 2002).

The relationship between parenting and child problems may be affected by child characteristics that shape parenting behaviors. Specifically, children contribute to risk by influencing the quality of the parent-child relationship. Early socialization research emphasized parent effects on children, focusing on the parental influence on child behaviors. Currently, research also focuses on the contribution of child effects, and has established that children's characteristics, including temperament, actively shape their surroundings, including the behavior of parents (Shaw, Bell & Gilliom, 2000; Ge et al., 1996; Rutter & Plomin, 1997; Lengua & Kovacs, 2005). Researchers in the field of developmental psychopathology have now largely adopted a reciprocal or transactional perspective in which each individual in the parent-child relationship influences and adapts to the other. Thus, child behavior problems have been

linked with subsequent increases in negative parenting practices, as well as negative parenting practices being linked with subsequent increases in behavior problems (Snyder, Cramer, Afrank, Patterson, 2005). Specifically, temperamentally and behaviorally “difficult” children may contribute to the development of conduct problems and depression by evoking particular parenting practices – suggesting a synergistic temperament by parenting risk process. Building on these findings, the proposed research assesses the degree to which individual child differences in executive frontal control interact with more or less skillful parenting practices to increment risk for child conduct problems and depressive symptoms.

The following review of the literature first summarizes research concerning how parenting variables and child executive frontal control influence the trajectories of conduct problems and depression in childhood. A number of studies have examined the relationship of parenting variables and executive frontal control to child conduct problems. However, far less research has been allocated to identifying the parenting variables associated with depression during early/middle childhood, and even less so to executive frontal control. As such, the following literature review is intended to develop a context for hypotheses related to skilled/coercive parenting and child executive frontal control as additive and interacting risk factors for the development of conduct problems and depressive symptoms.

Parenting and Childhood Depression

There is a large body of research investigating the parenting antecedents to depression in adolescents. There are also many studies examining the risk for depression in the children of depressed parents and retrospective reports of the parenting experienced by depressed adults

during their childhood. Additionally, many of the studies involving the parenting factors associated with depression in early/middle childhood examine depression within the broader construct of “internalizing disorders”. There are relatively few studies which specifically investigate the role of parent-child interactions in the development of depressive symptoms in early/middle childhood and preadolescence. These latter studies are the primary focus of this review.

Cole and Rehm (1986) examined, in an observational study, the family interaction patterns associated with the development or maintenance of depression in childhood. Along with their families, depressed clinic-referred children ages 8-12 were compared to clinic referred children without depression and to non-referred children without depression. Coding of parent-child interaction, diagnostic interviews, and self-report measures were collected for each of the three groups. Coding of the parent-child interaction focused on the child's task performance and the parent's use of reward and punishment for task performance. This study indicated mothers of depressed children set high criteria for reward and provided fewer rewards for the performance of their children compared to the mothers of non-depressed children. Mothers of the non-referred children were also nearly twice as likely as the mothers of the depressed children to express positive affect during interaction tasks.

In a cross-sectional study, Hill and colleagues (2003) examined the relationships of parenting to depression and conduct problems of children ages 8-13 in Mexican American and Euro-American families. Parenting practices, family conflict, and child depression were assessed by mothers' and children's reports. After controlling for family income and parent's marital status, conflict and inconsistent discipline were associated with increased symptoms of

depression. Child-reported maternal acceptance was negatively related to levels of depression and mothers' report of hostile control was positively associated with depression. Therefore, parenting that is accepting and supportive, consistent in rule-setting, and not reliant on hostile control appears to be associated with lower levels of depressive symptoms.

The relationship between parenting behaviors and child adjustment was examined in a sample of African American children assessed at age 10.5 and again at age 12.3 years (Kim, et al., 2003). Child depression was assessed through clinical interviews in both waves while parenting practices were measured by youth and caregiver report. Parenting measures included harsh-inconsistent parenting, nurturant-involved parenting, and parental warmth and hostility. Due to low diagnosis rates in this sample, symptom counts were used for analysis; the depression group included children whose depression symptom counts were more than one standard deviation above the mean. The non-depressive group was made up of children scoring at or below one standard deviation from the mean. Significantly more harsh-inconsistent discipline from caregivers was reported by the depression group at age 10.5 than by the group with lower symptom counts. At the second measurement, children with depressive symptoms reported significantly more harsh-inconsistent discipline and more hostility than the group without problems.

Dallaire et al. (2006) examined the relation of a variety of supportive-positive and harsh-negative parenting behaviors to depressive symptoms in a sample of second-grade, fourth-grade, and sixth-grade children, ages 7.5 to 11.3 years. Children's depressive symptoms were obtained by parent- and self-report while parents provided reports of parenting behaviors. According to this study, higher levels of harsh-negative parenting were associated with elevated

levels of child depressive symptoms. Similarly, lower levels of supportive-positive parenting were associated with more depressive symptoms in children; supportive-positive parenting did not moderate the effects of harsh-negative parenting on the level of depressive symptoms. That is, depressive symptoms were more likely to be displayed by children in households characterized by harsh and critical parenting and by children in households in which parents expressed less warmth, support, and acceptance.

Intervention studies have also shown that modifying the behavior of parents can ameliorate symptoms of depression. A case in point, one study investigated the effectiveness of an intervention altering parenting strategies on symptoms of child depression and internalizing problems (Webster-Stratton et al., 2008). Children ages 3-8 years and their families were randomly assigned to a parenting intervention or to a wait-list control group. The intervention was administered in the form of videotaped vignettes teaching a wide variety of parenting skills. Depressive and internalizing symptoms were measured by parent-report. According to Webster-Stratton el al., lower levels of depressive and internalizing symptoms were reported in children in the intervention group compared to those in the control group. In particular, child depressive symptoms appeared to be reduced by improving parenting practices.

The preceding empirical studies provide evidence of the link between parenting and the development of depression or depressive symptoms in childhood. All of this research, with the exception of the parent management study (Webster-Stratton et al., 2008), focused on children ranging in age from 7.5 to preadolescence and utilized self-report or interview measures. The intervention study by Webster-Stratton relied on parent-report only but was based on much

younger children (3-8 years of age). Several common features are revealed regarding the relationship of parenting to the development of depression or depressive symptoms in early/middle childhood. Specifically, inconsistent discipline and parenting characterized as hostile or harsh were associated with depression or depressive symptoms in childhood. Additionally, there were indications parenting characterized as responsive or supporting was related to lower levels of depressive symptoms.

Executive Frontal Control and Depression

Oldehinkel, Hartman, De Winter, Veenstra, and Ormel (2004) examined the association between temperament factors and adjustment problems in a large sample of 10-12 year old children. Temperament was assessed with the parent report version of the Revised Early Adolescent Temperament Questionnaire (EATQ-R; Ellis, 2001; Putnam, Ellis, & Rothbart, 2001). The EATQ-R is based on Rothbart's model (Capaldi & Rothbart, 1992) and reflects facets of surgency, negative emotionality, effortful control, and affiliation. Internalizing and externalizing problems were evaluated with the Child Behavior Checklist (Achenbach, 1991) with internalizing problems categorized as anxious/depressed, withdrawn/depressed, and somatic complaints. Low effortful control scores were primarily associated with externalizing problems, although children with only internalizing problems had lower scores on effortful control than children without problems.

Eisenberg and colleagues (2001) investigated the relations of negative emotionality and effortful control to externalizing and internalizing problems in a sample of 4-8 year old children. Children's problems were assessed by parent and teacher report on the Child

Behavior Checklist (Achenbach, 1991). The internalizing group was comprised of children rated higher on “sadness” by both parent and teacher report. Effortful control was assessed by adult report and by a series of videotaped tasks which included measures of children’s ability to comply when asked to sit still and their reactions to an undesirable prize. The results of this study indicate that children classified as internalizing scored relatively high on the reactive temperament factor of emotionality and scored lower than children without problems on measures of effortful control.

Muris, van der Pennen, Sigmond, and Mayer (2008) employed self-report measures and a neuropsychological battery to assess effortful control and its association with symptoms of anxiety, depression, and aggression in a sample of non-clinical children aged 8-12. These investigators employed 5 subtests of a behavioral battery measuring the capacity to regulate attention and control behavior and a self-report measure of effortful control. Child symptoms were assessed with the Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000a). These investigators sought to differentiate between self-report measures and performance-based measures and set effortful control apart from its component, attention control. According to Muris et al., there were significant negative correlations between self-report indexes of effortful control/attention control and symptoms of depression, anxiety, and aggression. Smaller but significant correlations were found between the performance-based measure of effortful control and depression/anxiety scores on the RCADS. The results of this study also indicate that the attention control component of effortful control is more closely linked to internalizing problems (i.e., depression and anxiety) than to externalizing problems.

Investigators have found statistically reliable associations between effortful control and internalizing problems although research currently describes a stronger relationship of effortful control processes to development of externalizing than internalizing problems. The bulk of extant research primarily focuses on the broadband construct of internalizing problems (Oldehinkel et al., 2004; Eisenberg et al., 2001). With the exception of the Oldehinkel et al. (2004) study in which child outcomes were based on the same informant, i.e., parent-report, observational data or self-report measures were used to examine the link between levels of effortful control and internalizing problems or depressive symptoms. Muris et al. (2008) provided evidence of significant negative associations between self-reported effortful control and symptoms of depression but the correlation was smaller using only 5 subtests of the performance-based measure. The literature regarding role of effortful control in the development of depressive symptoms in childhood is currently incomplete.

Interaction of Executive Frontal Control and Parenting on Depression

Morris and colleagues (2002) examined the moderating effect of negative emotionality and effortful control on the relation between parenting and child adjustment in a sample of 40 children ages 6-7. Temperament measures were obtained by parent report and child adjustment was assessed by teacher report. A videotaped interactive interview, which included indexes for psychological control and maternal hostility, provided a measure of negative parenting. A correlation between parental hostility and teacher report of internalizing behavior was found, but effortful control was not associated with internalizing behavior and did not moderate the association of parenting with teacher-reported child internalizing problems.

Kiff, Lengua, and Bush (2011) examined the interaction of parenting and child temperament in predicting chronic levels and changes in symptoms of child anxiety and depression from ages 8 to 12. These researchers hypothesized negative parenting would be a greater risk factor for children with high levels of negative emotionality, low positive affect or effortful control. Child temperament was measured by parent and child report. Internalizing symptoms were obtained by child self-report. Parenting behaviors were assessed by coding a parent-child interaction task obtained at the first assessment point. Fewer depressive symptoms at the chronic assessment point were reported by children high in effortful control whereas higher symptoms across all measurement points were reported by children low in effortful control. Parenting characterized by low levels of guidance and structure was associated with increases in the level of depressive symptoms.

Gilliom et al. (2004) investigated trajectories of externalizing and internalizing problems by tracking a sample of boys from ages 2 to 6 years. They examined how the dimensions of temperament and parenting were linked to the development of early externalizing and internalizing problems. Parent and teacher ratings of externalizing and internalizing problems, a coded parent-child interaction, and information gathered from a home visit were collected for each mother-child dyad. Boys were rated as either temperamentally fearless or fearful while parenting was coded along the dimensions of hostility, warmth, and punitiveness. Data from the home visit provided additional indexes of parental “acceptance” and “responsivity”. This study indicated negative parental treatment is associated with more severe internalizing problems in boys with higher levels of negative emotionality characterized as fearfulness. Additionally, these investigators found that negative parenting behaviors were linked with an

increase in internalizing problems over time only for negative, fearful boys. Interestingly, levels of internalizing problems decreased over time in boys scoring low on negative emotionality and fearfulness who experienced high levels of negative parenting. These results suggest a differential response such that parenting practices involving harsh and punitive discipline predicts internalizing problems in boys characterized by high negative emotionality and fear, while boys low on these temperament variables are less negatively impacted.

Most of the research documenting the moderating effects of temperament on parenting focuses on externalizing problems or aggression. Studies describing interaction of parenting and temperament predicting internalizing problems generally have relied primarily on measures of the temperament dimension of negative emotionality. There are very few studies examining the interaction of parenting and effortful control in the prediction of depression in early/mid childhood. Although the Morris et al. (2002) did not establish a link between effortful control and parenting in predicting child internalizing problems, this study was limited by its small sample size ($N = 40$) and cross-sectional design. The remaining two studies (Kiff et al., 2011; Gilliom et al., 2004) were longitudinal studies and used much larger samples. The mean or median level of child depressive symptoms in all three studies was generally low, and the resulting range restriction may have biased the results. As such, the relation of effortful control, both as a main effect and as a moderator of parenting to the development of depressive symptoms is relatively unclear. The current research examines the degree to which a multi-method measure of frontal effortful control moderates parent practices in predicting trajectories of conduct problems and depressive symptoms using a large, at-risk sample and a longitudinal design. In summary, currently there is limited research available examining the

role effortful control plays in the development and maintenance of depressive symptoms during childhood. The goal of this study is to add to our understanding of the processes related to adjustment problems in childhood.

Parenting and Conduct Problems

There are a very large number of sophisticated, large sample longitudinal studies that have documented the linkage between various parenting practices, such as discipline and monitoring, and childhood trajectories of conduct problems. Consequently, this section reviews a small sample of these studies to place the proposed research in an empirical context.

Stormshak and colleagues (2000) investigated the association of both positive and negative parenting practices and behavior problems in a sample of first grade children. Child disruptive behaviors as assessed by parent report were categorized as oppositional only, hyperactive only, aggressive and oppositional, a multiple problem group scoring high on oppositional/aggressive/hyperactive behaviors, and a low problem group. Parenting indexes of harsh discipline, inconsistency, warm/positive involvement, physical aggression, and spanking were collected by parent-report. According to Stormshak et al., harsh discipline and inconsistent parenting were associated with oppositional, aggressive, hyperactive, and multiple problem profiles of child disruptive behaviors. Oppositional and aggressive children experienced harsher discipline than did children with only hyperactive problems or children with low levels of disruptive behavior. Oppositional behavior was uniquely predicted by parenting characterized by low levels of warmth and responsiveness. Elevated rates of aggressive child behavior were specifically linked with parenting characterized by physical

punishment. Children with multiple disruptive behaviors were more likely to be spanked by their caregivers. Physically punitive parenting was associated with oppositional, aggressive, and multiple disruptive behaviors but not with hyperactive only behavior problems. These findings suggest specificity between the kind of parenting practice and different forms of externalizing behavior problems. Low parental warmth or responsiveness was uniquely related to increased risk for oppositional behaviors, and physically punitive discipline was uniquely related to increased risk for child aggressive behavior.

One prospective longitudinal study examined the relations between negative parenting and behavior problems starting when children were in preschool and continuing to their entry into kindergarten (Combs-Ronto, Olson, Lunkenhimer, & Sameroff, 2009). Coded parent-child interactions and maternal self-report were used to assess parenting, and parent/teacher reports were used to measure child disruptive behavior, with measures collected at age 3 and again at age 5-6 years. Negative parenting was a composite of coded negative maternal affect and parent-reports of the use of punitive physical discipline. Child conduct problems were defined as a composite of child noncompliance during coded observations and of parent and teacher reports of child externalizing behaviors. According to Combs-Ronto et al., negative parenting was linked with child noncompliance in preschool and with disruptive behavior problems in both preschool and kindergarten. These findings suggest that negative parenting practices at age 3 predicted externalizing behaviors of children at age 5-6 years. Bidirectional associations between negative parenting and child externalizing behavior were also reported such that externalizing problems in preschool predicted later negative parenting. The

combination of early negative parenting and high and moderate preschool child externalizing behaviors were associated with increases in disruptive behavior problems in kindergarten.

Using a longitudinal design, Denham et al. (2000) examined parenting factors associated with behavior problems in a sample of children followed from preschool into 3rd and 4th grade. An index of “proactive parenting” and ratings of parental emotion expression were obtained by coding parent-child interaction and by parent report. Child behavior problems were assessed by parent and teacher report and by youth self-report. Proactive parenting, involving positive regard/emotional support, clear instruction, and limit setting, was consistently associated with lower levels of behavior problems over time. Conversely, harsh parenting practices and anger expression were linked with higher levels of disruptive child behaviors. Third and fourth grade children rated as displaying lower levels of behavior problems had mothers who were rated as more proactive and who demonstrated less emotional negativity two to four years earlier.

There are also a large number of randomized trial parent training intervention studies which demonstrate that altering parenting behaviors leads to reductions in child behavior problems. Forgatch and DeGarmo (1999) implemented a parent-training group intervention for a sample of recently divorced mothers. The control group received no intervention. The women in the treatment group demonstrated an increase in effective parenting and less diminution in positive parenting following divorce than the mothers in the control group. The changes in parenting practices in the treatment group significantly predicted the degree of change in teacher-reported school adjustment and changes in child reported and mother reported maladjustment.

In summary, these representative studies describe some of the substantial evidence of the relation between parenting and child conduct problems. This linkage has been demonstrated in both passive cross-sectional and longitudinal studies, and in experimental randomized trial interventions. Parents of children with behavior problems give a greater number of commands, provide commands that are vague or less clear, lack consistency in applying rules, fail to acknowledge and support prosocial behavior, use harsh discipline, and are less likely to monitor their children's activities (Patterson, 1982). Intervention that enhances parenting skills ameliorate child conduct problems in both clinical and prevention samples.

Executive Frontal Control and Conduct Problems

There is a large body of research demonstrating that children with behavior problems struggle to maintain attention and inhibit impulsive behaviors, indicating the role of executive frontal control in the development of early onset conduct problems. Only those studies focused on early to middle childhood will be reviewed. Olson and colleagues (2005) examined the relation between effortful control and disruptive behavior problems in a sample of at risk 3-year-old children. Effortful control was assessed by a series of coded behavioral tasks and by parent report. The behavioral tasks were constructed to capture Rothbart's (1989) construct of effortful control. Child adjustment measures were obtained by parent and teacher report. Behavioral and parent reported indexes of effortful control were significantly negatively related with adult ratings of disruptive behavior problems; children with low effortful control displayed higher levels of problem behaviors than children high on effortful control.

In a similar study, Raaijmakers, et al. (2008) investigated the association between aggressive behavior and executive function deficits in preschool children. Executive functions

assessed using behavioral and verbal tasks were obtained from a group of children demonstrating high levels of parent-reported aggressive behavior and from a control group rated significantly lower on levels of aggression. According to Raaijmakers et al., children in the aggressive group made more mistakes on executive frontal tasks than did the children in the control group. That is, the children rated as having high levels of aggression performed significantly worse and were more impaired in executive frontal control than were children with low levels of aggressive behaviors.

Kochanska and Knaack (2003) assessed effortful control using a series of coded behavioral tasks in a sample of children at 22-45 months of age. Disruptive behavior problems were measured by maternal report. Children in all of the age groups who demonstrated higher effortful control skills were rated as having fewer behavior problems at 73 months by their mothers. Consequently, effortful control at 22-45 months predicted future levels of child disruptive behavior problems. These findings replicated previous findings by these investigators using a different sample and a different measure of child problem behavior.

To summarize, several studies have examined deficits in executive frontal control as correlates of externalizing problems in young children ranging in age from 14 months to age 4. All of these studies assessed executive frontal control with a variety of different laboratory assessments; two of the studies utilized tasks from the same source (Kochanska, Murray, Jacques, & Vandergeest, 1996). These and other studies provide consistent evidence for the role of diminished effortful control in predicting disruptive behavior problems in childhood; children with low in effortful control are less able to modulate their actions in a socially acceptable manner. In contrast, children relatively high in effortful control are more likely to

modulate their actions in an adaptive manner and thus engage in relatively lower levels of behavior problems.

Interaction of Parenting and Executive Frontal Control on Conduct Problems

This section summarizes the extant evidence concerning the synergistic effects of parenting and child executive frontal control on trajectories for conduct problems during early and middle childhood. The interaction of parenting and child temperament in predicting behavior problems was assessed in a community sample of 2-year old children (Rubin, Burgess, Dwyer, & Hastings, 2003). Effortful control and parenting were assessed by coded interactions and parent self-report. An index of externalizing behavior was obtained by parent report when the children were 4-years old. There was a significantly stronger relation between poor effortful control at age 2 and age 4 behavior problems for children who experienced more negative parenting than for children of mothers with low to average levels of negative parenting. These findings suggest children with lower levels of frontal regulatory control who experience higher levels of hostile parenting and less warmth, responsiveness, and guidance may demonstrate more disruptive behavior problems than those who experience more positive parenting.

Karreman and colleagues (2009) examined effortful control and parenting in the prediction of concurrent behavior problems at age 3 and behavior problems longitudinally at age 4.5 years. Child adjustment was obtained using parent and teacher report with children categorized as having “normal”, “borderline”, or “abnormal” levels of conduct problems or hyperactivity. Behavioral tasks were used to obtain an index of effortful control and coded parent-child interactions provided measures of parenting behaviors. These investigators found

significant interaction effects between levels of effortful control and parenting behaviors in predicting behavior problems. Regardless of levels of effortful control, children demonstrated average levels of behavior problems when parents applied high levels of positive control (limit setting, sensitivity, and providing structure). However, there was a negative relationship between levels of positive parenting and effortful control in predicting behavior problems. Specifically, low levels of positive parenting were associated with low ratings of disruptive behavior in children with a high level of effortful control, and with high ratings of disruptive behavior in children scoring low on effortful control.

Lengua (2008) examined interactions between temperament and parenting in the prediction of adjustment problems of a sample of children ages 8-12 years. A measure of effortful control was obtained using a series of behavioral tasks, and child adjustment problems were assessed by parent and self-report. Parenting was measured by child-report. Inconsistent discipline and physical punishment interacted with effortful control in predicting disruptive behavior problems in children. Inconsistent discipline was associated with higher levels of disruptive behavior in children with low levels of effortful control but not in children high in effortful control. Physical punishment was associated with lower levels of problem behavior in children high relative to those low in effortful control.

These studies provide relatively consistent evidence for the moderator effects of parenting quality and child executive control on the development of conduct problems during the period of development beginning in preschool and continuing into early and middle childhood. The studies summarized in this section used strong longitudinal designs, observational data, and specific behavioral tasks to measure child executive frontal control.

These studies suggest executive frontal control may serve as a protective factor for children whose parents are less skilled, and that low levels of executive frontal control may exacerbate the risk for conduct problems posed by ineffective parenting.

Present Study

Prevention and early intervention efforts are usefully based on understanding risk for social and emotional problems, both in determining who is at risk and should be targeted in intervention and in delineating malleable risk processes that can be targeted in intervention. Conduct problems and depression or depressive affect in childhood present with different symptoms or manifestations, but may share similar risk indicators and mechanisms. Previous research indicates ineffective, critical, non-contingent and unsupportive parenting is reliably associated with child conduct problems and with child depressive symptoms, although the evidence for depressive symptoms is less consistent and strong. The evidence that deficits in child executive frontal control are reliably associated with increased risk for conduct problems is well established, but its role in risk for the development of depressive symptoms during childhood is less clear as most of the research has focused on child negative affectivity as a risk for depressive symptoms – and then more so during later childhood and adolescence. The synergistic risk of ineffective parenting and poor child frontal control is pretty well established in relation to conduct problems, but not for depressive symptoms even though, logically, difficulties in regulating negative affect and overcoming social withdrawal should be facilitated by more effective child frontal control processes.

Summary and Hypotheses

As an overall empirical picture, research generally indicates that the pathways toward conduct problems and depressive symptoms may depend on variations in temperament and parenting experiences both additively and synergistically. Thus, dysregulated children whose parents provide unsupportive or coercive experiences and are inconsistent in their discipline may follow a developmental trajectory toward adjustment problems. The central question that remains relatively unanswered is whether the additive and synergistic contributions of parenting and child frontal executive control contribute in a similar fashion and to a similar degree to risk for the development of conduct problems and depressive symptoms during childhood. If it is the case that deficits in child executive frontal control and negative unsupportive parenting operate similarly on both of these pathways, then families of children with conduct problems and of children with depression may benefit from a common intervention. Specifically, the focus may then be on developing an “omnibus” parenting intervention that would address risk for child conduct problems and depressive symptoms in an efficacious and efficient manner. Or, it may be possible to develop interventions focused on enhancing children’s executive control in school or individual intervention settings.

This study focuses on models of risk that involve parenting practices reflecting both skilled and coercive parenting behaviors and the child temperament variable, executive frontal control. The study tests models which assess the additive and synergistic associations of parenting and child executive frontal control to growth in child conduct problems and depressive symptoms from age 5 to 9 years, and to ascertain whether the patterns of additive and synergistic associations are similar for conduct problems and depressive symptoms.

Hypothesis I: Direct Effects

- a. Parenting (skilled or coercive) and poor child executive frontal control will have direct effects on the growth of conduct problems from fall of kindergarten to 3rd – 4th grade.
- b. Parenting (skilled or coercive) and poor child executive frontal control will have direct effects on the growth of depressive symptoms from fall of kindergarten to 3rd – 4th grade.

Hypothesis II: Interaction Effects

- a. The effect of coercive parenting practices on the growth of conduct problems from fall of kindergarten to grades 3 – 4 will be exacerbated for children with poor executive frontal control relative to those with better executive frontal control.
- b. The effect of coercive parenting practices on the growth of depressive symptoms will be exacerbated for children with poor executive frontal control relative to those with better executive frontal control.

Hypothesis III:

The patterns of additive and synergistic associations of parenting (skilled or coercive) and poor child executive frontal control will contribute in a similar fashion to developmental trajectories for conduct problems and depressive symptoms.

CHAPTER TWO

METHODS

Participants

Participants were a community sample of 267 children, 133 girls and 134 boys. The community sample was obtained using a recruiting strategy that targeted all kindergarten children ($n = 352$) who enrolled in one elementary school in each of three consecutive years. All of the children enrolled in the school were invited to participate and a recruitment rate of 76% was achieved. Participants were reimbursed for their involvement at a rate of \$10 per hour. The elementary school served a mixed industrial-residential, low socioeconomic neighborhood in a Midwestern city with a population of 450,000. The sample of families and children who participated in the study was representative of those in the city.

At kindergarten entry (chronic data collection point), the mean age of the participants was 5.3 years and mean age of 9.2 years at the last data collection point, at exit from third grade. At recruitment, the average maternal age was 29.9 years. The ethnic composition of the participants was as follows: 71% European American, 19% African American, 5% Hispanic, 3% Native American, and 2% Asian American. Forty-three percent of the children lived in households with both biological parents, 28% lived in single-parent households primarily involving single mothers, 21% lived with a remarried parent and step-parent, and 7% resided in households with extended family members. Twenty-percent of the parents had less than a high school education, 46% of the parents had completed a high school education, and 34% of the parents had post-high school education. The median per capita family income was \$8,300.

Twenty-eight percent of the children lived in families with incomes below the poverty level and an additional 23% lived in families with incomes between the poverty level and 150% of the poverty level. Of the households with two parents, 75% were composed of dual earner families. Nine percent of the families were without an employed adult family member.

Procedures for Collection of Parent Data

Two-hour videotaped samples of parent-child interactions were collected on each of two separate occasions during the kindergarten school year. Children and one parent were invited to a lab setting that was carefully designed to resemble a playroom. The parent-child interactions were organized around a series of structured tasks that included: playing a novel interactive game, free play, planning a fun joint activity, a discussion of the child's day at school, problem solving an issue identified by the parent and child that resulted in conflict at home, eating a snack, picking up toys, and working on a series of numeracy and literacy tasks. The videotaped tasks were verbally cued at planned intervals. The parent-child interactions were videotaped through a one-way mirror and the audio of the session was obtained via a microphone in the playroom.

The parent-child interactions were coded using the Family Peer Process code (FPP; Stubbs, Crosby, Forgatch, & Capaldi, 1998) and the Specific Affect Coding System (SPAFF; Gottman, McCoy, Coan, & Collier, 1996). These coding systems each provide two types of data: global ratings of a variety of parenting behaviors by the coder at 15 minute intervals and rates per minute (RPM) of moment to moment micro-level observed parent behavior. The FPP codes each occurrence of parent's social behavior directed toward the child into one of 24 mutually

exclusive and exhaustive categories. The SPAFF codes displays of parents' affect during the ongoing parent-child interaction into 19 mutually exclusive and exhaustive categories.

Coders also made ratings of parent behaviors using a series of Likert-scale items after each 15 minute parent-child interaction. Coders were trained to the criterion of 80% agreement and met weekly for feedback and recalibration to minimize observer drift. Two observers independently coded 10% of all of the interactions to estimate coder agreement. Observers were blind to which of the sessions were being used to assess observer agreement. Measures derived from the FPP and SPAFF coding and rating were used to define constructs in the hypothesized parenting model of the onset and growth of child conduct problems and depression.

Additionally, parents were asked to complete a parent social information processing assessment (P-SIPI; Snyder, 2007) during the kindergarten year. The P-SIPI is a structured interview in which parents are asked to describe their thoughts regarding a range of everyday, challenging child behaviors presented orally in a series of eight vignettes. After the presentation of each vignette, parents were asked to respond to the following questions: 1. "Why do you think the behavior (presented in the vignette) occurred? 2. Who do you think was responsible?" 3. "What would you do or say in response to your child in this situation?" 4. "Which of the responses you gave above would you most likely do first?" 5. "How do you think your child would react to the response?" The vignettes presented what may be considered challenging behavior that can be exhibited by any child (e.g. a child interrupting a parent on the phone, child spilling milk, a child receiving a poor conduct report from a teacher, etc.). An additional two vignettes describing challenging behavior were used to obtain the mothers'

perceptions of the effectiveness of harsh, lenient or firm responses. Parents were asked to complete Likert-scale ratings of the degree to which they evaluated the harsh discipline strategies presented in the vignettes as the effective response to each of the challenging behaviors on a scale from 1 (very ineffective) to 5 (highly effective). An example of one of the P-SIPI vignettes presented to each parent involves one scenario in which a child refused to eat an unwanted food for dinner after which the parent responded by stating the child could eat or go hungry in response to food refusal. Alpha internal reliability across vignettes for parent rating was .66.

Parenting Measures The variables used to define the skilled parenting construct are now described and summarized in Table 1.

Skilled Parent Teaching. Parent skilled teaching is defined by the following six rating items completed by coders: consistent approach, approach involving positive reinforcement, parent provided only as much assistance as required by the child, parent completed the task for the child (reverse scored), parent threatened punishment to motivate the child (reverse scored), and parent's approach included using a multiple directives (reverse scored). The internal reliability for these items ranged from .59 to .72 across sessions for the FPP and SPAFF coders.

Skilled Parent Discipline. Skilled parent discipline was defined by the following seven rating items completed by coders: parent redirects child's attention, parent reasons with child, time-out or other non-coercive punishment is used by the parent, parent praises and rewards child for positive behavior, parent offers acceptable alternatives, parent uses touch to redirect the child, and parent used an evenhanded approach and was firm. Alphas for these items across sessions for FPP and SPAFF coders ranged from .55 to .79.

Positive Parenting. Positive parenting includes the following four rating items completed by coders: parent was attentive and focused, parent was caring and respectful of child, parent appeared happy and excited, and parent displayed warmth and affection. Alphas for these items for FPP and SPAFF coders ranged from .65 to .86 across sessions.

Parental Positive Emotion. Parental positive emotion was assessed by calculating the observed rate per minute as coded in SPAFF at which the parent demonstrated enthusiasm, joy, humor, validation, and interest during the videotaped parent-child interaction. Coder reliability (intra-class correlation) of the rpm of observed parental positive emotion displays was .77 across coders.

Positive Parent Interaction. Positive parent interaction was defined by observed rate per minute of parent behavior categories observed during videotaped parent-child sessions and coded in the FPP as follows: parent uses touch to redirect the child, positive talk, positive interpersonal interactions, endearment, parent agrees with child, and positive nonverbal displays. Alphas across the coding categories were .62 and .53 for the two sessions, respectively. Coder reliability of the rpm of observed parent positive interaction across coders was .73.

Cue Detection. Cue detection (P-SIPI) was defined as the degree the parent provided an accurate account of the events presented in the P-SIPI vignettes. Cue detection is an index of the parent's immediate recall of the specifics of the child's behavior. Responses are coded on a scale from 3 "fully relevant" when all of the critical details are provided to 1 "irrelevant" when none of the information is described (kappa = .67).

The variables used to define the coercive parenting construct are defined next, and are summarized in Table 2.

Harsh Parental Discipline. The measure of Harsh Parent Discipline is defined by the following seven rating items completed by FPP and SPAFF coders of videotaped parent-child interactions: parent grabs, hits, or pinches child; parent threatens negative consequences; parent is erratic or inconsistent; parent reliance on negative affect; parent use of ridicule and sarcasm; and parent is overly strict. The intra-class correlation of the ratings of parent harsh discipline across coders was .81. Alphas for the harsh discipline items for FPP and SPAFF coders ranged from .77 to .81 across the videotaped sessions. Additionally, parental reliance on harsh discipline was assessed by the parents' ratings of the effectiveness of harsh discipline strategies from the P-SIPI vignettes on a Likert-scale. The alpha for parent ratings across vignettes was .66.

Parental Abusive Behavior and Nattering. Parent abusive behavior and nattering was defined by calculating the rate per minute at which parents were observed to direct hostile behavior toward their child during the videotaped parent-child sessions. Hostile behavior was defined by the following FPP coding categories: physical aggression, physical attack, verbal attack, coercion, and negative nonverbal behavior. The intra-class correlation (coder reliability) of the rpm of observed parent nattering and abusive behavior was .87 across coders.

Negative Reinforcement. An odds ratio was calculated from observed parent-child interactions to estimate the probability with which the parent acquiesced to child aversive behavior during conflict or discipline episodes using the FPP. This response by the parent indicates parental negative reinforcement of child aversive behavior.

Parental Displays of Anger. Parental displays of anger were defined by calculating the observed rate per minute at which the parent directed anger and contempt at their child during videotaped sessions, as coded using SPAFF. Coder agreement on parental displays of anger and contempt was 83% (kappa = .73).

Hostile Attributions. Parent perceptions of the child misbehaviors presented in the P-SIPI vignettes as hostile, careless, intentional, defiant, inconsiderate, or selfish receive a “hostile” rating. The percentage of parent attributions of child responses as hostile was used as an index of parent negative attributions (kappa = .69).

Endorse Harsh Tactics. Parent ratings of the perceived effectiveness of harsh responses to child misbehavior presented in the P-SIPI vignettes defined this variate

Child Measures.

The variables used to define the child constructs are described next, and summarized in Table 3. Parents were asked to complete the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) in fall and spring semesters of kindergarten and first grade and in the spring semester of second and third grade. The CBCL is a normed parent rating scale of behavior problems which generates several scales. Parents rated child behavior occurring over the previous six months. Teachers were asked to complete the Teacher Report Form (TRF; Achenbach & Rescorla, 2001) at the same assessment occasions as parents. The TRF is a normed rating scale that provides teacher’s perception of child problem behavior occurring over the previous two months. The TRF generates scales of specific behavior problems.

The CBCL and the TRF contain 113 items describing behavior with each behavior rated on a 3 point Likert scale (0 = not true, 1 = somewhat true, and 2 = very or often true). The CBCL

and TRF generate eight different scales: Withdrawal, Somatic Problems, Attention Problems, Anxiety/Depression, Social Problems, Thought Problems, Delinquency, and Aggression. The psychometric properties of the CBCL and the TRF are well established. CBCL and TRF data were obtained at child ages 5.3 and 5.8 (fall and spring semesters of kindergarten), and 6.3 and 6.8 (fall and spring semesters of first grade), 7.8 (spring second grade) and 8.8 (spring third grade). Different teachers rated child behavior for each school year.

Child Conduct Problems. Parent ratings of child conduct problems were obtained using the sum of the aggression and delinquency scales of the CBCL. The aggression scale includes such items as: "destroys others things", "attacks people", "screams a lot", "threatens others", and "gets in fights". The delinquency scale includes the following items: "breaks rules", "swearing", "vandalism", "steals at home", "steals outside the home", and "lies, cheats". The internal reliability for the aggression scale was greater than .90 at each of the four collection points.

Teacher ratings of child conduct problems were obtained using the aggression and delinquency scales of the TRF. The aggression scale includes such items as: "destroys others things", "attacks people", "screams a lot", "threatens others", and "gets in fights". The delinquency scale includes the following items: "breaks rules", "swearing", "vandalism", "steals at home", "steals outside the home", and "lies, cheats". The internal reliability was greater than .93 at each of the four collection points.

Child Depressive Symptoms. Parents rated 9 items on the CBCL in describing their child's depressive symptoms over the previous six months: sad or depressed, withdrawn, underactive, lonely, prefers solitude, excessive guilt, cries a lot, feels unloved, and feels

worthless occurring. The internal reliability for the depressive symptom scale ranged from .65 (5.8 mean age) to .78 (6.8 mean age). Child depressive symptoms obtained by parent's ratings on the CBCL correlated modestly with observed rates of child displayed sadness obtained from SPAFF coding of parent-child interactions.

Teachers rated child depressive symptoms using 9 items on the TRF: sad or depressed, withdrawn, underactive, lonely, prefers solitude, excessive guilt, cries a lot, feels unloved, and feels worthless. The internal reliability ranged from .61 (5.8 mean age) to .81 (7.8 mean age). Teacher rated child depressive symptoms correlated modestly with observed rates of child displayed sadness obtained from SPAFF coding of parent-child interactions.

Executive Frontal Control. Child executive frontal control was measured during the kindergarten year using a series of different methods. The Attention Deficit Hyperactivity Disorder (ADHD) scale on the CBCL was used to obtain parent ratings of the executive frontal control construct. The ADHD scale consists of 7 items that are consistent with the *DSM-IV* criteria of inattention, hyperactivity, and impulsivity. Examples of the items on the ADHD scale include the following: impulsive, can't concentrate, can't sit still, inattentive, fails to finish, and confused. The alpha for this CBCL scale was .74.

Children were individually administered the Trail Making Test (Reitan, 1971) and the digit span subtest from the WISC-III (Wechsler, 1991) during the kindergarten year. The Trail Making Test is a well-established measure of complex attention, visual scanning, and mental flexibility. Each child was asked to connect the numbers 1 to 25 in order as quickly as possible to complete Part A. Part B of the Trail Making Test is more complex than A as each child was

asked to alternately connect numbers and letters (1-A, 2-B, 3-C, etc.) as quickly as possible. Errors may occur when completing Part B due to connecting number to number rather than number to letter as is the case when sequential numbers are located close to each other. Thus, the Trail Making Test measures the ability to override a dominant response (connect number to number), consistent with Rothbart's definition of executive frontal control. The digit span subtest is a measure of attentional capacity (Kindlon, Mezzacappa, & Earl, 1995) and consists of two parts, digit span forward and digit span backward. Digit span forward requires the child to repeat a series of numbers in the same order read by the examiner. Digit span backward requires the child to repeat the numbers in reverse order. Because digit span backward is given immediately after digit span forward, errors may occur if the impulse to repeat the numbers in the same order is not overridden. The means of the Trail B time, Trail B error, digit span forward, and digit span backward scores were used as another method of defining executive frontal control.

Classroom observations of child "time on task" in 5 minute increments of academic engaged time (AET; Walker & Severson, 1990) were obtained on 3 occasions for another measure of the executive frontal control construct. Academic engagement refers to specific classroom behaviors, such as writing, participating in tasks, reading, and asking and answering academic questions. Research indicates that lower observed rates of academic engaged time are related to higher rates of behavior problems (Ramsey, Patterson, & Walker, 1990). AET was recorded via direct observation during periods in which the target child was expected to be working on academic tasks. The alpha for the AET across the 3 observations was .52 and observer agreement was .72.

Assessor ratings on two items obtained from observations of child behavior during test administration were also used as a measure of executive frontal control. Assessors rated the child's ability to maintain attention and the need for redirection to the task at hand by answering Likert-scale items. The alpha for this indicator of executive frontal control was .76. There were significant correlations across the three measurement points ($p < .01$) ranging from .30 to .40 among the assessor ratings.

CHAPTER 3

RESULTS

Analytic Strategies

This study adopted a multi-phase data analytic strategy. Descriptive statistics were considered first. The first phase of data analyses was performed in SPSS (Version 19.0). Descriptive statistics were calculated for each of the composite indicators and assessed for deviations from normality. Data were analyzed through correlation and factor analysis. An examination of the correlations among the parenting composite indicators and among the indicators for child executive frontal control was used to assess relationships at a bivariate level.

Correlations between parent-reported child problems (CBCL) and teacher-reported child problems (TRF) were also examined. Parent ratings and teacher ratings of child conduct problems and parent ratings and teacher ratings of child depression (each taken separately, at fall and spring kindergarten, fall and spring first grade, spring of 2nd grade, and spring of grade 3) were used to estimate distinct linear growth trajectories for child problems. That is, trajectories for conduct problems and child depression were estimated separately for child problems as reported by teacher and as reported by parent.

A factor analysis was performed on the composite indicators for coercive parenting, skilled parenting, and child executive frontal control, forcing the items for each indicator to converge on a single factor. Next, standardized or z-scores were created in order to calculate mean aggregate scores for both parenting composites and for child executive frontal control.

Interaction terms, created by the product of each of the parenting constructs taken separately with the executive frontal control construct, were calculated for use in the structural equation models.

The second phase, structural equation modeling analyses, was performed in the Analysis of Moment Structure (AMOS) statistical package (Version 18.0) using full information maximum likelihood estimation (Hensher, 1986). Using separate SEM models, the additive and synergistic associations of skilled and coercive parenting, child executive frontal control, and the interaction of parenting and poor child executive frontal control on the chronic levels and growth of child conduct problems and depression from fall kindergarten to spring first grade were assessed. The final hypothesized models were examined to determine whether paths from parenting, child executive frontal control, and their product terms to chronic levels and growth in child conduct problems and depressive symptoms were significant. Three indices of model fit were considered when determining the quality of each model. The Chi-Square statistic (χ^2) and p values, root mean square error of approximation (RMSEA), and Comparative Fit Index (CFI), were calculated to assess model fit. For the CFI index, values range from 0 to 1.0 and those of .90 or greater are evidence of good fit. Conversely, values less than 0.08 on the RMSEA are an indication of good fit. The model chi square is the most common fit test and should not be significant if there is good model fit. However, it is a very conservative test affected by sample size and thus, achieving non-significance with large samples is particularly difficult (Kline, 2005). For this reason, the CFI and RMSEA were also used to determine support for each model.

The model building process first involves the calculation of a growth (unconditional) model to estimate the means and variances of intercepts and slopes prior to testing the predictive model. Predictor variables were then added to assess if differences in chronic levels and rates of change can be attributed to specific individual level predictors. Significant interactions between parenting and executive frontal control were probed by calculating a change score, subtracting the child problem score at fall kindergarten from the child problem score at 4th grade for entry to a regression equation. Positive values would indicate growth in the level of the child problem. Child executive frontal control was chosen as the moderating variable assessing whether the association of skilled or coercive parenting on change in child problems was conditional on high versus low child executive frontal control. A low executive frontal control group was defined by children with executive frontal control scores 0.6 below the mean. A high executive frontal control group was defined by children with executive frontal control scores 0.6 above the mean.

Descriptive Statistics and Preliminary Analyses

Means, standard deviations, and ranges of each indicator of the composites for parenting and child executive frontal control (EFC) are provided in Table 4 and Table 5 respectively. Table 6 provides the means, standard deviations, and ranges for CBCL and TRF ratings of child depression and conduct problems at all six assessment occasions. These means suggest a modest increase in depression and in conduct problems over time. Each of the variates for parenting, executive frontal control, and child depression and conduct problems

showed significant variance and did not deviate significantly from a normal distribution in terms of skewness and kurtosis.

The correlations among the indicators for the composites of skilled parenting, coercive parenting, and child executive frontal control are provided on Tables 7 - 9. Correlations among the indicators for skilled parenting range from .01 to .71, while correlations among indicators for coercive parenting indicators range from .04 to .50. Among the indicators for child executive frontal control, the correlations range from .03 to .47.

A series of factor analysis was computed to examine the convergence of the indicators used to define the constructs for skilled parenting, coercive parenting, and child executive frontal control, forcing the indicators for each construct to converge on a single factor. The results of these factor analyses are provided on Tables 10-12. The six indicators defining skilled parenting all loaded reliably with factor loadings equal to or greater than .59, with the exception of Cue Detection ($r = .04$). The Cue Detection indicator was not used to define the skilled parenting construct in the subsequent analyses, resulting in an internally consistent construct. The six indicators used to define the coercive parenting composite each had factor loading greater than .30, indicating reasonable convergence. All of these indicators were retained and used to define the coercive parenting composite. The factor loadings of all six indicators defining executive frontal control had loadings ranging from .36 to .61. All six indicators of child executive frontal control were retained to define the construct. Next, the factor scores for skilled parenting, coercive parenting, and child executive frontal controls were standardized, i.e., transformed in to z-scores. The indicators for each construct were averaged

to create a composite construct. The interaction term for parenting and executive frontal control was calculated by multiplying the mean z-scores for each parenting composite and the mean Z-score composite for executive frontal control.

Small to moderate correlations (not pictured) were found between same-time parent report of child problems (CBCL) and teacher report of child problems (TRF). The correlations between teacher-reported conduct problems and parent-reported conduct problems ranged from .26 to .37. Correlations between same-time teacher-reported child depression and parent-reported child depression ranged from .19 to .34. Cross-time correlations among teacher reports of conduct problems, as shown on Table 13, were all significant and ranged from .24 to .71. Cross-time correlations among conduct problems as reported by parent were all significant and ranged from .54 to .80 (Table 14). Cross-time correlations among teacher reports of child depression, as provided on Table 15, ranged from .07 to .50. Cross-time correlations among parent reports of child depression ranged from .34 to .63 (Table 16).

Models of Child Conduct Problems

Growth Models of Teacher-Reported Child Conduct Problems.

The growth model for teacher report of conduct problems yielded a good fit to the data, $\chi^2_{(15)} = 49.09, p < .01$, RMSEA = .08, CFI = .94 (see Figure 1 for growth model parameters). The model yielded significant effects for both the chronic level (set at spring first grade) and the slope. Coefficients for the mean chronic level and the slope were .45 (SE = .03, C.R. = 16.73, $p < .001$) and .08 (SE = .01, C.R. = 7.18, $p < .001$), respectively. This indicates that the mean for chronic levels of TRF conduct problems across fall kindergarten to 3rd – 4th grade transition was

significantly different than zero. The positive mean coefficient for the slope indicates that on average, children in the sample displayed increasing levels of conduct problems from the first measurement point in the fall of kindergarten on to grades 3 – 4. There were significant individual differences (variance) in the chronic levels of conduct problems (coefficient = .192, S.E. = .02, C.R. = 9.58, $p < .001$) and marginally significant individual differences (variance) in the slope of conduct problems from fall of kindergarten to the 3rd – 4th grade transition (coefficient = .009, S.E. = .006, C.R. = 1.58, $p = .11$).

Coercive Parenting, EFC and Teacher Report of Child Conduct Problems.

Next, a model was tested in which the additive and synergistic relationships of coercive parenting and child executive frontal control were used to predict the chronic levels and slope of conduct problems as indicated by teacher report (Figure 2). The model fit the data well, $\chi^2_{(29)} = 50.25$, $p = .01$, RMSEA = .05, CFI = .97. The coercive parenting and child executive frontal control constructs each significantly predicted higher chronic levels of teacher-reported conduct problems, $b = .28$, S.E. = .03, C.R. = 4.15, $p < .001$; $b = .26$, S.E. = .03, C.R. = 3.89, $p < .001$, respectively. Growth in teacher-reported conduct problems was significantly predicted by child executive frontal control, $b = .34$, S.E. = .01, C.R. = 2.28, $p = .02$, but growth was not significantly predicted by coercive parenting, $b = .19$, S.E. = .01, C.R. = 1.23, $p = .22$. The interaction between coercive parenting and child executive frontal control significantly predicted chronic levels of teacher reported conduct problems ($b = -.21$, S.E. = .03, C.R. = -2.94, $p < .01$). Coercive parenting predicted higher chronic levels of teacher-reported conduct problems for children with poor executive frontal control ($b = .42$). Coercive parenting was

unrelated to chronic levels of teacher-reported conduct problems for children with greater executive frontal control ($r = .065$). The interaction between coercive parenting and child executive frontal control did not significantly predict growth in teacher-reported conduct problems, $b = -.17$, S.E. = .01, C.R. = -1.09, $p = .27$. The coercive parenting and child executive frontal control model accounted for 22% of the variance in chronic levels of teacher-reported conduct problems from the fall of kindergarten to grades 3 - 4. Twenty percent of the variance in growth of teacher-reported conduct problems from fall of kindergarten to grades 3 – 4 was accounted for by the coercive parenting and child executive frontal control model.

Skilled Parenting, EFC and Teacher-Reported Child Conduct Problems.

The additive and synergistic model of skilled parenting and child executive frontal control of the onset and growth of conduct problems is provided in Figure 3. The model was a good representation of the data, $\chi^2_{(29)} = 68.67$, $p < .01$, RMSEA = .07, CFI = .94. The child executive frontal control composite significantly predicted higher chronic levels of teacher-reported conduct problems, $b = .31$, S.E. = .03, C.R. = 4.36, $p < .001$) and growth in teacher-reported conduct problems, $b = .32$, S.E. = .03, C.R. = 2.07, $p = .04$. The skilled parenting composite was negatively and reliably associated with lower chronic levels of teacher-reported conduct problems, $b = -.16$, S.E. = .03, C.R. = -1.92, $p = .05$. The skilled parenting composite also predicted less growth of teacher-reported conduct problems, $b = -.36$, S.E. = .01, C.R. = -2.01, $p = .04$. The interaction of skilled parenting and child executive frontal control significantly predicted chronic levels of teacher-reported conduct problems, $b = .19$, S.E. = .04, C.R. = 2.22, $p = .03$. Skilled parenting was associated with lower levels of conduct problems as reported by

teacher for children with poor executive frontal control ($b = -.34$). Skilled parenting was not reliably associated with the chronic level of teacher-reported conduct problems for children with better executive frontal control ($b = -.05$). The interaction between skilled parenting and executive frontal control was not associated with growth in teacher-reported conduct problems, $b = .06$, S.E. = .02, C.R. = .31, $p = .76$.

Growth Models of Parent-Reported Child Conduct Problems

The growth model for parent-reports of conduct problems, as provided in Figure 4, yielded an adequate representation of the data, $\chi^2_{(13)} = 184.64$, $p = .01$, RMSEA = .11, CFI = .81. The model included autoregressive paths, indicating that values of earlier conduct problems predicted values of later conduct problems, over and above growth in those problems. The coefficient for the mean chronic level was .32 (S.E. = .02, C.R. = 21.29, $p < .001$) and the coefficient for the slope was -.03 (S.E. = .01, C.R. = -4.72, $p < .001$). This indicates that the mean chronic level CBCL conduct problem score across fall kindergarten to grades 3 – 4 was significantly different from zero. The negative mean coefficient for the slope indicates that on average, parents in the sample reported a decrease in the level of conduct problems from fall of kindergarten to grade 3 – 4 transition. There were significant individual differences in the mean chronic level of conduct problems (coefficient = .084, S.E. = .01, C.R. = 8.45, $p < .001$ and significant individual differences in the slope of conduct problems from the fall of kindergarten to 3rd – 4th grade (coefficient = 1.95, S.E. = .01, C.R. = 1.95, $p = .05$).

Coercive Parenting, EFC and Parent-Reported Child Conduct Problems.

A model was tested examining whether additive and synergistic relationships of coercive parenting and child executive frontal control predicted chronic levels and slope of conduct problems as indicated by parents (Figure 5). This model fit the data well $\chi^2_{(23)} = 58.0, p = .01$, RMSEA = .07, CFI = .96. The coercive parenting and child executive frontal control constructs each significantly predicted chronic levels of parent-reported conduct problems, $b = .24$, S.E. = .01, C.R. = 3.61, $p < .001$; $b = .27$, S.E. = .01, C. R. = 4.03, $p < .001$, respectively. Growth in parent reported conduct problems was not predicted by coercive parenting or by child executive frontal control, $b = -.08$, S.E. = .01, C. R. = -.66, $p = .51$; $b = .10$, S.E. = .01, C. R. = .81, $p = .42$, respectively. The interaction between coercive parenting and child executive frontal control did not significantly predict chronic levels of parent reported conduct problems, $b = -.09$, S.E. = .02, C. R. = -1.34, $p = .18$ and was not associated with growth in parent reported conduct problems, $b = .19$, S.E. = .01, C. R. = 1.56, $p = .12$.

Skilled Parenting, EFC and Parent-Reported Child Conduct Problems.

The additive and synergistic, skilled parenting and child executive frontal control model of chronic levels and growth of conduct problems is provided in Figure 6. The model was a good representation of the data, $\chi^2_{(22)} = 65.05, p = .01$, RMSEA = .06, CFI = .95. Child executive frontal control deficits significantly predicted chronic levels of parent reported conduct problems, $b = .29$, S.E. = .02, C. R. = 4.02, $p < .001$, but child executive frontal control did not significantly predict growth in parent reported conduct problems, $b = .11$, S.E. = .01, C.R. = .90, $p = .37$. The skilled parenting construct and the interaction between skilled parenting and

child executive frontal control did not significantly predict chronic levels or growth in parent reported conduct problems. The coefficients for the skilled parenting construct were $b = -.10$, S.E. = .02, C.R. = -1.10, $p = .27$ for chronic level of parent reported conduct problems, and $b = .19$, S.E. = .01, C.R. = 1.29, $p = .20$ for the slope of conduct problems. The coefficients for the interaction of skilled parenting and child executive frontal control were not significant, $b = .07$, S.E. = .02, C.R. = .71, $p = .48$ (chronic levels) and $b = -.02$, S.E. = .01, C.R. = -.12, $p = .91$ (slope).

Models of Child Depressive Symptoms

Growth Model of Child Depression as Reported by Teacher.

The growth model for teacher reports of child depressive symptoms, as provided on Figure 7, yielded a good representation of the data, $\chi^2_{(13)} = 30.77$, $p < .01$, RMSEA = .07. CFI = .93. The model included autoregressive paths, indicating that values of earlier depressive symptoms predicted values of later depressive symptoms, over and above growth in those symptoms. The model yielded significant parameters for both the chronic level and the slope. Coefficients for the mean chronic levels and the slope were .79 (S.E. = .06, C.R. = 12.82, $p = <.001$) and .13 (S.E. = .04, C.R. = 3.11, $p = <.01$), respectively. This indicates that the mean for chronic levels of TRF child depression across fall kindergarten to 3rd – 4th grade was significantly different from zero. The positive mean coefficient for the slope indicates that on average, children in the sample displayed increasing levels of depressive symptoms from the fall of kindergarten on to grades 3 – 4. There were significant individual differences in the chronic levels of depression (coefficient = .46, S.E. = .08, C.R. = 5.72, $p < .001$) and marginally

significant individual differences in the slope of depressive symptoms from fall of kindergarten to the 3rd – 4th grade transition (coefficient = .07, S.E. = .04, C.R. = 1.69, *p* = .09).

Coercive Parenting, EFC and Teacher Report of Child Depression

Next, a model was tested assessing the additive and synergistic relationships of coercive parenting and child executive frontal control to the chronic levels and growth of child depressive symptoms as indicated by teacher report (Figure 8). The model fit the data well, $\chi^2_{(23)} = 38.71$, *p* = .02, RMSEA = .05, CFI = .94. The child executive frontal control construct significantly predicted chronic levels of teacher-reported child depressive symptoms, *b* = .25, S.E. = .06, C.R. = 2.94, *p* < .01, and was a marginally significant predictor of growth in child depression, *b* = .23, S.E. = .04, C.R. = 1.90, *p* = .06. The coercive parenting construct did not predict chronic levels of teacher-reported child depression, *b* = .02, S.E. = .06, C.R. = .20, *p* = .84, and the coercive parenting construct did not predict growth of child depression, *b* = -.12, S.E. = .04, C.R. = -.93, *p* = .35. The interaction between coercive parenting and child executive frontal control did not predict chronic levels or growth of teacher-reported depression, *b* = -.14, S.E. = .07, C.R. = -1.61, *p* = .11; *b* = .08, S.E. = .04, C.R. = .61, *p* = .54, respectively.

Skilled Parenting, EFC and Teacher Report of Child Depression

Next, a model was tested assessing the additive and synergistic relationships of skilled parenting and child executive frontal control to the chronic levels and growth of child depression as indicated by teacher report (Figure 9). The model fit the data well, $\chi^2_{(22)} = 36.31$, *p* = .03, RMSEA = .05, CFI = .95. The child executive frontal control construct significantly predicted chronic levels and growth of teacher-reported depressive symptoms, *b* = .28, S.E. =

.06, C.R. = 3.16, $p < .01$; $b = .27$, S.E. = .05, C.R. = 2.10, $p = .04$, respectively. The skilled parenting construct was a marginally significant predictor of growth of teacher-reported child depression, $b = .28$, S.E. = .05, C.R. = 1.78, $p = .07$ but the chronic level teacher-reported child depression was not predicted by the skilled parenting construct, $b = .03$, S.E. = .08, C.R. = .23, $p = .82$. The interaction between skilled parenting and executive frontal control did not predict chronic levels of teacher-reported child depression, $b = .13$, S.E. = .09, C.R. = 1.15, $p = .25$ and was not associated with growth in child depression as indicated by teacher report, $b = .07$, S.E. = .06, C.R. = .43, $p = .67$.

Growth Models of Child Depression as Reported by Parent

The growth model for parent reports of child depression, as provided on Figure 10, yielded a good representation of the data, $\chi^2_{(17)} = 36.86$, $p < .01$, RMSEA = .06, CFI = .96. Mean levels of chronic depression were significant (coefficient = 1.46, S.E. = .09, C.R. = 15.77, $p < .001$). This indicates that the mean for chronic levels of CBCL depression across fall kindergarten to 3rd – 4th grade transition is significantly different than zero. The mean slope was positive and marginally significant, coefficient = .07, S.E. = .04, C.R. = 1.76, $p = .08$. This indicates marginally significant mean increases in the slope of child depression from the fall of kindergarten to the 3rd – 4th grade. Statistically reliable individual differences were found for chronic levels and slope of depressive symptoms, coefficient = 1.94, S.E. = .20, C.R. = 9.68, $p < .001$, and coefficient = .13, S.E. = .04, C.R. = 3.28, $p < .01$, respectively.

Coercive Parenting, EFC and Parent-Reported Child Depression

A model tested the additive and synergistic relationships of coercive parenting and child executive frontal control to chronic levels and growth of child depression (Figure 11). The model fit the data well, $\chi^2_{(31)} = 46.59, p = .04$, RMSEA = .04, CFI = .97. The executive frontal control construct significantly predicted chronic levels of parent-reported child depression, $b = .17, \text{S.E.} = .10, \text{C.R.} = 2.43, p = .02$, but the executive frontal control construct did not predict growth in parent-reported child depression, $b = .13, \text{S.E.} = .04, \text{C.R.} = 1.09, p = .27$. Coercive parenting did not predict chronic levels or growth of child depression as indicated by parent, $b = .09, \text{S.E.} = .10, \text{C.R.} = 1.29, p = .20$ and $b = .06, \text{S.E.} = .04, \text{C.R.} = .52, p = .60$. The interaction of coercive parenting and child executive frontal control did not predict chronic levels of child depression as reported by parent, $b = -.13, \text{S.E.} = .11, \text{C.R.} = -1.70, p = .09$. Growth in child depression, as reported by parent, was not predicted by the interaction between coercive parenting and child executive frontal control, $b = -.09, \text{S.E.} = .05, \text{C.R.} = -.75, p = .45$.

Skilled Parenting, EFC and Parent-Reported Child Depression

A model tested the additive and synergistic relationships of skilled parenting and child executive frontal control to chronic levels and growth of child depression as indicated by parent report (Figure 12). This model fit the data well, $\chi^2_{(30)} = 51.25, p = .01$, RMSEA = .05, CFI = .96. The child executive frontal control construct significantly predicted chronic levels of parent-reported child depression, $b = .20, \text{S.E.} = .10, \text{C.R.} = 2.65, p = .01$ but not predict growth in parent-reported child depression, $b = .19, \text{S.E.} = .06, \text{C.R.} = .52, p = .13$. Skilled parenting did not predict chronic levels of parent-reported child depression, $b = -.01, \text{S.E.} = .13, \text{C.R.} = -.15, p = .88$.

and did not predict growth in child depression, $b = .08$, S.E. = .06, C.R. = .52, $p = .60$. The interaction of skilled parenting and child executive frontal control did not predict chronic levels of child depression as reported by parent, $b = .07$, S.E. = .15, C.R. = .70, $p = .48$. Growth in CBCL child depression was not predicted by the interaction between skilled parenting and child executive frontal control, $b = .04$, S.E. = .06, C.R. = .25, $p = .80$.

CHAPTER 4

DISCUSSION

Conduct problems and depression in childhood are generally regarded as the outcome of a complex interplay of factors involving the individual characteristics of the child and the child's social experiences. Extant research has often focused on the additive and synergistic associations of child temperament and parenting with risk for the onset and growth of externalizing and internalizing problems in childhood. This research suggests that individual temperamental characteristics of children are biologically-based and serve as a child-specific, intrinsic influence that can powerfully affect a child's socio-emotional development. Children, however, are raised in varied social environmental contexts, and the degree to which risk or resilience associated with specific patterns of temperament may be modified by the type of social environment they experience. Parenting has been found to be an important social environmental context during childhood and adolescence.

The present study examined the additive and synergistic relationships of parenting and child executive frontal control to the onset and growth of child conduct problems and depression with a sample of children from ages 5 to 9 years of age. It was hypothesized that (1) parenting (skilled or coercive) and executive frontal control would have direct effects on the growth of conduct problems and depression from ages 5 to 9 years, (2) the effect of parenting practices (skilled or coercive) on the growth of conduct problems and depression would be amplified for children with poor executive frontal control relative to those with better executive frontal control, (3) the patterns of additive and synergistic associations of parenting (skilled or

coercive) would contribute in a similar fashion to developmental trajectories for conduct problems and depression in childhood.

Summary of Relevant Findings

Parenting and EFC Models of Conduct Problems

The findings with respect to the parenting and executive frontal control models of conduct problems are summarized in Table 16. Executive frontal control was associated with high chronic levels of conduct problems at both home and school. Additionally, executive frontal control predicted growth in the levels of conduct problems at school but not in the home. Parenting also made a significant contribution to the chronic levels of conduct problems. Specifically, coercive parenting predicted the chronic levels of conduct problems at both home and at school, but had no effect on growth in the level of conduct problems. Skilled parenting was associated with lower chronic levels of conduct problems at school but not in the home. Skilled parenting also appeared to diminish growth of conduct problems at school but not in the home.

Both coercive parenting and skilled parenting moderated the effects of executive frontal control on changes in the chronic levels of conduct problems at school. Specifically, coercive parenting amplified the effects of poor executive frontal control on the chronic levels of conduct problems, and skilled parenting buffered the effects of poor executive frontal control on the chronic levels of conduct problems.

TABLE 17
SUMMARY OF MODELS FOR CHILD CONDUCT PROBLEMS

	Chronic Levels	Growth
School (Teacher Report)		
Coercive Parenting	$b = .28, p < .001$	
Executive Frontal Control	$b = .26, p < .001$	$b = .34, p = .02$
Interaction of Coercive Parenting and Executive Frontal Control	$b = -.21, p < .01$	
<hr/>		
Skilled Parenting	$b = -.16, p = .04$	$b = -.36, p = .02$
Executive Frontal Control	$b = .31, p < .001$	$b = .32, p = .04$
Interaction of Skilled Parenting and Executive Frontal Control	$b = .19, p = .03$	
<hr/>		
Home (Parent Report)		
Coercive Parenting	$b = .24, p < .001$	
Executive Frontal Control	$b = .27, p < .001$	
Interaction of Coercive Parenting and Executive Frontal Control		
<hr/>		
Skilled Parenting		
Executive Frontal Control	$b = .29, p < .001$	
Interaction of Skilled Parenting and Executive Frontal Control		

TABLE 18
SUMMARY OF FINDINGS FOR CHILD DEPRESSION

	Chronic Levels	Growth
	School (Teacher Report)	
Coercive Parenting		
Executive Frontal Control	$b = .25, p < .01$	$b = .23, p = .06$
Interaction of Coercive Parenting and Executive Frontal Control		
 <hr/>		
Skilled Parenting		
Executive Frontal Control	$b = .28, p < .01$	$b = .27, p = .04$
Interaction of Skilled Parenting and Executive Frontal Control		
 <hr/>		
Home (Parent Report)		
Coercive Parenting		
Executive Frontal Control	$b = .17, p < .02$	
Interaction of Coercive Parenting and Executive Frontal Control		
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Skilled Parenting		
Executive Frontal Control	$b = .20, p < .01$	
Interaction of Skilled Parenting and Executive Frontal Control		

Parenting and EFC Models of Child Depression

The findings with respect to the parenting and executive frontal control models of depressive symptoms in childhood are provided in Table 17. Executive frontal control was associated with higher chronic levels of child depressive symptoms both in the home and at school. Additionally, executive frontal control predicted growth in the level child depressive symptoms at school but not in the home. Neither skilled nor coercive parenting was associated with chronic levels or with growth of child depression at school or in the home. There were also no interaction effects between parenting and child executive frontal control; parenting did not intensify nor temper the effect of executive frontal control on chronic levels or growth of child depressive symptoms, whether at school or at home.

Main Effects Models

The Role of Executive Frontal Control

There was consistent evidence suggesting poor executive frontal control makes powerful and pervasive contributions to chronic levels of both conduct problems and depression at school and in the home. Executive frontal control was also consistently found to make contributions to growth of conduct problems and depression in the school setting. Executive frontal control includes processes that regulate attention, emotions and behaviors, or the capacity to consciously and voluntarily inhibit or activate behavior as necessary, inhibit or intensify emotions, and focus and shift attention appropriate to the situation (Derryberry et al., 1997). Executive frontal control is best regarded as a regulatory system that down-regulates high levels of negative emotionality and behavioral reactivity. Thus, deficits in executive frontal

control influence the likelihood that a child will reactively respond to environmental challenge, either with aggressive, externalizing behavior or with sadness and internalizing behavior. Executive frontal control also permits a child to overcome inhibition and shyness to negatively perceived or emotionally arousing situations. Executive frontal control also involves the capacity to regulate negative emotionality and may consequently mitigate the effects of other risk factors, including parenting that is less than optimal.

These findings are consistent with prior research on the contribution of child temperament to risk for early trajectories for conduct problems and depressive symptoms in childhood. Previous research has extensively and consistently catalogued the contribution of executive frontal control to the development of disruptive behavior problems in childhood. In one study (Raaijmakers et al., 2008), a significant negative relationship was found between levels of aggression and performance on executive frontal tasks. Other research suggests that low levels of executive frontal control at ages 22 – 45 months predict disruptive behavior problems at 73 months of age (Kochanska et al., 2003). Executive frontal control may be regarded as operating in a manner similar to “brakes” in the context of conduct problems to generate volitional control of socially unacceptable behaviors. Likewise, children with poor executive frontal control may struggle to modulate their expression of anger or frustration and frequently segue into difficulty inhibiting a dominant aggressive or other socially unacceptable response.

The findings in this study suggest that executive frontal control also makes a unique contribution to trajectories for early childhood depressive symptoms. Prior research suggests

that relatively lower levels of executive frontal control and high reactivity are associated with internalizing symptoms in childhood (Oldehinkel et al., 2004; Eisenberg et al., 2001), but extant research describes a stronger association between executive frontal processes and disruptive behavior problems of childhood. However, there is research (Muris et al., 2008) which suggests a significant negative association between self-reported executive frontal control and symptoms of internalizing problems in a sample of 8- to 12-year-old non-clinical children. Muris et al. also indicate that the attention component of executive frontal control is more strongly associated with internalizing relative to externalizing problems. Deficits in executive frontal control may result in difficulty modulating negative affect and in disengaging or orienting away from distressing stimuli. Specifically, children with executive frontal deficits may experience sadness or irritability more frequently, more intensely, and have fewer coping strategies relative to children who self-regulate more adaptively.

The temperament hypothesis that executive frontal control would have an effect on the growth of conduct problems and depressive symptoms in childhood was supported. However, executive frontal control was only related to the growth in the level of adjustment problems in the school setting. The findings in the current study were consistent with prior research with regard to the contribution of executive frontal control to trajectories for conduct problems; however, findings with respect to child depressive symptoms during middle childhood may be a more novel finding.

The Role of Parenting

Findings in the current study were consistent with prior research demonstrating a relation between parenting practices and disruptive behavior problems during childhood. Parents are important socialization agents in terms of a child's social, emotional, and behavioral development, particularly during earlier stages of development (Maccoby, 1992). Research detailing the influence of parenting on child adjustment is extensive in terms of conduct problems and less so in terms of depression.

Parenting: Conduct Problems

Replicating findings from past studies (Shaw et al., 1993; Collins et al., 2000; Snyder et al., 2002; Stormshak et al., 2000; Combs-Ronto et al., 2009; Denham et al., 2000; Forgatch et al., 1999), child conduct problems were linked to parenting practices in the current study. Findings in the current study also suggest parenting influences children's behavior across multiple contexts. For example, this finding is consistent with prior research (Combs-Ronto et al., 2009) demonstrating that unskilled parenting practices are linked to noncompliance and disruptive behavior problems at home and in the school setting during the preschool and during the kindergarten years. The data also suggest that early negative parenting practices predict change in disruptive behavior problems. Thus, socialization experiences at home during interaction with parents may "set the stage" for the appearance and growth of disruptive behaviors by children at school. Higher rates of conduct problems during kindergarten and first grade were displayed at home and at school by children experiencing harsh or coercive parenting and lower rates were displayed by children raised by more skillful parents. While

coercive parenting was not related to the growth in conduct problems at home or in the school during kindergarten and first grade, skilled parenting was related to the decrease of conduct problems during that same developmental period, and may be one source of normative reductions in conduct problems during this period. The effects of skilled parenting appear to also generalize to the school setting. Children raised by more skilled parents may be more likely to successfully negotiate the transition from the home to the classroom and peer environments relative to children whose parents rely on coercive parenting tactics.

Parenting: Child Depressive Symptoms

Contrary to the extant literature, no relationship was found between parenting practices and child depressive symptoms in this study. Prior research indicates harsh or hostile parenting and inconsistent discipline are linked to depressive symptoms in childhood (Hill et al., 2003; Kim et al., 2003; Dallaire et al., 2006). There is also evidence in the intervention literature suggesting that improvements in parenting skills are related to reductions in the levels of child depressive symptoms (Webster-Stratton et al., 2008).

However, there are some limitations to extant research. In particular, much of the support for the role of parenting in the development of depressive symptoms comes from studies of samples of older children (Cole et al., 1986; Hill et al., 2003; Kim et al., 2003). The effect of parenting on child depressive symptoms may vary by age. Temperamental factors may account for the emergence of depressive symptoms during childhood and parenting may become more salient in the period prior to puberty (Cicchetti et al., 1998; McCauley et al.,

2001; Thapar et al., 1996). Thus, it is possible that harsh, coercive parenting may be more significantly linked to depressive symptoms in later rather than in earlier childhood.

It is also possible that depressive symptoms in childhood may be related to parenting processes not measured in this study. For example, Morris et al. (2002) refer to two different types of unskilled or negative parenting. One of these categories of parenting was used in this study and involves overt harsh, hostile and aversive behaviors of the parent directed toward the child. The other category of negative parenting discussed by Morris and her colleagues involves intrusive control and is characterized by manipulation, guilt induction, contingent affection, and invalidation of the child's emotions (Barber, 2001). There is evidence of a relation between intrusive parenting and internalizing problems in youth (Barber, 2001; George, Herman and Ostrander, 2007). Therefore, the parenting dimensions measured in the current study may be less relevant to the development of depressive symptoms in childhood. Exposure to the parent's negative cognitions, behaviors and affective expression is another aspect of parenting related to the development of child depression that was not measured in the current study. Social learning theory suggests that children may model behavioral expressions of distress and help seeking expressed by their depressed parents (Bandura, 1977).

Interaction Effects of Parenting and EFC

Interaction of Parenting and EFC: Conduct Problems

Consistent with expectations based on prior research, parenting and executive frontal control interacted to predict chronic levels of conduct problems during kindergarten through third grade. The interaction between child executive frontal control and parenting indicated

children lower in executive frontal control were at increased risk for school conduct problems when they experienced coercive parenting at home. The moderating effects of the quality of parenting and child executive frontal control have been reported consistently in the literature (Rubin et al.2003; Karreman et al., 2009; Lengua, 2008). In a complementary fashion, children with executive frontal control deficits raised by skilled parents were found to be less likely to display chronic conduct problems at school relative to children with executive control deficits raised by less skilled parents. It seems that coercive parenting exacerbates the effects of executive frontal control deficits on the chronic levels of school conduct problems whereas skilled parenting buffers the effects of poor executive frontal control.

The levels of conduct problems displayed by children with good executive frontal control were unrelated to the quality of parenting they experienced. Surprisingly, harsh, coercive, unskilled parenting was not linked to conduct problems in children with good executive frontal control, suggesting that good executive frontal control may protect children against some of the negative effects of unskilled parenting. One interpretation is that children's behavioral regulation during childhood may derive from one or both of two sources – an internal source as indexed by executive frontal processes, or by an external such as parents or teachers. It should be noted that the frontal brain areas sub-serving executive frontal control, though closely associated with genetic factors, are also shaped by cumulative experience.

Interaction of Parenting and EFC: Depressive Symptoms

Although considerable evidence supports the hypothesis that the interaction between the quality of parenting and child executive frontal control predicts disruptive behavior problems (Rubin et al., 2003; Karreman et al., 2009; Lengua, 2008), there are few studies which have examined the hypothesis that the interaction of parenting and executive frontal control predicts child depressive symptoms. Parenting was not found to moderate the effect of executive frontal control in predicting the level of child depressive symptoms in the current study. It is possible that poorly regulated children may be at greater risk for depressive symptoms regardless of the quality of parenting. As described earlier, it may also be that this study did not measure facets of parenting most relevant to the development of depression, such as over-control, which may also interact with child executive control deficits.

Alternately, the quality of parenting may influence the development of depressive symptoms indirectly. While temperament, including executive frontal control, is considered a biologically-based characteristic, it is shaped over time through the child's interactions with the environment (Rothbart et al., 2004). Executive frontal control may serve as a mediator of the effects of negative parenting; in this model, negative parenting practices may interfere with the development of executive frontal control which subsequently leads to increasing risk for internalizing problems. It is also possible that other facets of child temperament may be related to depression and moderated by parenting practices. For example, significant interactions were found between parenting and temperament in predicting depression when examining whether parenting moderates the association of child fearfulness (or negative

emotionality) with child depression. Kiff et al. (2011) suggest that negative parenting may moderate the effect of fearfulness in predicting child depression. They found that negative parenting predicted depression in children with low relative to high levels of fear, and with low versus high levels of executive frontal control. Over-involved parenting practices e.g., excessive protectiveness has also been linked with depressive symptoms in childhood (Oldehinkel, Veenstra, Ormel, de Winter, & Verhulst, 2006). Therefore, using a different index of negative parenting may strengthen the proposed relationship.

Prevention/Intervention

The current study examined the contribution of parenting practices and child frontal executive control to the occurrence of child adjustment problems across the two of the most critical environments in early to middle childhood, the home and school settings. The focus of this research was to better understand the risk factors common and unique to child conduct problems and depressive symptoms with the objective of designing efficient and efficacious prevention interventions. The data suggest executive frontal control was a common risk factor for conduct problems and depressive symptoms, while parenting quality functioned as a risk factor unique to conduct problems.

These data suggest parent training interventions are likely to reduce chronic levels of conduct problems at home and at school from kindergarten through third grade, especially for children with poor executive frontal control, and to dampen growth in conduct problems at school during this developmental period. Targets of intervention for conduct problems may usefully focus on reductions in coercive parenting and enhancement of skilled parenting. This is

consistent with previous parenting training intervention research which has demonstrated that changes in parenting practices mediate long term reductions in child conduct problems and enhanced positive adjustment (Webster-Stratton et al., 2008; Patterson, Forgatch et al., 1999).

The degree to which executive frontal control can be directly enhanced by intervention has not been thoroughly assessed. However, extant research suggests that executive frontal control improves with age both as a result of maturation and socialization. As such, this study suggests that executive frontal control may be used as a marker variable for risk, and that children with poor executive control may be usefully targeted in selected preventive interventions. Additionally, because executive frontal control is shaped by social experiences, enhancements in parenting practices may indirectly contribute to better adjustment by improving child executive control. This infers a mediator rather than a moderator model.

Children with conduct problems lack adequate capacity for behavior regulation. Two sources are available for such regulation – internal or executive frontal control, and external control or parents and other social agents. Those children who lack sufficient internal sources of control benefit most from external control – in this case, good parenting skills. Conversely, the negative behavior of children who lack adequate internal frontal executive control is exacerbated by unpredictable, aversive external environments – or coercive parenting.

There is also evidence of reciprocal relationships found between parenting practices and child behaviors. Although this study has focused on the impact parenting practices may have on child adjustment, reverse effects may also occur. The various behaviors exhibited by children may elicit particular parenting responses, generating reciprocal influences (Rothbaum

et al., 1994). That is, a child's prosocial behaviors may elicit supportive parenting while a child's whining or noncompliance may be met with a negative or harsh parenting response. In some cases, parents may escalate the severity of aversive control tactics and be reinforced by the child's eventual compliance. Likewise, a child's aversive responses to directives may result in the withdrawal of the directive by the parent. If the child's aversive reaction results in the termination of the parent's directive, the child is more likely repeat that behavior. The child is reinforced for engaging in negative behaviors and the parent is reinforced for escalating their control tactics.

The findings in this study do not support the application of parenting interventions in the prevention or treatment of child depressive problems, at least during the developmental period of early elementary school. However, as described above, dimensions or styles of parenting other than those measured in this study may affect early trajectories for depression problems of young children, such as intrusive, over-control. More recently, parent-focused interventions, labeled emotion coaching or mindful parenting, have been developed to help parents learn to acknowledge and validate their children's negative affect and distressing cognitions, and to help children problem solve and respond skillfully to sources of distress. Additionally, there is some evidence to suggest that parenting interventions are effective in addressing children's depressive symptoms as well as their conduct problems (Webster-Stratton & Herman, 2008).

Previous research using this sample (Snyder et al., 2009) showed that child depressive symptoms are preceded as well as predicted by symptoms of anxiety. Thus the relationship

between parenting and depressive symptoms may be an indirect one. It is possible that parenting behaviors contribute to the development of anxiety symptoms in early childhood increasing the risk for a subsequent progression to depressive symptoms. Future research should examine these relationships

While executive frontal control is considered to be fairly stable, there is evidence for maturational change and the effects of specific programs designed to enhance executive frontal type abilities (Rueda, Rothbart, McCandliss, Saccomanno, & Posner, 2005). The findings of the present study suggest the potential merits of implementing prevention and intervention programs with a focus on promoting executive frontal competencies in early childhood to reduce the risk for depression.

Differences in Parent and Teacher Ratings

There were a number of interesting differences between parent report and teacher reports of trajectories of child conduct problems and depressive symptoms. The most apparent difference was that parents reported decreases in conduct problems from early kindergarten to the third grade transition (negative slope) whereas teachers reported a significant increase in conduct problems displayed at school over that time (positive slope). Another difference involved the association of parenting and executive frontal control with growth in conduct problems according to teacher but not to parent report. These differences have several potential explanations. First, it may be that parents have less information about normative changes in conduct problems, or lower their expectations over time as a result of cumulative experience with their child. In contrast, teachers may have more accurate and increasing

expectations about normative declines in child conduct problems during early to middle childhood so that the lack of change or growth in conduct problems is more apparent. It is also the case that different teachers rated child behaviors during each school year so that there is less perceptual and cognitive drift or accommodation of persisting conduct problems of the child.

Second, the transition to elementary school and to subsequent grades presents children with increasing behavior regulatory challenges – to pay attention in class, to follow rules, to be subject to systematic evaluation in which there is comparison to other children, and to age norms, and to develop relationships with an array of peers. Thus, relative failures in regulation and increasing expectations of reliance on self-regulation are more apparent in the school than in the home setting. In a sense, this suggests that both parents' and teachers' assessments are valid in the environmental and functional contexts in which children's behavior are being observed and evaluated.

Strengths, Limitations, and Future Research

The present study has several strengths. Multi-method, multi-informant composites were used to define constructs for parenting, executive frontal control, and child conduct problems and depressive symptoms, reducing measurement error. Different methods and informants were used to define the risk factors (frontal executive control and parenting) and child adjustment (conduct problems and depressive symptoms) which minimizes shared source variance as an alternate explanation for the empirical relationships observed in this study. The use of both parent and teacher ratings of child behavior provided assessments of child

adjustment in two of the major social contexts experienced by children during the developmental period under consideration, and provided the opportunity to ascertain the cross-setting generalization of risk processes associated with parenting and child frontal executive control. Future research should include child self-report of conduct problems and depressive symptoms. The study used a prospective longitudinal design which provides an assessment of the risk models across a sizable developmental window, and which provides the temporal ordering of variables consistent with their hypothesized causal status.

The study also has a number of limitations. Data and analyses were derived from a passive longitudinal design and, as such, the results cannot be used to infer strong causation. The recruited community sample was comprised of at-risk children from economically disadvantaged families recruited from one neighborhood in one city. The degree to which the findings generalize to samples from other locations and with other characteristics needs to be tested. This study used a non-clinical school-based sample with low base rates of depressive symptoms which may have obviated strong tests of the hypotheses in relation to the early development of depressive symptoms. The models being tested may have been incomplete; other omitted variables may be important or may account for the association between parenting, executive frontal control and child adjustment problems. The study did not examine sex differences in the mean levels of executive frontal control, parenting practices, and trajectories for conduct problems and depression, nor in the relationship of risk factors to child adjustment. Future research should examine gender-specific developmental models. It may be that the additive and synergistic effects of parenting and poor executive frontal control operate

differentially for boys and girls. It is possible that gender moderates these relationships, particularly in the trajectories for depressive symptoms.

Summary

This study examined whether child frontal executive control and parenting practices were prospectively associated in similar ways with the development of conduct problems and depressive symptoms in childhood. The data in this study suggest poor executive frontal control is a salient risk factor for early trajectories of both conduct problems and depressive symptoms, and may serve as a marker variable of the need for preventive intervention. The findings also provide evidence for the role of parenting practices in the development of child conduct problems, both as an independent predictor and as a moderator of child executive frontal control. The moderator effect indicates that effective parenting can buffer the risk for conduct problems associated with poor executive control. Parenting interventions appear to target malleable social processes associated with chronic levels and persistence in child conduct problems, and may serve as an effective preventive or early intervention for high risk children.

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APPENDIX

TABLE 1

VARIABLES USED TO DEFINE AGGREGATE SKILLED PARENTING COMPOSITE

Skilled Discipline (FPP and SPAFF observations: redirects child's attention, reasons with child, use of time-out or other non-coercive punishment, praises and rewards for positive behavior, offers acceptable alternatives, uses touch to redirect, and uses an evenhanded approach and was firm)

Positive Parenting (FPP and SPAFF observations: attentive and focused, caring and respectful of child, appears happy/excited, displays warmth/affection)

Skilled Teaching (FPP and SPAFF observations: consistent, positive reinforcement provides only as much assistance as required, completes task for the child (reverse scored), threatens punishment (reverse scored), multiple directives (reverse scored))

Rate per minute positive parent interaction (rpm FPP observations: uses touch to redirect, positive talk, positive interpersonal interactions, endearment, agrees with child, positive nonverbal displays)

Rate per minute positive parent emotion (rpm SPAFF observations: enthusiasm, joy, humor, validation, interest)

Total Cue Detection Score (P-SIPI vignettes: the degree parent attends to and processes critical details of child behaviors)

TABLE 2

VARIABLES USED TO DEFINE AGGREGATE COERCIVE PARENTING COMPOSITE

Parent aversive behavior (rpm FPP observations: physical aggression, physical attack, verbal attack, coercion, negative nonverbal behavior)

Anger displays (rpm SPAFF observations: directed anger and contempt at child)

Harsh discipline (FPP and SPAFF observations: grabs, hits, or pinches; threatens negative consequences; erratic or inconsistent; reliance on negative affect; use of ridicule/sarcasm; overly strict)

Parent negative reinforcement (odds ratio from FPP observation: acquiesced to child aversive behavior during conflict or discipline episodes)

Hostile attribution (P-SIPI; parent considers child misbehaviors as intentional and voluntary)

Endorse harsh (P-SIPI; parent endorses harsh discipline as effective response to situation described in vignette)

TABLE 3

VARIABLES USED TO DEFINE AGGREGATE CHILD MEASURES

Depressive Symptoms	CBCL (Parent Report Form) sad or depressed, withdrawn, underactive, lonely, prefers solitude, excessive guilt, cries a lot, feels unloved, feels worthless TRF (Teacher Report Form) sad or depressed, withdrawn, underactive, lonely, prefers solitude, excessive guilt, cries a lot, feels unloved, feels worthless
Conduct Problems	CBCL (Parent Report Form) aggression and delinquency scales TRF (Teacher Report Form) aggression and delinquency scales
Executive Frontal Control	Trails B (completion time) Trails B (number of errors) Digit Span (WISC-IV) CBCL (ADHD scale; fall kindergarten) Observed academic engaged time Assessor ratings of child attention during testing

TABLE 4
DESCRIPTIVE STATISTICS FOR PARENTING INDICATORS

Measure	Mean	Standard Deviation	Range
Skilled discipline	2.57	.35	1.51 – 3.44
Positive parenting	3.86	.38	2.27 – 4.80
Skilled teaching	.01	.36	-1.12 - .74
RPM positive behavior	.61	.30	.04 – 2.13
RPM positive emotion	.92	.51	.07 – 3.32
Total cue detection	2.08	.49	1.00 – 3.00
RPM Aversive behavior	1.42	.52	.24 – 3.03
RPM anger	.07	.09	.00 - .52
Harsh discipline	1.42	.28	1.02 – 2.38
Negative reinforcement	-.31	.63	-2.24 – 2.45
Hostile attributions	.37	.24	0.00 – 1.00
Negative response evaluation	2.27	.55	1.14 – 3.86

TABLE 5

DESCRIPTIVE STATISTICS FOR INDICATORS OF EXECUTIVE FRONTAL CONTROL INDICATORS

Measure	Mean	Standard Deviation	Range
Trails B completion	141.41	64.0	40s – 300s
Trails B errors	2.06	1.9	0 - 10
Digit Span	4.26	1.61	0 - 10
CBCL ADHD scale	.41	.34	0.0 – 1.75
Academic Engaged Time (AET)	1.8	.71	1.0 – 4.33
Assessor rated attentiveness	.27	.16	0.01 – 0.80

TABLE 6

DESCRIPTIVE STATISTICS FOR PARENT (CBCL) and TEACHER (TRF) REPORT OF CHILD PROBLEMS

Measure	Assessment Occasion	Mean	Standard deviation	range
TRF (depression)	Fall kindergarten	.51	1.14	0.0 – 10.0
TRF (depression)	Spring kindergarten	.95	1.40	0.0 -7.0
TRF (depression)	Fall of 1 st grade	.73	1.34	0.0 -8.0
TRF (depression)	Spring of 1 st grade	1.11	1.87	0.0 – 8.0
TRF (depression)	Spring of 2 nd grade	1.04	1.87	0.0 – 10.0
TRF (depression)	3 rd grade – 4 th grade	1.27	2.07	0.0 – 10.0
CBCL (depression)	Fall kindergarten	1.47	1.99	0.0 – 12.0
CBCL (depression)	Spring kindergarten	1.36	1.67	0.0 – 8.0
CBCL (depression)	Fall of 1 st grade	1.32	1.78	0.0 – 9.0
CBCL (depression)	Spring of 1 st grade	1.45	1.93	0.0 – 11.0
CBCL (depression)	Spring of 2 nd grade	1.61	2.24	0.0 – 14.0
CBCL (depression)	3 rd grade – 4 th grade	1.59	2.11	0.0 – 11.0
TRF (conduct)	Fall kindergarten	.30	.47	0.0 – 2.91
TRF (conduct)	Spring kindergarten	.44	.55	0.0 – 3.06
TRF (conduct)	Fall of first grade	.40	.51	0.0 – 2.66
TRF (conduct)	Spring of first grade	.48	.59	0.0 – 3.13
TRF (conduct)	Spring of 2 nd grade	.51	.58	0.0 – 2.22
TRF (conduct)	3 rd grade – 4 th grade	.55	.67	0.0 – 2.62
CBCL (conduct)	Fall kindergarten	.62	.42	0.0 - 212
CBCL (conduct)	Spring kindergarten	.33	.23	0.0 – 1.20
CBCL (conduct)	Fall of first grade	.53	.47	0.0 – 2.84
CBCL (conduct)	Spring of first grade	.57	.48	0.0 – 2.45
CBCL (conduct)	Spring of 2 nd grade	.56	.53	0.0 – 3.17
CBCL (conduct)	3 rd grade – 4 th grade	.34	.30	0.0 – 1.61

TABLE 7
CORRELATIONS AMONG SKILLED PARENTING INDICATORS

	Effective discipline	Positive parenting	Skilled teaching	Positive interaction	Positive emotion	Cue detection
Effective discipline	1					
Positive parenting	.71**	1				
Skilled teaching	.60**	.66**	1			
Positive interaction	.38**	.50**	.38**	1		
Positive emotion	.23**	.43**	.30**	.31**	1	
Cue detection	.01	.02	.02	.08	.07	1

**Correlation is significant at the .01 level

TABLE 8
CORRELATIONS AMONG COERCIVE PARENTING INDICATORS

	Aversive behavior	Anger displays	Harsh discipline	Negative reinforcement	Hostile attribution	Endorse harsh
Aversive behavior	1					
Anger displays	.15*	1				
Harsh discipline	.19**	.50**	1			
Negative reinforcement	.07	.23**	.22**	1		
Hostile attribution	.05	.04	.11	.04	1	
Endorse harsh	.14*	.19**	.23**	.09	.19**	1

**Correlation is significant at the .01 level *Correlation is significant at the .05 level

TABLE 9

CORRELATIONS AMONG INDICATORS FOR CHILD EXECUTIVE FRONTAL CONTROL

	Trails B completion	Trails B errors	Digit span (WISC-IV)	ADHD scale (CBCL; fall K)	Academic engaged time	Ratings by assessor
Trails B completion	1					
Trails B Errors	.47**	1				
Digit span (WISC-IV)	.18**	.21**	1			
ADHD scale (CBCL; fall K)	.03	.11	.04	1		
Academic engaged time	.12	.22**	.23**	.20**	1	
Ratings by assessor	.12	.13*	.21**	.20**	.30**	1

**Correlation is significant at the .01 level *Correlation is significant at the .05 level

TABLE 10
FACTOR LOADINGS FOR A FORCED n=1 FACTOR MODEL OF SKILLED PARENTING

Indicator	Factor Loading
Effective discipline	.78
Positive parenting	.90
Skilled teaching	.80
Positive interactions	.67
Positive emotion	.59
Cue detection	.04

TABLE 11

FACTOR LOADINGS FOR A FORCED n=1 FACTOR MODEL OF COERCIVE PARENTING

Indicator	Factor Loading
Aversive behavior	.41
Anger displays	.74
Harsh discipline	.78
Negative reinforcement	.45
Hostile attribution	.30
Endorse harsh	.53

TABLE 12

FACTOR LOADINGS FOR A FORCED n=1 FACTOR MODEL OF EXECUTIVE FRONTAL CONTROL

Indicator	Factor Loading
Trails B completion	.62
Trails B errors	.64
Digit span (WISC-IV)	.51
ADHD scale (CBCL; fall k)	.36
Academic engaged time (AET)	.61
Ratings by assessor	.59

TABLE 13

CORRELATIONS AMONG TEACHER MEASURE OF CONDUCT PROBLEMS (TRF) AT ALL SIX TIME POINTS

	Fall kindergarten	Spring K	Fall 1 st grade	Spring 1 st grade	Spring 2 nd grade	Grades 3-4
Fall Kindergarten	1					
Spring Kindergarten	.71**	1				
Fall 1 st grade	.58**	.63**	1			
Spring 1 st grade	.55**	.57**	.65**	1		
Spring 2 nd grade	.24**	.34**	.47**	.39**	1	
Grades 3-4	.44**	.55**	.57**	.49**	.45**	1

**Correlation is significant at the .01 level

TABLE 14

CORRELATIONS AMONG PARENT MEASURE OF CONDUCT PROBLEMS (CBCL) AT ALL SIX TIME POINTS

	Fall kindergarten	Spring K	Fall 1 st grade	Spring 1 st grade	Spring 2 nd grade	Grades 3-4
Fall Kindergarten	1					
Spring Kindergarten	.67**	1				
Fall 1 st grade	.60**	.76**	1			
Spring 1 st grade	.54**	.63**	.73**	1		
Spring 2 nd grade	.58**	.70**	.72**	.73**	1	
Grades 3-4	.65**	.68**	.64**	.64**	.80**	1

**Correlation is significant at the .01 level

TABLE 15

CORRELATIONS AMONG TEACHER MEASURE OF DEPRESSION (TRF) AT ALL SIX TIME POINTS

	Fall kindergarten	Spring K	Fall 1 st grade	Spring 1 st grade	Spring 2 nd grade	Grades 3-4
Fall Kindergarten	1					
Spring Kindergarten	.47**	1				
Fall 1 st grade	.35**	.27**	1			
Spring 1 st grade	.30**	.37**	.50**	1		
Spring 2 nd grade	.25**	.42**	.47**	.38**	1	
Grades 3-4	.07	.28**	.34**	.32**	.45**	1

**Correlation is significant at the .01 level

TABLE 16

CORRELATIONS AMONG PARENT MEASURE OF DEPRESSION (CBCL) AT ALL SIX TIME POINTS

	Fall kindergarten	Spring K	Fall 1 st grade	Spring 1 st grade	Spring 2 nd grade	Grades 3 -4
Fall kindergarten	1					
Spring Kindergarten	.54**	1				
Fall 1 st grade	.50**	.53**	1			
Spring 1 st grade	.43**	.50**	.57**	1		
Spring 2 nd grade	.45**	.51**	.59**	.63**	1	
Grades 3-4	.42	.34**	.52**	.58**	.58**	1

**Correlation is significant at the .01 level

FIGURE 1

GROWTH MODEL OF CONDUCT PROBLEMS AS REPORTED BY TEACHER

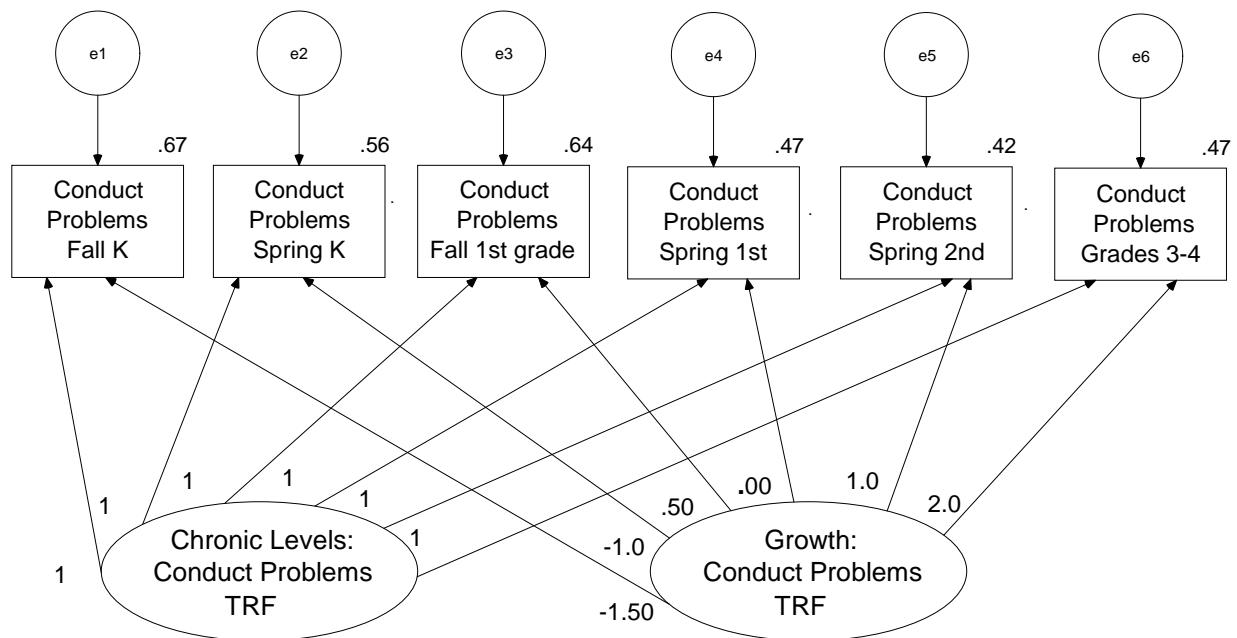
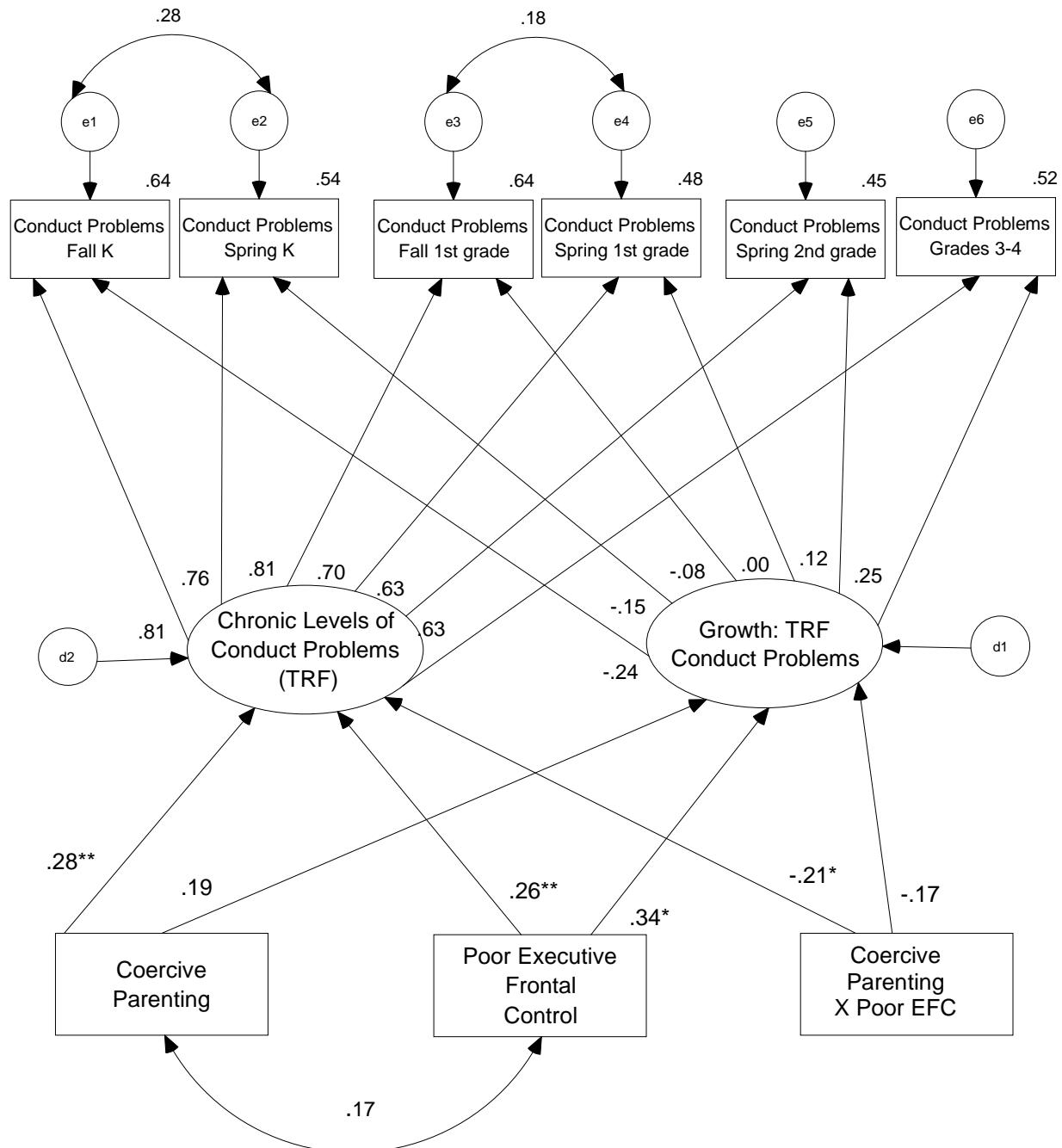


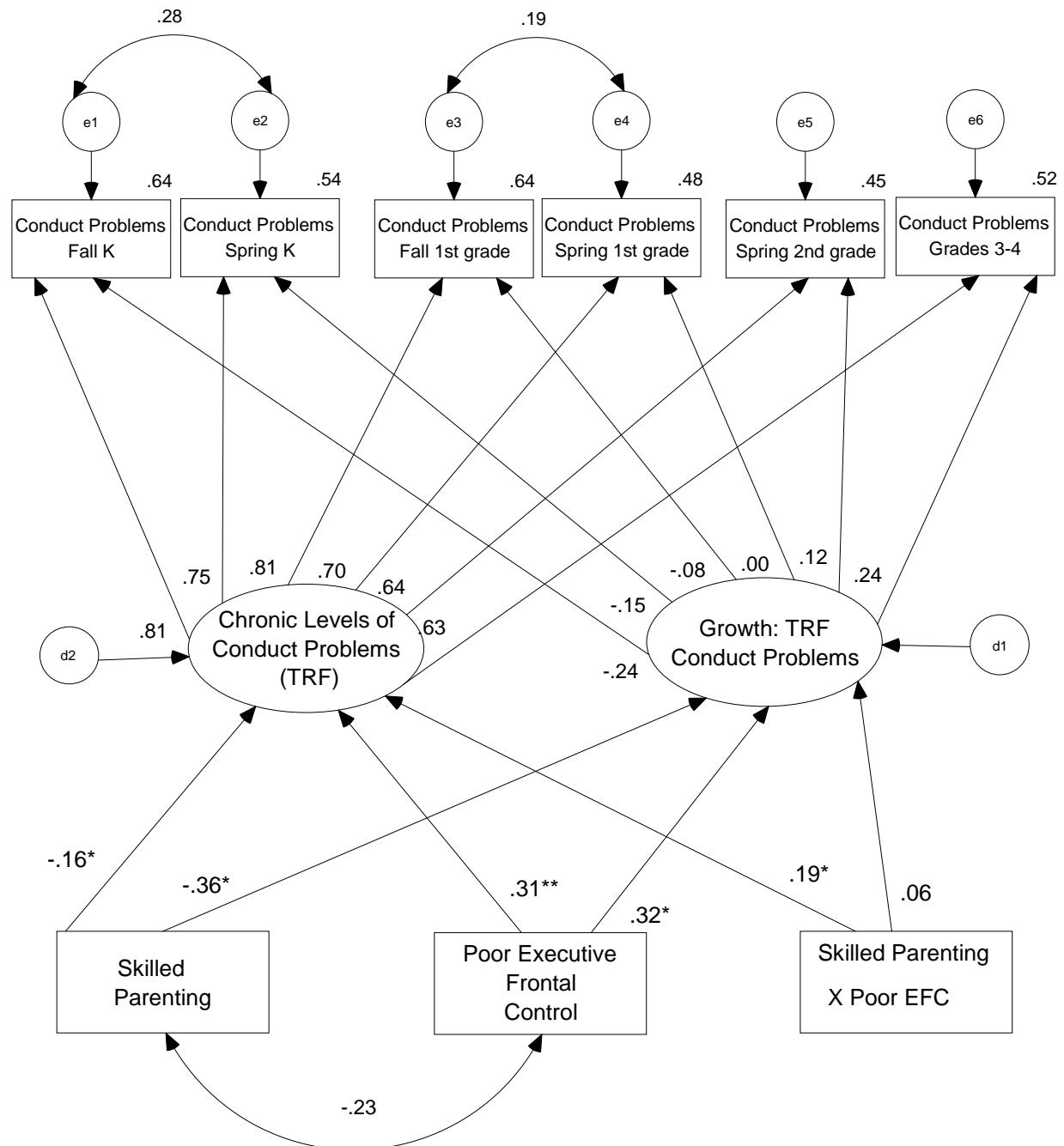
FIGURE 2
COERCIVE PARENTING – EFC MODEL OF TRF CONDUCT PROBLEMS



**Coefficient is significant at the .01 level *Coefficient is significant at the .05 level

FIGURE 3

SKILLED PARENTING – EFC MODEL OF TRF CONDUCT PROBLEMS



Coefficient is significant at the .01 level *Coefficient is significant at the .05 level

FIGURE 4

GROWTH MODEL OF CONDUCT PROBLEMS AS REPORTED BY PARENT

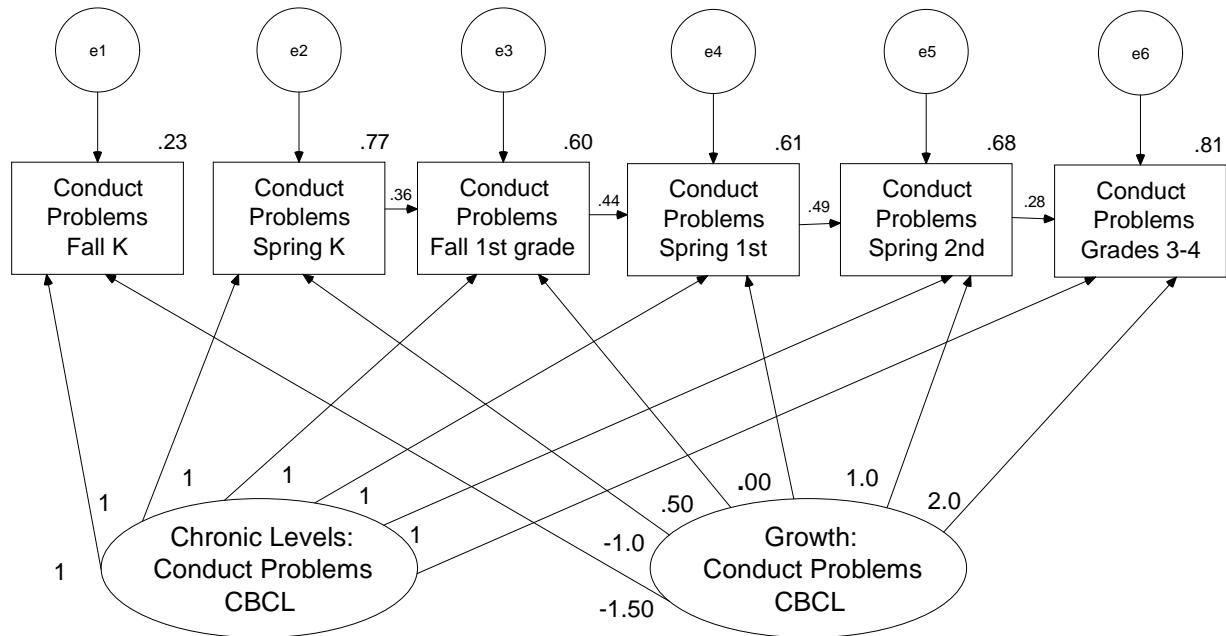
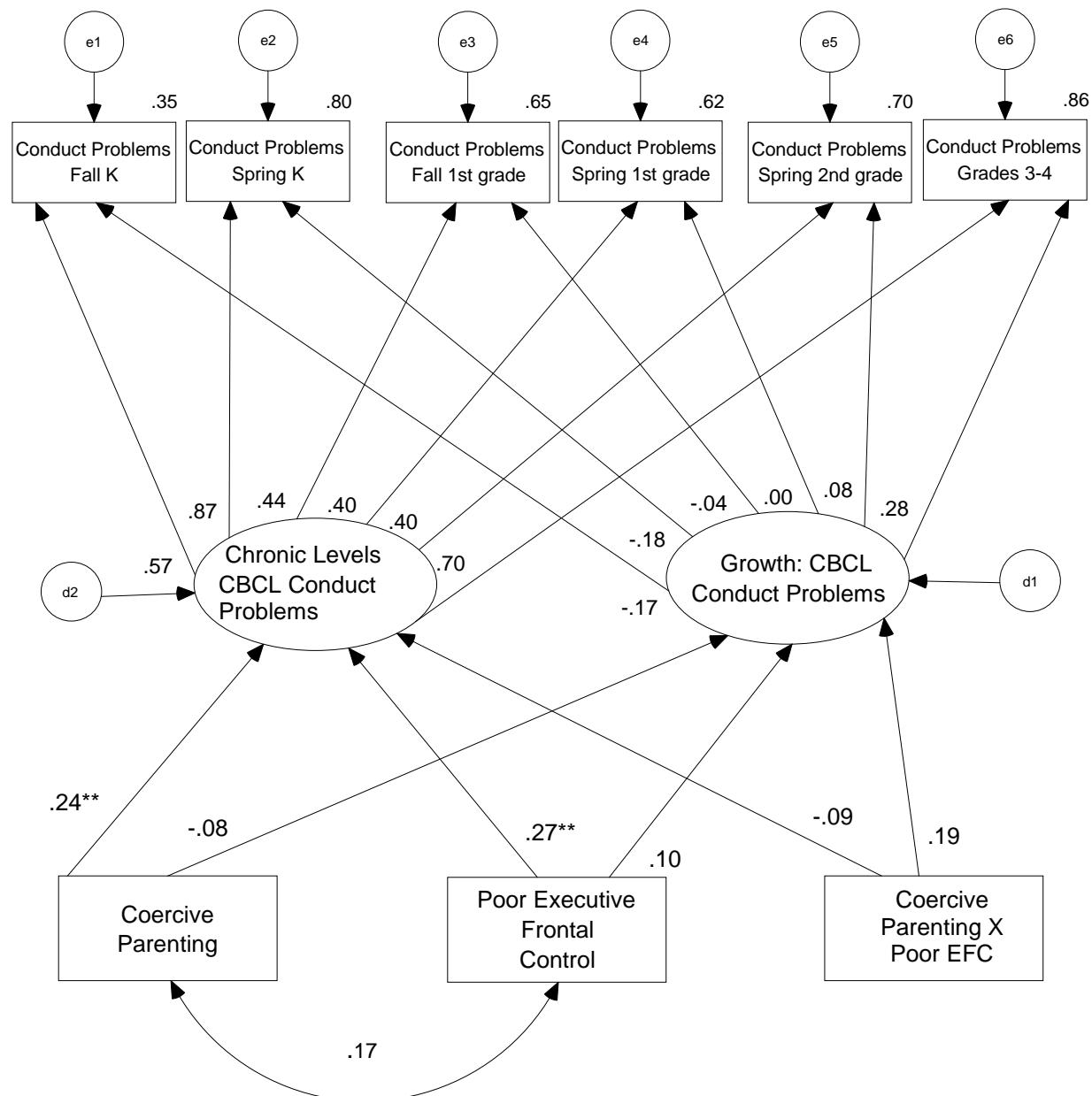


FIGURE 5

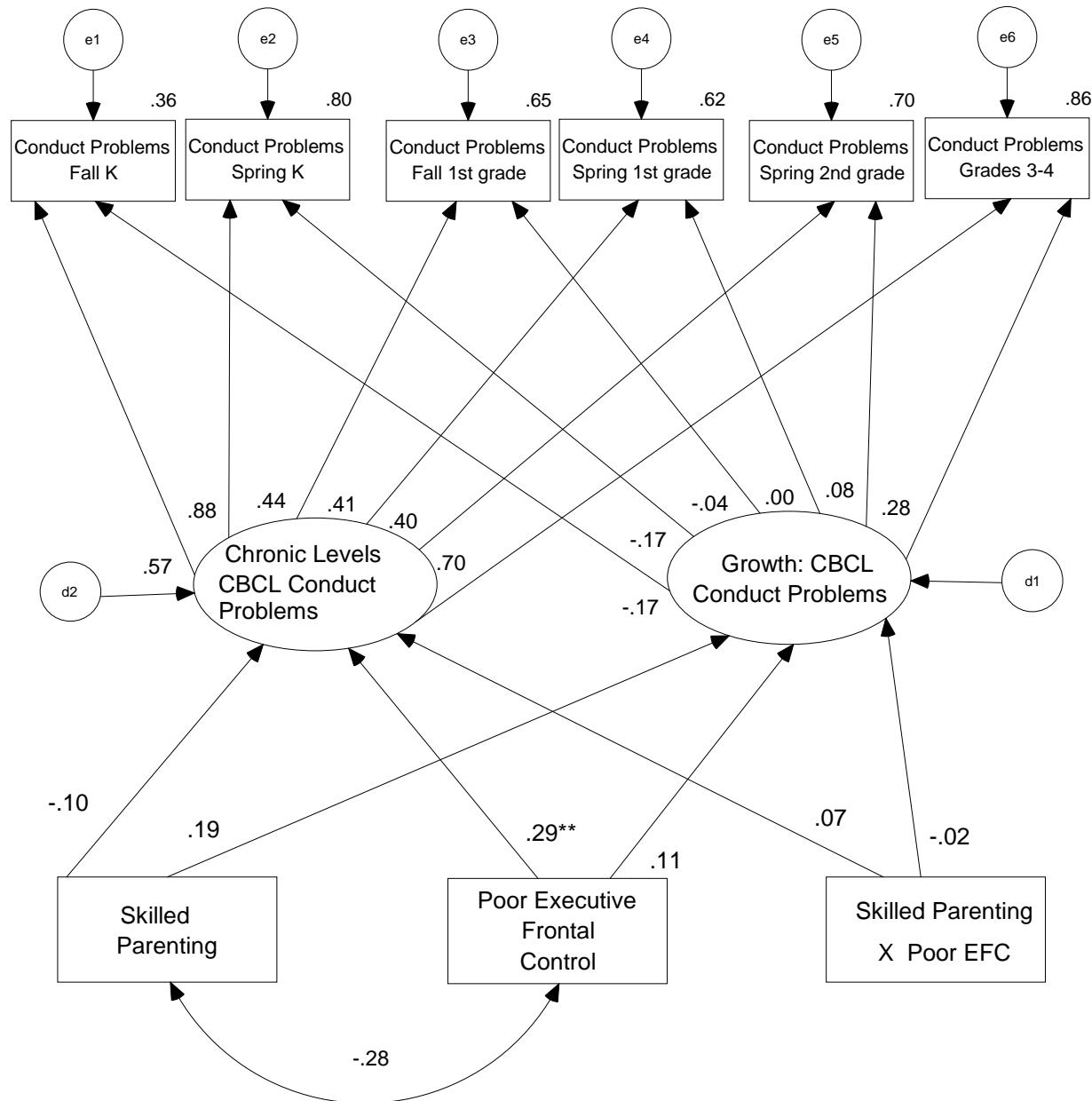
COERCIVE PARENTING – EFC MODEL OF CONDUCT PROBLEMS As REPORTED BY PARENT



**Coefficient is significant at the .01 level

FIGURE 6

SKILLED PARENTING – EFC MODEL OF CONDUCT PROBLEMS AS REPORTED BY PARENT



**Coefficient is significant at the .01 level

Figure 7

GROWTH MODEL OF CHILD DEPRESSION AS REPORTED BY TEACHER

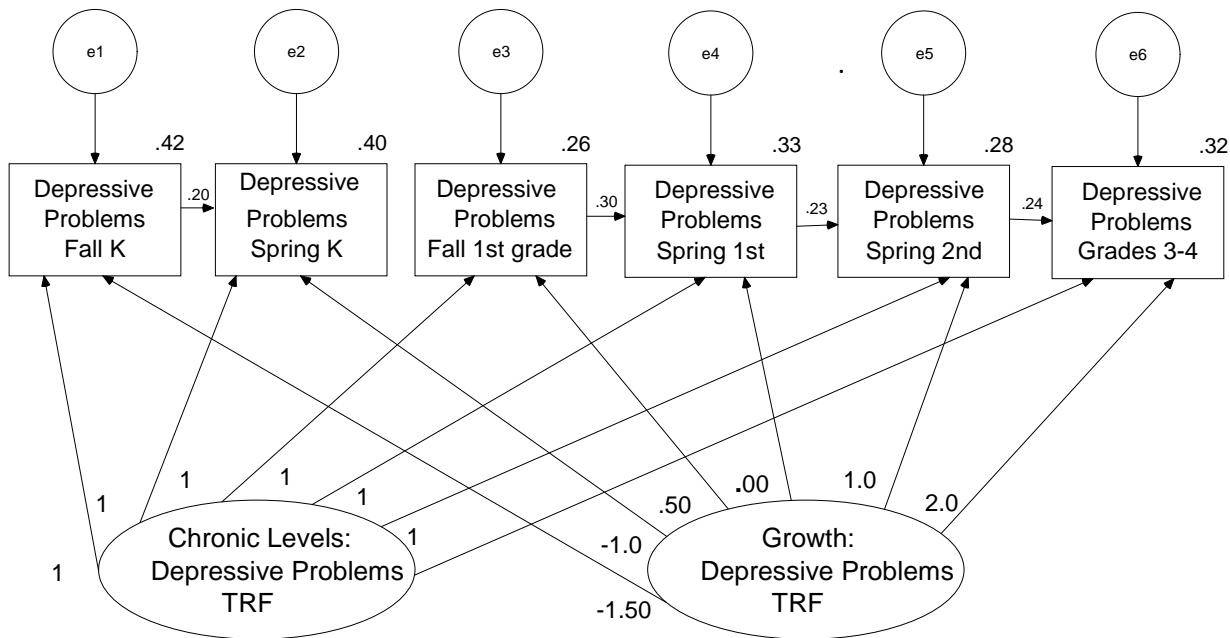
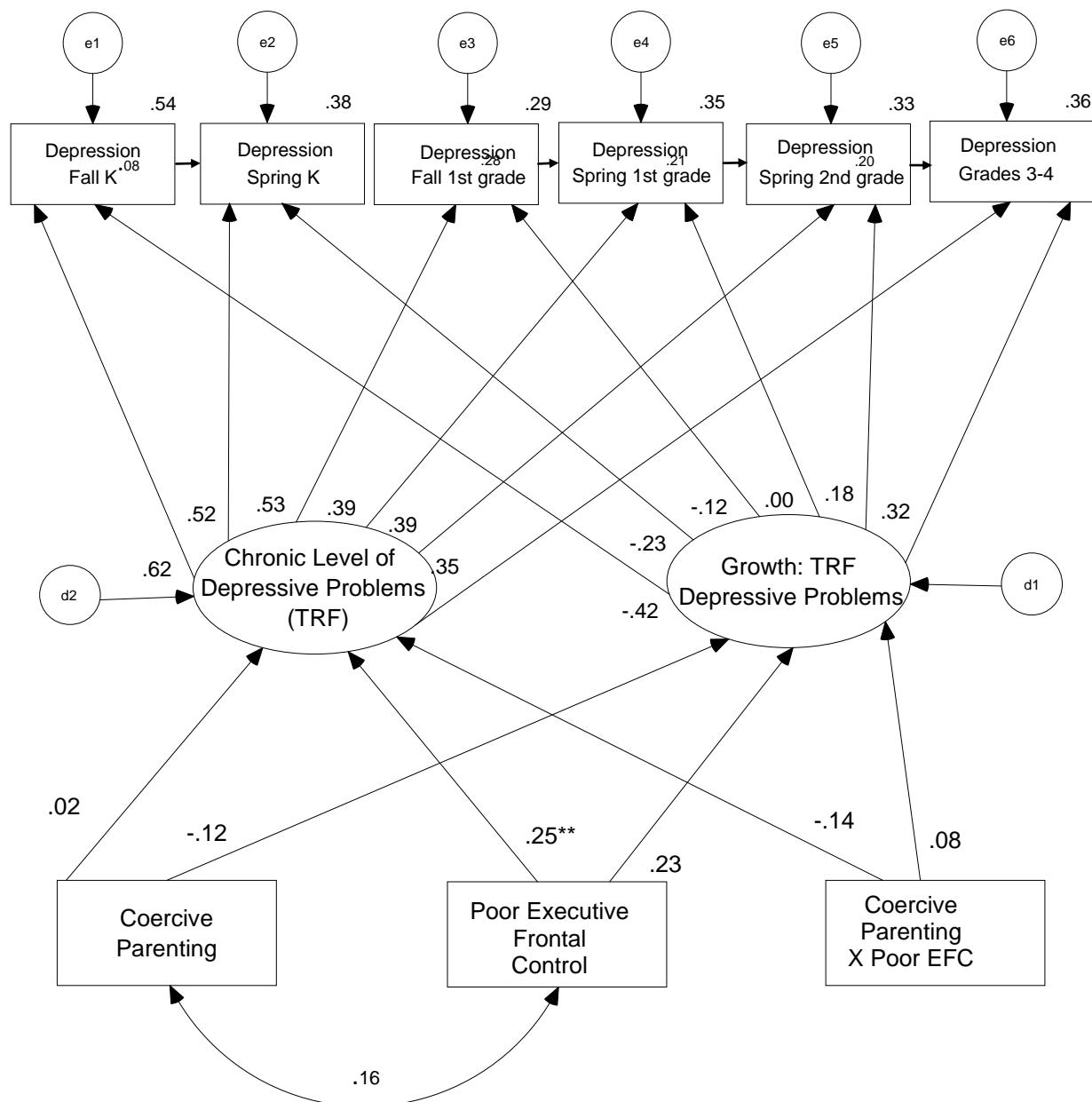


FIGURE 8

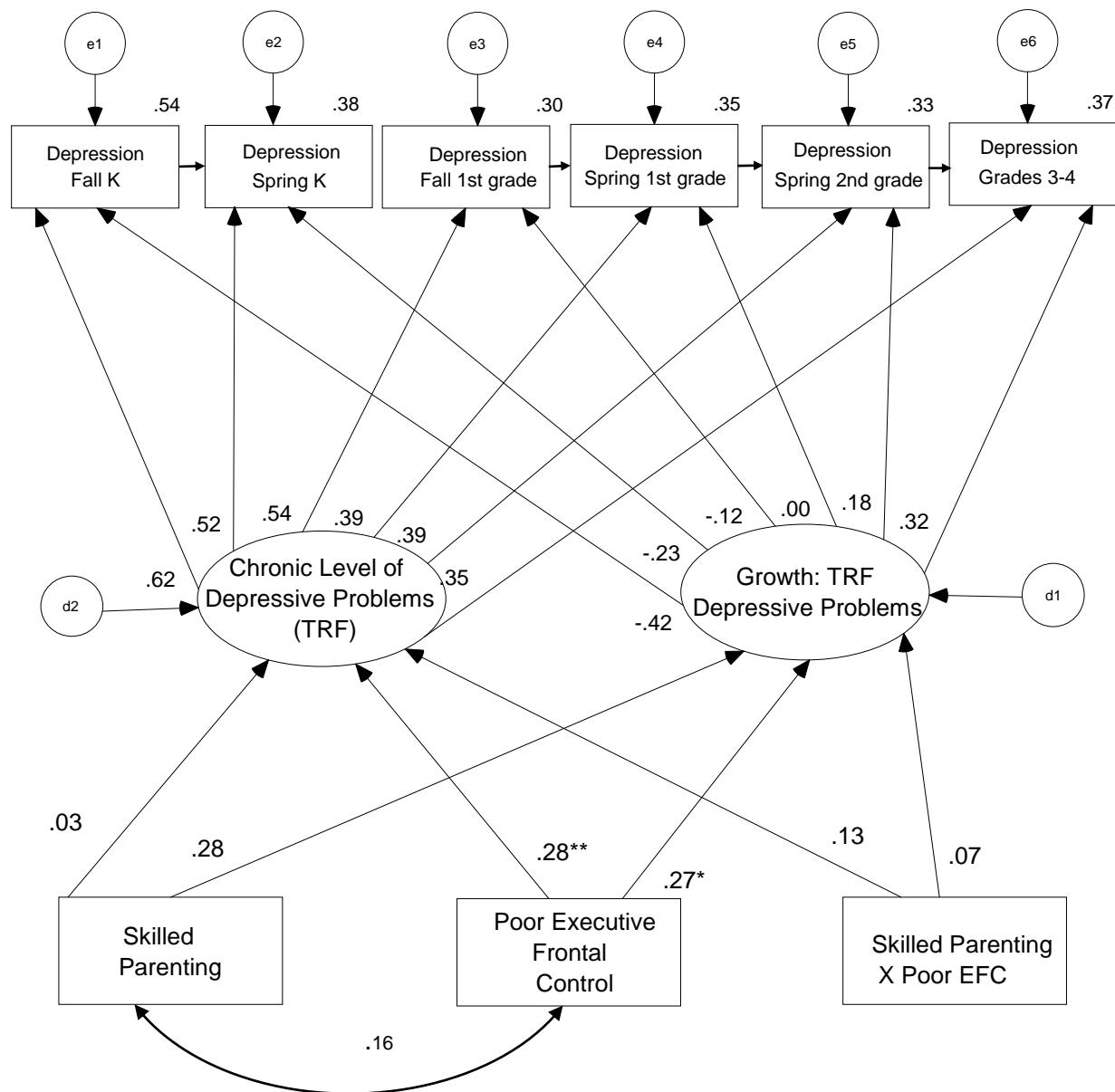
COERCIVE PARENTING – EFC MODEL OF CHILD DEPRESSION AS REPORTED BY TEACHER



** Coefficient is significant at .01 level

FIGURE 9

SKILLED PARENTING – EFC MODEL OF CHILD DEPRESSION AS REPORTED BY TEACHER



**Coefficient is significant $p < .01$ level; *Coefficient is significant at $p < .05$ level

Figure 10

GROWTH MODEL OF CHILD DEPRESSION AS REPORTED BY PARENT

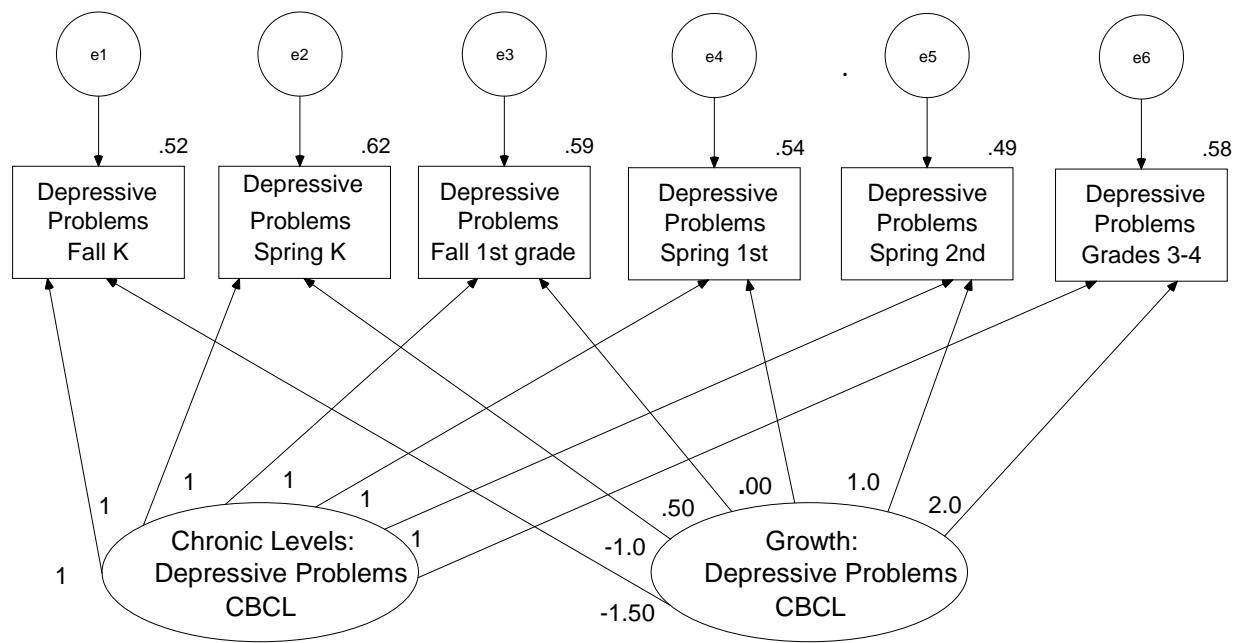
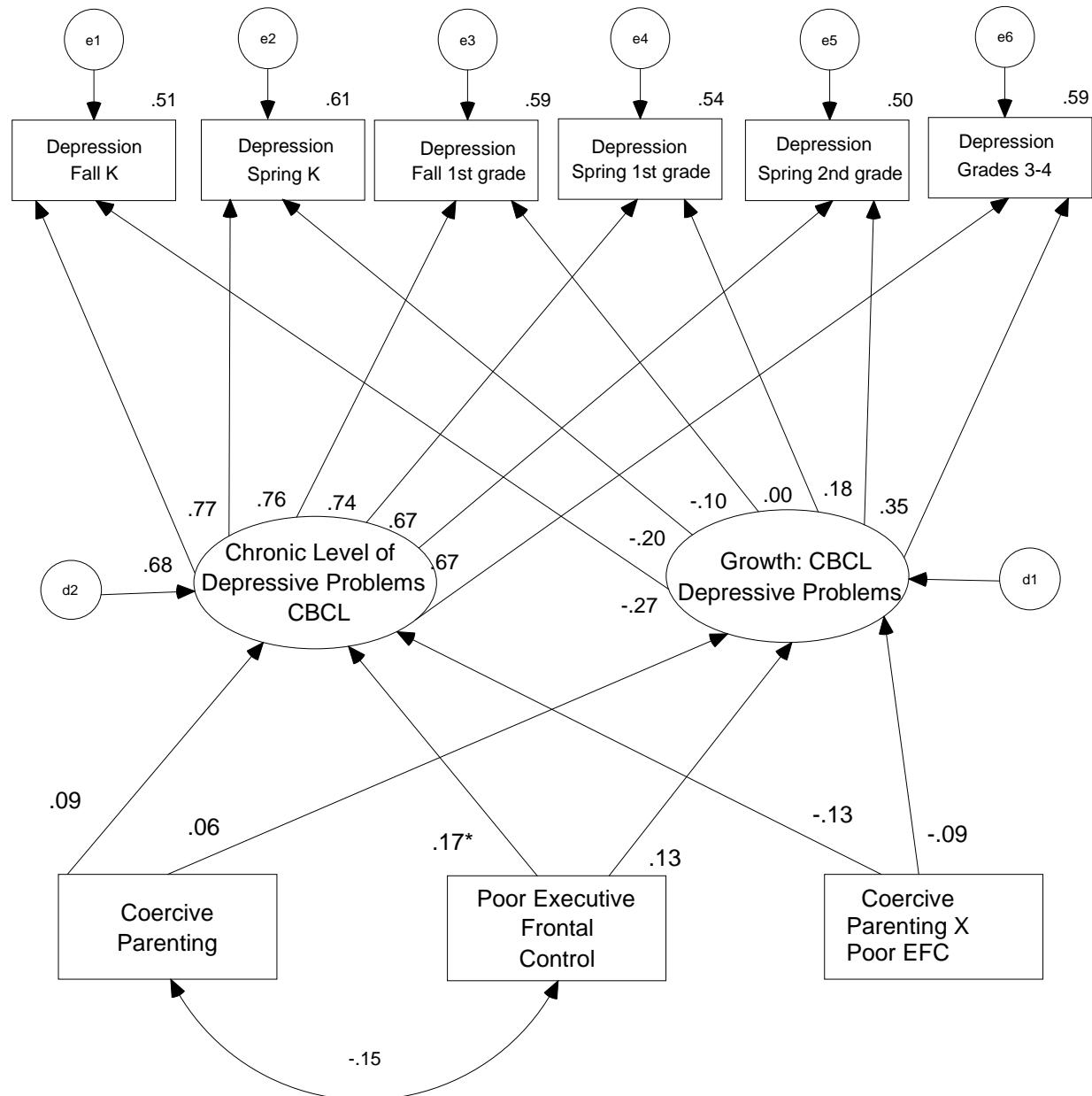


FIGURE 11

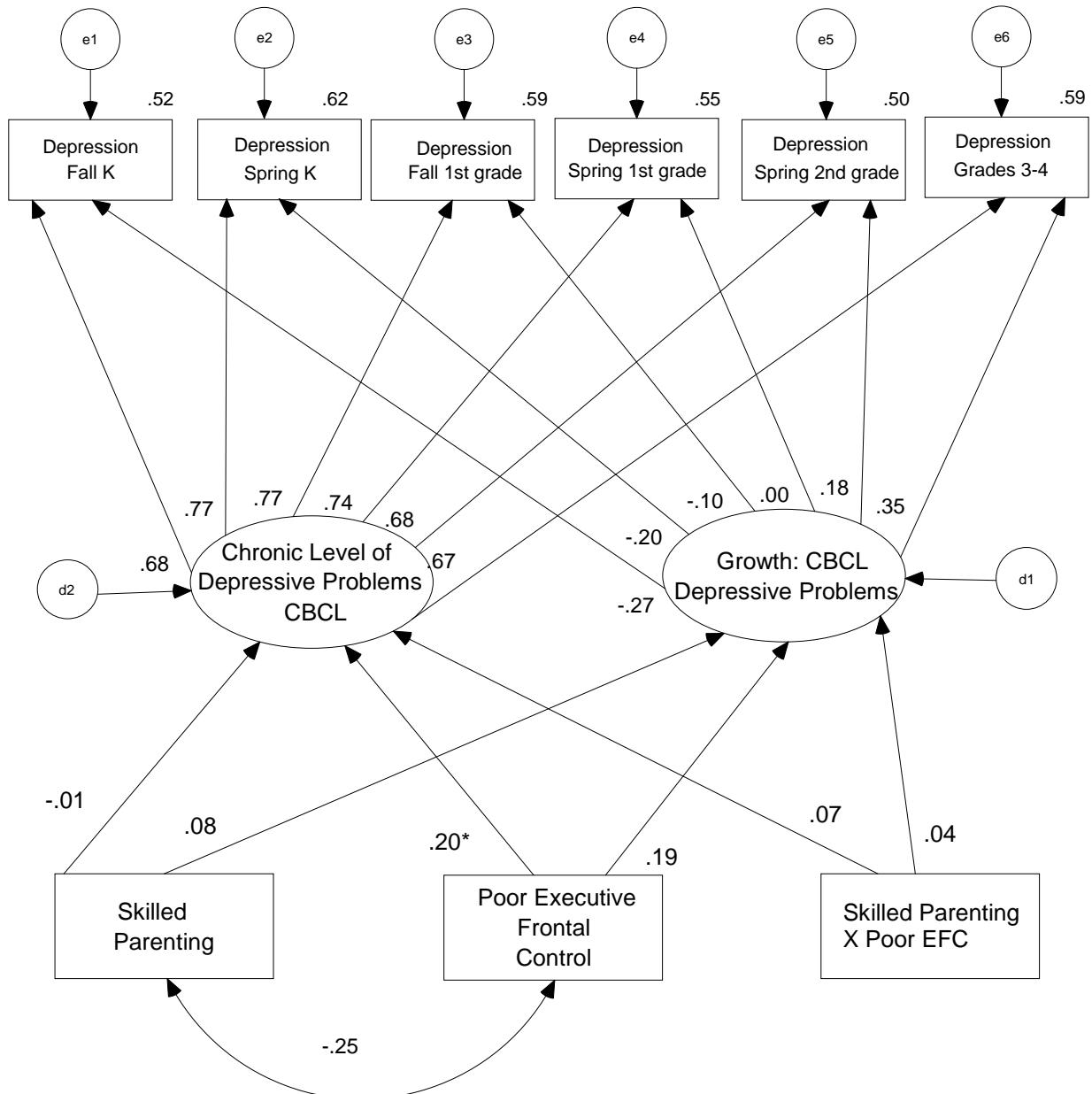
COERCIVE PARENTING – EFC MODEL OF CHILD DEPRESSION AS REPORTED BY PARENT



*Coefficient is significant $p < .05$ level

FIGURE 12

SKILLED PARENTING – EFC MODEL OF CHILD DEPRESSION AS REPORTED BY PARENT



*Coefficient is significant at the .05 level