DISSERTATION

CAN NURTURE ALTER NATURE? THE EFFECTS OF A PARENTING INTERVENTION PROGRAM ON REDUCING ANTISOCIAL BEHAVIORS

Submitted by

Nazanin Mohajeri-Nelson

Department of Psychology

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Summer 2006

COLORADO STATE UNIVERSITY

May 3, 2006

WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY NAZANIN MOHAJERI-NELSON ENTITLED HOW MUCH CAN NURTURE ALTER NATURE? THE EFFECTS OF A PARENTING INTERVENTION PROGRAM ON REDUCING ANTISOCIAL BEHAVIORS BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Committee on Graduate Work

Jennifer E. Cross, Ph.D.

Jerry L. Deffenbacher, Ph.D.

Randall C. Swaim, Ph.D.

Silvia S. Canetto, Ph.D., Co-Adviser

David L. MacPhee, Ph.D., Adviser

Ernest Chavez, Ph.D., Department Head

ABSTRACT OF DISSERTATION

CAN NURTURE ALTER NATURE? THE EFFECTS OF A PARENTING INTERVENTION PROGRAM ON REDUCING ANTISOCIAL BEHAVIORS

Multiple correlates of antisocial behaviors, ranging from genetic and biological factors (such as temperament) to environmental influences (such as parenting), have been implicated in previous research. Most contemporary researchers recognize an interactive relationship between the innate and environmental influences. However, the causal relationship between nature and nurture, and how they interact to shape behavior, is still being debated. Some researchers have argued for the minimal role of environmental influences, specifically parenting, while others have found stronger evidence for the effects of parenting. For example, some researchers have concluded that child characteristics elicit varying types of parenting, speculating that any differences in parenting practices can be better explained by differences in children's behavior than vice versa. Conversely, other researchers have concluded that one of the primary influences on the development of antisocial behaviors is parenting practices, particularly harsh parenting.

The purpose of the current study was to test the influence of one environmental factor, parenting, on the development of antisocial behaviors, including oppositional behaviors and overall problematic behaviors, and to test any causal link between parenting and those antisocial behaviors. The impact of parenting on antisocial behaviors

was analyzed with a longitudinal intervention program targeting families with children between the ages of 2 - 6 at-risk for higher rates of delinquency, oppositional behaviors, and substance use. The intervention program altered parenting practices and reduced problematic behaviors. Because of the correlations between punitive parenting practices and children's antisocial behaviors, decreased use of punitive child-rearing practices was expected to result in lower levels of oppositional and problematic behaviors. In order to determine if the changes in parenting practices mediated the effects of the intervention, a parallel process latent growth curve model was utilized to determine whether the rate of change in parenting practices impacted the rate of change in oppositional and problematic behaviors. The hypotheses were partially supported. Only one of the parenting variables, harsh and authoritarian composite score, mediated the effects of the intervention on children's oppositional and problematic behaviors.

Nazanin Mohajeri-Nelson
Psychology Department
Colorado State University
Fort Collins, CO 80523
Summer 2006

Acknowledgements

Selecting a dissertation committee is one of the most critical tasks that significantly impact one's experiences in graduate school. Having committee members who are experienced, knowledgeable, and devoted to research can make graduate school far more pleasant. In my case, I had the privilege of working with five brilliant researchers and devoted scholars: Drs. David MacPhee, Silvia S. Canetto, Randall C. Swaim, Jennifer E. Cross, and Jerry L. Deffenbacher. I would like to thank my dissertation committee for their time, guidance, and contributions to my research. I have learned a great deal from the committee members individually and collectively. Each has played a tremendous role in the completion of my degree. I hope that someday I will be as influential, instrumental, and inspirational to future students as they have been to me.

In particular, I would like to thank my advisor and committee chair, Dr. David MacPhee who made this entire project possible. I am grateful for the time that Dr. MacPhee devoted to reading proposals and suggesting ways to improve the project. Not only did he provide solid advice and guidance on several research projects, he also allowed me to use data from one of his grant-funded projects for this dissertation. Dr. MacPhee's is an insightful scholar and encourages advisees to uphold a high level of integrity. As an added bonus, he has a terrific sense of humor and an amusing wit. I would like to express heartfelt gratitude for his knowledge, wisdom, guidance, support, patience, and expertise.

Dr. Randall Swaim served as a statistical consultant on this project. I am extremely grateful to Dr. Swaim for his patience, time, and superb ability to explain complex statistics. I would also like to thank Drs. Kim Henry and Linda Stanley for their assistance with latent growth modeling and MPlus statistics software.

Drs. Silvia Canetto, Jerry Deffenbacher, and Jennifer Cross provided feedback that improved the final product. I am grateful for their time and devotion to my research. I appreciate Dr. Canetto's continuing support and belief in me. Her enthusiasm and encouragement has motivated me to set and achieve higher goals. Dr. Cross has also been very encouraging and insightful. I have learned so much from each of these mentors and gained so much from their support and encouragement that it is difficult to properly articulate my gratitude to them within this limited space.

I would also like to thank my husband, Shawn, and son, Conner, for their love, support, patience, and understanding. I am grateful to Shawn for being my best friend and a great partner. Knowing that I could count on and trust him to take care of everything else in our lives allowed me the emotional, physical, and mental freedom necessary to focus on graduate studies. I appreciate all of the sacrifices that Shawn and Conner made in order for me to complete my education. Conner, in particular, paid a significant price for my pursuit of higher education. I am proud of and motivated by his willingness and ability to be independent and self-sufficient so that I could be a full-time graduate student, teacher, researcher, and a full-time mom, all at the same time.

Last, but certainly not least, I would also like to acknowledge and thank our extended families and friends for their support and devotion. Without them, our lives would certainly have been far less exciting and not as much fun.

Table of Contents

List of Tables

List of Figures

CHAPTER 1

Introduction

This research project focused on the effects of parenting practices, as altered through an intervention program, on reducing antisocial behaviors. Two pivotal questions guided the background search for the study: (a) why study antisocial behaviors; and (b) why study parenting practices? Simply stated, the prevalence of antisocial behaviors among children and adolescents in the United States is still high (Kazdin, 1994) and the effects of parenting practices on the development of antisocial behaviors is still being debated (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Dodge, 2002; Harris, 1998; Hawkins et al., 2000; Pike, 2002; Rowe, 1994; Scarr, 1992; Schneider, Cavell, & Hughes, 2003; Stormshak, Bierman, McMahon, Lengua, & Group, 2000; Westman, 1994). Before elaborating on the answers to these questions, some terms need to be clarified.

Definition of Terms

Coie and Dodge (1998) have described antisocial behaviors as including behaviors such as aggression, noncompliance with authority, delinquency, substance use, oppositional behaviors, and uncooperativeness or lack of willingness to help others. Aggression, which is a subcategory of antisocial behaviors, requires an intent, willingness, or act to harm or damage another individual or property regardless of the intent resulting in actual damage or harm. Coie and Dodge have speculated that although

aggression and antisocial behaviors are often studied independent of each other, the two often co-exist. In fact, many times antisocial behaviors (such as oppositional disorder and substance use) are cited as precursors of aggression and violence (Loeber, Burke, & Lahey, 2002; Stormshak, Bierman, & Group, 1998). In particular, early oppositional behaviors have been found to lead to later antisocial and aggressive behaviors (Ostrander, 2004; Webster-Stratton, 2000). Specifically, early onset disruptive behaviors, including disobedience and authority defiance, have been found to increase the likelihood of becoming delinquent by adolescence (Loeber & Farrington, 2000). These researchers found that over a quarter of the children who engage in such disruptive behaviors became increasingly delinquent in later years.

The focus of the current study was on antisocial behaviors, specifically oppositional behaviors and early onset overall problematic behaviors, because they have been cited as precursors of later aggression and violence for both boys and girls (Hawkins et al., 1998; Hipwell et al., 2002). The literature and background of aggression and violence are presented as they relate to the development of antisocial behaviors, including oppositional and problematic behaviors. Due to the overlap in behaviors that are considered aggressive, violent, or antisocial (Kazdin, 1994), studies pertaining to the development of all three are presented.

Why Study Antisocial and Oppositional Behaviors?

Aggression and antisocial behaviors affect not only perpetrators and their victims, but they also affect the families, friends, schoolmates, and community members of both perpetrators and victims (Kazdin, 1994). In spite of decades of effort to reduce aggressive, violent, and antisocial behaviors during adolescence, particularly within

schools, the National Center for Injury Prevention and Control (NCIPC; 2001) still found that, "More than two-thirds of high school students who participated in a Center for Disease Control study reported being in a physical fight in the past 12 months..." (p. 118), over 4% of whom required medical treatment for the injuries sustained as a result of the fighting. The NCIPC concluded that although youth homicide rates have decreased over the past few decades, the rates for the United States are still higher than any other developed nation. In a national survey of students, the Center for Disease Control (2001) found that during the 12-month period preceding the survey, 14% of students had been in a physical fight on school grounds, 8% had been threatened with a weapon on school grounds, and 5% had missed at least one day of school due to fear of being hurt by another student at school. Because injuries caused by aggressive behaviors and fear of being at school continue to plague our nation, it is important to find effective ways to prevent aggression and antisocial behaviors among adolescents.

Why Study Parenting Practices?

The Division of Violence Prevention from the NCIPC (2001), utilizing the expertise of many violence prevention researchers, has compiled a list of individual, family, peer, school, and neighborhood risk factors for youth violence, including but not limited to, "...social cognitive deficits, poor monitoring or supervision of children, exposure to violence,...association with peers engaged in high-risk or problem behavior...." (p. 119). In fact, poor parenting has been listed as a risk factor for developing antisocial, aggressive, or violent behaviors by many researchers (Coie & Dodge, 1998; Dekovic, 1999; Dodge, Bates, & Pettit, 1990; Hawkins et al., 2000;

Herrenkohl et al., 2000; Windle, 1991). What remains to be substantiated is whether a causal link exists between parenting practices and children's behavioral outcomes.

Two primary camps of researchers (that are of particular interest to the current author) study the effects of parenting on the development of antisocial behaviors: behavioral geneticists and socialization researchers. Behavioral geneticists and their supporters have argued that parenting practices are a result of children's personality or temperament as determined by their genetic make-up, with minimal influences from shared environment factors, such as parenting (Harris, 1998; Pike, 2002; Rowe, 1994; Scarr, 1992). The heritability rates of antisocial behaviors, particularly of the life-course-persistent kind, has been found to be quite high (Pike). On the other hand, social influences on antisocial behaviors have also been well-documented (Dodge, Pettit, & Bates, 1997; Rutter, 1997a). In particular, parenting is often cited as a primary contributor to the development of many social behaviors (Aunola & Nurmi, 2005; Baumrind, 1991; Dodge, 2002; Farrington, 1989; Hawkins et al., 2000; Maughen & Cicchetti, 2002; Pettit, Bates, & Doge, 1997; Shucksmith, Hendry, & Glendinning, 1995; Stormshak et al., 2000; Westman, 1994). For example, Westman has argued that incompetent parenting is the primary source of the development of many problematic behaviors, including antisocial and oppositional behaviors.

Regardless of the origins of the behaviors, many researchers have found that family interventions are extremely successful in reducing antisocial behaviors (Tremblay et al., 1992). Programs that appear to be the most effective in preventing violence, aggression, and antisocial behaviors are ones that target children prior to first grade, before contact with other social influences, such as teachers and peers (Tolan, Guerra, &

Kendall, 1995). With ample studies from both camps, the debate about the influences of parenting continues. Hence, the origins of antisocial behaviors, particularly the effects of parenting practices on the development of antisocial behaviors, warrant further investigation (Collins et al., 2000; Dodge, 2002; Harris, 1998, 2000; Pike).

An effective resolution to this debate, about the links between parenting practices and children's behavior, can be achieved through the use of three methods: (a) true experimental designs manipulating the environment starting in infancy (such as experimental designs used in animal research); (b) longitudinal studies on the development of social behaviors; and (c) intervention studies that illustrate a causal link by reversing the effects of one variable, such as parenting (Collins et al., 2000). The prevalence of all three types of studies has increased in the past few decades. Nonetheless, Collins et al. have advocated for more intervention studies in order to fill the gaps within the literature. Therefore, the primary purpose of this study was to examine the effectiveness of an intervention program in reducing problematic and oppositional behaviors. A longitudinal mediational model was used to test the causal relation between parenting practices and children's behavioral outcomes.

CHAPTER 2

Literature Review

Behavioral Genetics: The Nature of Antisocial Behaviors

Some researchers have argued for the genetic (Caspi et al., 2002; Caspi & Silva, 1995; Harris, 1998; Lane & Cherek, 2000; O'Connor, Deater-Deckard, Fulker, Rutter, & Plomin, 1998; Rowe, 1994; Rutter, 1997b; Scarr, 1992) and biological (American Academy of Child & Adolescent Psychiatry, 2004; Cohen-Bendahan, Buitelaar, van Goozen, & Cohen-Kettenis, 2004; Mirsky & Siegel, 1994; Raine, 2002; Volavka, 2002) bases of antisocial behaviors. For instance, temperament, described as an innate characteristic, is often listed as a primary contributor to antisocial tendencies (Caspi & Silva, 1995). Based on an analysis of adolescents' temperament and frequency of reported delinquency and conduct disorders, Windle (1991) concluded that having a difficult temperament (defined by variations in three characteristics: rhythmicity, flexibility, and distractability) during childhood is predictive of developing aggressive behaviors during adolescence. When comparing temperament, timing of puberty, and parenting styles, Dekovic (1993) found a stronger relation between temperament and aggressive behaviors than the other two variables. Intellectual competence and optimism of the adolescent, both of which are considered personal characteristics or self-factors, have been found to reduce the effects of environmental influences (Kaplan, 1999).

Aggression has been described as a heritable trait that remains stable across the lifespan (Pike, 2002). Only nonaggressive problematic behaviors are considered to be specific to age groups (i.e., adolescence) and aggressive problematic behaviors detected early in life are expected to continue across the lifespan with much stability (Moffitt & Caspi, 2005; Pike). The heritability of a behavior is defined as the amount of the variance in a behavior that can be accounted for by genetics (Pike). For example, the heritability of antisocial behaviors that are stable across the lifespan is much higher than the rate of heritability of antisocial behaviors that are only manifested during adolescence (DiLalla, 2002). With significant heritability and stability across the lifespan, the effects of environmental influences are very minimal, particularly for shared environmental factors, such as parenting (Moffitt, 1993). Following Moffitt's reasoning, intervention programs targeting reduction of early onset antisocial behaviors through altering socialization processes, including altering parenting practices, should have limited effects in causing change in those behaviors outside of the normal developmental trajectory.

Nonetheless, numerous intervention programs have been able to reduce antisocial behaviors within various age groups (LeMarquand, Tremblay, & Vitaro, 2001). For instance, Frey and Weller (2000) utilized social skills training, as part of a behavior management and interpersonal skills training, to effectively reduce aggressive behaviors among mental health patients, ranging in age from 21 years to 67 old, diagnosed with psychotic, mood, and personality disorders, who were at high risk for violence against themselves and others. Strictly by teaching these patients respectful treatment of themselves, other patients, and the staff, these researchers and clinicians alleviated some of the aggression issues within that facility. Because the genetic and biological

components of antisocial behaviors provide the foundation on which environmental influences are built, they supply a pivotal starting point for the presentation of the literature.

Biological influences. Biological factors that are correlates of youth violence include low resting heart rate (Raine, 2002), prefrontal dysfunction (Raine, 1997), attention problems (Herrenkohl et al., 2000), and neurotransmitter imbalance (Lane & Cherek, 2000). The coexistence of aggression and these biological factors does not insinuate a causal or direct relation. For example, clearly not all youths who have neurotransmitter imbalance become violent and not all violent youths suffer from neurotransmitter imbalance. These researchers have merely found a correlation between aggressive tendencies and these risk factors. For instance, Raine (2002) found that violent youth tend to have lower heart rate and exhibit a low level of arousal to fear and anxiety. He has postulated that youth who have a low resting heart rate and low level of arousal might seek dangerous or physiologically arousing situations (which often involve or lead to aggression) in order to become stimulated. Although low resting heart rate and poor concentration have been implicated as salient predictors of violence during adolescence, the question of whether these factors can be attributed to genetic or environmental factors remains unanswered (Raine) and the causal relation warrants further investigation.

Impulsivity, defined as acting in a risky and hasty manner without reflection and the ability to focus (Lane & Cherek, 2000), has also been associated with higher levels of aggression, antisocial, and problematic behaviors (Cooper, Wood, Orcutt, & Albino, 2003). Impulsivity, which is correlated with lower levels of serotonin (Lane & Cherek), might have a causal link to the development of antisocial and aggressive behaviors. In

fact, Barratt (1994) has argued that impulsivity is a precursor of violence and aggression, inferring a unidirectional causal relationship. Although Lane and Cherek concluded that impulsivity and aggression are both correlated with lower levels of serotonin, others have argued that serotoninergic dysfunction, potentially caused by polymorphisms in the serotonin transporter (5-HTT) gene coding, predisposes individuals to aggression (Manuck et al., 1998), suggesting a causal relationship between low serotonin and higher levels of aggression, particularly for males.

Another correlate of aggression is higher levels of testosterone (Wingfield, Ball, Dufty, Hegner, & Ramenofsky, 1987). Although animal research has shown that increasing testosterone leads to higher rates of aggression and antisocial behaviors within nonhuman animals (Wingfield et al., 1987), within the human species the relations between social behaviors and testosterone are still being determined. For instance, although males are more likely to be physically aggressive (Bjorkqvist, Lagerspetz, & Kaukiainen, 1992; Tallandini, 2004), females are equally likely to behave in other antisocial manners, such as stealing, lying, and cheating (Tiet, Wasserman, Loeber, McReynolds, & Miller, 2001). Males are also more likely to participate in confrontational direct forms of aggression whereas females are more likely to engage in indirect forms of aggression wherein the victim would not know who the aggressor is (Bjorkqvist et al.). Empathy has been linked to the development of prosocial behaviors (Grusec, Davidov, & Lundell, 2002) and lack of empathy to the development of antisocial behaviors (Quinsey, Skilling, Lalumiere, & Craig, 2004). The link between maleness and aggressive behaviors could be possibly explained by how social behaviors and empathy are socialized within children. For instance, parents have reported that prosocial behaviors

(sharing, kindness, being considerate, and making self-sacrifices) are valued more for daughters than sons (Grusec et al.). If a parenting intervention program alters social behaviors across the sexes, the socialization of those behaviors, as opposed to the level of testosterone, would be supported.

Lastly, the correlational and cyclical relations between children's attention problems and activity levels and antisocial behaviors have been well-established. Attention problems and hyperactivity have been correlated to aggression, antisocial behaviors (Farrington, 1989; Herrenkohl et al., 2001a), and academic problems (Faraone, Biederman, & Kiely, 1996). Academic failure has also been correlated with antisocial behaviors (Farrington; Hawkins et al., 2000). Children who are difficult to discipline and have behaviors that increase the stress level of the parents, such as hyperactivity, attention problems, or school failure, most likely evoke the harshest forms of parenting (Collins et al., 2000; O'Connor et al., 1998; Patterson, 1986). Coercive or punitive disciplines are often utilized by parents who have been taxed by the children's behavior and children's poor behavioral and academic outcomes are often mediated by poor parenting practices (Patterson). Regardless of where the cycle begins, parenting practices and children's behavioral outcomes are strongly correlated with each other. Determining any causal link between parenting practices and children's behaviors would provide a better understanding of this cyclical pattern and assist in separating the effects of one on the other.

Genetic factors. Researchers have also argued for a genetic basis of variations in aggression (Caspi et al., 2002). Individual differences in behavior can best be studied with behavioral genetics (DiLalla, 2002). In fact, DiLalla has speculated that

developmental studies of behavior can be significantly improved by combining developmental methodologies with behavioral genetics techniques. Other researchers have cautioned against interpreting findings from nonbehavioral genetics studies because they do not account for the effects of genetics (Pike, 2002). The interaction of genetics and environment is often studied by analyzing antisocial behavior concordance rates in monozygotic and dizygotic twins, siblings, and adopted children. Such techniques thus far have revealed a strong heritability, ranging from .34 to .70 (Pike), for antisocial, aggressive, and violent behaviors (DiLalla), suggesting a genetic basis for antisocial behaviors.

Volavka (2002) has explained the genetic links to aggression as follows: The gene that codes for monoamine oxidase (MAOA) causes individuals to be more prepared or primed for aggression. When this gene is knocked out in mice, they exhibit far more bouts of aggression. The MAOA gene adjusts the neurotransmitters that are responsible for the regulation of responses to stress (Morell, 1993). If these neurotransmitters are not sufficiently broken down, the response to stress will be far more extreme and most likely will be violent and aggressive (Morell). Caspi et al. (2002) have asserted that the levels of MAOA expression moderate the manifestation of antisocial behaviors (such as aggression and violence) that result from maltreatment during childhood. These researchers have reasoned that children with higher levels of MAOA expression exhibited a weaker response to maltreatment, postulating an explanation for individual differences in children's response to harsh parenting.

Based on behavioral genetics studies, some researchers have proposed that after accounting for the influence of genetics, minimal amounts of the variance in antisocial

behaviors can be accounted for by the shared environment, specifically parenting (Rowe, 1994; Scarr, 1992). Harris (2000) has proposed that the effects of genetics and peer socialization primarily determine development. She has further argued that the role of parenting on development has been overestimated in numerous correlational socialization studies of child rearing. Conversely, Volavka (2002) has argued:

> Twin and adoption studies provided strong evidence for congenital and at least partly genetic effects on crime, aggressiveness, impulsiveness, and irritability. The propensity toward violent behavior results from interactions between genetic, prenatal, and perinatal factors. The effect of these factors is then modified by rearing environment (p. 163).

Some behavioral genetics researchers have concluded that innate factors, such as temperament, provide a more accurate relational pathway between parenting practices and children's behavioral outcomes (Pike, 2002). It has been argued that socialization researchers rely on correlational findings between parenting practices and children's outcomes to account for children's behaviors and development (Harris, 1998). Behavioral genetics research provides a different perspective and explanation for the relation between parenting practices and children's behavior: the correlations between harsh parenting and antisocial behaviors can be better explained by evocative genotype-environment correlations (Scarr, 1992). Because parents and children share both genotypes and environments, the genotype that causes children's aggressive or antisocial behaviors increases the likelihood of harshness from parents, which in turn increases aggression and antisocial behaviors in children.

Based on their longitudinal study of aggression, Caspi and Silva (1995) concluded that certain characteristics of temperament during childhood can predict specific behaviors in adolescence (e.g., impulsivity, aggressiveness, alienation, and danger-

seeking). For example, toddler boys with dysregulated temperament had higher levels of aggression towards peers (Rubin, Hastings, Chen, Stewart, & McNichol, 1998). In accordance with behavioral genetics studies, children's behavior through an intervention should result in changes in parenting practices and not the other way around. The current study was designed to measure changes in parenting practices over time in response to children's behavior at baseline. If the children's initial behavior is a stronger influence on the parenting practices than the intervention, a behavioral genetics perspective would be supported.

Evolutionary perspective. Aggression, particularly among adolescents, often stems from risk-taking behaviors. Risk-taking tendencies, which have been affiliated with aggression, serve an adaptive purpose in that they increase the likelihood of gaining status, resources, and mates (Quinsey et al., 2004). It is conceivable that risky behaviors might provide adolescents with a sense of independence and capability to survive without the family. Coie and Dodge (1998) have determined that aggressive behaviors are most prevalent during adolescence, in particular physical aggression. Perhaps the increase in aggressive behaviors during adolescence could serve the same evolutionarily adaptive functions as risk-taking behaviors. For an adolescent or young adult, it might be advantageous to be more aggressive if that aggression demonstrates to others within the adolescents' social environment the strength, independence, and status of that adolescent. If confronted by a risky or potentially death-threatening situation, it could be much more evolutionarily adaptive to become aggressive. For instance, living in a high-crime neighborhood might necessitate being aggressive to survive environmental threats such as other violent youth in the neighborhood or violent/abusive parents. It is, therefore,

acknowledged that under some circumstances, some antisocial behaviors may increase the likelihood of survival and reproduction. However, that evolutionary advantage can be counterproductive, even detrimental, in today's society where the societal expectations of peaceful and civilized conduct are held in higher regard in most instances.

An evolutionary perspective that emphasizes the size and physical strengths required for surviving physically aggressive situations has been used to explain why a larger percentage of violent and aggressive youths have been male (Harris, 1998). However, this perspective fails to explain why there has been a continuing increase in violence among adolescent females in recent years (Potter, 1999). Rutter (1997b) has argued that it is not plausible that behaviors deemed unacceptable within a society would be coded within its members' genes, particularly because societal laws and norms can be changed and often do change. For example, laws within numerous states were recently changed to make it illegal for students to carry any form of weapon, including paring knives, to school. Based on Rutter's argument, it would be inconceivable that evolutionary explanations alone could be used as the basis for this newly-deemed aggressive behavior. Perhaps humans are biologically, genetically, or evolutionarily hard-wired for aggressiveness; therefore, it is important to determine if interventions can be used to replace instinctual aggressive responses with more socially desirable skills (i.e., negotiation and refusal skills).

Socialization: The Nurture of Antisocial Behaviors

Some researchers have focused on environmental factors that influence the development of social behaviors, such as parenting styles and skills used in the adolescents' homes (Gershoff, 2002; Stormshak et al., 1998; Stormshak et al., 2000),

socioeconomic background, and neighborhood (Hipwell et al., 2002; Molnar, Buka, Brennan, Holton, & Earls, 2003). Exposure to family violence (Dodge et al., 1990; Farrington, 1989; Herrenkohl, Huang, Tajima, & Whitney, 2003), media violence (Huesmann, Moise-Titus, Podolski, & Eron, 2003; Pettit, Bates, Doge, & Meece, 1999), antisocial peers (Beyers, Loeber, Wikstrom, & Stouthamer-Loeber, 2001; Pettit et al., 1999), and drugs and alcohol (Brook, Whiteman, & Finch, 1992; Herrenkohl et al., 2001a; Herrenkohl et al., 2000) are also considered environmental influences on antisocial behaviors. An strong and cohesive social network has also been found to protect adolescents against developing antisocial behaviors (Ceballo & McLoyd, 2002).

Environmental precursors of aggression. Many home, school, and community environment factors have been correlated with aggressive and antisocial behaviors. The National Youth Violence Prevention Resource Center [NYVPRC] (n.d.) delineated the following home and school risk factors as increasing the likelihood of becoming delinquent by adolescence: coercive, punitive, and inconsistent parenting methods; low emotional support from and involvement with parents; becoming involved with antisocial peers or being rejected by peers; and low school achievement. Exposure to violence was also implicated by NCIPC (2001) as being a risk factor for developing aggression during adolescence. Community and societal factors that increase the likelihood of aggression include presence and tolerance of alcohol, tobacco, and other drugs (ATOD), firearms, and crime within the youths' environment (NYVPRC). Several others have implicated the same risk factors (American Psychological Association and American Academy of Pediatrics, n.d.; Department of Health and Human Services, n.d.; Hawkins et al., 2000; National Youth Violence Prevention Resrouce Center, 2001).

As previously indicated, many researchers listed parenting practices as one of the risk factors for developing antisocial behaviors (Collins et al., 2000; Farrington, 1989; Hawkins et al., 2000; Stormshak et al., 2000; Westman, 1994). Behavioral genetics theorists have countered that parenting plays a minimal role in the development of children's and adolescents' social behaviors, particularly antisocial behaviors (Rowe, 1994; Scarr, 1992). Although Harris (2000) has conceded that the effects of parenting exist in the home, she has claimed that those effects would not transfer or would have limited transferability to other social arenas (such as school or the playground). Nonetheless, antisocial and oppositional behaviors manifested in the home at an early age are often predictors of later delinquent behaviors, even in other arenas (Farrington & Loeber, 2000; Farrington, Loeber, Yin, & Anderson, 2002).

Direct effects of parenting. Classic socialization theorists (Baumrind, 1991) have asserted that parents exert much influence over developmental outcomes, in particular in terms of academic adjustment and success (Baumrind, 1971, 1991; Dornbusch, Ritter, Leiderman, Roberts, & Farleigh, 1987; Steinberg, Lamborn, Darling, Mounts, & et al., 1994; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Strage & Brandt, 1999) and overall emotional and psychological wellbeing (McClun & Merrell, 1998; Shucksmith et al., 1995). Researchers have also studied the effects of parenting on antisocial behaviors (Coie & Dodge, 1998; Gershoff, 2002). For instance, the use of corporal punishment in the home has been associated with higher levels of aggression (Gershoff, 2002; Strassberg, Dodge, Pettit, & Bates, 1994; Weiss, Dodge, Bates, & Pettit, 1992). In a longitudinal study to identify predictors of criminality in adulthood, Huesmann, Eron, and Dubow (2002) found that for males the best predictors of adult criminality are the

level of aggression manifested by age 8 and the parents' strong belief in punishment. The World Health Organization (2002) has determined that, "Experiencing harsh physical punishment or witnessing violence in the home, lack of supervision and monitoring by parents, and associating with delinquent peers" are important defining factors of aggression expressed in childhood and adolescence (p. 14). Dodge et al. (1990) deduced that regardless of child's temperament or impulsivity level, physical abuse was a stronger predictor of aggression towards peers.

Many researchers agree that the level of physical punishment used in the home during childhood is positively correlated with children's later manifestation of aggression (Farrington et al., 2002; Loeber & Farrington, 2000). For instance, physically aggressive parenting has been linked to children's aggressive behaviors in the home and in school (Strassberg et al., 1994). In fact, Stormshak et al. (1998) found that externalizing problems at home effectively predicted kindergarten children's adjustment difficulties in the classroom, including aggressing towards peers. In comparing children whose parents did not spank, spanked, or used violent discipline, Strassberg et al. found that although the children who received harsh discipline had the highest rates of aggression, the spanked children (both boys and girls) had significantly more acts of aggression than the nonspanked children. Similar effects of punitive discipline are observed even when the researchers controlled for other potential confounds, such as SES, marital violence, and child temperament (Weiss et al., 1992).

Children's compliance with authority is often considered a positive aspect of children's behavior and corporal punishment often leads to immediate compliance (Gershoff, 2002); nonetheless, corporal punishment is also associated with higher levels

of aggression (Gershoff; Strassberg et al., 1994; Weiss et al., 1992). When corporal punishment is the primary form of discipline used in the home, children often learn that aggression is an effective response to frustrating or anger-provoking situations. This misconception might be due to the fact that, as Gershoff stated, they find themselves complying when their parents aggress towards them. Therefore, if compliance from a peer is desired, they are more likely to aggress towards that peer to achieve compliance. These findings are consistent with Bandura's social learning theory (1973) in that children have a tendency to exert aggression towards others in frustrating or anger-arousing situations when that is the manner in which their parents handle frustration or anger. Therefore, social learning theory has been used to build the foundation for the socialization model, indicating that aggression is learned through imitation and vicarious reinforcement (Patterson, 1986). Furthermore, parents influence the development of social behaviors with the level of importance they place upon such behaviors (Grusec et al., 2002). For example, parents are more likely to value and reinforce prosocial behaviors within their daughters yet tolerate antisocial behaviors from their sons.

Indirect effects of parenting. Another risk factor for youth violence is a deficiency in social cognition and social skills (NCIPC, 2001). Weiss et al. (1992) explained that harsh discipline seems to affect the development of the ability to process social information. Physically abused children often lack the ability to solve interpersonal social problems and have limited problem solving and social skills (Dodge et al., 1990). Because they lack the ability to resolve issues in more socially accepted manners, harmed children will often resort to aggression (Dodge et al.). Prior researchers have successfully altered children's aggressive behaviors, in spite of most risk factors (except for maternal

use of corporal punishment and excess force), by implementing social skills and problem-solving training (Webster-Stratton, Reid, & Hammond, 2001). Not only were these researchers able to reduce aggressive behaviors in children, they were also able to reduce other problematic behaviors (e.g., distractibility, inability to focus/pay attention).

Hindered social information processing might prohibit children from behaving in a prosocial manner and cause them to behave more aggressively. For example, children who have limited information processing skills are more likely to misinterpret others' behaviors as being hostile towards them, causing them to react in more aggressive manners (Conduct Problems Prevention Research Group, 2002; Slaby & Guerra, 1988). In particular, reactively aggressive children are predisposed to make attribution errors and misjudge the reasons for others' intentions towards them (Dodge & Coie, 1987). Even mothers' attribution style affects children's development of antisocial or problematic behaviors in that mothers who made hostile attributions when explaining their children's behaviors were more likely to have children who exhibited problematic behaviors at school (Nix et al., 1999). Prevention programs that have focused on altering children's cognitive and social skills have been successful in reducing antisocial behaviors and increasing prosocial behaviors (Eron et al., 2002; LeMarquand et al., 2001; Lochman, Barry, & Pardini, 2003; Tschann et al., 2002) in spite of the origins (genetic or biological) of those behaviors.

Other theories have been offered to explain the relation between harsh punishment in the home and the level of aggression manifested outside the home. Researchers have found a deficit in development of emotion regulation in children who have been either maltreated or exposed to excessive amount of interparental violence

(Maughen & Cicchetti, 2002). These researchers found a negative correlation between the level of violence observed by children and the ability to regulate their own emotions. Maughan and Cicchetti have argued that the socioemotional development of these children is hindered because they do not observe their parents using proper emotion regulation. In a study of bullying and victimization among children at a day camp, it was concluded that children with deficits in the ability to regulate their emotions were most at risk for becoming bullies or victims (Shields & Cicchetti, 2001). Furthermore, children whose parents did not display regulation of emotions (such as anger, frustration, and other forms of emotional arousal) were more at risk for displaying the same emotional dysregulation (Shipman & Zeman, 2001). These researchers suggested that emotional regulation (or lack thereof) can be learned through socialization, such as observing parents exercise emotion regulation or being reinforced for displaying emotion regulation.

The Need for Research on Causal Links

Regardless of the heritability of social behaviors, the genetic and biological factors often interact and overlap with environmental influences (O'Connor et al., 1998; Pike, 2002; Volavka, 1999). For example, Volavka has argued that the more potent precursors of aggression include attention deficit hyperactivity disorder, child abuse, and inconsistent, punitive discipline. Conversely, researchers are cautious about interpreting correlational results of parenting on children's behavior, as the children's genes might be evoking specific (i.e., harsher) responses from the parents (Pike, 2002). Children at genetic risk for aggressive behaviors, for example, were found to receive harsher responses from their parents (O'Connor et al., 1998). Due to the contradictory

correlational findings and limited causal studies in the literature, there is a vital need for the establishment of causal links between parenting and the development of social behaviors.

Behavioral genetics researchers rely upon twin and adoption studies to differentiate between genetic and environmental influences. Nonetheless, most of these researchers acknowledge that the effects are difficult to separate even when using these methodologies, because it is still possible for environmental influences to overlap with genetic influences (Cohen-Bendahan et al., 2004). For instance, when studying the effects of increased levels of testosterone exposure on cerebral lateralization in girls from opposite sex twins, Cohen-Bendahan et al. acknowledged that increased masculine behaviors of the girls from opposite sex twins could be explained by the social exposure to having a male twin, not just to the increased testosterone.

Socialization researchers have been criticized for using correlational findings to support their arguments that environmental factors, specifically parenting, affects the development of social behaviors (Harris, 1998). It is acknowledged that many biological and genetic factors, such as the MAOA gene (Caspi et al., 2002, 2003; Volavka, 2002), serotonin levels (Caspi et al.; Lane & Cherek, 2000; Manuck et al., 1998), temperament (Rubin et al., 1998), and testosterone (Volavka), interact with children's environments to affect social behavior; however, many of these findings are correlational as well. There is a need for studies that test the causal relationships between parenting practices and children's developmental outcomes (Collins et al., 2000).

Given the negative impact of aggressive and antisocial behaviors on the lives of the protagonists (e.g., imprisonment or gang involvement) and their victims (e.g., injury

or death), it would be beneficial to ascertain the causal link between parenting and antisocial behaviors. If reducing punitive child-rearing practices results in reduction of oppositional and problematic behaviors in children, then a causal link would be supported. Establishing a causal link would be beneficial because oppositional and problematic behaviors in childhood have been found to be precursors of aggression and delinquency during adolescence and adulthood (Hamalainen & Pulkkinen, 1995; Hawkins et al., 1998; Ostrander, 2004; Webster-Stratton, 2000). If it can be shown that social behaviors can be effectively altered by a parenting intervention program, then the shared environment can be considered a more influential factor than some researchers have implied (e.g., Harris, 2000).

The Need for Intervention Studies

According to Harris (2000), one of the most effective ways of studying parental influences is by assessing the impact of an intervention program on long-term changes in behavior. Using longitudinal intervention studies can help clarify the bidirectional relationship of individual and situational effects on aggressive and antisocial behaviors (Collins et al., 2000). Intervention studies also disentangle evocative effects from parent effects because if changing parenting results in a change in social behaviors, then those behaviors could not be entirely due to genetic or biological factors. If it can be shown that children's behavior remains the same across time in spite of changes in parenting practices, then the behavioral genetics perspective that children's behavior is determined by their own genes or biology, more so than the parenting they receive, will be supported. However, if it is found that changes in parenting practices results in changes in children's behavior, then a socialization perspective will be upheld. Therefore, a longitudinal

parenting prevention program, called DARE to be You, was used to test the causal effects of parenting practices on children's oppositional and problematic behaviors.

Logic Model of the DARE to be You Program

The DARE to be You program (DTBY) is grounded in two theoretical models: an ecological model of development and social cognitive theory (for a detailed explanation of the program see Miller-Heyl, MacPhee, & Fritz, 2001). It has been argued that the "only appropriate model [for parent prevention programs] is an ecological one that emphasizes the interplay of organismic and environmental forces" (Garbarino, 1990, p. 169). Luthar, Cicchetti, and Becker (2000) have concluded that resilience is affected by both the family and the wider social environment (including school and community). These researchers have indicated a need for not only theoretical models of prevention and intervention, but also programs that consider multiple contexts that influence the developmental process. Dodge and Pettit (2003) concurred that sociocultural contexts (family, school, and peers) need to be considered in children's outcomes. Nonetheless, individual factors (developmental level, sex, temperament, skills) must also be considered (Dodge & Pettit). As Roth and Brooks-Gunn (2003) argued, it is insufficient to place at-risk children in programs without focusing on improving their environments (home, school, and community). Multifaceted and multicontextual programs that recruit families with multiple risks are more effective at prevention of problem behaviors, particularly when one of the primary focuses of the prevention program is to increase assets and tools of the participants such as self-efficacy and self-esteem (Reynolds & Ou, 2003; Rutter, 1990). Because of its emphasis on the contextual aspect of development as well as individual attributes, DTBY is an ideal program for the current study.

The DTBY program elements thoroughly covered many of the previously outlined correlates of antisocial behaviors. The goal of the DTBY program was to reduce the risks of child maltreatment, and other negative outcomes such as child oppositional behavior, through parent (family) training, teacher training (in this case childcare provider training), and enhancing peer and social network systems (Miller-Heyl et al., 2001). The premise of the program was to prevent negative outcomes for the children by increasing the children's self-efficacy, self-esteem, internal locus of control, decision-making, problem-solving, and communication skills, while training parents to use less child blaming and more effective limit setting, increase parental self-efficacy, use internal locus of control, and improve problem-solving, decision-making, and communication skills. Age-appropriate activities geared towards the development of such skills are implemented for groups of parents, groups of children, and teams of parents and children. For example one of the self-esteem and self-efficacy building activities includes parents and children working as a team to list children's positive, yet accurate, characteristics that are important to the parents. Then parents present the list to other families in the program so that their children have the opportunity to hear parents describe positive characteristics about them. Hearing their parents provide such positive aspects helps children build a higher level of self-esteem and self-efficacy (because the parents are emphasizing not only positive and accurate characteristics but also ones that are important to them).

Simultaneous with helping children develop stronger self-efficacy and self-esteem, the parenting curriculum emphasizes parenting self-efficacy and self-esteem. Through the parenting curriculum, parents learn to identify their children's and their own personal strengths. Parents also learn about the aspects of their parenting practices that

are within their control. They learn how to appraise their own and their children's behaviors, beliefs, and thoughts. Parenting strategies, such as giving honest and positive feedback to children, knowing how to rely on own appraisals (as opposed to others' appraisals), are emphasized and practiced over the 12-week program. Cognitive skills, including but not limited to communication skills, decision-making, prioritizing, problem-solving, social skills, and using internal attributional style, are also learned and practiced in the program. For example, parents participate in an illustration activity called strings, wherein they learn the effects of external stressors that are not properly prioritized.

Because of the theoretical foundation of the program, not only was parent training provided on topics such as discipline strategies, parental self-efficacy, locus of control, and normalizing parenting issues, teacher (or in this case childcare providers) training was also implemented into the program. Teachers who participated in the program learned specific activities for establishing group norms, fostering efficacy, motivation, and creativity. For example, teachers learn how to focus on the process of learning as opposed to the outcome. The children were also engaged in developmentally appropriate activities with teen mentors who role modeled effective social relations. Stress management techniques were also taught to the parents. Finally, an effort was made to enhance the social support systems of the families involved in the program. The primary focus of the program was to enhance parents and children's self-efficacy, improve social skills and relations, reduce stress by increasing social support, improve coping with stressors by learning how to prioritize and problem solve, and foster communication

skills. By helping parents build a social network consisting of other parents, the program provides opportunities for normalizing parenting concerns and difficulties.

DTBY, an evidence-based program, was designed with attention given to specific limitations of prior prevention programs (Miller-Heyl et al., 2001). For instance, a large sample of at-risk families was recruited so that there was adequate statistical power to detect modest effect sizes, and so that potential moderators (e.g., risk status, site, and ethnicity) could be examined. Also, random assignment to the intervention and control groups improved the likelihood that effects that were found were due to the program. Several instruments were used to reliably measure the core constructs. All three of these characteristics of the DTBY program have been implicated as essential for developing successful parenting programs (Garbarino, 1990).

The DTBY program targeted families with children between the ages of 2 and 5 years who were at-risk for maladaptive outcomes (parental harsh punishment, children's oppositional and maladaptive behaviors, risk-taking behaviors later in adolescence). The families that were recruited had, on average, three of the following risk and marker variables: low parental education, economic disadvantage, history of mental health issues requiring treatment in the 6 months prior to the program, history of substance abuse by a family member or high rate of substance abuse within the family, teen parent, low social support, foster parents, and history of violence or delinquency, most of which have been listed as risk factors for children becoming aggressive or violent in later years (Farrington, 1989; Hawkins et al., 1998). Although 73% of the families had at least four of the risks present, a majority of the families in the intervention group benefited from the program (Miller-Heyl et al., 2001). For some of the variables, the families with greater

risk appeared to benefit even more from the program. Overall, two years after the program, significant changes in child-rearing practices were detected between the intervention and control groups (Miller-Heyl et al.). The purpose of the current study is to determine if these significant changes in parenting resulted in lower levels of subsequent oppositional and antisocial behaviors. For the reasons stated thus far, DTBY would be an exemplary program to test the hypothesis that reducing harsh parenting and increasing democratic parenting practices would yield a reduction of negative outcomes for the children, specifically, oppositional and antisocial behaviors.

Hypotheses of the Current Study

A longitudinal intervention program that used random assignment to intervention and control groups can be used to test the research question, "Is there a causal link between parenting practices and children's behavioral outcomes?" (Collins et al., 2000). Based on prior research, it was predicted that altering parenting practices through an intervention program would result in changes in children's behavioral outcome. More importantly, the effects of the intervention on children's oppositional and problematic behaviors would be mediated through changes in parenting practices. In order to test such a mediational model, it is important to first establish that parenting practices and children's behaviors are correlated. Second, the patterns of change in parenting practices and behavioral outcomes must be in the predicted direction (decline in harsh parenting practices and decline in children' oppositional and problematic behaviors). Then, a mediational model of the relation between parenting practices and behavioral outcomes can be tested. Therefore, the first four hypotheses are stepping stones to the development of the parallel process latent growth model that was used to test the mediational model to

determine the causal relation between parenting practices and children's behavioral outcomes.

H_1: There is a positive correlation between coercive parenting practices (e.g., harsh punishment and authoritarianism) and oppositional and other problematic behaviors.

H_2: The intervention group will have a decrease in use of coercive parenting practices over the course of the intervention and at the follow-ups.

H_3: The children whose families participated in the intervention program will have a decrease in oppositional and other problematic behaviors over the course of the intervention program and at the follow-ups.

H_4: The oppositional and problematic behavior of children at the beginning of the program will be positively correlated with increases in negative parenting and decreases in positive parenting. However, this impact will not exist for families within the intervention group.

H_5: The effects of the intervention will be mediated through changes in parenting practices, establishing a causal link between parenting practices to children's behavioral outcomes. A lack of mediational effect would support the notion that the comprehensive program altered children's behavior, but that change cannot be attributed to changes in parenting practices.

CHAPTER 3

Methods

This study involved analyses of data from the first intervention trial with the DARE to Be You program (DTBY). The participants, measures, and procedures of the original study are described below.

Participants

Participants were recruited at four sites in Colorado: metropolitan Colorado Springs; the San Luis Valley, an isolated agricultural area in south-central Colorado; Towaoc, on the Ute Mountain Ute reservation in the Four Corners area; and Montezuma County, an ethnically mixed area including Cortez. Eligible families, mostly low-income, were randomly assigned, in a 2:1 ratio, to the intervention and control groups, resulting in more participants in the intervention group.

A total of 744 individuals participated in the project: 472 intervention and 272 control parents who began the DTBY prevention project. Baseline, 12-month, and 24-month data were available for the first three cohort groups. The primary caregiver who completed the questionnaires and participated in the intervention (for the intervention group) will be referred to as the caregiver for the remainder of the paper. Demographic factors that describe the sample from the original study (MacPhee & Fritz, 1995, March) are:

- The mothers and fathers were typically high school graduates (*M* education = 12.7

years; range of 7-22 and *F* education = 14.47, range 2-24), although 26.4% were high school dropouts. The Towaoc caregivers were more likely to have dropped out of school.

- They worked as unskilled laborers or service workers (average occupational status = 30 on a scale from 0 to 93). The occupational status average was 27 for mothers and 30 for fathers. This difference was not statistically significant.
- The median (50th percentile) annual family income was $14,500 a year, or at poverty level (with an average of 4 persons in the household). Not surprisingly, 45% of the families received some form of welfare and many (23%) had sought help from an employment or financial assistance agency.
- This was an ethnically diverse sample: 22% Hispanic, 29% Native American, 2% Black, and 45% White. The ethnic mix was different at each site: Most Towaoc parents were Native Americans (98.5%), San Luis was predominantly Hispanic (64%), and Montezuma County was mostly White (81%). Colorado Springs included a heterogeneous mix of American Caucasian (53%), Hispanic (21%) and African American (16%) caregivers.
- Most of the participants were either married (53.7%) or cohabiting (10.7%); the rest were single (15%), separated (7%) or divorced (12.6%). Compared to the other sites, more of the Ute Mountain participants were single and more of the Colorado Springs parents were separated or divorced (43%).
- The mothers averaged 29.7 years of age and the fathers 31.5 years of age. The women had their first child at an average age of 22.2 years (30% as teenagers). Their youngest child was 3.15 years of age, and there were 2.4 children per family

on average, with Colorado Springs parents having fewer children.

- Less than one in five participants had sought individual or family therapy in the previous 6 months, but there was wide variation by site in such help seeking. Caregivers in Towaoc and the San Luis Valley were less likely to seek therapy, due perhaps to lack of access or financial resources, or to cultural differences in support.
- Few parents had a child placed in foster care within the previous year (less than 3% of the families), except at Towaoc where 16.7% of the families had at least one foster placement.

Attrition. Attrition was high in the control group, especially in the San Luis Valley; none of the control families in the San Luis Valley completed year 2 follow-ups. The overall attrition in year 2 was 39.4%. To test for selective attrition, the program evaluators divided all participants in the first three cohorts into those who had completed the 24-month follow-up questionnaires versus those who had dropped out of the study. These two groups were compared on 7 demographic variables (i.e., age, education, occupation, family income) and 10 measures of self-esteem, child rearing, and child behavior, to determine if the drop outs differed at entry into the program. Only three significant differences were noted: Mothers who had dropped out were younger (28.42 versus 29.89 years) and less satisfied with the parental role (19.61 versus 20.47), and fathers who dropped out were less educated (12.12 versus 12.88 years). However, the groups were more similar than different, suggesting that selective attrition was not a problem (MacPhee & Fritz, 1995, March).

Missing values. Missing values were imputed using the expectation maximization algorithm, which maintains the same variance and covariance of the overall data set while calculating missing values. This method has been found to be more reliable and accurate than other methods for imputing the missing data (Enders, 2003).

Final number of participants. For the current study, after attrition and missing values imputation, there were 678 participants: 433 in the intervention group and 245 in the control group. Of the primary caregivers who completed the survey questionnaires, only six were fathers and the remainder mothers. All analyses for the latent growth modeling, including the parallel process latent growth model, were conducted using these participants. The demographic information of the participants is described in Table 1.

Table 1

Participants' Demographics

Category	Description	Intervention	Control
Kids' age range		1 – 6 years old	1 – 6 years old
Biological Sex of Child	Male	207 (48%)	115 (47%)
	Female	226 (52%)	130 (53%)
Ethnicity	Hispanic	90 (21%)	50 (20%)
	Native American	149 (34%)	77 (31%)
	Caucasian	174 (40%)	110 (44%)
	African American	16 (4%)	8 (3%)
	Asian	3 (1%)	0 (0%)
	Other	1 (<1%)	0 (0%)

Procedure

Group testing was the norm, although individual assessments were given when it was difficult to arrange for the participant to attend the group testing. Paper-and-pencil surveys were administered to all participants. When necessary, a trained data collector orally administered the measures. An administration manual provided guidelines for how to administer the measures. Code numbers but no other identifiers were written on the booklets.

Participants were offered substantial incentives for participation. Families in the control group received $30 upon completion of each set of measures (i.e., at baseline and each follow-up). Parents in the intervention group received $200 at completion of the DTBY workshops, which included the baseline and first follow-up measures. If participants did not complete the workshops, they received the $30 for completing the measures. As part of a long-term retention program, reinforcing classes that occur 6-12 months after enrollment also carried an incentive. For completion of 8 hours of reinforcing classes, the parent received an additional $50. Other program incentives and retention strategies included meals for the family classes, a quality children's educational program, the possibility to be employed as a teacher in the children' program upon completion of the family classes (which provides job training and mentoring in education), development of a support system, and transportation vouchers.

Measures

Given the diversity of the target families, it was important to evaluate the cultural relevance of the assessment instruments. Steps were taken by the researchers to evaluate

the cultural sensitivity of the measures used. For instance, human services professionals, who were members of or familiar with local ethnic groups, reviewed all measures for cultural relevance. To further assess cross-cultural equivalence, alpha reliabilities were computed, within ethnic group for each outcome measure, and scalar equivalence was evaluated with regression procedures (Knight, Virdin, & Roosa, 1994). The regression coefficients were equivalent across ethnic groups (MacPhee, Fritz, & Miller-Heyl, 1996); the alpha coefficients were similar to those from standardization samples and did not vary with ethnicity by more than ±.06. Readabilities were assessed through computerized text analyses at the 6th grade level or lower.

How antisocial behaviors are defined can make a significant difference on the outcome of studies (DiLalla, 2002). Some of scales from the original DTBY study are described below. Only select items from the following scales were utilized to create new composite items that were relevant to the current study. The composite items for the current study are explained following the descriptions of the survey instruments.

Social skills and competence. The Behavior Checklist for Infants and Children scale, created by MacPhee, Benson, and Bullock (1986), was used to measure changes in children's behaviors. The BCIC contains brief descriptions of 42 child behaviors, the frequencies of such behaviors, and how problematic they are for the caregiver. The BCIC also contains items measuring social competence (i.e., sharing, getting along with peers). Program evaluators found the reliabilities for the Total Problem score to be greater than .90 (MacPhee & Fritz, 1995, March). Content validity was ensured by drawing items from research on infant temperament, young children's social skills, and early-emerging behavior problems. Factor analyses conducted by the program evaluators resulted in item

clusters that replicate prior research on behavior problems and temperament [e.g., Aggression (similar in content to conduct disorders or externalizing behaviors), Dependency (akin to internalizing behaviors), Compliance, Social Relationships, and Activity Level]. Correlations between Frequency and Problem scores for each scale ranged from .05 (Social Relationships) to .75 (Aggression) (MacPhee & Fritz). Convergent validity was demonstrated by a relation between BCIC scale scores and analogous temperament scores (e.g., activity level). Although difficult behavior increased with age, the evaluators concluded that variations in BCIC ratings were unrelated to developmental level as assessed on the MCDI.

Child-rearing practices. Parents completed the Parent-Child Relationship Inventory, short form [PCRI] (Gerard, 1994). The PCRI has three scales measuring child-rearing attitudes and practices: Limit Setting, with 9 items assessing consistent control vs. coercion, and child defiance; Autonomy, with 10 items related to encouraging independence versus being permissive and protective; and Communication (7 items). High scores represent more positive attributes, such as consistent, democratic control. Program evaluators found that alpha (.80-.89) and test-retest (.76-.92) reliabilities were high in both the DTBY and standardization sample. The PCRI is uncorrelated with social desirability, is sensitive to the effects of parent education, and is related to other measures of self-esteem and child-rearing practices (MacPhee & Fritz, 1995, March, 1999, September; MacPhee & Miller-Heyl, n.d.).

Caregivers who completed the questionnaires were also asked how often they used 12 child-rearing practices, reported from 1 (*Never*) to 4 (*Often*). Each strategy includes concrete examples to ensure uniform interpretation. Based on factor analysis conducted

by program evaluators, punitive practices such as spanking and criticizing were combined into Harsh Punishment, with an alpha reliability of .81 and a retest coefficient of .61; a smaller cluster (Rational Guidance; alpha = .64) consists of time out, giving choices, reasoning, and praise (MacPhee & Fritz, 1995, March, 1999, September; MacPhee & Miller-Heyl, n.d.). In terms of validity, feelings of parental competence and the amount of prior caregiving experience were negatively correlated with Harsh Punishment (MacPhee & Rattenborg, 1991), and both measures were sensitive to the effects of intervention. Finally, after each attribution vignette, parents were asked what they would do next to resolve the problematic behavior. These open-ended responses were first content coded for 21 disciplinary and communication strategies. Each strategy is assigned a weight, derived from the mean of four experts' Q-sorts, from 1 (*Most harmful or ineffective*) to 5 (*Most beneficial or effective*); the weights are then summed across vignettes to yield a composite "effective discipline" score. Evaluators found that inter-rater agreement for identifying specific strategies was 85% (MacPhee & Fritz, 1995, March, 1999, September; MacPhee & Miller-Heyl, n.d.).

Constructs used in current study. From the above battery of tests, two parenting and two behavioral variables were used for the analyses in the current study. Parenting was measured with one negative parenting practices measure, the parenting composite score, and one positive parenting practices measure, the vignette reaction score. For each of the constructs, the score used for analyses represents the mean across several items, as described below.

The parenting composite score was comprised of 15 items that measured parenting harshness and authoritarianism. Harshness depicted the method of discipline used by the

parents, including items such as the frequency of hitting, smacking, yelling, and threatening. Authoritarianism was measured by the amount of control exerted by the parent, including items such as "I need to come down hard on my child when he or she acts up; when my child misbehaves, I am gentle but firm (reverse scored item)." A high score on this measure means that the parent used harsh and authoritarian (negative) parenting practices. The parenting composite score used for analyses represents the mean across all 15 items for each participant.

The vignette reaction measured how democratically or nurturing a parent would respond to a hypothetical situation. Parents' reactions to the vignettes were coded as being child-centered, democratic, and nurturant. A high score on this scale equates democratic and nurturing (positive) parenting practices. The vignette reaction score represents the mean of each participant's responses to the vignettes.

Oppositional behavior was measured with a 10-item scale, which included items such as, "My child can't be disciplined; child is defiant, uncooperative, and disobedient; punishment does not change his or her behaviors." A high score on this scale would mean that the child rated high on oppositional behaviors and frequently manifested such behaviors. The oppositional behavior score represents the mean of the participants' responses to the 10 items. Alpha reliability was high for these items (.81).

Overall antisocial behaviors were measured using a 42-item scale, called the BCIC, which includes items such as, "child can't stand still; child can't stand waiting; child shares with other children (reverse scored); child teases or argues with other children; child's demands must be met immediately; child easily becomes jealous, easily frustrated, whiles, or sulks." The BCICP score used in the analyses of the current study

represents the mean of the participants' responses to the 42 items, and a high score means that the child's behaviors were problematic and antisocial.

Analysis Plan

DTBY is a longitudinal intervention program that utilized random assignment of at-risk families to intervention and control groups. The primary purpose of the current study was to analyze the changes in parenting practices and children's oppositional and problematic behaviors over three time points, as caused by the intervention program. When analyzing the changes in behaviors over time, latent growth modeling has been found to be effective in capturing any changes in behavioral trajectories between groups (such as intervention and control groups) (Singer & Willett, 2003). Hypotheses 2 through 4 were tested using latent growth modeling with the EQS statistical program.

When a longitudinal comprehensive intervention program has been utilized to alter several aspects within families, including parenting practices and children's social skills, but the researchers are interested in measuring the direct effects of one aspect, such as parenting practices, on one of the outcomes, such as children's oppositional behaviors, it is recommended to test these effects using mediational parallel process latent growth curve modeling (Cheong, MacKinnon, & Khoo, 2003). The DTBY program, which was the subject matter of this study, was such a longitudinal comprehensive program. The purpose of the current study was to test the changes in parenting practices (the mediator) over time caused by the intervention, while simultaneously testing the changes in children's behavior over time (the outcome) caused by the mediator. The parallel process latent growth modeling is a superior method for testing such a mediational model because it allows for measurement of the effects of the intervention as well as the changes in both

variables (mediator and outcome) over time and the effects of the mediator on the outcome (Cheong et al.). This method is particularly recommended for intervention studies wherein the participants were randomly assigned to intervention and control groups, as was done in the DTBY program. Because of the random assignment to the intervention and control groups, any changes in the behavioral outcome can be causally attributed to the intervention via the mediator, if the indirect model is significant (Cheong et al.).

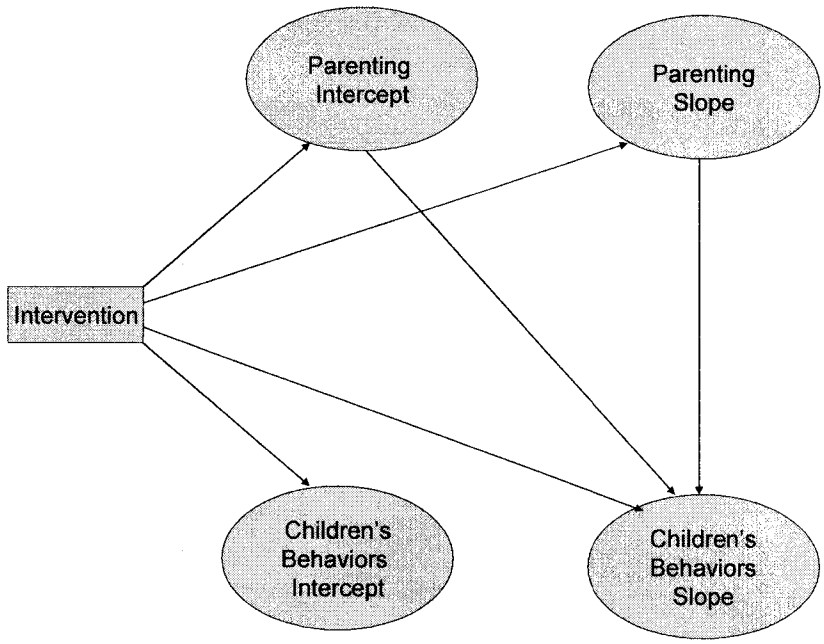
In order to test the mediational effect of parenting practices on children's behavioral outcomes, it is necessary to first establish the long-term pattern of change for each construct (Cheong et al., 2003). Correlations and latent growth models were used to first establish the effects of the intervention on the mediator (parenting practices) and the outcome (oppositional behaviors and overall problematic behaviors) before the mediational model was tested. Hypothesis 5 was tested using the mediational parallel process latent growth curve modeling, using the MPlus statistical program. Hypotheses 4 and 5 are illustrated in Figure 1. This model served as the basis for the analyses that were computed.

The questions that guided the analyses are as follows:

1. Are parenting practices and children's behavioral outcomes correlated with each other (hypotheses 1)?
2. Were the changes in parenting practices and children's behavioral outcomes in the predicted directions (reduction of harsh parenting, increases in democratic parenting, and reductions in children's oppositional and problematic behaviors) (hypotheses 2 – 4)?

3. Did the changes in parenting practices mediate the effects of the intervention on the children's behavioral outcomes (hypothesis 5)?

Figure 1. Parallel Process Latent Growth Curve Model Used to Test Mediational Effects.



CHAPTER 4

Results

Hypothesis 1: Correlations

Correlational relations between various predictor variables at baseline were calculated using Pearson *r*. Oppositional and problematic behavior frequencies and the parents' rating of how problematic those behaviors are were highly correlated (see Table 2 for specific examples). These measures were identical in structure with the only differences being in parents' ratings of how problematic they considered a behavior and how frequently they observed it for each item on the scales. Hence, there were two scales: parent ratings of how problematic a behavior was and frequency of that behavior (see Table 2). Using parents' frequency ratings of problematic behaviors is a common practice in the literature. For example, many researchers (i.e., Deater-Deckard, Dodge, Bates, & Pettit, 1996; Dodge et al., 1990; Dodge, Pettit, & Bates, 1994; Eley, Lichenstein, & Stevenson, 1999; Schmidt, Fox, Rubin, Hu, & Hamer, 2002; i.e., Schwartz, Snidman, & Kagan, 1996) have used Achenbach's CBCL (1991) which asks parents to report how frequently they observe specific behaviors. As such, to reduce the complexities of this model, only the frequency of problem behaviors were utilized in further analyses.

These results supported the hypothesis that there is a positive correlation between the level of harsh punishment used in the home and manifestation of oppositional

behavior and overall behavioral problems. Not surprisingly, the level of authoritarian control utilized by the caregiver was also correlated with oppositional behavior, level of harsh punishment, and overall behavioral problems. Lastly, oppositional behavior and overall problematic were also correlated with each other (see Table 2).

Table 2

Correlations Between Parental Behaviors and Children's Behaviors

	Parenting ratings			
Behaviors	1	2	3	4
1. Oppositional Behaviors	--	.34***	.67***	.40***
2. Total problem behaviors		--	.27***	.41***
3. Authoritarian control			--	.50**
4. Harsh punishment				--

*p < .05, **p < .01, ***p<.001

Hypotheses 2 and 3: Changes in Parenting Practices and Children's Behaviors

When analyzing the effects of an intervention on the development of a particular social behavior, the measures taken prior to the intervention should not serve as the baseline or comparison data. Rather, researchers should use the *changes* in developmental trajectory for the intervention group compared to the developmental trajectory of the control group on that particular behavior (Reid & Eddy, 1997). As previously stated, latent growth modeling was utilized to test the changes in parenting practices and children's behavior over time due to the intervention (hypotheses 2 and 3) and to compare the developmental trajectory of parenting practices and children's behavioral outcomes between intervention and control groups. For the latent growth model, two parenting variables were used: parenting practices composite score (level of authoritarianism and harsh punishment) and vignette reaction (level of democratic

practices). For these analyses, two children's behavior variables were used: oppositional behaviors and the BCICP scale (which measured overall problematic behaviors).

Hypothesis 2. The results of the multi-group latent growth model revealed that the intervention reduced harsh parenting practices and increased democratic practices (see Table 3). On the measure of parenting practices, the initial measures at baseline were not statistically different for the intervention and control groups for the parenting composite ($\chi^2 = 81.337$) or the vignette reaction ($\chi^2 = 29.386$), indicating that random assignment was effective in creating two groups that were similar on parenting practices. However, the results of the chi-square difference test showed that the slope (change over the two years) was statistically significantly different for the two groups for parenting composite ($\Delta\chi^2 = 11.015$, p<.001) and vignette reaction ($\Delta\chi^2 = 32.715$, $p < .001$).

Table 3

Fit Indices for Single-Group Latent Growth Modeling (Parenting Practices)

	Parenting Composite					
	Intercept	Slope	χ^2	*df*	*CFI*	*p*
Intervention	4.692	-.135	81.16	1	.973	<.001
Control	4.634	-.021	4.45	1	.988	.035
	Vignette Reaction					
	Intercept	Slope	χ^2	*df*	*CFI*	*p*
Intervention	3.413	0.295	26.868	1	.995	<.001
Control	3.497	0.066	1.118	1	1.00	.290

Fit Indices for Multi-Group Tests (Parenting Practices)

	Parenting Composite				
Model	χ^2	*df*	$\Delta\chi^2$	*p*	*CFI*
No constraints	80.628	2		<.001	
Intercepts equal	81.337	3	0.709	.400	
Slopes equal	91.643	3	11.015	<.001	
	Vignette Reaction				
Model	χ^2	*df*	$\Delta\chi^2$	*p*	*CFI*
No constraints	27.896	2		<.001	.997
Intercepts equal	29.386	3	1.490	.222	
Slopes equal	60.611	3	32.715	<.001	

Figures 2 through 3 illustrate the estimated changes over time in each parenting variable separately. Although the parenting composite (authoritarianism and harsh punishment) was initially slightly higher for the intervention group, the rate of decline was faster (slope = -.139), while the control group had a very slight decrease (slope = -.021) (see Figure 2 and Table 4). The estimated slope of the vignette reaction variable (democratic parenting strategies) for the intervention group increased at a faster rate (slope = .295) than the control group (slope = .066) (see Figure 3 and Table 4).

Figure 2. Estimated Changes in Parenting Composite (harsh parenting) Scores across Time (Parenting Composite Slope).

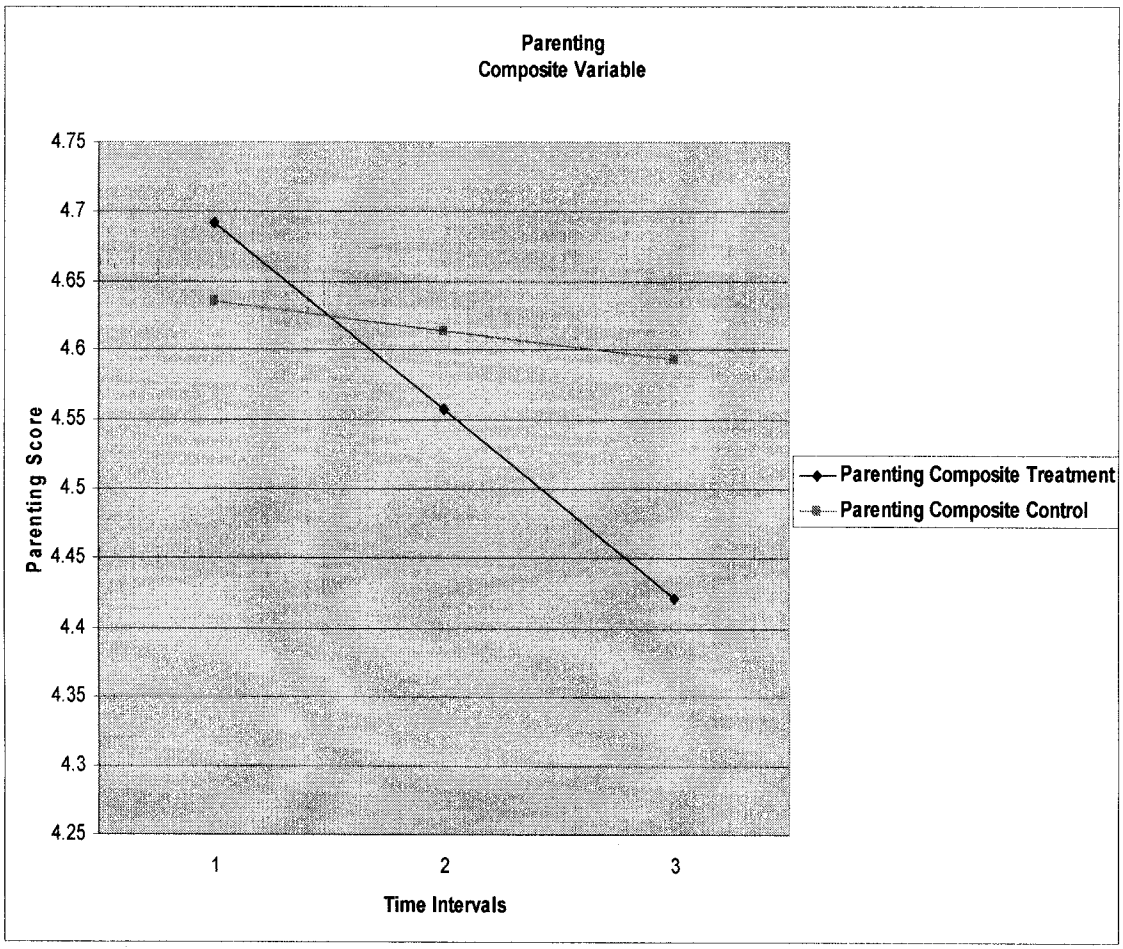


Figure 3. Estimated Changes in Vignette Reaction (democratic parenting) Scores across Time (Democratic Practices Slope).

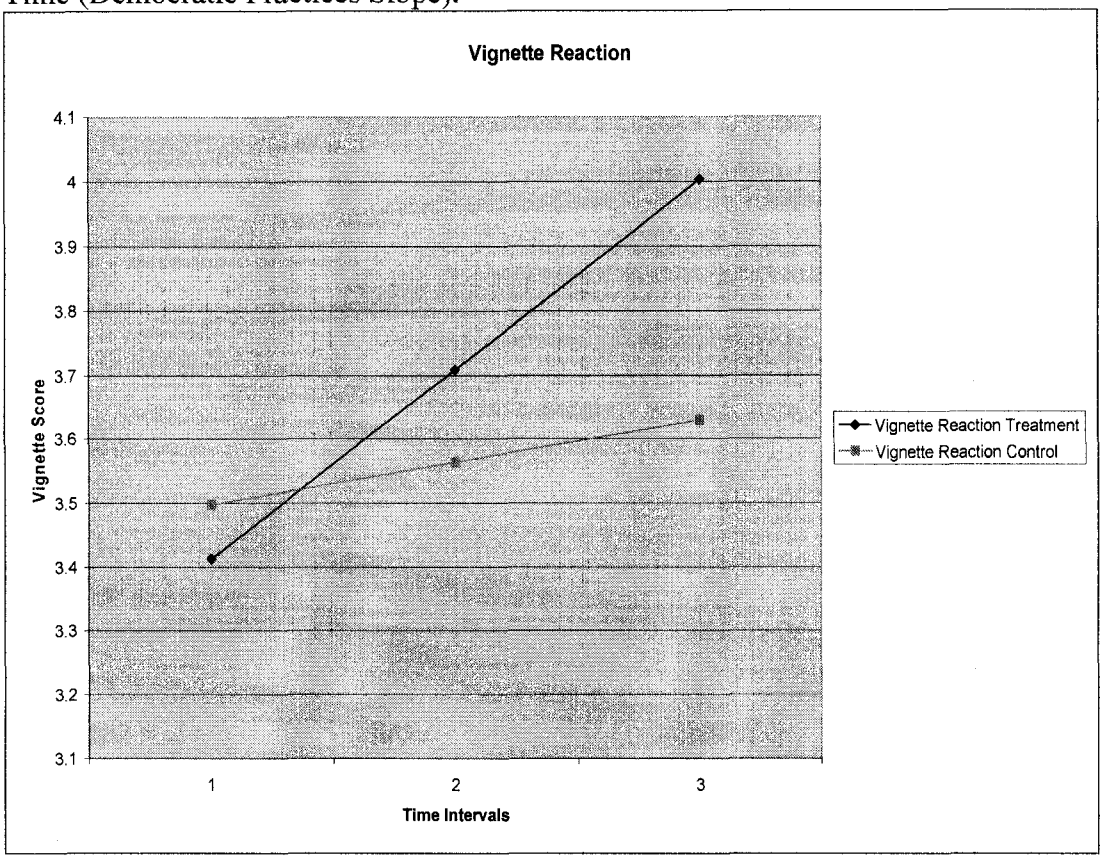


Table 4

Estimated Means for Parenting Practices

Variable	Group	Time 1	Time 2	Time 3
Parenting Composite	Intervention	4.692	4.557	4.422
	Control	4.635	4.614	4.593
Vignette Reaction	Intervention	3.413	3.708	4.003
	Control	3.497	3.563	3.629

Hypothesis 3. The results of the multi-group latent growth modeling revealed that the intervention was also effective in reducing oppositional and overall problematic behavior (as measured by the BCICP scale) [see Figures 4 and 5]. As with the parenting variables, the initial measures of behavior at baseline were not statistically different for

the intervention and control groups for oppositional behavior ($\chi^2 = 95.867, p = .11$) or the overall problematic behavior ($\chi^2 = 139.234, p = .89$), indicating that random assignment was effective in creating two groups that were similar on behavior as well (see Table 5). However, the chi-square difference test revealed that the slope (change over time) was statistically significantly different for the two groups for oppositional behavior ($\chi^2 = 13.824, p < .001$) and problematic behaviors ($\chi^2 = 18.56, p < .001$). The decline in the slope of oppositional behavior was more steep for the intervention group (slope = -.062) than the control group (slope = -.017). Likewise, the decline in the overall problematic behaviors was steeper for the intervention (slope = -.061) than the control group (slope = .000) [see Table 5].

Table 5

Fit Indices for Single-Group Latent Growth Modeling (Behavioral Outcomes)

	Oppositional Behavior					
	Intercept	Slope	χ^2	*df*	*CFI*	*p*
Intervention	1.015	-.062	33.86	1	.935	<.001
Control	0.974	-.017	59.39	1	.919	<.001
	BCICP					
	Intercept	Slope	χ^2	*df*	*CFI*	*p*
Intervention	0.565	-.061	72.865	1	.984	<.001
Control	0.567	.000	66.378	1	.970	<.001

Fit Indices for Multi-Group Tests (Behavioral Outcomes)

	Oppositional Behavior				
Model	χ^2	*df*	$\Delta\chi^2$	*p*	*CFI*
No constraints	93.330	2		<.001	.928
Intercepts equal	95.867	3	2.537	.11	
Slopes equal	107.154	3	13.824	<.001	
	BCICP				
Model	χ^2	*df*	$\Delta\chi^2$	*p*	*CFI*
No constraints	139.215	2		<.001	.978
Intercepts equal	139.234	3	0.019	.890	
Slopes equal	157.775	3	18.56	<.001	

Figures 4 and 5 illustrate the changes over time in each behavior variable separately. For both behavioral variables, the intervention was effective in reducing problematic behaviors at a faster rate than the control group (see Table 6). In the intervention group, children's oppositional behaviors declined slightly [see Figure 4]. For overall problematic behaviors, the intervention group had a steeper decrease (see Table 6 and Figure 5).

Figure 4. Estimated Changes in Oppositional Behavior across Time (Oppositional Behavior Slope).

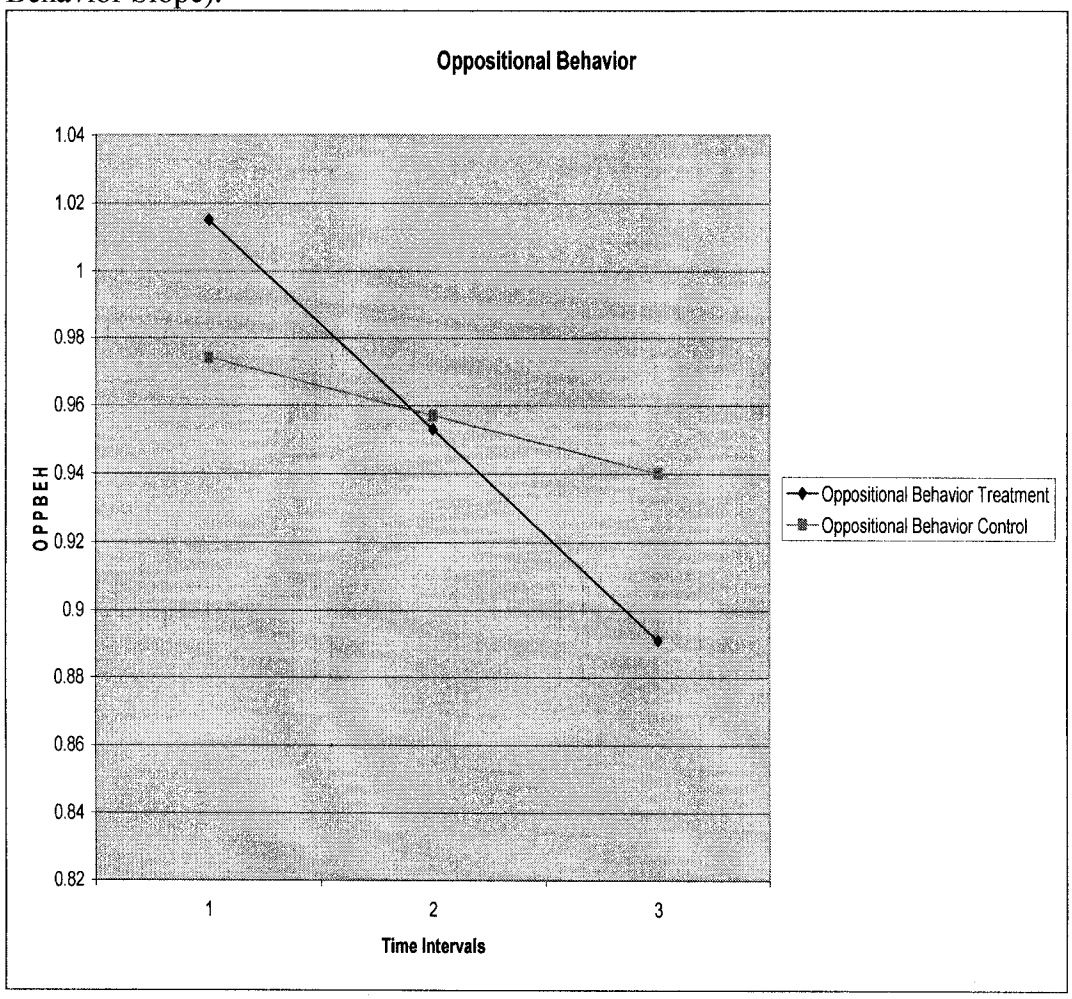


Figure 5. Estimated Changes in BCICP (Overall Problematic Behaviors) across Time (BCICP Slope).

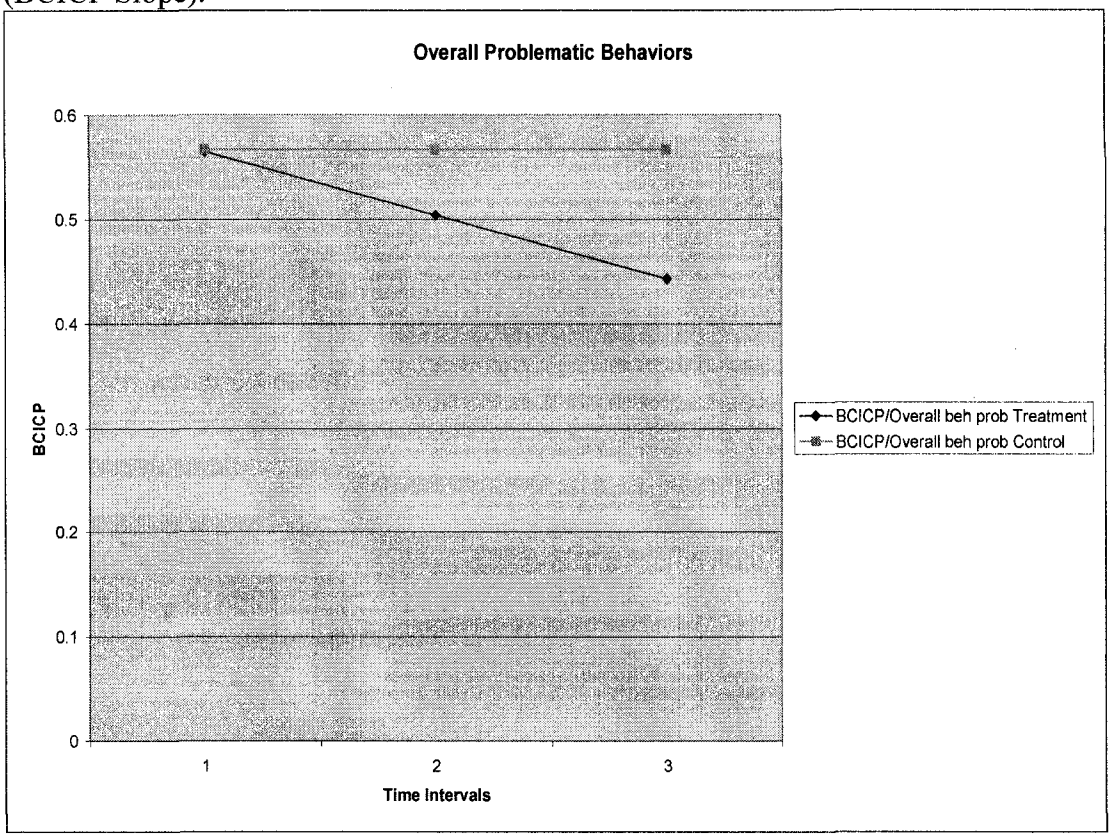


Table 6

Estimated Means for Behavioral Outcomes

Variable	Group	Time 1	Time 2	Time 3
Oppositional Beh.	Intervention	1.015	0.953	0.891
	Control	0.974	0.957	0.940
BCICP	Intervention	0.565	0.504	0.443
	Control	0.567	0.567	0.567

Hypothesis 4: Does Children's Behavior Cause Changes in Parenting Practices?

Hypothesis 4, regarding whether the children's initial behavior influenced changes in parenting practices, was tested by comparing four latent growth models (see Figures 6 to 9). The same four variables were utilized for these analyses as the previous

tests: parenting composite (authoritarianism and harsh punishment); vignette reaction (democratic practices); oppositional behaviors; and overall problematic behaviors (BCICP). Parenting practices at the beginning of the study (parenting intercepts), the rate of change in parenting methods (parenting slopes), children's behaviors at the beginning of the study (oppositional behavior and BCICP intercepts), and the rate of change in antisocial behaviors (oppositional behavior and BCICP slopes) were compared.

It had been hypothesized that if the socialization theories were accurate, the effects of the children's initial behavior (intercepts) on the parenting practices would be weakened by the intervention. Therefore, we would expect that, for the intervention group, a larger portion of the variance in the changes in parenting practices could be explained by the intervention than the children's initial rate of oppositional and problematic behavior, making it more plausible that the changes in parenting practices are better accounted for by the intervention than the children's initial behaviors. Based on behavioral genetics findings, it was expected that children's initial behavior would explain a larger portion of the variance in parenting practices over time than would the intervention.

The results of the multi-group latent growth models supported behavioral genetics more than socialization findings (see figures 6 through 9 and Tables 7 through 10). These figures (6 – 9) illustrate similar effects from the children's initial behaviors on the changes in parenting (the diagonal line in the models) for both the intervention and control groups (see Tables 7 through 10). The intervention did not alter the effects of children's initial behavior on parenting practices. The regression coefficients for the effects of initial child behavior on parenting slopes (diagonal lines) are not statistically

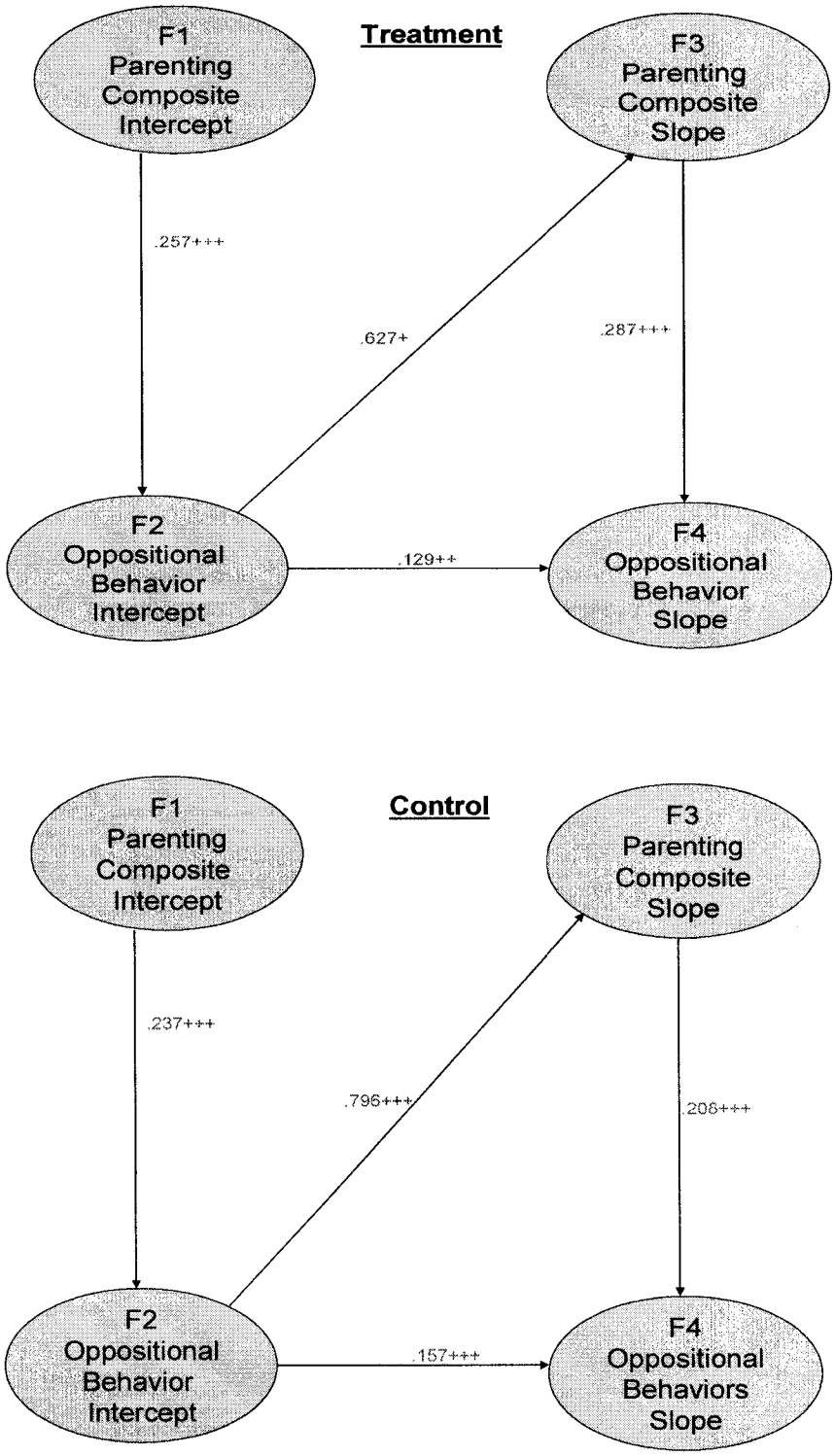
different from each other for the intervention or control groups for any of the models. Due to the similar findings across the models, each is briefly summarized and illustrated.

In the first model, a large portion of the variance in the changes in parenting practices could be explained by the children's initial rate of oppositional behavior (see Figures 6 and 7). This supports a behavioral genetics perspective that certain types of behavior evoke certain types of parenting and implies that if a child has an oppositional disposition, he or she is more likely to receive harsh parenting.

The relationship between the parenting composite score and overall problematic behaviors was similar to the effects of children's oppositional behavior on parenting composite. The effects of children's initial overall problematic behavior on the changes in parenting composite slope between the intervention and control groups were not significantly different (see Figure 7 and Table 8). For both the intervention and control groups, a large portion of the increase in harsh parenting, for example, could be accounted for by the higher rates of children's overall problematic behaviors at baseline. Similarly, if overall problematic behaviors were low at baseline, then a smaller increase in harsh parenting was detected.

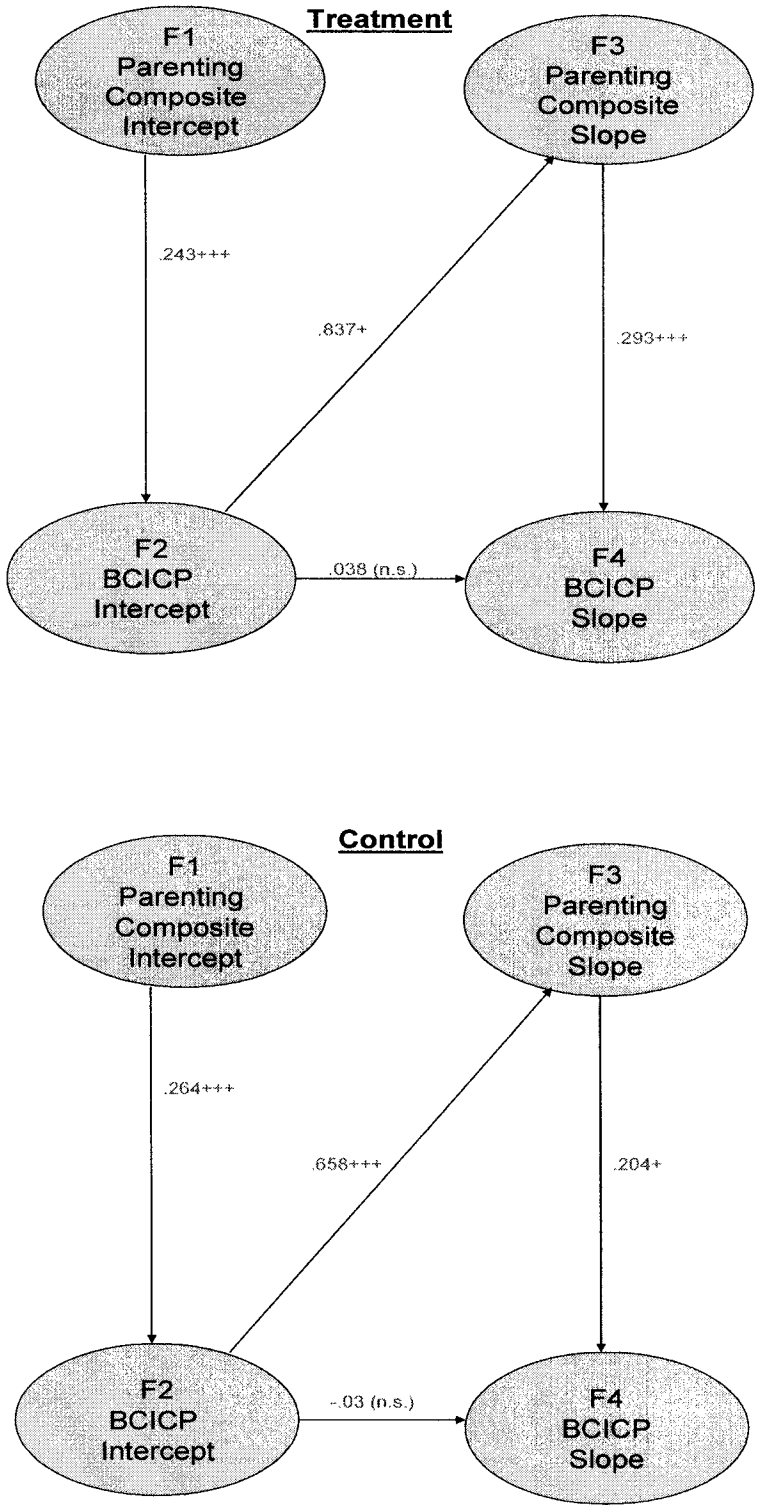
In summary, both the initial rates of oppositional and overall problematic behaviors could be used to explain the rate of change in harsh parenting practices over time, for both the intervention and control groups. The next two models were used to test the effects of children's initial rates of oppositional and problematic behaviors on the rate of change in democratic practices on the vignette reaction scale. Similar results were found for those models.

Figure 6. Effects of Initial Oppositional Behavior on Parenting Slope.



Note: + = $p < .05$, ++ = $p < .01$, and +++ = $p < .001$

Figure 7. Effects of Initial BCICP on Parenting Composite Slope.



Note: + = $p < .05$, ++ = $p < .01$, and +++ = $p < .001$

Table 7

Results of the Multi-Group Tests Treatment versus Control Groups

Effects of Oppositional Behavior Intercept on Parenting Composite Slope

Model	χ^2	df	$\Delta\chi^2$	*p*	CFI
No Constraint	415.379	16		<.001	.865
F2, F3 (diagonal line)	415.640	17	0.26	.610	
F3, F1 (PI → BI)	415.658	17	0.28	.597	
F4, F2 (PS → BS)	416.096	17	0.72	.396	
F4, F3 (BI → BS)	415.687	17	0.31	.578	
All	417.046	20	1.667	.644	

Note: F1-F4 = see Figure 6; PI = parenting variable intercept; PS = parenting variable slope; BI = children's behavior intercept; and BS = children's behavior slope.

Table 8

Results of the Multi-Group Tests Treatment versus Control Groups

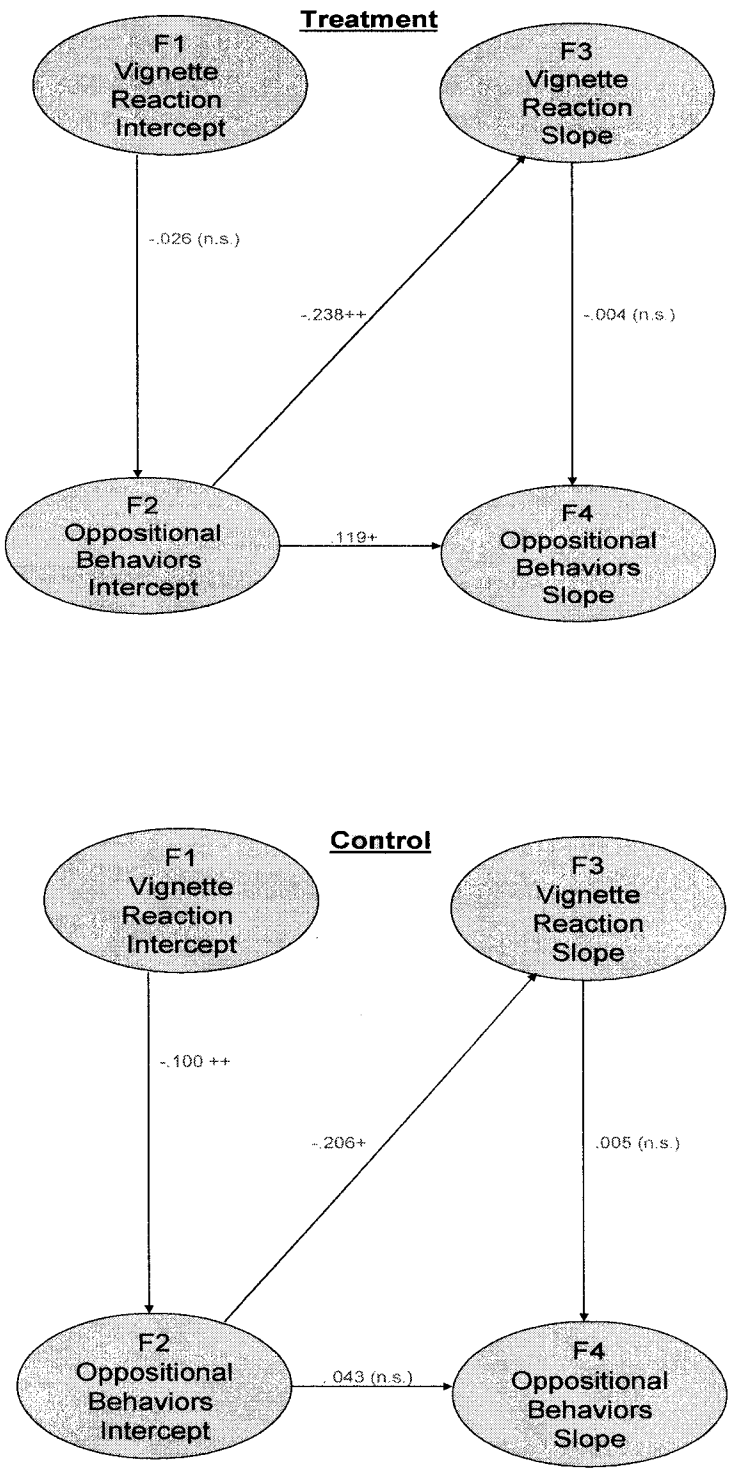
Effects of BCICP Intercept on Parenting Composite Slope

Model	χ^2	df	$\Delta\chi^2$	*p*	CFI
No Constraint	400.601	16		<.001	.905
F2, F3 (diagonal line)	400.869	17	0.268	.604	
F3, F1 (PI → BI)	401.000	17	0.399	.528	
F4, F2 (PS → BS)	401.165	17	0.564	.453	
F4, F3 (BI → BS)	401.500	17	0.899	.343	
All	402.392	20	1.791	.614	

Note: F1-F4 = see Figure 7; PI = parenting variable intercept; PS = parenting variable slope; BI = children's behavior intercept; and BS = children's behavior slope.

Once again, the initial oppositional behavior of the children in the intervention and control groups did not differ in their effects on the changes in parenting vignette reactions (see Figure 8 and Table 9). Initial oppositional behaviors accounted for a large portion of changes in parenting over time and this effect was not statistically different between intervention and control groups.

Figure 8. Effects of Initial Oppositional Behavior on Vignette Reaction Slope.



Note: + = $p < .05$, ++ = $p < .01$, and +++ = $p < .001$

Table 9

Results of the Multi-Group Tests Treatment versus Control Groups

Effects of Oppositional Behavior Intercept on Vignette Reaction Slope

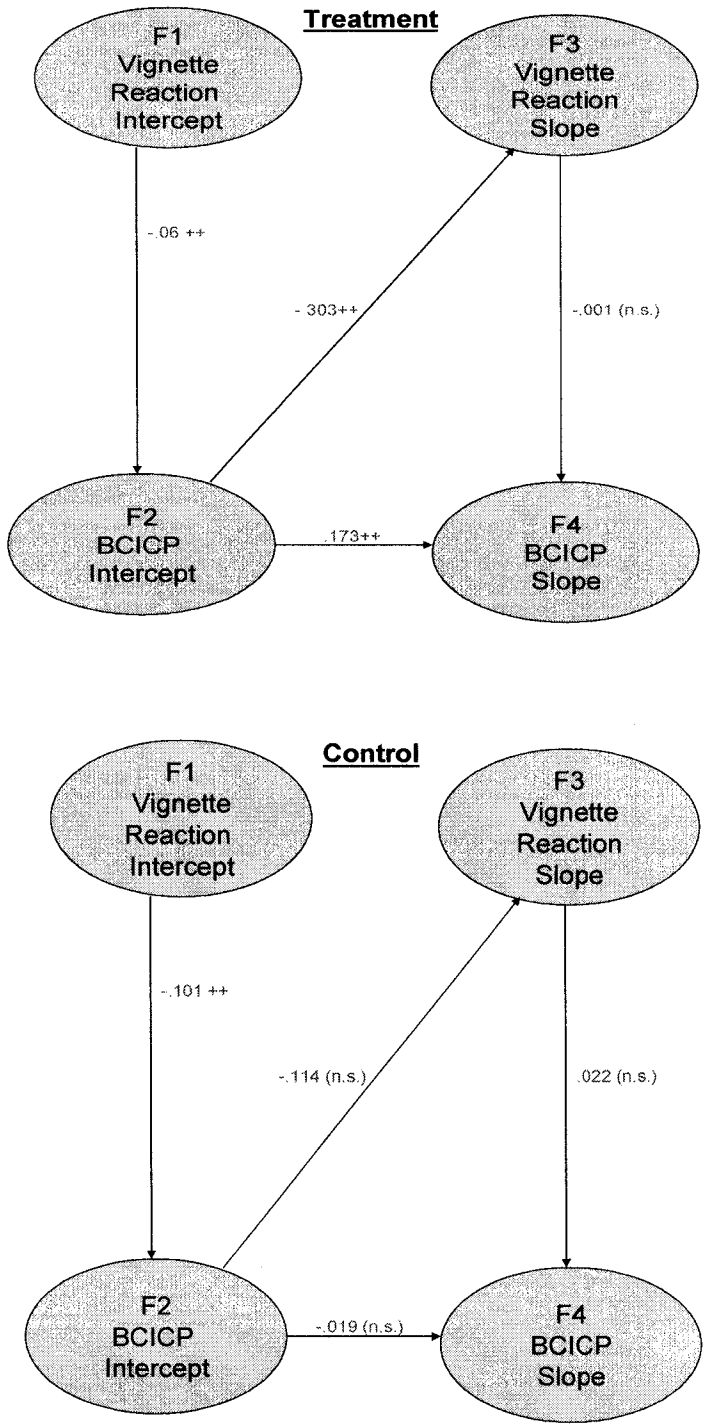
Model	χ^2	df	$\Delta\chi^2$	*p*	CFI
No Constraint	158.153	16		<.001	.925
F2, F3 (diagonal line)	158.226	17	0.073	.787	
F3, F1 (PI → BI)	161.032	17	2.879	.090	
F4, F2 (PS → BS)	158.210	17	0.057	.811	
F4, F3 (BI → BS)	159.310	17	1.157	.282	
All	163.003	20	4.850	.183	

Note: F1-F4 = see Figure 8; PI = parenting variable intercept; PS = parenting variable slope; BI = children's behavior intercept; and BS = children's behavior slope.

Finally, there was not a statistically significant difference between the intervention and control groups' initial BCICP scores on the changes in parenting vignette reactions slope (see Figure 9 and Table 10). In this particular model, there was a statistically significant effect from the behavior intercept on the behavior slope (χ^2 = 254.865, p = .014). For the intervention group, the children's initial problematic behaviors did correlate with a higher rate of changes in behavior over time. For instance, children who started off with higher rates of problematic behaviors initially also had a higher rate of increase in those behaviors or conversely, those who started off with a lower rate of problematic behaviors also had lower rate of increase in those behaviors over time. It could be concluded that children's initial behavior is a better predictor of changes in behavior. Although this is interesting to note, it does not support nor refute the hypothesis being tested.

Finally, a parallel process latent growth model was used to determine if changes in children's behaviors were mediated through changes in parenting practices. Four models illustrate these relations.

Figure 9. Effects of Initial BCICP on Vignette Reaction Slope.



Note: + = $p < .05$, ++ = $p < .01$, and +++ = $p < .001$

Effects of BCICP Intercept on Vignette Reaction Slope

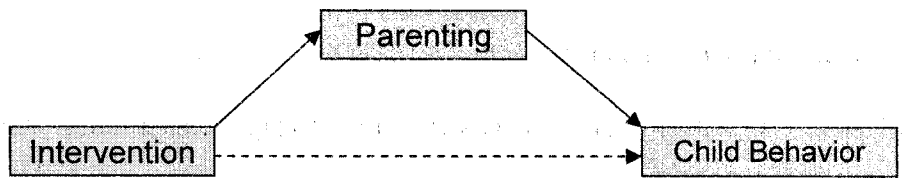
Model	χ^2	df	$\Delta\chi^2$	*p*	CFI
No Constraint	248.876	16		<.001	.918
F2, F3 (diagonal line)	250.670	17	1.794	.180	
F3, F1 (PI → BI)	249.750	17	0.874	.350	
F4, F2 (PS → BS)	249.119	17	0.243	.622	
F4, F3 (BI → BS)	254.865	17	5.989	.014	
All	257.633	20	8.757	.033	

Note: F1-F4 = see Figure 9; PI = parenting variable intercept; PS = parenting variable slope; BI = children's behavior intercept; and BS = children's behavior slope.

Hypothesis 5: The Mediational Model

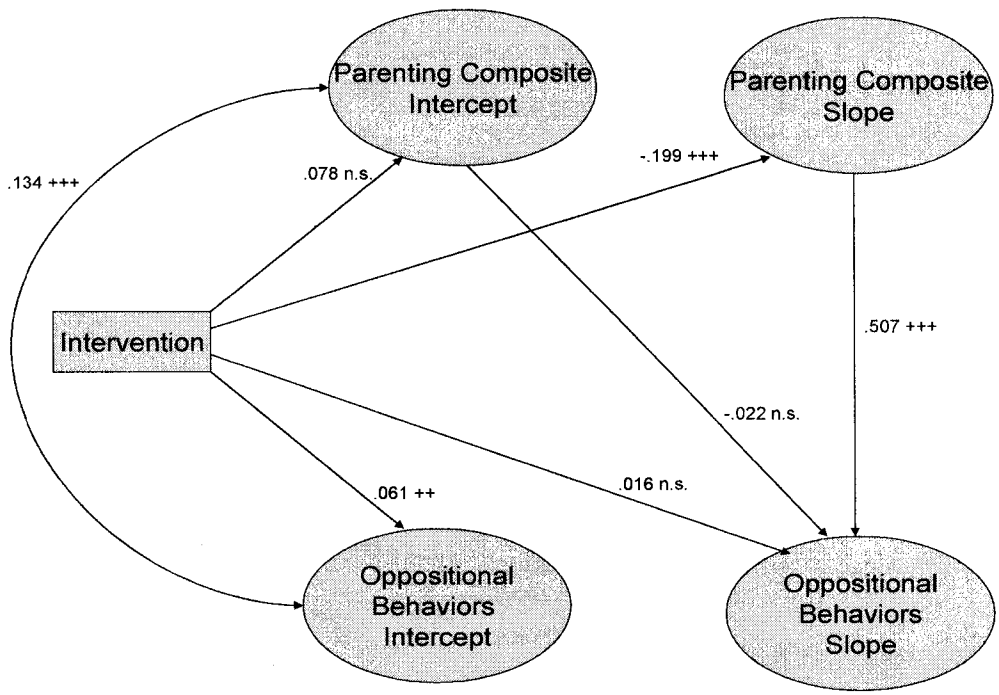
In order to determine whether or not the effects of the intervention were mediated through parenting practices, a parallel process latent growth curve model (PPLGCM) was utilized (see Figure 1). To maintain testing congruency, the same two parenting variables and two behavioral variables were used as the previous latent growth models. The results of the parallel process latent growth curve models revealed a statistically significant mediational effect for the parenting composite variable on both behavioral outcomes but not the vignette reaction for either behavioral outcome. The indirect effects are discussed below. Figures 1 and 10 illustrate the models that were utilized for these set of analyses.

Figure 10. Mediational Model; Parenting Practices Mediating the Effects of the Intervention on Children's Behavioral Outcomes.



Each parenting variable was tested as a mediator between the effects of the intervention and the two behavioral outcomes using the PPLGCM. First, parenting practices had a mediating effect on the relationship between the intervention and oppositional behaviors [χ^2 (21) = 860.425, $p < .001$, RMSEA = .099]. The intervention's effect on the reduction of children's oppositional behaviors (Oppositional Behavior Slope) was mediated by the reduction in harsh parenting (Parenting Composite Slope) [see Figure 11].

Figure 11. Mediational Effects of Parenting Practices Composite Score on Oppositional Behavior.



Note: + = $p < .05$, ++ = $p < .01$, and +++ = $p < .001$

The coefficient of change in parenting practices (-.199) based on the intervention was significant (t (17) = -3.651, $p < .001$). Therefore, the changes in children's behavior could be accounted for by the changes in parenting practices. Parents in the intervention

group experienced a reduction of harsh parenting practices, which in turn led to a reduction of oppositional behavior (.507). Table 11 provides the covariances between the parenting and oppositional behavior variables for this model.

Table 11

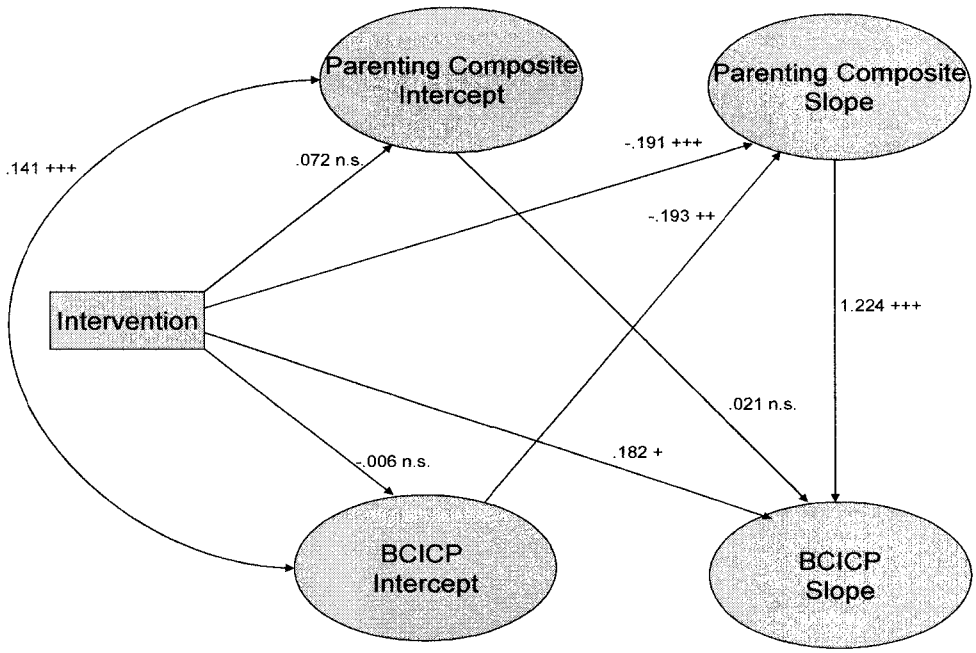
Estimated Covariances for Parenting Practices and Oppositional Behaviors

	T1Par	T2Par	T3Par	T1Opp	T2Opp	T3Opp	Treat
T1Parent	0.733						
T2Parent	0.457	0.751					
T3Parent	0.444	0.447	0.690				
T1OppBeh	0.161	0.120	0.120	0.131			
T2OppBeh	0.101	0.140	0.094	0.057	0.105		
T3OppBeh	0.110	0.148	0.177	0.075	0.070	0.144	
Treat	0.036	-0.061	-0.024	0.014	-0.010	-0.014	0.231

Next, the relation between the intervention and children's overall problematic behavior as measured by the BCICP was also mediated by parenting practices [χ^2 (21) = 1007.689, $p < .001$, RMSEA = 0.115]. This indirect effect was also statistically significant [t (17) = -3.028, $p < .001$], meaning that the reduction of problematic behaviors (BCICP Slope) could be accounted for by the reduction of harsh parenting (Parenting Composite Slope) [see Figure 12]. The intervention had a significant impact on changes in parenting practices (-.191), which in turn had a positive significant effect on the changes in overall problematic behaviors (+1.224).

Table 12 delineates the variable covariances for this model. The intervention also had a slight direct effect on reducing overall problematic behaviors (+.182), but the mediated effect was more significant. These findings indicate that altering parenting practices, particularly harsh parenting practices, will result in a reduction of oppositional and problematic behaviors.

Figure 12. Mediational Effects of Parenting Composite Score on Overall Problematic Behaviors.



Note: + = $p < .05$, ++ = $p < .01$, and +++ = $p < .001$

Table 12

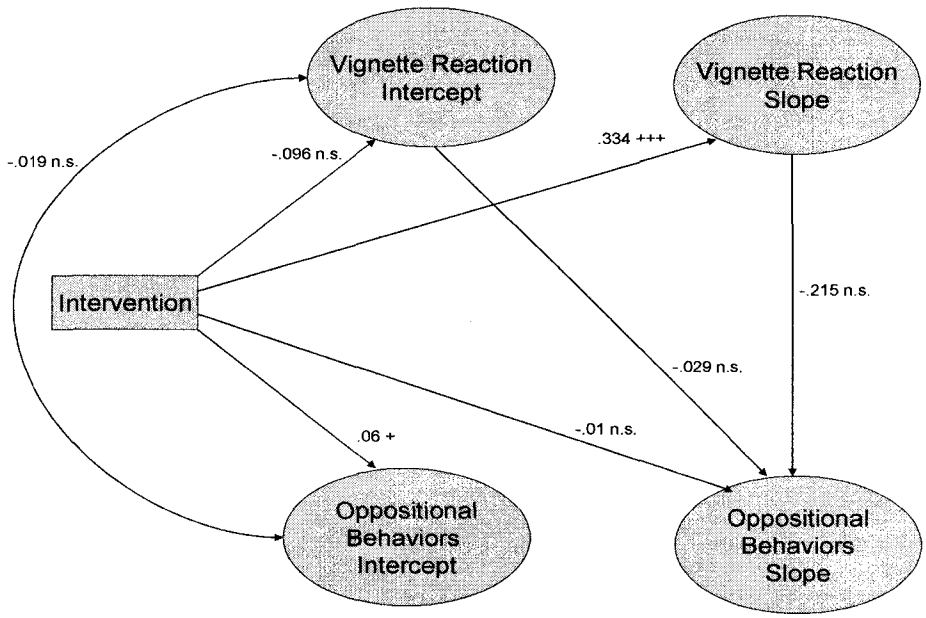
Estimated Covariances for Parenting Practices and BCICP

	T1Par	T2Par	T3Par	T1BCICP	T2BCICP	T3BCICP	Treat
T1Par	0.736						
T2Par	0.461	0.747					
T3Par	0.452	0.447	0.696				
T1BCICP	0.147	0.107	0.127	0.108			
T2BCICP	0.116	0.156	0.120	0.059	0.100		
T3BCICP	0.082	0.116	0.142	0.055	0.074	0.190	
Treat	0.035	-0.062	-0.026	0.000	-0.012	-0.026	0.231

The other parenting variable, Vignette Reaction, did not have the same mediating effects on either outcome variable (oppositional behavior or overall problematic behaviors). The trends were in the direction that was expected; however, the indirect effects were not statistically significant, t (17) = 0.104. Although the intervention had a

positive effect on democratic parenting (.324), the increase in democratic parenting could not be used to explain the changes in oppositional behavior. In other words, when there was an improvement in democratic parenting practices, as measured by the vignette reaction (Vignette Reaction Slope), there was a reduction in oppositional behaviors (Oppositional Behavior Slope), but that relation was not statistically significant (see Figure 13). Table 13 outlines the covariances for this model.

Figure 13. Mediational Effects of Vignette Reaction on Oppositional Behaviors.



Note: + = $p < .05$, ++ = $p < .01$, and +++ = $p < .001$

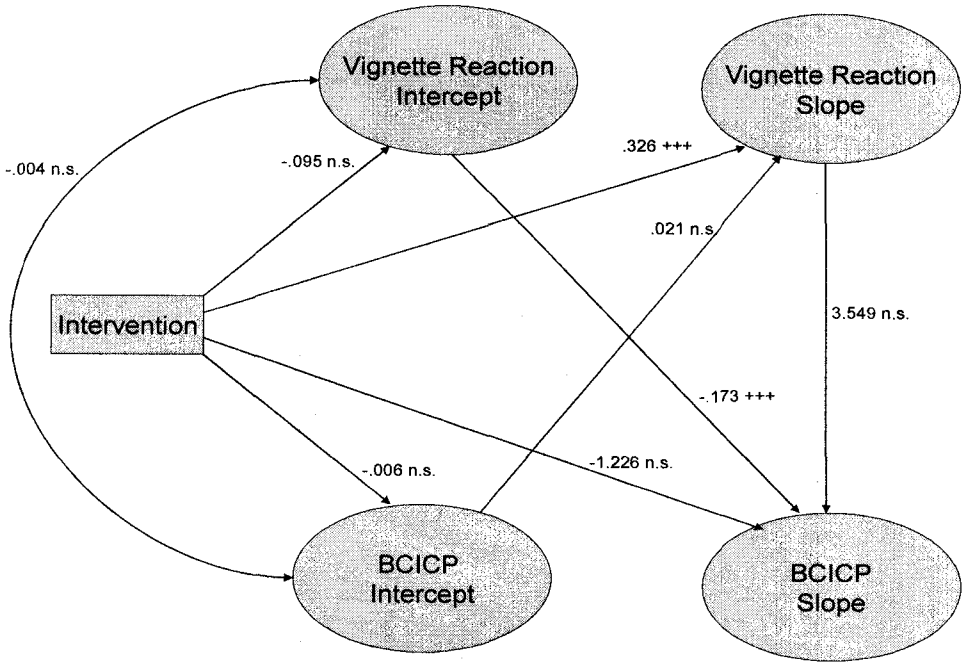
Table 13

Estimated Covariances for Vignette Reaction and Oppositional Behaviors

	T1Vig	T2Vig	T3Vig	T1Opp	T2Opp	T3Opp	Treat
T1Vig	1.073						
T2Vig	0.313	0.842					
T3Vig	0.110	0.294	0.788				
T1OppBeh	-0.040	-0.013	-0.030	0.131			
T2OppBeh	-0.001	-0.024	-0.033	0.056	0.105		
T3OppBeh	-0.034	-0.064	-0.069	0.075	0.070	0.144	
Treat	-0.036	0.077	0.107	0.014	-0.010	-0.015	0.231

Likewise, the mediational effects of parents' responses on the vignettes in relation to overall problematic behaviors was also not statistically significant, t (17) = -.178. A similar relationship exists between positive parenting practices and overall problematic behaviors and positive parenting and oppositional behaviors, with one exception: the higher the democratic parenting, the higher the rate of overall problematic behaviors. This finding was very surprising. Furthermore, this relationship was different than the others in that the initial parenting practices, which were obviously not affected by the intervention, represented the highest rate of change in overall problematic behaviors. The relations between the variables in this model are illustrated in Figure 14. Table 14 outlines the covariances between the variables in this model.

Figure 14. Mediational Effects of Vignette Reaction on Overall Problematic Behaviors (BCICP Slope).



Note: + = $p < .05$, ++ = $p < .01$, and +++ = $p < .001$

Table 14

Estimated Covariances for Vignette Reaction and BCICP

	T1Vig	T2Vig	T3Vig	T1BCICP	T2BCICP	T3BCICP	Treat
T1Vig	1.071						
T2Vig	0.311	0.842					
T3Vig	0.094	0.282	0.784				
T1BCICP	-0.027	-0.004	-0.019	0.18			
T2BCICP	-0.026	-0.031	-0.034	0.058	0.100		
T3BCICP	-0.066	-0.111	-0.093	0.055	0.071	0.188	
Treat	-0.038	0.077	0.107	0.000	-0.012	-0.028	0.231

CHAPTER 5

Discussion

In many cultures, acts of aggression stemming from self-preservation (e.g., self-defense) are not considered a violation of laws and social norms. Behaviors that are consistent across cultures are considered to be evolutionarily driven. When an individual is threatened or attacked, it is natural to become aggressive in order to defend oneself. Based on this pattern, there is an instinctual human tendency towards aggression. Nonetheless, most individuals function in numerous social milieus without resorting to aggression. In fact, most of the violent and aggressive acts are committed by a small number of the population (National Center for Injury Prevention and Control, 2001; Widom, 1989). Why are some individuals more prone to aggression, while others manage to repress these evolutionary or genetic dispositions?

The etiology of aggression and other antisocial behaviors has been studied by numerous researchers (Brennan, Hall, Bor, Najman, & Williams, 2003; Caspi et al., 2002; Caspi & Silva, 1995; Coie & Dodge, 1998; DiLalla, 2002; Dodge, 2002; Dodge et al., 1990; Dodge & Pettit, 2003; Dodge et al., 1994; Schwartz et al., 1996). Conflicting theories exist in the field of developmental psychology as to the origins of social behaviors. Specifically, antisocial behaviors, such as life-course-persistent antisocial behaviors, have been determined to have a high heritability rate (Moffitt, 1997; Moffitt & Caspi, 2005; Moffitt, Caspi, Harrington, & Milne, 2002; Pike, 2002; Rowe, 1994; Scarr, 1992), leading some authors to argue that after accounting for the effects of genetics and

peers, no other influences on the development of social behaviors is noteworthy (Harris, 2000). Conversely, other researchers have found direct and indirect effects of environmental influences, including parenting, on the development of social behaviors (Bates, Pettit, & Dodge, 1995; Coie & Dodge, 1998; Dodge, 2002; Dodge et al., 1990; Dodge & Pettit, 2003; Dodge et al., 1994; Dodge et al., 1997; Nix et al., 1999; Schwartz, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999; Strassberg et al., 1994; Weiss et al., 1992). In fact, some authors have claimed that poor parenting is the leading source of the development of antisocial and problematic behaviors (Westman, 1994).

The purpose of the current study was to ascertain the causal links, if any, between parenting practices on children's social behavior development. One of the most effective methods for establishing a causal link between parenting practices and children's behavioral outcomes would be to test the efficacy of a longitudinal intervention program that used random assignment to intervention and control groups, and successfully altered parenting practices (Collins et al., 2000). If it can be shown that by altering parenting practices, children's developmental trajectories could be changed then the effects of parenting are more influential (Collins et al.) than has been previously presented (Harris, 1998; Pike, 2002; Rowe, 1994; Scarr, 1992). Based on prior findings that parenting intervention programs have been effective in altering children's developmental outcomes (Conduct Problems Prevention Research Group, 2002; Hawkins et al., 2000; LeMarquand et al., 2001; Lochman et al., 2003), it was hypothesized that the parenting practices would mediate the effects of a comprehensive prevention program on children's outcomes. The hypotheses were partially supported by the findings. First, as predicted, correlational relations existed between the two parenting measures and the two

behavioral measures. This finding supported prior research that children's behavioral outcomes are related to the parenting practices used in the home (O'Connor et al., 1998; Patterson, DeBaryshe, & Ramsey, 1989; Stormshak et al., 2000). Although it was a necessary step to establish these correlational relations, the primary purpose was to test a causal link by establishing that the effects of an intervention program can be mediated by parenting practices.

As a second necessary step before the final analyses, the changes over time in the two parenting variables and two behavioral variables were analyzed. It was determined that, for the intervention group, harsh parenting practices declined more quickly, while democratic parenting increased more quickly. Given the deleterious outcomes associated with severely harsh parenting (Allen & Allen, 2000; Farrington, 1989; Hawkins et al., 2000; Weiss et al., 1992), any reduction of harsh parenting practices and increasing of democratic parenting practices would be considered a fruitful effort (NICHD Early Child Care Research Network, 2006). It was also determined that the oppositional and problematic behaviors of the children in the intervention group decreased in comparison to the control group. At a time when oppositional behavior is normally on the rise (between the ages of 2-5), the intervention group had a decline in their oppositional behavior, particularly for the first 12 months following the intervention. Because children who are harder to discipline and have oppositional behaviors are more susceptible to receiving harsher parenting (DiLalla, 2002; Patterson, 1986), any decline in such behaviors may have long-term consequences if it alters developmental trajectories.

The next hypothesis and set of analyses tested the behavioral geneticists' argument that children's behavior is more likely to elicit changes in parenting practices

than vice versa (DiLalla, 2002; O'Connor et al., 1998; Pike, 2002; Rowe, 1994; Scarr, 1992). It was expected that the children's initial behavior at baseline would influence the changes in parenting practices for the families in the control group but that the intervention would alter that relationship, maybe even reverse it. This hypothesis was not supported by the data. Both the intervention and control groups had similar patterns of effect from the children's initial behavior on the changes in parenting practices. For instance, regardless of the group, if a child started off with a high level of oppositional behavior, the increase in harsh parenting was positively correlated with a higher level of oppositional behavior. In other words, the more oppositional the children's behavior was at baseline, the more likely that the parents would be to use harsh parenting over the course of the three time points. These findings neither support nor refute either camp of theorists (behavioral genetics or socialization), but do however imply a cyclical relationship. It is difficult, based on these findings, to make any definitive statements as to the origins of antisocial behaviors. Because the baseline data were obtained when the children were already two years old (at the minimum), it is difficult to tease out the effects of nature and nurture. The data do not explain the processes that existed in these children's lives (genetics, parenting, socialization) prior to the intervention (see *Limitations of the Current Study* and *Future Research* for an elaboration of this issue).

Last, the hypothesis that the effects of the intervention program would be mediated through parenting practices was partially supported by the findings. For both behavioral outcomes (oppositional behavior and overall problematic behaviors), the effects of the intervention on children's behavioral outcomes was mediated through the composite parenting practices score (harsh and authoritarian parenting). In other words, it

was shown that reducing harsh parenting practices does influence reductions in children's oppositional and problematic behaviors. Nonetheless, this same pattern did not exist for the democratic parenting practices (vignette reaction) on altering oppositional and problematic behaviors. Therefore, it does not appear that increasing democratic parenting practices leads to a reduction in oppositional and antisocial behaviors. Although only partially supported, it is interesting to note that the role of parenting was not as minimal as some authors have implied (Harris, 1998). The parallel process latent growth model that was utilized to test this hypothesis has been identified as a powerful method for ascertaining the effects of one aspect of a comprehensive intervention program on one or two specific outcomes in order to establish a causal link, particularly when the intervention program utilized random assignment (Cheong et al., 2003). The findings warrant further investigation of the causal links between parenting practices and children's behavioral developmental trajectories using this methodology.

Certainly, it would be difficult to argue against the need for further understanding of such problematic behaviors as aggression, violence, and antisocial behaviors, particularly in the United States, where youth are still plagued with fear of aggression at school and in their communities (NCIPC, 2002). The NCIPC has delineated risk factors that increase the likelihood of aggressive behaviors. Many of these risk factors are individual, family, and community factors that cannot be controlled or changed (e.g., history of early aggression, exposure to violence, or poverty). Other factors are more feasible to alter (e.g., parenting practices, social and cognitive skills, or mental interpretation of the effects of the violence that was viewed during childhood). Although the primary purpose of the current study was to attempt to address the basic nature versus

nurture question, the findings could be beneficial to future researchers and prevention specialists who want to target changing children's behavioral outcomes by changing the parenting practices of their parents.

Limitations of the Current Study

Analyzing causal relationships is a very complex matter, particularly when studying factors that are dynamic and difficult to separate, such as parenting practices and children's behaviors. An overwhelming number of variables have been either correlationally or causally linked with both. It is unreasonable to control many influential factors that are simultaneously influencing either or both of these variables. The difficulty in manipulating many variables was addressed with random assignment to groups. The experimental design of the longitudinal intervention program, DTBY, made it an ideal program for testing the causal relationship between parenting practices and children's behavioral outcomes. Nonetheless, as with any study, there were a few limitations.

The reductions in oppositional and problematic behaviors due to the intervention were small. However, over 25% of children with early oppositional and defiant behaviors engage in later delinquent behaviors that tax the family, school, and community (Loeber & Farrington, 2000). Therefore, any reduction in oppositional and problematic behaviors would be beneficial. Admittedly, a larger reduction would provide more practical significance; nonetheless, even minor reductions should not be considered insignificant. Working with families to reduce these early oppositional and problematic behaviors is extremely critical because the typical progression of oppositional behaviors leading to antisocial, aggressive, and violent behaviors is for these behaviors to start in the home

and spread to other social arenas such as school, peers, and the community and rarely the other way around (Loeber & Farrington).

As is to be expected of any longitudinal study, a high attrition rate, particularly within the control group, affected the data and data analysis. However, as previously stated, this particular sample was not affected by differential attrition. Specifically, differences between the participants who ceased participation and those who continued were only detected on three variables: mothers' age, mothers' satisfaction level of parenting, and fathers' education levels. Otherwise, the participants who remained in the study were not statistically different than those who dropped out.

Another limitation was that missing data had to be imputed. Although the missing data imputation method that was used (EM algorithm) has been found to be more reliable and accurate than other missing data imputation methods (Enders, 2003), it is acknowledged that using imputations alters the error rates in the analyses. Certainly, it would be ideal to have no missing data, but given that it was a longitudinal study with at-risk families with lower levels of education, the missing data were relatively minimal.

Many parenting and child behaviors measures, particularly when studying the parents of young children, are by parents' self-reports. It is recommended that multiple measures, including observational methodologies, be used whenever possible to have a more accurate depiction of parenting practices and children's behaviors (Collins et al., 2000). The intervention program that was the subject matter of the current study also used parent self-report for parenting practices and children's behaviors. The same concerns that apply to the use of any self-report measures certainly exist in the current study. However, one of the strengths of the DTBY program was that it also utilized

teacher reports of children's behaviors and developmental skills, which were highly correlated with the parent reports of the same behaviors and skills (MacPhee & Fritz, 1995, March). It is probable that parents who gave reliable answers about their children's behaviors and developmental skills also provided more reliable answers about their own parenting practices.

There was a distinct difference between the two parenting measures that might have posed a limitation as well. The parenting composite score was based on the parents' reports of their own behaviors as they had previously occurred or currently occur within their homes. The vignette reaction, on the other hand, was a measure of the parents' description of an appropriate response to a hypothetical situation. Obviously, this measure of "what I *would* do if" does not parallel the "what I have done in the past" line of questioning from the parent composite score. The differences in the two types of measure might explain why there was such a distinct difference in the mediational effects of each parenting variable in the parallel process latent growth models.

Many antisocial behaviors, including oppositional and problematic behaviors, develop later in life than between the ages of 2 and 5 (Coie & Dodge, 1998; Herrenkohl et al., 2001b). Even though the manifestation of early childhood antisocial behaviors has been found to be an effective predictor of later aggression and antisocial behaviors (Farrington, 1989; Hawkins et al., 1998; Herrenkohl et al., 2001a), it would be helpful for future studies to include more time points than three and a longer period of study than two years. More time points and longer period of time would make the design more sensitive to detecting developmental trajectories. Furthermore, for the purposes of separating the influences of nature and nurture, it would be beneficial to have families

enter an intervention program, even if only for data collection purposes, at a much earlier time frame than when the children are already at the age of two years old. By the time the children are two years of age, it becomes difficult to analyze the processes that have influenced the development of antisocial behaviors. Therefore, future researchers should recruit at-risk families prior to or during pregnancy to better study the impact of parenting practices.

Truly comparing behavioral genetics and socialization models would require longitudinal data from birth through adolescence and possibly adulthood, analyses, and methodologies (such as using twins and adopted siblings) that are beyond the scope of this dissertation. It had been planned to test the reverse mediational model to determine how much nurture could alter nature by comparing the two models. Although the parallel process latent growth curve modeling is considered one of the most effective statistical methods for testing the mediational model (Cheong et al., 2003) that was proposed in this study, this method did not allow for simultaneously testing the meditional effects of children's behaviors on parenting practices (the reverse model). In spite of the complex statistical controls used, the primary question of how nurture alters nature remains to be answered. The pursuit of experimentally testing the effects of nature and nurture, as well as continuing to test causal links between parenting practices and behavioral outcomes, would be a worthy future cause.

Future Research

Scarr (1992) has postulated that the effects of nature are significant enough that parents who are "good enough" at nurturing can rest assured that nature will take care of the rest. She has argued that such parents can be more relaxed about their parenting

practices knowing that not every single one of their actions will have life-altering impacts on their children's developmental outcomes. Only parents who are at the extreme ends of abuse and neglect need worry about the harm that they are causing to their children. Parents who fall in the middle of the spectrum have minimal influences (Harris, 1998). But could such a recommendation backfire on society? By emphasizing the role of nature and downplaying the role of nurture, are we swinging the pendulum too far in the opposite direction from John Watson's claim that nurture controls all behavioral outcomes?

If it is truly in some children's nature to be antisocial or aggressive, it would be beneficial to learn what type of environments or more specifically what type of parenting practices would interact most effectively with those predispositions or innate tendencies. Changes in parenting practices were found to mediate the effects of an intervention program in altering children's behaviors at least when it comes to harsh parenting practices; as such, the next step should be to determine if that mediational effect would be stronger for children with specific genetic predispositions. For instance, if an individual does have an aggressive predisposition especially when emotionally charged, how could parenting practices be tailored to meet the needs of that individual differently than other individuals who have milder predispositions but are more easily influenced by the environmental factors such as antisocial peers? Combining behavioral genetics methodologies and developmental study strategies would be beneficial in formatting interventions and prevention programs to better meet the needs of at-risk populations.

Furthermore, it is insufficient to study behavioral deficiencies and problems. It is equally important to study the role of parenting on prosocial behaviors and social skills.

Similar studies using parallel process latent growth curve modeling should be conducted to test the mediational effects of parenting practices on children's positive behaviors. Can children who are prone to antisocial behaviors or have early manifestations of such behaviors have their developmental trajectories changed by altering the positive parenting practices of their parents? Can children with antisocial predispositions learn prosocial behaviors and positive social skills through vicarious reinforcement and role modeling? Testing the causal links between parenting practices and children's prosocial behaviors would also help bring us closer to solving the puzzle of the relationship between nature and nurture.

References

Achenbach, T. M. (1991). *Manual for the child behavior checklist and 1991 profile.* Burlington, VT: Department of Psychiatry, University of Vermont.

Allen, J. R., & Allen, B. A. (2000). Violence: Early childhood, family and context. *Transactional Analysis Journal, 30*(2), 111-124.

American Academy of Child & Adolescent Psychiatry. (2004). Understanding violent behavior in children and adolescents.

American Psychological Association and American Academy of Pediatrics. (n.d.). Raising children to resist violence: What you can do. Retrieved November 27, 2004, from http://www.apa.org/pi/pii/raisingchildren.html

Aunola, K., & Nurmi, J.-E. (2005). The role of parenting styles in children's problem behavior. *Child Development, 76*(6), 1144-1159.

Bandura, A. (1973). *Aggression: A social learning analysis.* Englewood Cliffs: NJ: Prentice Hall.

Barratt, E. S. (1994). Impulsiveness and aggression. In J. Monahan & H. J. Steadman (Eds.), *Violence and mental disorder: Developments in risk assessment* (Vol. x, pp. 61-79). Chicago, IL: University of Chicago Press.

Bates, J. E., Pettit, G. S., & Dodge, K. A. (1995). Family and child factors in stability and change in children's aggressiveness in elementary school. In J. E. McCord (Ed.), *Coercion and punishment in long-term perspectives.* (Vol. xiii, pp. 124-138). New York: Cambridge University Press.

Baumrind, D. (1971). Current patterns of parental authority. *Developmental Psychology, 4*, 1-103.

Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *Journal of Early Adolescence, 11*, 56-95.

Beyers, J. M., Loeber, R., Wikstrom, P.-O. H., & Stouthamer-Loeber, M. (2001). What predicts adolescent violence in better-off neighborhoods. *Journal of Abnormal Child Psychology, 29*(5), 369-381.

Bjorkqvist, K., Lagerspetz, K. M., & Kaukiainen, A. (1992). Do girls manipulate and boys fight? Developmental trends in regard to direct and indirect aggression. *Aggressive Behavior, 18*(2), 117-127.

Brennan, P. A., Hall, J., Bor, W., Najman, J. M., & Williams, G. (2003). Integrating biological and social processes in relation to early-onset persistent aggression in boys and girls. *Developmental Psychology, 39*(2), 309-323.

Brook, J. S., Whiteman, M. M., & Finch, S. (1992). Childhood aggression, adolescent delinquency, and drug use: A longitudinal study. *The Journal of Genetic Psychology, 153*(4), 369-383.

Caspi, A., McClay, J., Moffitt, T., Mill, J., Martin, J., Craig, I. W., et al. (2002). Role of genotype in the cycle of violence in maltreated children. *Science, 297*(5582), 851-854.

Caspi, A., & Silva, P. A. (1995). Tempermental qualities at age three predict personality traits in young adulthood: Longitudinal evidence from a birth cohort. *Child Development, 66*, 486-498.

Caspi, A., Sugden, K., Moffitt, T. E., Taylor, A., Craig, I. W., Harrington, H., et al. (2003). Influence of life stress on depression: Moderation by a polymorphism in the 5-htt gene. *Science, 301*(5631), 386-389.

Ceballo, R., & McLoyd, V. C. (2002). Social support and parenting in poor, dangerous neighborhoods. *Child Development, 73*(4), 1310-1321.

Cheong, J. W., MacKinnon, D. P., & Khoo, S. T. (2003). Investigation of mediational processes using parallel process latent growth curve modeling. *Structural Equation Modeling, 10*(2), 238-262.

Cohen-Bendahan, C. C. C., Buitelaar, J. K., van Goozen, S. H. M., & Cohen-Kettenis, P. T. (2004). Prenatal exposure to testosterone and functional cerebral lateralization: A study in same-sex and opposite sex twin girls. *Psychoneuroendocrinology, 29*, 911-916.

Coie, J. D., & Dodge, K. A. (1998). Aggression and antisocial behavior. In N. Eisenberg & W. Damon (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (Vol. 3, pp. 779-862). Hoboken, NJ: John Wiley & Sons, Inc.

Collins, W. A., Maccoby, E. E., Steinberg, L., Hetherington, E. M., & Bornstein, M. H. (2000). Contemporary research on parenting. *American Psychologist, 55*(2), 218-232.

Conduct Problems Prevention Research Group. (2002). Using the fast track randomized prevention trial to test the early-starter model of the development of serious conduct problems. *Development and Psychopathology, 14*, 925-943.

Cooper, M. L., Wood, P. K., Orcutt, H. K., & Albino, A. (2003). Personality and the predisposition to engage in risky or problem behaviors during adolescence. *Journal of Personality and Social Psychology, 84*(2), 390-410.

Deater-Deckard, K., Dodge, K. A., Bates, J. E., & Pettit, G. S. (1996). Physical discipline among african american and european american mothers: Links to children's externalizing behaviors. *Developmental Psychology, 32*(6), 1065-1072.

Dekovic, M. (1999). Parent-adolescent conflict: Possible determinants and consequences. *International Journal of Behavioral Development, 23*(4), 977-1000.

Department of Health and Human Services under the direction of the Office of the Surgeon General, in partnership with the Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, the National Institutes of Health, National Institute of Mental Health, and the Substance Abuse and Mental Health Services Administration & Center for Mental Health Services. (n.d.). *Youth violence: A report of the surgeon general*

DiLalla, L. F. (2002). Behavior genetics of aggression in children: Review and future directions. *Developmental Review, 22*(4), 593-622.

Dodge, K. A. (2002). Mediation, moderation, and mechanisms in how parenting affects children's aggressive behavior. In J. G. Borkowski, S. L. Ramey & M. Bristol-Power (Eds.), *Parenting and the child's world: Influences on academic, intellectual, and social-emotional development* (Vol. xv, pp. 215-229). Mahwah, NJ: Lawrence Erlbaum Associates.

Dodge, K. A., Bates, J. E., & Pettit, G. S. (1990). Mechanisms in the cycle of violence. *Science, 250*, 1678-1683.

Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology, 53*, 1146-1158.

Dodge, K. A., & Pettit, G. S. (2003). A biopsychosocial model of development of chronic problems in adolescence. *Developmental Psychology, 39*, 349-371.

Dodge, K. A., Pettit, G. S., & Bates, J. E. (1994). Socialization mediators of the relation between socioeconomic status and child conduct problems. *Child Development, 65*, 649-665.

Dodge, K. A., Pettit, G. S., & Bates, J. E. (1997). How the experience of early physical abuse leads children to become chronically aggressive. In D. Cicchetti & S. L. Toth (Eds.), *Developmental perspectives on trauma: Theory, research, and intervention* (Vol. xvii, pp. 263-288). Rochester, NY: University of Rochester Press.

Dornbusch, S. M., Ritter, P. L., Leiderman, P., Roberts, D. F., & Farleigh, M. J. (1987). The relation of parenting style to adolescent school performance. *Child Development, 58*(5), 1244-1257.

Eley, T. C., Lichenstein, P., & Stevenson, J. (1999). Sex differences in the etiology of aggressive and nonaggressive antisocial behavior: Results from two twin studies. *Child Development, 70*(1), 155-168.

Enders, C. K. (2003). Using the expectation maximization algorithm to estimate coefficient alpha for scales with item-level missing data. *Psychological Methods, 8*(3), 322-337.

Eron, L. D., Huesmann, L. R., Spindler, A., Guerra, N. G., Henry, D., Tolan, P. H., et al. (2002). A cognitive-ecological approach to preventing aggression in urban settings: Initial outcomes for high-risk children. *Journal of Consulting & Clinical Psychology, 70*, 179-194.

Faraone, S. V., Biederman, J., & Kiely, K. (1996). Cognitive functioning, learning disability, and school failure in attention deficit hyperactivity disorder: A family study perspective [abstact]. In J. H. Beitchman, N. J. Cohen, M. Konstantareas & R. Tannock (Eds.), *Language, learning, and behavior disorders: Developmental, biological, and clinical perspectives* (pp. 247-271). New York: Cambridge University.

Farrington, D. P. (1989). Early predictors of adolescent aggression and adult violence. *Violence and Victims, 4*(2), 79-100.

Farrington, D. P., & Loeber, R. (2000). Epidemiology of juvenile violence. *Child And Adolescent Psychiatric Clinics Of North America, 9*(4), 733-749.

Farrington, D. P., Loeber, R., Yin, Y., & Anderson, S. J. (2002). Are within-individuals causes of delinquency the same as between-individual causes. *Criminal Behavior and Mental Health, 12*, 53-68.

Frey, R. E. C., & Weller, J. (2000). Behavioral management of aggression through teaching interpersonal skills. *Psychiatric Services, 51*(5), 607-609.

Garbarino, J. (1990). Preventing child abuse and neglect. In M. Rothery & G. Cameron (Eds.), *Child maltreatment: Expanding our concept of helping* (pp. 169-180). Hillsdale, NJ: Erlbaum.

Gerard, A. B. (1994). *The parent-child relationship inventory: Manual.* Los Angeles, CA: Western Psychological Services.

Gershoff, E. T. (2002). Corporal punishment by parents and associated child behaviors and experoences: A meta-analytic and theoretical review. *Psychological Bulletin, 128*(4), 539-579.

Grusec, J. E., Davidov, M., & Lundell, L. (2002). Prosocial and helping behavior. In P. K. Smith & C. H. Hart (Eds.), *Blackwell handbook of childhood social development* (Vol. xv, pp. 457-474). Malden, MA: Blackwell.

Hamalainen, M., & Pulkkinen, L. (1995). Aggressive and non-prosocial behaviour as precursors of criminality. *Studies on Crime & Crime Prevention, 4*(1), 6-21.

Harris, J. R. (1998). *The nurture assumption.* New York: Free Press.

Harris, J. R. (2000). Socialization, personality development, and the child's environments: Comment on vandell (2000). *Developmental Psychology, 36*(6), 711-723.

Hawkins, J. D., Herrenkohl, T., Farrington, D. P., Brewer, D., Catalano, R. F., & Harachi, T. W. (1998). A review of predictors of youth violence. In R. F. Loeber, David P. (Ed.), *Serious & violent juvenile offenders: Risk factors and successful interventions* (Vol. xxv, pp. 106-146). Thousand Oaks, CA: Sage Publications.

U.S. Department of Justice, Office of Justice Programs & Office of Juvenile Justice and Delinquency Prevention. (2000). *Predictors of youth violence* (NCJ 179065). OJJDP.

Herrenkohl, T. I., Guo, J., Kosterman, R., Hawkins, J., Catalano, R. F., & Smith, B. H. (2001a). Early adolescent predictors of youth violence as mediators of childhood risks. *Journal of Early Adolescence, 21*(4), 447-469.

Herrenkohl, T. I., Huang, B., Kosterman, R., Hawkins, J., Catalano, R. F., & Smith, B. H. (2001b). A comparison of social development processes leading to violent behavior in late adolescence for childhood initiators and adolescent initiators of violence. *Journal of Research in Crime and Delinquency, 38*(1), 45-63.

Herrenkohl, T. I., Huang, B., Tajima, E. A., & Whitney, S. D. (2003). Examining the link between child abuse and youth violence: An analysis of mediating mechanisms. *Journal of Interpersonal Violence, 18*(10), 1189-1208.

Herrenkohl, T. I., Maguin, E., Hill, K. G., Hawkins, J., Abbott, R. D., & Catalano, R. F. (2000). Developmental risk factors for youth violence. *Journal of Adolescent Health, 26*(3), 176-186.

Hipwell, A. E., Loeber, R., Stouthamer-Loeber, M., Keenan, K., White, H. R., & Kroneman, L. (2002). Characteristics of girls with early onset disruptive and antisocial behaviour. *Criminal Behavior and Mental Health, 12*, 99-118.

Huesmann, L. R., Eron, L. D., & Dubow, E. F. (2002). Childhood predictors of adult criminality: Are all risk factors reflected in childhood aggressiveness. *Criminal Behavior and Mental Health, 12*, 185-208.

Huesmann, L. R., Moise-Titus, J., Podolski, C.-L., & Eron, L. D. (2003). Longitudinal relations between children's exposure to tv violence and their aggressive and violent behavior in young adulthood: 1977-1992. *Developmental Psychology, 39*(2), 201-221.

Kaplan, H. B. (1999). Toward an understanding of resilience: A critical review of definitions and models. In M. D. Glantz & J. L. Johnson (Eds.), *Resilience and development: Positive life adaptions* (pp. 17-83). New York: Kluwer.

Kazdin, A. E. (1994). Interventions for aggressive and antisocial children. In L. D. Eron, J. H. Gentry & P. Schlegal (Eds.), *Reason to hope: A psychological perspective on violence & youth* (pp. 341-382). Washington, D.C.: American Psychological Association.

Knight, G. P., Virdin, L. M., & Roosa, M. (1994). Socialization and family correlates of mental health outcomes among hispanic and anglo american children: Consideration of cross-ethnic scalar equivalance. *Child Development, 65*, 212-224.

Lane, S. D., & Cherek, D. R. (2000). Biological and behavioral investigation of aggression and impulsivity. In D. H. Fishbein (Ed.), *The science, treatment, and prevention of antisocial behaviors: Application to the criminal justice system* (pp. 5-21). Kingston, NJ: Civic Research Institute.

LeMarquand, D., Tremblay, R. E., & Vitaro, F. (2001). The prevention of conduct disorders: A review of successful and unsuccessful experiments. In J. Hill & B. Maughan (Eds.), *Conduct disorders in childhood and adolescence* (pp. 449-477). New York: Cambridge University.

Lochman, J. E., Barry, T. D., & Pardini, D. A. (2003). Anger control training for aggressive youth. In A. E. Kazdin & J. R. Weisz (Eds.), *Evidence-based psychotherapies for children and adolescents* (Vol. xix, pp. 263-281). New York: Guilford Press.

Loeber, R., Burke, J. D., & Lahey, B. B. (2002). What are adolescents antecedents to antisocial personality disorder. *Criminal Behavior and Mental Health, 12*, 24-36.

Loeber, R., & Farrington, D. P. (2000). Young children who commit crime: Epidemiology, developmental origins, risk factors, early interventions and policy implications. *Development and Psychopathology, 12*, 737-762.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future research. *Child Development, 71*(3), 543-562.

MacPhee, D., Benson, J. B., & Bullock, D. (1986, April). *Influences on maternal self-perceptions*. Paper presented at the the biennial International Conference on Infant Studies, Los Angeles, CA.

MacPhee, D., & Fritz, J. (1995, March). *Dare to be you colorado prevention project (osap): Final evaluation report* (Final Report No. Center for Substance Abuse Prevention: High-Risk Youth Grant #1397). Fort Collins, CO: Colorado State University.

MacPhee, D., & Fritz, J. (1999, September). *Dare to be you replication project / colorado sites (csap): Final evaluation report* (No. Center for Substance Abuse Prevention: High-Risk Youth Grant #). Fort Collins, CO: Colorado State University.

MacPhee, D., Fritz, J. J., & Miller-Heyl, J. (1996). Ethnic variations in personal social networks and parenting. *Child Development, 67*, 3278-3295.

MacPhee, D., & Miller-Heyl, J. (n.d.). *Dare to be you project (head start): Final evaluation report* (No. Head Start-University Partnership Grant: DHHS grant 90YD0011). Fort Collins, CO: Colorado State University.

MacPhee, D., & Rattenborg, K. (1991, April). *Cognitive mediators of child abuse*. Paper presented at the the biennial meeting of the Society for Research in Child Development, Seattle, WA.

Manuck, S. B., Flory, J. D., McCaffrey, J. M., Matthews, K. A., Mann, J. J., & Muldoon, M. F. (1998). Aggression, impulsivity, and central nervous system serotonergic responsivity in a nonpatient sample. *Neuropsychopharmacology, 19*(4), 287-299.

Maughen, A., & Cicchetti, D. (2002). Impact of child maltreatment and interadult violence on children's emotion regulation abilities and socioemotional adjustment. *Child Development, 73*, 1525-1542.

McClun, L. A., & Merrell, K. W. (1998). Relationship of perceived parenting styles, locus of control orientation, and self-concept among junior high age students. *Psychology in the Schools, 35*(4), 381-390.

Miller-Heyl, J., MacPhee, D., & Fritz, J. J. (2001). *Dare to be you: A systems approach to the early prevention of problem behaviors*. New York: Kluwer Academic/Plenum.

Mirsky, A. F., & Siegel, A. (1994). The neurobiology of violence and aggression. In A. J. J. Reiss, K. A. Miczek & J. A. Roth (Eds.), *Understanding and preventing violence: Biobehavioral influences* (pp. 59-172). Washington, D.C.: National Academy Press.

Moffitt, T. E. (1997). Adolescence-limited and life-course-persistent offending: A complementary pair of developmental theories. In T. P. Thornberry (Ed.), *Developmental theories of crime and delinquency* (pp. 11-54). New Brunswick, NJ: Transaction Publishers.

Moffitt, T. E., & Caspi, A. (2005). Life-course persistent and adolescence-limited antisocial males: Longitudinal followup to adulthood. In D. M. Stoff & E. J. Susman (Eds.), *Developmental psychobiology of aggression* (Vol. xii, pp. 161-186). New York: Cambridge University.

Moffitt, T. E., Caspi, A., Harrington, H., & Milne, B. J. (2002). Males on the life-course-persistent and adolescence-limited antisocial pathways: Follow-up at age 26 years. *Development and Psychopathology, 14*(1), 179-207.

Molnar, B. E., Buka, S. L., Brennan, R. T., Holton, J. K., & Earls, F. (2003). A multlilevel study of neighborhoods and parent-to-child physical aggression:

Results from the project on human development in chicago neighborhoods. *Child Maltreatment, 8*(2), 84-97.

Morell, V. (1993). Evidence found for a possible 'aggressive gene'. *Science, 260*, 1722-1723.

National Center for Injury Prevention and Control. (2001). *Injury fact book.* Atlanta, GA: Center for Disease Control and Prevention.

National Youth Violence Prevention Resrouce Center. (2001, November 27, 2004). Aggression. from http://www.safeyouth.org/scripts/teens/aggression.asp

National Youth Violence Prevention Resrouce Center. (n.d.). Risk and protective factors for youth violence fact sheet. Retrieved November 27, 2004, from http://www.safeyouth.org/scripts/facts/risk.asp

NICHD Early Child Care Research Network. (2006). Child-care effect sizes for the nichd study of early child care and youth development. *American Psychologist, 61*(2), 99-116.

Nix, R. L., Pinderhughes, E. E., Dodge, K. A., Bates, J. E., Pettit, G. S., & McFadyen-Ketchum, S. A. (1999). The relation between mothers' hostile attribution tendencies and childrens' externalizing behavior problems: The mediating role of mothers' harsh discipline practices. *Child Development, 70*(4), 896-909.

O'Connor, T. G., Deater-Deckard, K., Fulker, D., Rutter, M., & Plomin, R. (1998). Genotype-environment correlations in late childhood and early adolescence: Antisocial behavioral problems and coercive parenting. *Development Psychology, 34*(5), 970-981.

Ostrander, R. (2004). Oppositional defiant disorder and conduct disorder. In F. M. Kline & L. B. Silver (Eds.), *The educator's guide to mental health issues in the classroom.* (Vol. xv, pp. 267-286). Baltimore, MD: Paul H. Brookes.

Patterson, G. R. (1986). Performance models for antisocial boys. *American Psychologist, 41*(4), 432-444.

Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989). A developmental perspective on antisocial behavior. *American Psychologist, 44*(2), 329-335.

Pettit, G. S., Bates, J. E., & Doge, K. A. (1997). Supportive parenting, ecological context, and children's adjustment: A seven-year longitudinal study. *Child Development, 68*(5), 908-923.

Pettit, G. S., Bates, J. E., Doge, K. A., & Meece, D. W. (1999). The impact of after-school peer contact on early adolescent externalizing problems is moderated by parental monitoring, perceived neighborhood safety, and prior adjustment. *Child Development, 70*(3), 768-778.

Pike, A. (2002). Behavioral genetics, shared and nonshared environment. In P. K. Smith & C. H. Hart (Eds.), *Blackwell handbook of childhood social development.* (Vol. xv, pp. 27-43). Malden, MA: Blackwell.

Potter, C. C. (1999). Violence and aggression in girls. In J. M. Jenson & M. O. Howard (Eds.), *Youth violence: Current research and recent practice innovations* (pp. 113-138). Washington, D.C.: National Association of Social Workers Press.

Quinsey, V. L., Skilling, T. A., Lalumiere, M. L., & Craig, W. M. (2004). *Juvenile delinquency: Understanding the origins of individual differences*. Washington, D.C.: American Psychological Association.

Raine, A. (1997). Antisocial behavior and psychophsiology: A biosocial perspective and a prefrontal dysfunction hypothesis. In D. M. Stoff, J. Breiling & J. D. Maser (Eds.), *Handbook of antisocial behavior* (pp. 289-304). New York: John Wiley & Sons, Inc.

Raine, A. (2002). Annotation: The role of prefrontal deficits, low autonomic arousal and early health factors in the development of antisocial and aggressive behavior in children. *43*(4), 417-434.

Reid, J. B., & Eddy, J. M. (1997). The prevention of antisocial behavior: Some considerations in the search for effective interventions. In D. M. Stoff, J. Breiling & J. D. Maser (Eds.), *Handbook of antisocial behavior* (pp. 343-356). New York: John Wiley & Sons.

Reynolds, A. J., & Ou, S.-R. (2003). Promoting resilience through early childhood intervention. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 436-459). New York: Cambridge University.

Roth, J. L., & Brooks-Gunn, J. (2003). Youth development programs: Risk, prevention, and policy. *Journal of Adolescent Health, 32*, 170-182.

Rowe, D. C. (1994). *The limits of family influence: Genes, experience, and behavior.* New York: Guilford.

Rubin, K. H., Hastings, P., Chen, X., Stewart, S., & McNichol, K. (1998). Intrapersonal and maternal correlates of aggression, conflict, and externalizing problems in toddlers. *Child Development, 69*(6), 1614-1629.

Rutter, M. (1990). Psychosocial resilience and protective mechanisms. In J. Rolfe, A. S. Masten, D. Cicchetti, K. H. Neuchterlein & S. Weintraub (Eds.), *Risk and protective factors in the development of psychopathology* (pp. 181-214). New York: Cambridge University.

Rutter, M. (1997a). Antisocial behavior: Developmental psychopathology perspectives. In D. M. Stoff, J. Breiling & J. D. Maser (Eds.), *Handbook of antisocial behavior* (pp. 115-124). New York: John Wiley & Sons, Inc.

Rutter, M. L. (1997b). Nature-nurture integration. *American Psychologist, 52*(4), 390-398.

Scarr, S. (1992). Developmental theories of the 1990's: Development and individual differences. *Child Development, 63*, 1-19.

Schmidt, L. A., Fox, N. A., Rubin, K. H., Hu, S., & Hamer, D. H. (2002). Molecular genetics of shyness and aggression in preschoolers. *Personality and Individual Differences, 33*(2), 227-238.

Schneider, W. J., Cavell, T. A., & Hughes, J. N. (2003). A sense of containment: Potential moderator of the relation between parenting practices and children's externalizing behaviors. *Development and Psychopathology, 15*, 95-117.

Schwartz, C. E., Snidman, N., & Kagan, J. (1996). Early childhood temperament as a determinant of externalizing behavior in adolescence. *Development and Psychopathology, 8*, 527-537.

Schwartz, D., McFadyen-Ketchum, S., Dodge, K. A., Pettit, G. S., & Bates, J. E. (1999). Early behavior problems as a predictor of later peer group victimization: Modertors and mediators in the pathways of social risk. *Journal of Abnormal Child Psychology, 27*(3), 191-201.

Shields, A., & Cicchetti, D. (2001). Parental maltreatment and emotion dysregulation as risk factors for bullying and victimization in middle childhood. *Journal of Clinical Child Psychology, 30*, 349-363.

Shipman, K. L., & Zeman, J. (2001). Socialization of children's emotion regulation in mother-child dyads: A developmental psychopathology perspective. *Development and Psychopathology, 13*(2), 317-336.

Shucksmith, J., Hendry, L., & Glendinning, A. (1995). Models of parenting: Implications for adolescent well-being within different types of family contexts. *Journal of Adolescence, 18*(3), 253-270.

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York: Oxford University Press.

Slaby, R. G., & Guerra, N. G. (1988). Cognitive mediators of aggression in adolescent offenders: I. Assessment. *Developmental Psychology, 24*, 580-588.

Steinberg, L., Lamborn, S. D., Darling, N., Mounts, N. S., & et al. (1994). Over-time changes in adjustment and competence among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Development, 65*(3), 754-770.

Steinberg, L., Lamborn, S. D., Dornbusch, S. M., & Darling, N. (1992). Impact of parenting practices on adolescent achievement: Authoritative parenting, school

involvement, and encouragement to succeed. *Child Development, 63*(5), 1266-1281.

Stormshak, E. A., Bierman, K. L., & Group, T. C. P. P. R. (1998). The implications of different developmental patterns of disruptive behavior problems for school adjustment. *Development and Psychopathology, 10*(3), 451-467.

Stormshak, E. A., Bierman, K. L., McMahon, R. J., Lengua, L. J., & Group, T. C. P. P. R. (2000). Parenting practices and child disruptive behavior problems in early elementary school. *Journal of Clinical Child Psychology, 29*(1), 17-29.

Strage, A., & Brandt, T. S. (1999). Authoritative parenting and college students' academic adjustment and success. *Journal of Educational Psychology, 91*(1), 146-156.

Strassberg, Z., Dodge, K. A., Pettit, G. S., & Bates, J. E. (1994). Spanking in the home and children's subsequent aggression toward kindergarten peers. *Development and Psychopathology, 6*(3), 445-461.

Tallandini, M. A. (2004). Aggressive behavior in children's dolls' house play. *Aggressive Behavior, 30*, 504-519.

Tiet, Q. Q., Wasserman, G. A., Loeber, R., McReynolds, L. S., & Miller, L. S. (2001). Developmental and sex differences in types of conduct problems. *Journal of Child and Family Studies, 10*(2), 181-197.

Tolan, P. H., Guerra, N. G., & Kendall, P. C. (1995). A developmental-ecological perspective on antisocial behavior in children and adolescents: Toward a unified risk and intervention framework. *Journal of Consulting & Clinical Psychology, 63*(4), 579-584.

Tschann, J. M., Flores, E., Martin, B. V., Pasch, L. A., Baisch, E., & Wibbelsman, C. J. (2002). Interparental conflict and risk behaviors among mexican american adolescents: A cognitive-emotional model. *Journal of Abnormal Child Psychology, 30*(4), 373-385.

Volavka, J. (1999). The neurobiology of violence: An update. *Journal of Neuropsychiatry & Clinical Neurosciences, 11*(3), 307-314.

Volavka, J. (2002). *Neurobiology of violence* (2nd ed. Vol. xix). Washington, D.C.: American Psychiatric Publishing.

Webster-Stratton, C. (2000). Oppositional-defiant and conduct-disordered children. In M. Hersen & R. T. Ammerman (Eds.), *Advanced abnormal child psychology (2nd ed.)* (Vol. x, pp. 387-412). Mahwah, NJ: Lawrence Erlbaum Associates.

Webster-Stratton, C., Reid, J., & Hammond, M. (2001). Social skills and problem-solving training for children with early-onset conduct problems: Who benefits? *Journal of Child Psychology & Psychiatry, 42*, 940-952?

Weiss, B., Dodge, K. A., Bates, J. E., & Pettit, G. S. (1992). Some consequences of early harsh discipline: Child aggression and a maladaptive social information processing style. *Child Development, 63*(6), 1321-1335.

Westman, J. C. (1994). *Licensing parents: Can we prevent child abuse and neglect.* New York: Plenum Press.

Widom, C. S. (1989). The cycle of violence. *Science, 244*(4901), 160-166.

Windle, M. (1991). The difficult temperament in adolescence: Associations with substance use, family support, and problem behaviors. *Journal of Clinical Psychology, 47*, 310-315.

Wingfield, J. C., Ball, G. F., Dufty, A. M., Jr., Hegner, R. E., & Ramenofsky, M. (1987). Testosterone and aggression in birds. *American Scientist, 75*, 602-608.

World Health Organization. (2002). *World report on violence and health: Summary*, Geneva, Switzerland.