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Item Type	Dissertation
Authors	Wachlarowicz, Marissa Marie
Publisher	Wichita State University
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Download date	2026-05-21 08:47:45
Link to Item	http://hdl.handle.net/10057/5522

**PATHWAYS BY WHICH PARENT MANAGEMENT TRAINING BRINGS ABOUT LONG-TERM
CHANGES IN DEVIANT PEER ASSOCIATION**

A Dissertation by

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**Submitted to the Department of Psychology
and the faculty of the Graduate School of
Wichita State University
in partial fulfillment of
the requirements for the degree of
Doctor of Philosophy**

July 2012

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CHANGES IN DEVIANT PEER ASSOCIATION**

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

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ACKNOWLEDGMENTS

I would like to thank my advisor, James Snyder, for shaping my clinical and research skills and supporting me in my professional development. I would also like to express gratitude toward each of my committee members, Darwin Dorr, Louis Medvene, Robert Zettle, and Don Nance, for their time and support. Finally, I am truly indebted to and thankful for my parents who provided me endless support and love. They instilled in me the value of education and importance of hard work.

ABSTRACT

Parental monitoring, child social competence, and child academic success were examined as mediators explaining the relationship between Oregon's Model of Parent Management Training (PMTO) and long-term changes in deviant peer association for an at-risk sample of divorced mothers of 6-10 year old boys. Participants included a community sample of 238 boys and mothers. Mother's mean age was 34.7 years at the start of data collection, and boys mean age was 7.8 years. Multi-method, multi-informant methods were used to examine skilled parenting and parental monitoring, as well as child factors, including social competence, academic success, and deviant peer association. Intervention was found to positively impact average levels in deviant peer association across time. Parental monitoring did not mediate the relationship between intervention and changes in deviant peer association. Parenting skill-induced changes in social competence and academic success were not found to mediate the relationship between PMTO and future deviant peer association. However, children who were ranked higher on social competence and had stronger academic skills demonstrated lower levels of deviant peer association and reduced risk for persistent affiliation with antisocial peers. These results support the need to ascertain other mediating factors contributing to the increasing, long-term benefits of PMTO. Further implications for prevention and intervention are discussed.

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CHAPTER 1

INTRODUCTION

Two goals of prevention science are to understand developmental trajectories of psychological disorders and identify intervention programs that promote mental health and reduce the risk of psychopathology. Of the numerous mental health disorders, antisocial behavior is one of the most costly, both in terms of personal and financial costs. Children identified early in life as being aggressive toward others are found to be at an increased risk for problems throughout childhood and adulthood, including academic failure, conduct disorder, delinquency/criminality, and substance abuse (Broidy et al., 2003; Fergusson & Horwood, 1998). Anderson's (1999) financial analysis indicated direct and indirect costs to society due to criminal activity were upward of one trillion dollars per year in the United States.

Decades of thorough and exhaustive research show that the foundation for antisocial behavior is laid down early in development (Forgatch, DeGarmo, & Beldavs, 2005; Patterson, DeBryshe, & Ramsey, 1989; Stoff, Breiling, & Maser, 1997). Snyder et al. (2010) document that antisocial behavior can occur as early as age 5, and is one of the most prevalent diagnosed childhood disorders (Kazdin, 1993). A number of risk factors for the development of antisocial behavior have been identified, including early externalizing problems, poor parenting skills, deviant peer association, socioeconomic disadvantage, marital transition, and parental psychopathology. Of the known risk factors, coercive parenting and peer relationships appear to be important mechanisms contributing to future antisocial behavior (DeGarmo & Forgatch, 2005; Forgatch, Patterson, DeGarmo, & Beldavs, 2009).

Research on risk factors has been instrumental in identifying targets for intervention and indicates the importance of locating intervention early in development (Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011). Given the importance of parenting in the development of antisocial behavior, efforts have been made to enhance parenting skills to change the trajectory of child antisocial behavior. A number of studies have demonstrated the efficacy and effectiveness of Parent Management Training (PMT) programs in improving positive parenting skills, reducing the use of coercive parenting practices, and remediating clinical levels of child antisocial behavior (Brestan & Eyeberg, 1998; Kaminski, Valle, Filene, & Boyle, 2008; Nock, 2003; Taylor & Biglan, 1998).

Research has also assessed the usefulness of PMT as a preventative intervention for families of children identified as at-risk for future antisocial behavior. With intervention located early in the child's development, PMT acts as a catalyst to steer at-risk children toward an alternative, more positive behavioral trajectory (Beauchaine, Webster-Stratton, & Reid, 2005; CPRG, 2002; Forgatch et al., 2005; Sandler, Wolchick, Winslow, & Schenck, 2006). PMT has gained support in terms of efficacy as a preventative intervention, with outcomes showing positive benefits to parenting practices, reductions in antisocial behavior and deviant peer association, and collateral benefits to parents, including increased education and occupational attainment, financial advantage, and reduced rates of maternal depression (Patterson, Forgatch, DeGarmo, 2010). Positive outcomes engendered by prevention programs appear to be maintained in both the short and long-term, with effect sizes actually increasing across time (Patterson et al., 2010).

One question that remains to be addressed is the relationship between early changes in parenting practices, and long-term changes in adolescent deviant peer association and delinquency. Although PMT programs appear to be effective at preventing future child antisocial behavior, it is unclear how parent-focused programs located in early childhood affect deviant peer association during adolescence, even though peer relationships are not specifically targeted in early intervention. A number of research groups have attempted to link early changes in effective parenting to diminished deviant peer association through the parental skill of monitoring (Dishion & McMahon, 1998; Dishion, Patterson, Stoolmiller, & Skinner, 1991; Kerr & Stattin, 2000; Laird, Criss, Pettit, Dodge, & Bates, 2008; Patterson, 1993; Patterson & Dishion, 1985). Monitoring consists of a collection of related parenting behaviors involving attending to, knowledge about, and tracking of a child's whereabouts, activities, and associates (Dishion & McMahon, 1998; Kerr & Stattin, 2000). Monitoring appears to be an important parenting skill as children expand their social networks and move into middle school (Dishion et al., 1991; Laird et al., 2008). Researchers have proposed that improvements in parental monitoring lead to better supervision of children's behavior at home and school, as well as increasing parental knowledge, supervision, and limitations on children's social networks (Kerr & Stattin, 2000; Patterson & Dishion, 1985).

Although monitoring appears to be an important parenting skill for children during late childhood and adolescence and is a focal skill for PMT programs designed for youth during these developmental periods, it is a less salient parenting skill for PMT programs designed for children during early to middle childhood. However, a strong, long-term effect is found for diminished involvement with deviant peers by at-risk children in families participating in early

childhood PMT programs. This phenomenon leads to a need to ascertain other potential parenting and child factors, in addition to monitoring, that may influence future deviant peer association for children whose parents receive intervention during early and middle childhood.

The present research used data from a preventative intervention, *Parenting through Change* (Forgatch, 1994) to assess mechanisms for reductions in deviant peer association in an at-risk sample of divorced mothers of 6-10 year old boys who displayed early signs of externalizing problems. This dissertation examined the direct effect of changes in parental monitoring on deviant peer association and future delinquency for children and families receiving intervention prior to adolescence. The study also examined alternative mechanisms by which early preventative intervention led to positive long-term child outcomes, specifically examining children's social competence and academic success as mediators of parenting intervention on later deviant peer association and delinquency.

LITERATURE REVIEW

Prevalence and Risk Factors for Child Antisocial Behavior

Conduct disorder (CD) and oppositional defiant disorder (ODD) are two of the most prevalent diagnosed disruptive behavior disorders of youth (American Psychiatric Association, 2000). These disorders are marked by a number of externalizing problems, including opposition, defiance, aggression toward others, low academic achievement, association with deviant peers, and early substance use (American Psychiatric Association, 2000). Using a survey from 9,282 adults in the United States, Nock, Kazdin, Hirripi, and Kessler (2006) estimated lifetime prevalence of conduct disorder at 12.0% for males, and 7.1% for females. Nock, Kazdin,

Hirripi, and Kessler (2007) estimated the lifetime prevalence of ODD for males at 11.2%, and females at 9.2%.

Not only are prevalence rates high for ODD and CD, but early externalizing problems appear to be the single best predictor of risk for future antisocial behavior (Loeber, 1991; Patterson, 1993). A number of studies have assessed nonclinical samples of youth as young as 4 years old, and found that 50% or more of children demonstrating early externalizing symptoms develop persistent conduct disorder problems later in childhood (Campbell, 1995; Coie, 1996; Reid, 1993; Reid & Patterson, 1991).

In addition to the presence of early externalizing problems, other risk factors for ODD and CD include being male, academic under-achievement and reading problems, family socio-economic disadvantage, low maternal education, low parental social support, maternal psychopathology, family dysfunction, marital conflict/divorce, ineffective parenting practices, and deviant peer association (Fendrich, Warner, & Weissman, 1990; Institute of Medicine, 1994; Offord, 1987; Yoshikuwa, 1994; Zoccolillo, 1993). Identification of child, parent, and family risk factors have contributed to understanding the development of antisocial behavior and the long-term consequences for children with persisting externalizing problems. Identification of a wide range of risk factors for antisocial behavior has also allowed researchers to identify potential targets for treatment, with parenting skills appearing to be an important contributor to the development of later conduct problems, as well as a malleable target for intervention (Nock, 2003).

Development of Antisocial Behavior and Social Interaction Learning Theory

Social Interaction Learning Theory (SIL) has been used in various PMT programs to explain the development of child antisocial behavior, including the roles of parents and peers. SIL proposes that patterns of antisocial behavior develop early in life, with coercive interaction patterns first being established in early parent-child interactions (Forgatch et al., 2009). Parents are a child's first socializing agent, and children develop knowledge of acceptable behavior through everyday interactions with parents. Child antisocial behavior is believed to occur when coercive parent-child interaction patterns become over-learned and engrained in a child's behavioral repertoire (Patterson et al., 1989). SIL theory proposes that families of antisocial children are characterized by harsh and inconsistent discipline practices, and poor monitoring and supervision of the child's activities. SIL theory holds that parents essentially train children to engage in antisocial behavior through failure to use positive reinforcement to promote prosocial behavior and punishment to reduce child antisocial behavior. A critical contingency in the development of antisocial behavior entails negative reinforcement as children learn to use aversive behavior to terminate aversive intrusions by other family members. In using harsh and inconsistent parenting practices, parents inadvertently support daily interactions with family members in which coercive child behaviors are reinforced (Patterson et al., 1989).

Stressful family contexts often precipitate the onset of child antisocial behavior (Reid, Patterson, & Snyder, 2002). Adversity creates stressful family contexts, which can tip the balance from using effective parenting skills to using coercive approaches to parenting. Adversities can include social disadvantage, family structure transitions (divorce/remarriage), discrimination, parental mental or physical illness, and legal entanglement. Adversity can

amplify coercive interactions in the family, and diminish positive parenting practices (Patterson et al., 1989). The persistent use of coercive parenting can result in the development of overt forms of child antisocial behavior. Overt child antisocial behavior may include excessive noncompliance, arguing, aggression toward others and animals, and temper tantrums (Dishion & Patterson, 2006). These behaviors are shaped by negative reinforcement of aversive and aggressive behavior and by little or non-contingent reinforcement for positive or prosocial child behavior (Patterson & Yoerger, 1997).

Patterson et al. (1989) provide an empirical base for the use of SIL theory in understanding the development of child antisocial behavior. Patterson et al. reviewed four longitudinal studies examining the relationship between disrupted parenting practices and child antisocial behavior. The studies found that parenting practices and family interaction constructs accounted for 30-40% of the variance in child antisocial behavior at home and school. Forgatch (1988) found that, in families referred for treatment, improved parental discipline and monitoring resulted in significant reductions in child antisocial behavior. In the absence of change in parenting skills, children did not demonstrate subsequent reductions in antisocial behavior. The results of these studies support the theory that disrupted parenting practices are causally related to child antisocial behavior (Patterson et al., 1989).

As children enter school, their social context broadens to include other important socializing agents, including teachers and peers. SIL theory proposes that the coercive interaction patterns established during parent-child interaction in the home generalize to children's other relationships, including interactions with teachers and peers at school (Patterson & Dishion, 1985; Patterson, Reid, & Dishion, 1992). Coercive interactions with

teachers and peers can lead to early school failure and peer rejection. As overt antisocial behavior and rejection by prosocial peers occur, the likelihood of association with other rejected, deviant peers increases (DeGarmo & Forgatch, 2005).

As children progress through school, peers become an increasingly important influence on children's behavior (Patterson & Yoeger, 1997). Around middle childhood (age of 12), a growth spurt in deviant peer association and antisocial behavior occurs, with deviant peers encouraging new and more covert (lying, stealing) forms of antisocial behavior (Patterson & Yoeger, 1997; Snyder et al., 2005). Deviant peers tend to rely on positive reinforcement to train covert acts, praising and providing status to youth as they increase the frequency and intensity of covert antisocial behaviors. Simultaneously, parents continue to contribute to children's antisocial behaviors through the use of punitive discipline and poor monitoring (Reid et al., 2002). The continuation of coercive parenting strategies can lead to increases in unsupervised time away from home and to engaging in more deviant behaviors outside the view of parents. Snyder, Reid, and Patterson (2003) documented that deviant peer association occurs as early as kindergarten, and promotes lying, stealing, and cheating by children as early as 5-6 years of age. Once on this early antisocial trajectory, children are at greater risk for engaging in more severe and covert forms of antisocial behavior (Snyder, 2002) and adult chronic offending (Patterson & Yoeger, 1997).

Parent Management Training

In response to the high prevalence of ODD and CD and their costs to individuals and society, a substantial body of research has been dedicated to the identification and evaluation of efficacious and effective interventions designed to prevent and remediate child antisocial

behavior (Brestan & Eyeberg, 1998; Kaminski et al., 2008; Nock, 2003; Taylor & Biglan, 1998).

Several interventions for child conduct disorder have gained varying amounts of empirical support, including child-focused cognitive behavioral approaches, teacher-focused educational approaches, parent-training programs, and multimodal treatment methods (Nock, 2003).

Among the various forms of treatment, behavioral parent management training (PMT) has been identified as an efficacious and effective intervention for child disruptive behavioral problems, focusing on promoting constructive parenting practices and family relationships as mechanisms to induce behavioral change.

PMT programs have met stringent criteria for a “well-established intervention” as defined by the Division 12 Task Force on Effective Psychosocial Interventions, demonstrating efficacy and effectiveness in decreasing child conduct problems, reducing future deviant peer association, and preventing persisting antisocial behavior (Brestan & Eyberg, 1998; Eyeberg, Nelson, & Boggs, 2008). PMT programs utilize operant principles to create behavioral change, with a specific focus on teaching parents to increase the use of effective parenting skills and decrease the use of coercive parenting practices (Patterson et al., 1992; Reid et al., 2002). Parents participate in manual-based treatment sessions that promote specific parenting skills, including child encouragement, effective discipline and limit setting, monitoring, problem solving, and positive involvement (Patterson, Dishion, & Bank, 1984).

A number of studies have assessed proximal and distal outcomes for parents and children participating in PMT, as well as the collateral effects of PMT programs for mothers. Studies have consistently demonstrated PMT programs increase parents’ use of effective parenting practices (positive involvement, skill encouragement, problem-solving, monitoring)

and reduce coercive parenting practices (negative reinforcement, negative reciprocity, inept discipline) (Bullard et al., 2010; Forgatch et al., 2009; Kaminski et al., 2008; Patterson, DeGarmo, Forgatch, 2004). These effects on parenting practices appear to persist across time, without additional intervention (Forgatch et al., 2009; Martinez & Forgatch, 2001).

Parent Management Training as a Preventative Intervention

Knowledge of risk factors for ODD and CD and support for the use of PMT with clinical populations have led to the investigation of the efficacy of PMT as a preventative intervention for families (Beauchaine et al., 2005; Conduct Problems Research Prevention Group, 2002; Forgatch et al., 2005; Sandler et al., 2006). Preventative interventions target children and families identified as high-risk, with the assumption that providing families with early intervention can alter children's developmental trajectories, preventing future antisocial behavior (Bennet et al., 1999). Preventative interventions are economically advantageous, as they selectively provide services to at-risk children and families and are an effective means to increase coverage and population health impact (Bennet et al., 1999).

A number of research groups have assessed the efficacy of various PMT preventative interventions (Buchaine et al., 2005; DeGarmo & Forgatch, 2007; Forgatch et al, 2005; Sandler et al., 2006, 2011). Using Webster Stratton's Incredible Years (2003), Beauchaine et al. (2005) summarized results from a set of six outcome studies. All studies utilized a wait-list/control design, with assessment data collected across 20 years of intervention trials. Children were identified as at-risk for conduct problems and ranged from ages 3-8 years. Treatment modalities included PMT, child training, and/or teacher training. Collective results showed PMT

resulted in a decrease in harsh and ineffective parenting, which was associated with reductions in externalizing child behavior.

Children in families experiencing marital disruptions (divorce) and remarriage are one at-risk group for conduct problems. In a study using an at-risk sample of newly constituted biological mothers and stepfathers of children in kindergarten through grade 3, Forgatch et al. (2005), DeGarmo and Forgatch (2007), and Bullard et al. (2010) demonstrated a prevention effect for PMT. Families receiving the Oregon Model of Parent Management Training (PMTO) showed increases in effective parenting practices, for both mothers and stepfathers, resulting in decreases in child noncompliance and in home and school problem behaviors that were evident up to 30 months after baseline. Results from these studies suggest that not only does PMT increase effective parenting skills and reduce conduct problems of children demonstrating early externalizing symptoms, but that PMT programs are effective for families experiencing additional adversity such as divorce and remarriage.

Sandler et al. (2006) also assessed the efficacy of their preventative parenting intervention designed for divorced mothers and their children. Sandler's program focused on rebuilding the mother-child relationship after divorce. Families were assessed at treatment termination, as well as at 6 months and 6 years post-baseline. Results showed increases in maternal discipline and warmth, with these factors significantly mediating the treatment impact in reducing child internalizing and externalizing problems. Encouragingly, Sandler and colleagues found a meditational effect of maternal warmth on child mental health at 6 years post-baseline for the high-risk families, providing evidence for long-term benefits of preventative interventions targeting child antisocial behavior.

Recently, Sandler et al. (2011) reviewed the long-term effects of preventative parenting programs. Sandler et al. summarized findings from programs for subclinical samples of children and families, reporting outcomes 1 year or longer after termination of treatment. Sandler et al. reviewed 46 randomized, experimental trials of preventative parent training programs for children and families across developmental levels for ages 0-3 (13 trials); 4-7 (8 trials); 8-12 (11 trials); and 13-18 (6 trials).

The majority of studies in the review targeted families experiencing multiple adversities, including socioeconomic disadvantage, single parenthood or divorce, legal entanglement, or parental psychopathology. General findings from the 46 studies spanning child ages 0-20 provided substantial evidence that parent-focused preventative interventions lead to improvements in parenting practices and in a broad range of child problem outcomes and competencies. Positive outcomes for parents included increased parenting confidence, use of positive parenting skills, and decreased use of coercive parenting practices.

Collectively, these studies also demonstrated lower rates of child and parental mental health disorders; reduced child abuse and substance use; reduced delinquency and risky sexual behavior; and improved academic adjustment, academic achievement, and social competence. In addition to reviewing the efficacy and effectiveness of PMT programs, Sandler et al. also documented the longevity of PMT's effects. Three-quarters of the PMT programs targeting families with children ages 0-3 reported positive changes in parenting skills 1 year after intervention. A majority of studies reported reductions in child conduct problems between 1-2 years after termination of intervention. One-third reported reduced rates of child abuse between 2-13 years after termination of intervention. Two studies followed their samples from

infancy to adolescence, finding reductions in risky behaviors, involvement in the legal system, and greater language and math skills for youth in the intervention compared to the control conditions.

Similar positive long-term outcomes were found for studies assessing parenting programs for families with children ages 4-7 years. Half of the studies demonstrated benefits to positive parenting practices 1 year after completing the program for families participating in PMT compared to those in control groups. A number of studies followed children into adolescence, finding that children in the intervention group showed fewer externalizing problems, delinquent behaviors, substance abuse, internalizing problems, and better school adjustment compared to children whose parents were in the control conditions (Sandler et al., 2011).

Studies with families of children ages 8-12 and ages 13-18 years also found effects on parenting 1-2 years after completing intervention, with intervention groups demonstrating benefits in effective parenting practices compared to control groups. Collectively, these studies also found positive effects during adolescence (3-7 years after the intervention) for the intervention compared to control groups, including decreases in delinquency, conduct problems, internalizing problems, risky sexual behavior, and substance use. The Sandler et al. review demonstrates that not only has a body of research provided evidence for the effectiveness of PMT for families with children in the clinical range for antisocial behavior problems (Forgatch et al., 2009; Kaminski et al., 2008; Patterson et al., 2004; Taylor & Biglan), but that research has also demonstrated that early prevention for at-risk families can be useful in guiding children's behavior and emotional trajectories down a positive path, thus preventing

the development of future antisocial behavior (Buchaine et al., 2002; DeGarmo & Forgatch, 2007; Forgatch et al., 2005; Sandler et al., 2006, 2011).

Oregon Divorce Study-II

The Oregon Divorce Study-II (ODS-II) is a preventative-intervention study that measured a broad range of child, parent, and family outcomes across time. Given that there is a well-substantiated relationship between divorce and the increased likelihood of early child antisocial behavior, including deviant peer association and delinquency (Hetherington, Bridges, & Insabella, 1998; Martinez & Forgatch, 2002), ODS-II is an optimal data set to explore the short and long-term impact of parent management training on the prevention of child antisocial behavior. ODS-II is an experimental, longitudinal study designed to test the efficacy of a preventive intervention for at-risk children in families experiencing the transition of divorce.

The study used a randomized control design, assessing 237 boys (ages 6-9 years, grades K-3) and their recently separated mothers. Using the Oregon Model of Parent Management training (PMTO), *Parenting Through Change* (Forgatch, 1994), researchers aimed to test the theoretical model underlying the intervention, collecting 9 years of follow-up data on a number of parent and child outcomes. A number of studies have been conducted using this data set, and demonstrate the effects of parent management training on child antisocial behavior. Children of parents receiving PMTO, compared to those in the control group, demonstrated better teacher and child reported school adjustment (Forgatch & DeGarmo, 1999), decreased internalizing problems (DeGarmo, Patterson, & Forgatch, 2004; Forgatch & DeGarmo, 1999), and reductions in child delinquency (DeGarmo & Forgatch, 2005; Forgatch & DeGarmo, 2002).

Not only do PMT programs appear to produce proximal and distal positive child outcomes, collateral effects were also found for mothers assigned to the PMTO intervention group in the ODS-II study. Patterson et al. (2004) found group assignment to the PMTO condition was associated with reduced levels of maternal depression that were maintained across 30 months. Mothers who showed initial drops in depression were more likely to show increases in positive parenting skills and decreased use of coercive parenting practices.

In addition to lower rates of depression for the divorced, at-risk mothers, Patterson et al. (2010) identified a number of other positive outcomes for mothers across the 9 year follow-up period. Mothers in the experimental compared to the control group had improved standards of living, improved maternal education attainment and occupational success (DeGarmo, Forgatch, & Martinez, 1999), and fewer arrests (Patterson et al., 2010). The benefits to mothers were found to be mediated by changes in parenting practices.

The documented positive benefits to children and mothers participating in the PMTO program in the Oregon Divorce Study-II appear to persist across time. Additionally, the magnitude of changes in child and parent behavior appears to increase rather than fade over time. DeGarmo et al. (2004) found increased effect sizes over the first 30 months after baseline in terms of child deviant peer association, teacher-reported externalizing behavior problems, child-reported internalizing problems, and maternal depression. Forgatch and DeGarmo (2007) found significant increases in effect sizes for economic benefits to families, including rise out of poverty, larger per capita annual income, and better income-to-needs ratio. These findings suggest that life is generally improving for families participating in PMT programs, while those experiencing divorce who do not receive intervention experience persistent or increasing child

antisocial behavior, academic challenges, and ecological adversity over time. The results from this and other research suggest that if intervention can be implemented early in a child's development, children's behavioral trajectories can be shifted toward more normative youth functioning.

Of particular interest to the current study is Forgatch and colleague's finding that PMTO has a direct and long-term effect in reducing deviant peer association. DeGarmo and Forgatch (2005) assessed the impact of PMTO on boys' deviant peer association and teacher-rated delinquency across 36 months. Significant differences for the intervention compared to the control group were found, with increases in effective parenting and decreases in deviant peer association. DeGarmo and Forgatch also established that benefits to parenting practices and deviant peer association were found to independently mediate the effect of intervention on delinquency, with the intervention group demonstrating lower rates of teacher-reported delinquency across time. This is particularly interesting, as the intervention only targets the parent and does not directly target the child. Moreover, the results suggested that children of families receiving PMTO were less likely to affiliate with antisocial peers as they moved into later childhood and early adolescence, and that this effect was not mediated by changes in parenting.

In a 9 year follow-up study, Forgatch et al. (2009) again assessed teacher-reported delinquency, and also examined the number of youth police arrests and age at first police arrest. Change in parenting was found to have a direct effect on delinquency. Children of parents in the PMTO group engaged in less teacher-reported delinquency compared to the control group. Results of the study also found that children of parents in the PMTO group,

compared to the control group, showed decreased average levels of deviant peer association, fewer arrests across 9 years, and delayed onset of first arrest. Again, these long-term intervention effects on antisocial behavior were independently mediated by changes in parenting and deviant peer association. Results of this study demonstrate that the positive effects PMTO has on child antisocial behavior, without additional intervention, persist across time and positively impact children's development. They also demonstrate that reduced contact with deviant peers is important in preventing future antisocial behavior. What is unclear, however, is how an intervention designed to improve parenting skills during early childhood alters a child's later association with deviant peers. The reductions in deviant peer association were not directly mediated by changes in the parenting practices examined by Forgatch et al. (2009).

Pathways by which PMT brings about Long-Term Changes in Youth Outcomes

A number of studies, including the collective set of studies from ODS-II, have demonstrated that changes in parenting practices mediate the impact of PMT on short and long-term changes in child behavior and family wellbeing (Beauchaine et al., 2005; Eddy & Chamberlain, 2000; Forgatch et al., 2005, 2009). Although ODS-II and other research informs prevention science about the efficacy and effectiveness of PMT in reducing child behavior problems (substance use, delinquency) and enhancing child academic performance and maternal well-being (depression, SES status, educational and occupational attainment, and arrest record), little is known about how and why PMT programs have these long-term effects (Sandler et al., 2011). The long-term persistence, spreading of positive effects, and increasing effect sizes are, at first glance, counterintuitive as the intervention is relatively brief,

implemented during childhood, and exclusively targets parenting skills. For this reason, it is important for research to ascertain the processes that account for these effects.

Mediational studies provide evidence that changes in parenting are important in improving outcomes for children engaging in early antisocial behavior. However, they do not specify the process by which PMT interventions affect youth outcomes over time or account for the increasing effect sizes for child and parent outcomes. Previous research appears to suggest that changes in parenting act as a catalyst, setting off a cascade of effects. However, research has yet to address how and why PMT programs have these cascading effects. It remains unclear whether the effects are due to the skills taught to parents in the programs or to other secondary effects of the intervention. For this reason, it is necessary to identify the causal mechanisms that account for long-term intervention effects (Sandler et al., 2011).

Pathways by which PMT brings about Long-Term Changes in Deviant Peer Association

It is particularly perplexing that PMT interventions have a direct and persistent effect on deviant peer association, but that this effect is not mediated by changes in parenting. PMT programs are designed to target parenting practices that encourage prosocial child behavior (Reid & Patterson, 1991). As proposed by SIL theory, parents and peers are key players in shaping a child's behavior. Parents are the first agents to shape children's behavior and teach children necessary skills to successfully negotiate social relationships (Forgatch et al., 2009). Research pertaining to the development of antisocial behavior suggests that early maladaptive parent-child interactions lay the foundation for future child antisocial behavior (Patterson et al., 1989; Stoff et al., 1997). PMT focuses heavily on teaching effective parenting skills to help the parent learn how and when to apply reinforcement and discipline strategies that promote

prosocial behavior (Reid & Patterson, 1991). A number of outcome studies have supported the finding that parenting skills mediate the relationship between PMT intervention and reductions in child antisocial behavior (Patterson et al., 2010).

Although parents play a crucial role in the development of child prosocial behavior, SIL theory also suggests that peers play an important role in shaping behavior as a child's social environment expands with age (Patterson & Yoeger, 1997). Research addressing the development of antisocial behavior has shown that early overt antisocial behavior tends to lead to social rejection by normative peers at school, increasing the likelihood that the child will affiliate with other deviant peers (Patterson & Yoeger, 1997; Snyder et al., 2005). As a child enters school, deviant peers become an increasingly important and powerful influence on child behavior, providing reinforcement for increasingly serious overt conduct problems and covert antisocial behavior. A number of outcome studies have supported the finding that intervention has a direct effect on deviant peer association, which impacts child antisocial behavior (DeGarmo & Forgatch, 2005; Forgatch et al., 2009), but these studies did not document the role of parenting practices on reduced deviant peer association.

PMT programs, particularly those implemented during childhood, do not specifically work with the child to prevent deviant peer association. PMT programs for pre-adolescent children also do not place much emphasis on how a parent can deter future deviant peer association. For this reason, it is unclear why PMT programs located early in children's lives diminish children's later deviant peer association. Given that changes in parenting do not appear to account for the effect of PMT intervention on deviant peer association (DeGarmo & Forgatch, 2005; Forgatch et al., 2009), it is necessary that research ascertains potential

secondary effects of intervention, or mediators, which lead to reduced deviant peer association. Three variables, parental monitoring, academic success, and child social competence, were explored as potential mediators in this study, explaining the effect of PMTO on deviant peer association.

Monitoring

Most studies examining mediators of PMT outcomes have focused on parenting variables as causal mechanisms for the long-term effects on deviant peer association and youth behavior change. A substantial body of evidence has demonstrated a causal effect of parenting on child antisocial behavior; PMT programs do, in fact, lead to changes in parenting, which in turn is associated with subsequent changes in child outcomes.

Monitoring is one variable that has been implicated as an important parenting skill in deterring youth from participating in deviant peer relationships and future antisocial behavior (Dishion & McMahon, 1998; Dishion et al., 1991; Kerr & Stattin, 2000; Laird et al., 2008; Patterson, 1993; Patterson & Dishion, 1985). Monitoring consists of a collection of related parenting behaviors involving attending to, and knowledge about, and tracking of the child's whereabouts, activities, and associates (Dishion & McMahon, 1998; Kerr & Stattin, 2000). Monitoring appears to be an important parenting skill as children expand their social networks and move into middle school (Laird et al., 2008; Dishion et al., 1991). Researchers have proposed that improvements in parental monitoring lead to better supervision of children's behavior at home and school, as well as increasing parental knowledge, supervision, and limitations on children's social networks and activities outside the home (Kerr & Stattin, 2000; Patterson & Dishion, 1985).

The importance of monitoring has been demonstrated in a number of longitudinal studies. Patterson and Dishion (1985) assessed the impact of poor parental monitoring on delinquent behavior, finding monitoring to have both a direct and indirect effect on delinquent behavior. An indirect effect of parental monitoring on delinquent behavior appeared to be mediated through adolescents' involvement with deviant peers. In a study using 260 boys, Dishion et al. (1991) assessed parental monitoring and discipline, and boys' peer rejection, deviant peer association, and academic achievement from ages 10-12 years. Results showed poor parental monitoring practices, peer rejection, and academic failure at age 10 years were predictive of boys' involvement with deviant peers at age 12 years. Monitoring and parental discipline were significantly correlated with deviant peer association at ages 10 and 12 years.

Laird et al. (2008) also found monitoring to be an important parental skill in reducing future contact with deviant peers. Using data from 504 adolescents in the longitudinal Child Development Project, these researchers assessed adolescents' perceptions of their parents' monitoring knowledge, deviant peer association, and delinquent behavior. Monitoring appeared to attenuate the link between deviant peer association and delinquent behavior. Adolescents who reported low parental monitoring and knowledge of their whereabouts and activities reported more antisocial friends and more delinquent behavior in early adolescence. This group of adolescents also reported a more rapid increase in antisocial peers from middle to late adolescence, and was more likely to report increases in their own delinquent behavior following contact with antisocial peers. Adolescents who rated their parents as higher on parental monitoring knowledge were less likely to form relationships with antisocial peers, and reported being less negatively influenced by the behavior of antisocial peers.

In a study of 1,283 adolescents age 14 and their parents, Kerr and Stattin (2000) assessed the importance of parental monitoring in the development of antisocial behavior, internalizing problems, and peer relationships. A relationship was found between reduced parental monitoring, externalizing problems, and undesirable friends. Reduced parental monitoring also was correlated with internalizing problems and poorer quality of peer relationships.

PMT intervention studies have also shown that increased parental monitoring can reduce deviant peer association. Eddy and Chamberlain (2000) conducted a randomized control trial examining the influence of family management skills (supervision, discipline, and positive youth-adult relationship) on youth antisocial behavior. The sample consisted of adolescent males (mean age = 14.9 years, *SD* = 1.3) with histories of chronic and serious juvenile delinquency. Families were randomly assigned to a multidisciplinary treatment foster care (MTFC) or services-as-usual group care. Parents in the foster-care families participated in pre-intervention training focusing on the use of behavior management practices to create a structured, supervised, and consistent living environment for the adolescents. During the intervention, families participated in weekly family therapy sessions focused on parental skill building in supervision, encouragement, discipline, and problem solving. Results showed adolescents receiving MTFC demonstrated less antisocial behavior compared to those youth in the services-as-usual condition. Family management skills, including monitoring or supervision, were found to mediate the effect of treatment condition on subsequent deviant peer association and youth antisocial behavior. These results suggest that a significant part of the influence of MTFC on youth behavior was due to improvements in family management skills.

Eddy and Chamberlain proposed that family management skills, particularly parental supervision and monitoring of contact with deviant peers, powerfully diminished adolescents' association with deviant peers and engagement in future adolescent antisocial behavior.

Many studies have focused on the importance of parental monitoring during adolescence in an effort to prevent deviant peer association (Dishion & McMahon, 1998; Dishion et al., 1991; Kerr & Stattin, 2000; Laird et al., 2008; Patterson, 1993; Patterson & Dishion, 1985). However, studies have found that deviant peer association can occur much earlier than adolescence (Snyder, Horsch, & Childs, 1997; Snyder et al., 2005). Using a sample of 72 preschool children, Snyder et al. (1997) found that children were selective in their peer affiliations and gravitated toward peers who optimize social reinforcement. Those children identified as aggressive were more likely to associate and develop a strong, mutual affiliation with other aggressive children. Children who spent more than 30% of their social time with aggressive peers showed significant increases in aggression over a 3 month period. Snyder et al. (2005) also documented the occurrence of deviant peer association during early childhood. Using an at-risk sample of 267 children ages 5-7 years, Snyder et al. tracked children's peer affiliation from kindergarten to first grade. Results showed that antisocial children as young as age 5 years selectively associated with deviant peers and this deviant peer association was found to be predictive of later antisocial behavior. Snyder et al. (1997, 2005) suggest that deviant peer association occurs well before the onset of adolescence, particularly for children demonstrating early aggression.

It is clear that monitoring is an important skill for parents in promoting social and emotional development for youth, especially as children enter adolescence. Although

numerous studies provide evidence for the importance of monitoring in promoting prosocial behavior and deterring deviant peer involvement during late childhood and adolescence, monitoring has not been thought to be a critical parenting skill for younger children with more limited social environments and contact with peers (Reid et al., 2002). However, children of families receiving PMT earlier in development in the ODS-II study demonstrated reduced deviant peer association and later delinquency similar to effects seen for families and youth receiving intervention later in adolescence (DeGarmo & Forgatch, 2005; Forgatch et al., 2009; Sandler et al., 2011). A gap in the literature exists in exploring the mediational role of parental monitoring for at-risk, preventative samples of younger children, and in examining whether the power of monitoring as a mediator of diminished deviant peer association and delinquency for children receiving intervention is as great in childhood as in adolescence. The present study addressed the mediational role of monitoring in the development of deviant peer association and antisocial behavior for young children identified as at-risk for antisocial behavior.

Social Competence and Academic Success

Sandler et al. (2011) propose that parental behavior is only one factor contributing to changes in child outcomes, and other processes must be explored to determine the cascade of effects generated by improved parenting in maintaining long-term outcomes for youth. Sandler et al. suggest that changes in parenting are due to social, cognitive, behavior, and biological processes that occur in parents and youth, and in the transactions between youth and their social contexts. Changes in parenting practices may result in child behavior change that then, in turn, alters children's ability to successfully develop other prosocial relationships and contexts and diminish their affiliation with deviant peers.

The present study examined two child factors, children's social competence and academic success, that may act as mediating processes contributing to the reduced association with deviant peers found for families participating in PMT programs. A consistent relationship has been documented among early antisocial child behaviors, poor social and academic skills, and social rejection (Patterson et al., 1989). Children who struggle academically and are less socially skilled appear to develop externalizing problems and experience rejection by normative peers (Cobb, 1972; Dishion et al., 1984; Dodge, 1983; Patterson, 1982). Furthermore, a large body of evidence has shown that children who are rejected by normative peers are at an increased risk of affiliating with deviant peers who then provide models and reinforcement for antisocial behavior (DeGarmo & Forgatch, 2005; Forgatch et al., 2009). Improved parenting skills resulting from PMT may lead to the secondary effects of children's improved academic skills and performance, and an ability to engender positive relationships with teachers and peers. Children who are able to develop these skills may, as a consequence, be at a reduced risk for experiencing social rejection and, in turn, for associating with deviant peers.

A number of studies appear to support the relationship of academic failure, poor social skills, and social rejection to deviant peer association (Coie & Krehbiel, 1994; Dishion, Veronneau, & Myers, 2010; Veronneau, Vitaro, Brendgen, Dishion, & Tremblay, 2010). Coie and Krehbiel (1984) provide evidence for the relationship between academic success, social competence, and social acceptance. Forty socially rejected, low achieving children in grade 3 received an academi- focused intervention, social skill intervention, a combination of the two interventions, or no intervention. Children's academic and social progress were measured at the end of third, fourth and fifth grades. Coie and Krehbiel found students in the academi-

focused group showed improved academic skills, including more on-task behavior and less disruptive behavior. Coie and Krehbiel also found that improved academic skills resulted in an improvement in social skills and increased social preference by school peers.

Veronneau et al. (2010) also provide support for the relationships among academic success, social competence, and social acceptance, finding child academic achievement was associated with friends' achievement and peer group status. In a longitudinal study, Veronneau et al. assessed 452 children in grade 2 to grade 7 in terms of peer experiences (acceptance, rejection, and friends' academic achievement) and academic achievement. Results showed that higher academic achievement predicted greater peer acceptance in grades 2-6, decreased peer rejection grades 2-4, and increased achievement of friends in grades 4-7. These studies suggest that children who are able to develop critical academic and social skills early in development have more opportunity to interact with, and be accepted by prosocial peers, and are at a reduced risk for social rejection.

While previous research has tied poor academic and social skills to social rejection, Dishion et al. (2010) provide evidence for a developmental, cascading pathway linking early child antisocial behavior, low academic performance and marginalization, and deviant peer association (gang membership) to indices of late adolescent violence (physical attacks, threatening, kidnapping, hurting people, and murder). Dishion et al. used a longitudinal study design, assessing 998 students age 11 -19 years. Using multi-method data collection, Dishion et al. found early problem behaviors, academic performance, and school marginalization at age 11 predicted later deviant peer and gang association at ages 13-14 years. Gang involvement predicted deviancy training with friends and violence at ages 18-19 years. Coie and Krehbiel

(1984), Veronneau et al. (2010), and Dishion et al. suggest that children who demonstrate low academic skills and poor social skills potentially close off opportunities to associate with normative, prosocial peers and seek out affiliation with deviant peers.

Given these research findings, and in light of SIL theory, early antisocial behavior that leads to teacher and peer rejection may limit the opportunity for children to develop fundamental academic, as well as social and cognitive skills, including peer group entry, perception of peer group norms, appropriate responses to social irritation, and endorsement of prosocial behavior (Patterson et al., 1989). Peer rejection and a deficiency in social-cognitive skills can lead to association with deviant peers and to an escalation in child antisocial behavior through peers' positive reinforcement for deviant behavior and punishment for socially normative acts (Buehler, Patterson, & Furniss, 1966). It is hypothesized that child academic success and social competence may act as long-term causal processes protecting students from participating in deviant peer association and more severe forms of antisocial behavior.

Family-based interventions appear to have a positive effect on school achievement and social competence (Cowan, Cowan, & Heming, 2005; Forgatch & DeGarmo, 1999; Stormshak, Connell, & Dishion, 2009). Stormshak et al. (2009) assessed 998 students in sixth through ninth grade, and then again in eleventh grade, demonstrating a positive effect of family-based intervention on students' academic success. Stormshack et al. (2009) found children of families receiving the intervention, compared to matched controls, maintained higher GPAs in high school. Children in the family intervention group showed the greatest reductions in problem behavior, ultimately resulting in improved academic performance. Forgatch and DeGarmo (1999) and Martinez and Forgatch (2002) also demonstrated this effect using the ODS-II sample.

Results of these studies indicated that boys with mothers who participated in the PMTO group demonstrated better school academic (working harder at school and learning more) and social functioning (peer adjustment and social satisfaction).

Effective parenting practices and reduced deviant peer association are two important mechanisms contributing to the prevention of antisocial behavior (DeGarmo & Forgatch, 2005; Forgatch et al., 2009; Sandler et al., 2011). Although previous research using the ODS-II data set has shown that changes in parenting practices and in deviant peer association independently mediate long-term changes on antisocial behavior, research has yet to explore why an intervention designed for parents has a direct effect on deviant peer association, and how both contribute to long-term reductions in delinquency. Improved academic success and social competence, two important child outcomes that are affected by changes in parenting associated with PMT, may be integral in preventing deviant peer association (DeGarmo & Forgatch, 2005; Forgatch et al., 2009). These child outcomes, as a consequence, may move at-risk children to an alternative trajectory than their counterparts who continue to experience academic and social failures. The current study hypothesized that the improved parenting practices engendered by PMT create a cascade of positive effects. Improvements in parenting skills and positive parent child-interactions in the home are hypothesized to spill over into a child's school environment, leading to benefits in academic performance and social relationships. Benefits to children's academic functioning and social skills may provide children with the opportunity to affiliate with prosocial peers, and deter children from affiliation with deviant peers. In this sense, academic success and social competence may act as mediators between intervention and long-term outcomes for children and family.

Current Study

As noted, there is limited research assessing long-term mediators of outcomes for parent management training programs. Understanding the causal processes leading to long-term benefits of PMTO can inform interventionists about the development of more effective and efficient interventions for early child antisocial behavior by focusing intervention on processes that are likely to maintain PMT's effects across time. The current study used the ODS-II data set to: (a) assess the role of parental monitoring in curbing future deviant peer association and delinquency, and (b) explore the role child of academic success and social competence as mediators in preventing deviant peer association.

Although previous data analyses using the ODS-II intervention sample have investigated the mediational role of parenting in preventing later child antisocial behavior, the current study is unique in that it explores how initial changes in youths' behavior may alter their ability to successfully transact peer social and academic contexts, and, as a consequence, contribute to the maintenance of PMTO's long-term effects on reduced association with deviant peers. The two novel analyses in this study focused on assessing whether changes in parental monitoring or early changes in the children's academic success and social competence associated with PMTO mediated changes in adolescent deviant peer association.

CHAPTER 2

METHODS

Participants

Participants in the current study were previously described by Forgatch and DeGarmo (1999). Families included 238 recently separated, single mothers and their biological sons. Families resided in a medium-sized city in the Pacific Northwest. Mothers met the following criteria for entry into the study: (a) had been separated from their partner within 3-24 months prior to recruitment, (b) resided with a biological son in grades 1-3, and (c) did not cohabitate with a new partner. At baseline, mothers had been separated for an average of 9.2 months. Families on average had 2.1 children. The mean age of mothers was 34.7 years (SD = 5.4; range 21.4 to 49.6). The boys' mean age was 7.8 years (SD = .93; range 6.1 to 10.4). The racial/ethnic composition of the boys in the sample was 86% Caucasian, 1% African American, 2% Latino, 2% Native American, and 9% from "other" racial/ethnic groups including those who were identified as belonging to more than one group. The sample reflected the racial/ethnic makeup of the community in which the study was conducted. The mean annual family income was \$14,000, with 76% of the families receiving public assistance. Seventy-six percent of mothers had some academic or vocational training beyond high school, with 17% having completed a 4-year college degree or higher. Twenty percent of the mothers obtained a high school diploma; 4% had not completed high school.

The intervention and control groups differed on two characteristics at baseline: the number of months since time of parental separation and boys' age. On average, mothers in the intervention group had been separated for approximately 2.4 months longer than those in the

control group ($M = 9.84$ and 7.47 , respectively, $p < .01$). Boys in the experimental group were about .28 years younger than those in the control group ($M = 7.65$ and 7.93 , respectively, $p < .05$).

Design

Families were randomly and intentionally assigned, with approximately two-thirds of participants to the experimental group ($n = 153$) and one-third to the no-intervention control group ($n = 85$). Unequal groups were used to provide sufficient sample size in the experimental condition to examine potential full-implementation intervention effects (Vinokur, Price, & Caplan, 1991). Mothers in the experimental group were invited to participate in the intervention. Families in the control condition received no intervention. Participants in the experimental and control conditions participated in the same assessment schedule.

All families participating in Phase I of the ODS-II study received multiple-method, -setting, and -agent assessment at the following intervals: at baseline and 6, 12, 18 and 30 months. Teacher ratings were collected annually at baseline, 12, 24, and 36 months. All families in the experimental group finished intervention by the 6-month assessment. Two hundred and nine families participated at the 30-month longitudinal follow-up. Phase II of data collection began in year 6 post-baseline and continued through year 9 post-baseline. Teacher and family questionnaire data were collected annually and observational data were collected twice on alternate years. There were no significant differences in attrition by group condition (89.4 % participation for experimental and 86.9% for the controls). A relatively high retention rate was obtained by using incentives and intensive tracking procedures for following the sample (e.g. incentive pay, obtaining addresses and phone numbers for multiple contacts, regular

newsletters informing of upcoming assessments and for address verification, using publicly available databases for tracking, etc).

Intervention

The intervention program, *Parenting through Change* (Forgatch, 1994), is fully described in the manual. The intervention consisted of 14 weekly parent group meetings. There were 13 parent groups, ranging in size from 6 to 16 participants ($M = 9.5$). Mothers assigned to the experimental condition participated in an average of 8.5 sessions ($SD = 5.7$). The intervention targeted five theoretically based parenting practices: (a) appropriate discipline, (b) skill encouragement, (c) monitoring, (d) problem solving, and (e) positive involvement. The curriculum also included *The Divorce Workout* (Forgatch & Marquez, 1993), an adjunct treatment component addressing issues relevant to divorcing women, including regulating negative emotions and managing interpersonal conflict.

Sessions 1 and 2 taught parents to provide children with clear, firm, and respectful directions to increase compliance. Session 3 taught mothers strategies to promote child prosocial behavior (schoolwork, cooperation, and chores) with skillful teaching techniques and contingent positive reinforcement. In Sessions 4 and 5, mothers learned strategies for decreasing coercive exchanges with their children by responding early and appropriately to child misbehavior with non-corporal discipline. This included strategies such as time-out, work chores, and privilege removal. Sessions 6 through 12 emphasized the use of positive involvement and reinforcement for school-related and other prosocial behavior. Session 7 taught communication skills. Sessions 8 and 9 focused on mothers' own emotional experience and that of others. Session 10 taught specific skills for negotiating and resolving interpersonal

problems. Strategies learned in the prior three sessions were applied in Session 11, which emphasized strategies to deal with conflict situations with adults and children. Session 13 introduced monitoring strategies to track children while they were away from the home. Session 14 reviewed the entire curriculum and emphasized the value of maintaining an adult life. The topics were presented in an integrated step-by-step approach. Each new topic was introduced to build upon a previously learned skill. Topics were usually introduced in one or more sessions and then reviewed and revisited throughout the remainder of the program.

Effective Parenting Practices

Observations of parenting practices were obtained using a series of structured interaction tasks (SIT) that lasted 45 minutes. The tasks included mother-son problem-solving about a current “hot” conflict topic, a teaching task, an unstructured activity, a forbidden toy situation, and a refreshment break. Micro-social data were used to assess parent behavior during ongoing parent-child interaction using the Interpersonal Process Code (IPC; Rusby, Estes & Dishion, 1991). The IPC has 13 codes that describe behavior of the respondent and recipient in terms of sequence, content, affect, context, and duration. Aversive behaviors are those scored as negative either in content (e.g., refusal, criticism) or in affective tone (e.g., hostile, sad). Positive behaviors are either positive in content (e.g., positive interpersonal, endearment) with neutral or positive affect, or neutral in content (e.g., talk) with positive affect (e.g., happy, caring). Coders also rated more global aspects of interaction following micro-social coding. Approximately 15% of the interactions were scored for inter-coder reliability at each wave.

A composite factor score of *effective parenting* was defined by two domains (positive involvement and skill encouragement) encompassing aspects of positive parenting skills. The

domains of positive involvement and skill encouragement demonstrated convergence (Forgatch & DeGarmo, 2002). Parental monitoring was independently assessed as an effective parenting skill mediating the relationship between PMTO and reduced deviant peer association. In the descriptions below, relevant reliabilities are reported, respectively for baseline, 6 months, and 12 months.

Positive Parenting Skills

Positive involvement was a mean scale score of coder ratings following each of the eight structured interaction tasks. Seven indicators of mother's observed positive involvement and two overall ratings were averaged for the final scale score. The seven indicators included Likert-scale items concerning the mother's interaction with her son (e.g., showed empathy, support, genuine concern, provided encouragement, showed warmth, showed respect, was accepting, and was affectionate). Cronbach alphas for baseline, 6 months, and 12 months were .76, .89, and .55, respectively. The intraclass correlation coefficients (ICCs) of coder agreement were .83, .91, and .81, respectively.

Skill encouragement was defined by a mean scale score based on global coder ratings following the 10 minute teaching task. Skill encouragement was based on ratings of mothers' ability to promote child skill development through contingent encouragement and scaffolding strategies. The measure comprised 11 Likert-scale items (e.g., breaks the task into manageable steps, reinforces success, prompts appropriate behavior, corrects appropriately). Cronbach's alphas for baseline, 6 months, and 12 months were .78, .73, and .81, respectively; ICCs for coder reliability at baseline, 6 months, and 12 months were .73, .66, and .66, respectively.

Monitoring

Monitoring was comprised of a scale score from two agents' reports of how effective the mother was in supervising her son. Parent interviews provided global Likert-scale ratings on two items: (a) the mothers' apparent knowledge of their sons' day-to-day activities and (b) tolerance of negative behavior. Cronbach alphas for baseline, 6 months, and 12 months were .82, .76, and .73, respectfully. Coders also provided global ratings of monitoring after coding the 45 minute SIT interaction task. Three Likert-scale items assessed mothers on the following items: (a) skillful in supervising during the assessment, (b) keeps close track of youngster outside the laboratory, and (c) skillful at obtaining information from the child. The final score was an average of the ratings by the two agents. Cronbach alphas at baseline, 6 months, and 12 months were .72, .64, and .71, respectively.

Child Social Competence

Asher, Hymel, and Renshaw's (1984) Peer Adjustment scale was used to measure boys' social competence. The Peer Adjustment scale (Asher et al., 1984) was based on a 16-item, child self-report, scale measuring loneliness and dissatisfaction with peer relations. Items were rated 1-5, with 5 indicative of greater loneliness or social dissatisfaction. Items included "I do not have any friends," "I have nobody to talk to," "There is nobody I can go to when I need help," and "It is hard to get other kids to like me." Asher et al. (1984) found the measure to be internally consistent and reliable (Cronbach's alpha = .90; split-half correlation between forms = .83; Spearman-Brown reliability coefficient = .91; Guttman split-half reliability coefficient = .91).

Cronbach alphas for the ODS-II study at 6 months, 12 months, and 18 months were .86, .86, and .89, respectively.

Child Academic Success

Two distinct methods of measuring boys' academic functioning were used to assess child academic success: (a) the Adaptive Functioning *T* score from the Teacher's Report Form (TRF; Achenbach, 1991), and the (b) reading and math achievement scores from the Woodcock-Johnson Psychoeducational Battery—Revised (Woodcock & Johnson, 1989). In the descriptions below, relevant reliabilities are reported, respectively for baseline, 6 months, 12 months, and 18 months.

Adaptive Functioning. The TRF is a well-validated, normed teacher-report rating scale of child adaptive functioning. Teachers rated the child's behaviors during the previous 2 months. The TRF Adaptive Functioning scale asks teachers to compare the youngster to typical pupils of the same age on the following four items using a 7—point scale ranging from 1 (much less) to 7 (much more). Four items were used to assess adaptive functioning: (a) how hard is he working, (b) how much is he learning, (3) how appropriately is he behaving, and (c) how happy is he. Cronbach alphas for baseline and 12 months were .88 and .87.

Reading and Math Achievement were assessed using the Woodcock-Johnson Psychoeducational Battery – Revised (Woodcock & Johnson, 1989). The Woodcock-Johnson Psychoeducational Battery—Revised is a well-validated, normed assessment of academic achievement. The overall Woodcock-Johnson battery has been standardized on a nationally representative sample of 24 months to 95 years of age. Raw scores are converted to standardized scores with a mean of 100 and a standard deviation of 15. The Woodcock-Johnson

was administered by trained personnel in the laboratory, and scores are composite standard scores based on national normative data. Reading achievement was assessed by a composite standard *T* score based on two subtests: (a) Letter-Word Identification and (b) Passage Comprehension. Math achievement was also assessed by a standard *T*-score based on two subtests: (a) Calculation and (b) Applied Problems. The Cronbach alphas in the national normative sample for the reading and math scores are .95 and .95.

Deviant Peer Association: was a summative index of five items scored 1 for true and 0 for false.

The items were the boys' report of their friends' deviant behaviors (e.g., my friends get into fights, clown around, get into trouble, do not like schoolwork, and find schoolwork too hard).

The Cronbach alphas for 18, 30, 72, 84, 96, and 108 months post-baseline were .60, .46, .55, .58, .44, and .54, respectively.

CHAPTER 3

RESULTS

Preliminary Analyses and Construct Building

Descriptive statistics were calculated for each of the variables (Table 2). Variables were assessed for skewness and kurtosis. The Peer Adjustment scale (Asher et al., 1984) demonstrated significant skewness. A square-root transformation was used to reduce the skewness of the variable. The scale appeared to be within an adequate range of skewness following the transformation. Measures of parenting (positive involvement, skill encouragement, and monitoring) were also significantly skewed at one or more measurement points. The measures for positive involvement and skill encouragement were not transformed because, after their calculation as change scores in the analyses, they were no longer skewed. The measures of monitoring were not transformed because such transformations significantly restricted between-individual variability in change over time in growth curve models used in the current analyses. There was significant variability (as indicated by the standard deviations) for each of the variables defining parenting practices and child adjustment.

Correlations among the measures for the positive parenting construct (positive involvement, skill encouragement, and monitoring) were examined. Correlations among the potential measures defining the positive parenting construct ranged from .14 to .44 (Table 3). The correlations among the parenting measures were consistently reliable with the exception of problem solving which was less consistently correlated with skill encouragement. Problem solving was not used as an indicator to define the positive parenting construct due to its

unreliability. The final positive parenting construct was defined by skill encouragement and positive involvement.

A change score was created for the positive parenting construct, assessing change in parenting from baseline to 12 months. Change scores were calculated by subtracting raw scores of positive involvement and of skills encouragement at baseline from their comparable raw score values at 12 months. These two change scores measures were then converted to standardized Z-scores. This was done independently for positive involvement and skill encouragement. The parenting construct was then defined by calculating the average standardized change scores for the positive involvement and skill encouragement scales.

The correlation between the two measures (parent report and observer ratings) of parental monitoring was significant ($p < .001$) at baseline (.27), 6 months (.21), and 12 months (.37) (Table 4). In order to take advantage of both methods and given that both scales ranged from 1-4 in the same direction, the parental monitoring construct was created by adding the parent report and the coder's global rating scales. The parental monitoring construct demonstrated kurtosis after combining the parent interview and global impression scales. A log transformation was performed to reduce the kurtosis.

Structural Equation Models

The models were tested in a step-wise fashion. The initial step was to replicate the Forgatch et al. (2009) findings regarding youth self-reported deviant peer association. First, a growth curve model was specified with a latent factor for average levels of deviant peer association from 18 months post-baseline to 108 months post-baseline and a latent factor for rate of growth of deviant peer association over that period. These factors were specified using

appropriately weighted parameters. The weighted time loadings in the unstandardized model for the intercept of deviant peer were fixed at 1.0 for each of the repeated indicators. For the growth factor, weights were fixed at -4.0, -3.0, 0, 1.0, 2.0, and 3.0, representing the timing of the waves of available data obtained from baseline to 108 months post-baseline. As such, the intercept was set at approximately year 6 post-baseline for deviant peer association (Figure 1). The model in Figure 1 demonstrated modest fit to the data: $\chi^2(17) = 48.85, p < .001$, comparative fit index [CFI] = .74, root mean square error of approximation [RMSEA] = .09. The intercept of deviant peer association across the 6 assessment periods was significantly different from 0 (C.R. = 34.76, $p < .001$), and the mean slope for deviant peer association was significant and positive ($M = .07$; C.R. = 3.85, $p < .001$), indicating a group mean increase in deviant peer association across time. There was also significant variance in both mean levels of deviant peer association (C.R. = 6.67, $p < .001$) and in slope of deviant peer association (C.R. = 4.63, $p < .001$) indicating reliable individual differences in average chronic levels of deviant peer association, and in the direction and amount of change in deviant peer association over time.

After replicating the Forgatch et al. (2009) findings on deviant peer association, separate hypothesized models were tested to evaluate the roles of positive parenting, parental monitoring, academic success and social competence as mediators of the relationship between intervention condition (PMTO versus no treatment) and changes in deviant peer association.

Monitoring

The mean level and rate of growth for parental monitoring from 18 to 72 months post-baseline were added to the deviant peer model, ignoring intervention condition (Figure 2). The loadings for the unstandardized model for the mean level of monitoring were fixed at 1.0 for

each of the repeated indicators. For the growth factor for monitoring, time weights were fixed at 0, 1.0, and 2.0 to reflect linear growth with the intercept at 18 months post-baseline. Autoregressive paths from 18 to 30 and from 30 to 72 month measures of monitoring were included to achieve a better fitting model. The fit of the data to the model was moderate: $\chi^2(34) = 63.90, p < .001, CFI = .82, RMSEA = .06$. The mean of the intercept of parental monitoring at 18 months post-baseline was significantly different than 0 (C.R. = 118.83, $p < .001$); however, the mean slope was not significant (C.R. = 1.23, n.s.), indicating a lack of average level change in parental monitoring from 18 to 72 months post-baseline. There was significant variance in the intercept of parental monitoring (C.R. = 4.65, $p < .001$), demonstrating reliable between-family differences in parental monitoring at 18 months post-baseline. There was marginally significant variance in the slope of parental monitoring (C.R. = 1.91, $p < .08$), suggesting that there were modest between-family differences in the amount and direction of change in parental monitoring from 18 to 72 months post-baseline. The path coefficients from intercept of parental monitoring to chronic levels of deviant peer association from 18 months to 108 months post-baseline, and to the slope of deviant peer association from 18 months to 108 months post-baseline were $\beta = -.20, p = .17$ and $\beta = -.01, p = .96$, respectively. The path coefficients from slope of parental monitoring to chronic levels of deviant peer association and to the slope of deviant peer association were $\beta = -.02, p = .90$ and $\beta = -.23, p = .32$, respectively. In this model, parental monitoring was unrelated to deviant peer association.

Next, a model was tested which added intervention condition (PMTO versus no intervention), assessing the role of parental monitoring as a mediator between intervention condition and deviant peer association (Figure 3). This model fit the data moderately well: χ^2

(32) = 62.31, $p < .01$, CFI = .86, and RMSEA = .05. The Forgatch et al. (2009) finding of a reliable association between intervention condition and average levels of deviant peer association was replicated ($\beta = -.19$, $p < .05$). Intervention also had a reliable positive effect on growth in monitoring ($\beta = .21$, $p < .05$). Although growth in monitoring was generated by PMTO, evidence for its role as a mediator between intervention condition and average levels and growth in deviant peer association was not found; growth in monitoring was not related to chronic levels ($\beta = -.01$, n.s.) or to growth in deviant peer association ($\beta = -.12$, n.s.). A comparative model (Figure 4) was evaluated in which the relationship of the intercept and growth factors of parental monitoring to chronic level and slope of deviant peer association were constrained to 0. The comparative model also demonstrated a relatively modest fit: $\chi^2 (39) = 62.1$, $p < .01$, CFI = .86, and RMSEA = .05. A significant difference in fit was not found between the mediation model (Figure 3) and the non-mediation model (Figure 4), suggesting the simpler constrained model better fit the data.

Social Competence

The next model estimated the effects of intervention assignment and change in youths' social competence [measured using Asher et al. (1984) Peer Adjustment scale] from baseline to 30 months post-baseline on deviant peer association (Figure 5). The intercept for social competence was set to estimate chronic levels (at roughly 18 months post-baseline) across the 30 month period from baseline to 30 months post-baseline. The weighted time loadings in the unstandardized model for the mean levels of social competence were fixed at 1.0 for each of the repeated measures indicators. For the growth rate factor, time weights were fixed at -2.5,

-1.5, -0.5, 0.5, and 2.5 representing the assessment timing of the waves of available data. The mean of chronic levels of social competence across the five assessment periods was significantly different than 0 (C.R. = 203.09, $p < .001$) as was the mean slope from baseline to 30 months post-baseline (C.R. = 4.20, $p < .001$), indicating average increases in social competence over time. There was significant variance in both the chronic levels of social competence (C.R. = 8.06, $p < .001$), and in the slope of social competence (C.R. = 2.69, $p < .01$), indicating reliable individual differences in the average child social competence across all measurement points from baseline to 30 months post-baseline, and in change in that social competence over that time period.

A full model (Figure 5) estimating the combined effects of child self-reported social competence and intervention condition on deviant peer association was then tested and fit the data moderately well: $\chi^2(61) = 110.82$, $p < .001$, CFI = .87, RMSEA = .06. A direct effect of intervention condition on the intercept of deviant peer association was found ($\beta = -.19$, $p < .05$). Chronic levels of child social competence estimated at 18 months was negatively associated with chronic levels of deviant peer association estimated at 72 months ($\beta = -.29$, $p < .05$). Children ranked higher on social competence at 18 months demonstrated lower chronic levels of deviant peer association, indicating decreased risk for deviant peer association. Growth in child social competence from baseline to 30 months post-baseline was not reliably associated with chronic levels of deviant peer association at 72 months, but was negatively associated with growth in deviant peer association from 18 to 108 months post-baseline ($\beta = -.46$, $p < .05$). In the context of the associations between social competence and deviant peer association, the PMTO intervention condition continued to predict lower chronic levels deviant peer association

($\beta = -.19, p < .05$). Intervention condition was not reliably related to social competence, $\beta = .09$, n.s., and $\beta = .16, p = .18$). These results indicate social competence and intervention condition were additive predictors of deviant peer association, but social competence did not mediate the relationship of intervention condition to deviant peer association.

A comparative model was then assessed by constraining the paths from social competence to deviant peer association to 0, and assessing the significance of the direct path from intervention condition to deviant peer association (Figure 6). This model fit the data ($\chi^2(65) = 132.11, p < .001, CFI = .82, RMSEA = .07$, less well than the full model shown in Figure 5 (χ^2 difference (4) = 21.29, $p < .001$). The direct path from intervention to average levels of deviant peer association remained significant ($\beta = -.19, p < .05$), again indicating that the effect of intervention was not mediated by child social competence.

A model was then tested (see Figure 7) which added changes in positive parenting to the model for social competence and intervention condition to assess whether the effects of intervention condition on deviant peer association and on social competence were mediated by changes in positive parenting. This model achieved adequate fit: $\chi^2(73) = 136.6, p < .001, CFI = .83$, and $RMSEA = .06$. PMTO relative to the NTC condition had a reliable beneficial effect on positive parenting ($\beta = .14, p < .05$). A marginal triple mediation effect was found, with intervention condition predicting positive parenting ($\beta = .14, p < .05$), which in turn was marginally predictive of growth in social competence ($\beta = .22, p = .09$), which in turn was predictive of less growth in deviant peer association ($\beta = -.46, p < .05$). This triple mediation accounts for very small amounts of variance in growth in deviant peer association. The effect of group assignment on average levels of deviant peer association continued to be statistically

reliable ($\beta = -.17, p < .05$), without mediation through parenting or social competence. A model constraining the paths from social competence to deviant peer association to 0 (Figure 8) was then evaluated to compare its fit to the full model shown in Figure 7. The comparative model's fit was $\chi^2 (76) = 145.49, p < .01, CFI = .82$, and RMSEA = .06. The chi-square difference was $\chi^2 (3) = 8.89, p < .05$, indicating a better fit for the full relative to the constrained model, and replicating the additive but not meditational role of social competence on deviant peer association.

Academic Success

Teacher Report Form

Group assignment, and average level of academic success and growth in academic success as measured by the TRF from baseline to 36 months post-baseline were used in a full model to predict deviant peer association from 18 months to 108 months post-baseline (Figure 9). The intercept for academic success (TRF) was set at 18 months post-baseline. The weighted time loadings in the unstandardized model for the mean levels of academic success were fixed at 1.0 for each of the repeated measures indicators. For the growth rate factor, time weights were fixed at -1.5, -0.5, 0.5, and 1.5 representing the timing of the waves of available data. The model, including intervention condition, achieved adequate fit: $\chi^2 (50) = 82.33, p < .01, CFI = .92, RMSEA = .05$. The mean of the intercept of academic success (TRF) across the four assessment periods was significantly different than 0 (C.R. = 93.72, $p < .001$) as was the mean slope of academic success (TRF) (C.R. = 3.57, $p < .001$), indicating average level of growth in academic success (TRF) across 36 months post-baseline. There was significant variance in both the chronic mean levels of academic success (TRF) (C.R. = 6.58, $p < .001$), and in the slope of

academic success (TRF) (C.R. = 1.97, $p < .05$), indicating reliable individual differences in child academic success over time. In this full model, only intervention assignment was a significant predictor of chronic levels of deviant peer association; youth whose parents were assigned to the PMTO versus no treatment control condition showed lower average levels of deviant peer association ($\beta = -.19, p < .05$) from 18 to 108 months post-baseline. The intercept of the TRF was found to be marginally and negatively related to chronic levels of deviant peer association ($\beta = -.16, p = .07$) and to growth in deviant peer association ($\beta = -.19, p = .08$). Figure 9 demonstrates that children exhibiting more positive academic skills, as measured by the TRF at 18 months, are showing lower chronic levels of deviant peer association and less growth in deviant peer association over time. However, intervention condition was unrelated to the intercept or slope of teacher-rated academic success.

A mediation effect was then assessed by constraining all paths from the TRF to deviant peer association to 0, assessing the significance of the direct path from the intervention condition to deviant peer association (Figure 10). The model fit the data: $\chi^2(53) = 91.31, p < .001$, CFI = .92 RMSEA = .06. A direct effect of intervention on average levels of deviant peer association remained significant. The chi-square difference between the constrained and unconstrained models was $\chi^2 \text{ dif}(3) = 8.98, p < .05$, indicating a better fit for the full relative to the constrained model.

The potential role of changes in parenting practices engendered by intervention on TRF academic success and deviant peer association was then tested (see Figure 11). This full model achieved adequate fit: $\chi^2(58) = 87.37, p < .01$, CFI = .94, and RMSEA = .05. Group assignment was found to reliably predict average levels of deviant peer association ($\beta = -.18, p < .05$). Group

assignment was also found to predict change in positive parenting practices ($\beta = .22, p < .01$). However, change in parenting practices did not predict TRF academic success intercept ($\beta = .10, p = .23$) or slope ($\beta = .11, p = .57$), failing to achieve the linkage necessary to support a meditational model. A comparative model (Figure 12) constraining to 0 the paths from TRF academic success to deviant peer association was also evaluated to compare fit to the full model. The fit for this constrained model fit was: $\chi^2 (61) = 93.38, CFI = .94$, and $RMSEA = .05$. The chi-square difference was $\chi^2 (3) = 6.01, p > .10$. The full and constrained models fit the data equally well, and the simpler model without paths from academic success to deviant peer association is the preferred model. There was no evidence for a meditational effect.

Woodcock-Johnson Psychoeducational Battery-Revised

A full model was then fit to assess the association of intervention condition, and the mean levels and rate of growth of the WJ with deviant peer association (Figure 13), from baseline to 84 months post-baseline. The intercept for the WJ was set at 21 months post-baseline reflecting average levels over the 84 months. The weighted time loadings in the unstandardized model for the mean levels of academic success were fixed at 1.0 for each of the repeated measures indicators. For the growth rate factor, time weights were fixed at -2.0, -1.0, 0.5, and 1.0 representing the timing of the waves of available data collection. The model fit was: $\chi^2 (46) = 71.49, p < .01, CFI = .96, RMSEA = .05$. The mean intercept of academic success (WJ) across the four assessment periods was significantly different than 0 (C.R. = 20.86, $p < .001$). However, the mean slope of academic success (WJ) was not significant (C.R. = 1.70, n.s.), indicating a lack of mean level of change in academic success (WJ) over time. There was significant variance in both the chronic mean levels of academic success (WJ) (C.R. = 7.00, $p <$

.001), and in the slope of academic success (WJ) (C.R. = 4.55, $p < .001$), indicating reliable individual differences in the direction and amount of change in child academic success over time. A direct effect of treatment group assignment on intercept of deviant peer association was found to be significant ($\beta = -.21$, $p < .01$). There was no relationship between treatment group assignment and average levels ($\beta = -.09$) or growth ($\beta = .03$) in academic success as measured by the WJ. Mean levels of academic success (WJ) at 21 months were found to be negatively related to average levels of deviant peer association at 72 months ($\beta = -.26$, $p < .01$). Growth in academic success (WJ) from baseline to 84 months post-baseline was found to be negatively related to average levels of deviant peer association at 72 months ($\beta = -.24$, $p < .05$).

A model was then tested in which the paths from academic success to deviant peer association were set to 0 (Figure 14). The model fit the data: $\chi^2(50) = 84.68$, $p < .01$, CFI = .94, RMSEA = .05. The direct effect of treatment assignment on the intercept of deviant peer association remained significant ($\beta = -.19$, $p < .01$). The chi-square difference was $\chi^2(4) = 13.19$, $p < .05$, indicating a better fit for the full relative (including the association of WJ academic success with deviant peer association) to the constrained model.

A model was then tested which added changes in parenting as a result of intervention affected academic success as well as deviant peer association (Figure 15). This model achieved adequate fit: $\chi^2(56) = 85.47$, $p < .01$, CFI = .94, and RMSEA = .05. Group assignment was found to predict average levels of deviant peer association ($\beta = -.19$, $p < .05$). Group assignment also predicted change in parenting ($\beta = .15$, $p < .05$). Average levels of academic success on the WJ predicted average levels of deviant peer association ($\beta = -.26$, $p < .01$). Growth across time for the WJ predicted average levels of deviant peer association ($\beta = -.23$, $p < .05$). However,

changes in parenting resulting from intervention were not reliably related to mean levels and growth in WJ academic success. This does not support a mediational model.

The same model was then tested after constraining to 0 paths from WJ academic success to deviant peer association (Figure 16). The fit of this model was: $\chi^2 (60) = 98.34, p < .01$, CFI = .93, and RMSEA = .05. The chi-square difference was $\chi^2 (4) = 12.87, p < .05$. The model including paths from the WJ academic success to deviant peer association fit the data better, but there was no evidence that trajectories for academic success mediated the relationships between intervention condition or parenting to deviant peer association.

CHAPTER 4

DISCUSSION

The present study assessed the roles of parental monitoring, parent-induced changes in child academic success, and parent-induced changes in child social competence as mediators of the relationship between an early preventative parenting intervention (PMTO) and later deviant peer association. Several preventive parenting interventions have been successful in reducing the risk for the development of child antisocial behavior and deviant peer association during early childhood (Brestan & Eybert, 1998; Patterson et al., 2010; Sandler et al., 2011; The Conduct Problems Prevention Research Group, 2001). However, critical variables explaining the relationship between parent-focused, early intervention and long-term, positive child outcomes, especially reductions in deviant peer association, have not been carefully examined.

Positive parenting skills, such as parental monitoring, appear to play an important role promoting positive child outcomes and affiliation with prosocial peers (DeGarmo et al., 2005; Forgatch et al., 2009; Kerr & Stattin, 2000). At the same time, child factors including children's early academic success and ability to successfully navigate interactions with parents, teachers, and peers also appear to be important factors in promoting future prosocial behavior and constructive peer relationships (Cobb, 1972; Dishion et al., 1984, Dodge, 1983; Patterson et al., 1989). Intervention-induced improvements in parental monitoring, social competence, and academic success not only appear to reduce early antisocial behavior, but may also improve children's relationships with important socializing agents (i.e., parents, teachers, and peers) and deter children from associating with antisocial youth (Coie & Crebiel, 1984; Forgatch & DeGarmo, 1999; Stormshak et al., 2009). This suggests that improvement in both positive

parenting skills and specific child social and academic skills may be critical components in the effects engendered by PMTO intervention that, in turn, contribute toward increased pro-social peer affiliation and decreased association with deviant peers. Research on parent management training programs has provided a substantial amount of evidence for their efficacy and effectiveness (Brestan & Eyberg, 1998; Sandler et al., 2011), but is in its infancy in addressing the processes that explain the positive, long-term, increasing effects found for parents and children participating in PMTO preventative intervention.

Based on previous longitudinal and intervention research, the present study aimed to replicate Forgatch et al.'s (2009) findings regarding the effect of PMTO on reduced growth in deviant peer association. The present study also tested the following hypotheses: (a) improvements in parental monitoring mediates the effect of PMTO on long-term deviant peer association; (b) parenting-induced improvements in child social competence mediates the relationship between PMTO and long-term deviant peer association; and (c) parenting-induced improvements in child academic success mediates the relationship between PMTO and long-term deviant peer association.

The Effect of PMTO on Deviant Peer Association

Previous research with the ODS sample (DeGarmo & Forgatch, 2005; Forgatch et al., 2009) demonstrated that PMTO reliably reduced children's later association with antisocial peers. Children of families receiving PMTO showed less growth in deviant peer association across the 9 years after intervention was completed, compared to the control group. Results of the current study replicated the findings of Forgatch et al. (2009) regarding significant differences in average levels of deviant peer association during the multi-year post-intervention

period, with all models demonstrating positive effects on deviant peer association for families who received PMTO relative to the control group. However, in none of the models did parenting practices mediate the relationship between intervention condition and deviant peer association. The findings in this study also replicated the results presented by Forgatch et al. (2009). The key question tested in this study was whether other aspects of parenting (i.e., monitoring) not previously tested, or a cascade of changes in child behavior engendered by the effects of PMTO on parenting practices (i.e., social competence, academic competence) mediated the effects of the PMTO intervention on deviant peer association.

Role of Parental Monitoring as a Mediator

Past research has typically focused on the collective contribution of multiple parenting skills (i.e., positive involvement, skill encouragement, problem solving, monitoring, negative reinforcement, negative reciprocity, and appropriate discipline) as mediators of the relationship between PMTO and reductions in child antisocial behavior and deviant peer association (DeGarmo et al., 2004; Forgatch et al., 2009; Patterson et al., 2010). The current study is unique in that it looked specifically at the effect of parental monitoring as a key parenting skill mediating the relationship between PMTO and reduced deviant peer association.

In the current study, PMTO was found to have a positive impact on the reduction of deviant peer association as well as an effect on parental monitoring. PMTO led to improvement in parent's ability to acquire knowledge and track their children's whereabouts and activities, which is an important parenting skill contributing to reduced antisocial behavior and deviant peer association. Although parental monitoring appeared to be enhanced by PMTO, the first hypothesis assessing parental monitoring as a mediator between intervention and future

deviant peer association was not supported. Improvement in parental monitoring, alone, did not appear to provide a full explanation for why PMTO leads to long-term reductions in child deviant peer association.

Though a mediation effect was not found for parental monitoring, the present study is consistent with previous studies showing that parental monitoring is improved by participation in parent management training programs and is an important parenting skill in the prevention of antisocial behavior (Dishion & McMahon; Kerr & Stattin, 1991; Laird et al., 2008; Stormshak et al., 2009). In the present study, parental monitoring, alone, did not provide an adequate explanation for why parent-focused interventions have persisting effects on children's association with deviant peers, but the results suggest that parental monitoring is one of several tools in a parent's toolbox that guides children, even during childhood, toward positive behavioral trajectories and prosocial interaction with peers.

Roles of Social Competence and Academic Success as Mediators

Forgatch et al. (2009) found that PMTO has a direct and persistent effect on deviant peer association, but this effect was not mediated through changes in parenting. However it was unclear why PMTO had positive and persistent effects on deviant peer association when it was a parent-focused, preventative-intervention implemented early in children's lives and did not directly intervene with children or target peer relationships. Although parents are critical socializing agents in the development of child prosocial behavior, peers are also important influences on child behavior, particularly as children enter school (Snyder et al., 2005; Patterson & Dishion, 1985; Patterson & Yoeger, 1997). Although PMTO programs are designed to target parenting practices, it was hypothesized in this study that changes in parenting practices set off

a cascade of secondary effects, including promoting children's ability to successfully seek out and navigate prosocial peer relationships, and as a consequence reduce their association with deviant peers.

The current study explored this cascading, triple mediation effect, hypothesizing that parenting skill-induced changes in social competence would mediate the relationship between PMTO and future deviant peer association. The triple mediation effect was only partially supported. There was a modest trend demonstrating that children who were ranked higher on social competence showed lower levels of deviant peer association and a reduced risk for persistent affiliation with antisocial peers. However, intervention remained a reliable predictor of reduced deviant peer association, and this intervention effect was not reliably mediated by social competence or by changes in parenting practices. The results suggested PMTO and social competence act as additive predictors of deviant peer association, rather than social competence acting as a mediator of the effects of intervention or of changes in parenting engendered by intervention. This analysis indicates that child social competence deters affiliation with deviant peers, but that a number of factors other than parenting influence child social competence.

An additional interesting finding in this set of analyses was that change in parenting was reliably related to average levels of deviant peer association (Figure 7). This is important, as change in parenting was not reliably related to average levels or growth in deviant peer association in any of the other analyses. A potential interpretation of this finding is that social competence may act as a moderator of changes in parenting resulting from intervention, suggesting that social competence may not have a uniform effect across all families receiving

PMTO. The impact on deviant peer association may be greatest for children with low levels of social competence at the start of intervention. It may also be the case that a number of other factors (child's age, socioeconomic status, maternal psychopathology) may act as potential moderators of intervention's effect on deviant peer association. Future research may want to consider assessing various moderators of intervention and the differential effects they may have on families receiving PMTO.

The triple mediation theory was also assessed using child academic success as a mediator. Two independent analyses, each based on different methods of measuring academic success, were used to assess whether improvements in parenting skills engendered by intervention had an effect on child academic success and whether changes in child academic success associated with improved parenting mediated the relationship between PMTO and deviant peer association. Both models demonstrated that PMTO intervention had a direct positive impact on reduced deviant peer association, but that this effect was not mediated by changes in parenting. The analyses also demonstrated that children who were more academically skilled showed lower chronic levels and growth of deviant peer association. However, neither model demonstrated the triple mediation effect as hypothesized, as neither change in parenting skills nor intervention condition were reliably related to changes in academic success. As demonstrated by multiple research groups (Cobb, 1972; Dishion et al., 1984; Dodge, 1983; Patterson et al., 1989) and apparent in the current analysis, the acquisition of critical academic skills is associated with reductions in affiliation with other antisocial youth. However, improvement in academic success was unrelated to intervention-induced changes in

parenting skills, and changes in parenting skills do not appear to explain how and why PMTO has long-term, persistent effects on child deviant peer association.

The current study provides support to a body of literature that suggests academic success and social competence are important variables contributing to the prevention of antisocial behavior, including affiliation with antisocial peers. The current study also suggests that PMT, social competence, and academic success have an additive effect in reducing the risk for deviant peer association, and it may be the efficacy of PMT prevention programs may be enhanced by adding a child-focused component focused on social skills training or on academic tutoring.

The CPPRG (2002) demonstrated the benefit of targeting multiple agents (parents, children, teachers, and school systems) in a preventative-intervention program using 891 children in grade 1 and their families. In a longitudinal research study across 3 years, children identified as high-risk for conduct problems and their families were randomly assigned to a multi-component prevention program or to a no treatment/control group. Families participating in the prevention program received a combination of social skill and anger-control training, academic tutoring, home visits, parent training, and a universal classroom program. Positive effects were found for the prevention group compared to the control group in terms of improved parenting skills, parent and teacher-reported reductions in conduct problems, reduced use of special education resources, and improvement in child social cognitive skills. However, a number of limitations were identified in the CCPRG study, including the high costs to implement such a complex, multicomponent intervention. For this reason, it is important for research to continue be judicious in examining the cost-benefit ratio when examining the

benefits of adding adjunct treatment components (e.g., social skills training, tutoring, school intervention) to PMT programs..

General Inferences

Deviant peer association is complexly determined and its origins may be specific to developmental periods. Parenting during the early part of childhood, either as measured more generally or as reflected in monitoring, may not have a strong effect on deviant peer association into later childhood and adolescence. However, PMTO does appear to have a persistent, increasing effect on reduced rates of deviant peer association. One interpretation of the current study's results is that the effect of intervention on deviant peer association may be mediated by factors other than parenting practices. Literature on the effects of psychotherapy suggest that approximately 30% of client behavior change in therapy is attributable to nonspecific factors of therapy, including social support, respect and acceptance for the client, and unconditional positive regard (Lambert, Shapiro, & Bergin, 1986). These nonspecific factors may contribute toward explaining the effect PMTO has on the increasing, long-term effects found in the ODS-II sample. Factors such as warmth, acceptance, and social support from the PMTO therapist and group members may act as mediators between intervention and parent and youth outcomes. These factors may also serve as a catalyst, leading to a spreading of effects in terms of improving overall parent stress, more positive interaction patterns between mother and child, and increased general self-efficacy for mothers.

It is also of note that the mothers in the ODS-II study were relatively well educated, with 76% having educational training past high school. The effect of intervention on deviant peer association, as well as other long-term positive benefits to youth, mothers, and families, may be

a reflection of mother's educational status. Mothers' higher educational resources may have the foundation needed to seek out a social support system, access therapeutic, community, and school resources, and to improve their sense of self-efficacy and agency. These potential benefits may act as vehicles in addition to enhanced parenting skills to move mothers and families toward more positive life trajectories. Future research may want to assess the contribution of nonspecific therapeutic factors and maternal education in mediating PMTO's effect on long-term outcomes for youth and families.

In addition to nonspecific factors and maternal education, a number of contextual variables have been identified that influence parenting practices and child behavior (Reid et al., 2002). Although consistent use of effective parenting practices is important in reducing the risk for overt and covert antisocial behavior, it is only one factor among many that influence children's development, including association with deviant peers (Patterson et al., 2010). Other factors, including social disadvantage, neighborhood, marital adjustment, family transitions, school resources, and general familial stress all contribute to risk for disruptions in behavior development (Reid et al., 2002). Although parents are typically the first socializing agents for children, they are but one driving force in child behavioral development. Other factors-- such as neighborhood, school characteristics, and economic disadvantage may more powerfully contribute to children's later affiliation with deviant peer groups than do early parenting practices. Each of these factors may be correlated with parenting, and may serve as other indirect routes for the impact of early parenting interventions on later deviant peer affiliation.

Timing may also be an important factor in the development and prevention of various forms of antisocial behavior, including deviant peer association. Although parents greatly

influence children's behavior during early childhood through reinforcement and discipline practices, their potency decreases as children's social environments expand (Patterson & Yoeger, 1997; Snyder, 2007; Snyder et al., 2005). Peers become increasingly potent sources for modeling, reinforcement, and approval as children enter and progress through school (Snyder, 2002). The multiple transitions and challenges accompanying adolescence require continuing accommodations in parenting skills that are not yet apparent in parenting skills during earlier childhood.

However, child social skills and academic performance during the early part of childhood do seem to have an impact, and serve as advance indicators of later peer-related risk. The findings from the current study likely reflect the well known homophily processes indicating that "likes attract likes;" children who lack social competence and are not academically skilled are increasingly likely, over time, to gravitate to peers similar to themselves (Dishion, Andrews, & Crosby, 1995; Keenan, Loeber, Zhang, Stouthammer-Loeber, & Van Kammen, 1995; Thornberry & Krohn, 1997). As children continue to affiliate with less socially and academically skilled children, opportunities to develop social skills and for reinforcement of prosocial behavior are closed off. The antisocial behavior of the children may be increasingly reinforced by other unskilled peers rather than reinforcement of social and academic skills by normative peers (Cobb, 1972; Dishion et al., 1984; Dishion et al., 2010, Forgatch et al., 2009; Patterson, 1982). This active selection of peer ecologies and social assortment, if continued during childhood and into adolescence may involve increased association with peers and involvement in peer deviancy training processes.

The linkage of PMTO to reductions in later deviant peer association is an important finding with strong implications. The potential mediators assessed in this research did not account for that linkage. However, there are a number of other potential mediators, including changes in family and social context (e.g., neighborhoods, schools) associated with family income and parental adjustment that are impacted by PMTO. Marital relationship processes, marital satisfaction, and parental psychopathology could be potential family factors mediating the relationship between PMTO and child deviant peer association. In a study assessing children at-risk for antisocial behavior in newly reconstituted step-families, Bullard et al. (2009) demonstrated that PMTO had reliable indirect effects on marital relationship processes and marital satisfaction, and prevented subsequent child behavior problems. These effects were mediated by early parenting practices. Using the same sample of participants, Wachlarowicz, Snyder, Low, Forgatch, and DeGarmo (*in press*) found that PMTO resulted in greater reductions in coercive parenting as parent antisocial histories were more extensive for stepfamilies. Wachlarowicz et al. showed that antisocial histories of parents moderate the impact of intervention on parenting practices, and is an important factor contributing to the development of youth antisocial behavior. The success of family transitioning, marital satisfaction, and parental psychopathology are important factors impacted by PMTO and may serve as indirect routes on youth's exposure to deviant peers, adult models, and deviancy training processes.

The results of the current study indicate the change processes set in motion by parenting intervention may be multiple and unfold in complex, reciprocal and sequential fashion. The long term, persisting effects engendered by parent management training programs appear to be due to cascading effects on multiple developmental trajectories, on parents and

youth and their relationships, and on the multiple social ecologies that provide the contexts for development. A better understanding of these processes is key to formulating more efficacious, effective and perhaps efficient interventions.

Strengths of the Study

The current study has several strengths. First, the data were derived from a randomized controlled study in which participants were assigned to the PMTO or no-intervention control groups. This allowed an experimental test of the linkage between parenting practices and deviant peer association that have primarily been established using passive longitudinal designs. The study also employed an intention to treat (ITT) design, including all participants in the analysis regardless of whether they fully participated in the intervention. This provides a conservative estimation of the effects of intervention. The study from which these data were derived used multiple methods and agents (including data from parents, children, teachers, and direct observation) to measure the various constructs, reducing measurement error and bias, and shared method variance as an alternate explanation of empirically observed relationships among the constructs. A second strength of the study was the long-term longitudinal design with follow-up assessment to 9 years post-baseline, with relatively low levels of attrition. This provided the opportunity to test the various mediational models in a temporal order needed to test mediation in a strong way, as well as to assess the long term and cascading effects of the PMTO intervention on multiple family processes and youth outcomes.

Limitations

This study has several limitations. Several of the mediated and non-mediated, comparative models only fit the data modestly. Given the substantial number of variables that were being

assessed in each model, it was difficult to achieve close fit to the data. This was particularly true of the mediational model assessing parental monitoring. As noted in Forgatch and DeGarmo (1999), measuring parental monitoring of preadolescent children is difficult, as multiple passive longitudinal studies have demonstrated restricted range problems. Parents of preadolescents tend to report high rates of supervision most of the time, and mothers in the ODS sample reported that they supervised their children 95% of the time across multiple repeated interviews with the mothers. As proposed by Kerr and Stattin (2002), future research may want to re-evaluate how parental monitoring is operationalized, specifically for preadolescent children.

A second limitation was the inability to combine multiple indicators to measure latent variables for social competence and academic success. For example, the TRF and WJ were not strongly correlated and models attempting to combine them as a latent factor for academic success did not achieve adequate fit. As such, each model assessed academic success using only one measurement method, potentially increasing the opportunity for measurement bias and error.

Additional limitations pertain to the demographic characteristics of the sample. The sample was primarily comprised of Caucasian Americans and relatively well educated. This may limit the generalizability of the findings to the broader population. The sample also was limited in generalizability in terms of the use of only male child participants. Although prevalence studies provide evidence that both male and female children engage in antisocial behavior, less is known about how parent- and child- factors may contribute in different ways to antisocial development of girls (Nock et al., 2006, 2007). Specifically, the social and academic skills of girls

may be more likely to be reinforced by parents, teachers, and peers and thus may serve as more powerful predictors of peer affiliation.

Future Research

Although the triple mediation models were not supported and measurement of the variables was limited, the relationship of social competence and academic success to reduced deviant peer association suggests parent management training programs may usefully focus intervention more intensively on fostering these child skills. Given that children who display better social and academic skills also demonstrate less subsequent affiliation with deviant peers, parenting or other interventions explicitly encouraging these skills during early childhood may reduce the risk of future antisocial behavior and affiliation with antisocial peers.

The timing of the various cascading and reciprocal effects set off by efficacious and effective interventions remains “educated guesswork,” to a degree. The various factors and processes examined in this report may be key mediators, but have their effect at different times or in a different sequence than assessed in the models in this report. Other theoretical and analytic models may be needed to explore the timing and synergistic effects of these factors and models, including cascade approaches.

Summary

The present study adds to research regarding the development of early antisocial behavior. Multiple research groups have called for the examination of processes explaining the long-term, persistent effects of parent-focused interventions on child outcomes. The present study examined both parenting processes and child skills that have been identified as malleable targets for intervention, including parental monitoring, child social competence, and child

academic success. Although the study was unable to demonstrate the mediating effect of parental monitoring or the triple mediation effect of social competence and academic success on deviant peer association, the study did provide evidence that parenting interventions during earlier childhood are important in reducing the risk of affiliating with antisocial youth during later childhood and adolescence. These findings also point to the benefit of targeting multiple processes during early intervention, including effective parenting skills and encouragement of fundamental child social and academic skills. Future research may usefully continue to ascertain parent, child, and ecological variables that contribute to and promote the long-term, positive effects of parent training programs. Given the great economic cost to society resulting from antisocial behavior, the development of increasingly effective and targeted interventions are critical to the prevention of antisocial behavior.

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APPENDIX

TABLE 1

PARENT AND CHILD MEASURES

Parenting Measures

Parental Positive Involvement (SIT)

Parental Skill Encouragement (SIT)

Parental Monitoring (Parent Rating Scale and SIT)

Child Measures

Social Competence (Peer Adjustment Scale)

Academic Success (TRF and Woodcock Johnson Psychoeducational Battery—Revised)

Deviant Peer Association (Child Rating Scale)

Note: SIT = Social Interaction Tasks; TRF = Teacher Report Form

TABLE 2
DESCRIPTIVE STATISTICS FOR PARENT, PEER, AND CHILD MEASURES

Measure	Mean	Standard Deviation	Skewness	Kurtosis
Positive Involvement (BL)	4.12	.71	-8.00	5.29
Positive Involvement (12 Months)	3.90	.85	-5.18	-.42
Skill Encouragement (BL)	7.36	1.53	-4.06	-1.23
Skill Encouragement (12 Months)	7.35	1.70	-4.06	-.58
Monitoring Baseline	7.96	1.03	9.06	8.40
Monitoring 6 Months	7.63	1.00	-5.41	2.88
Monitoring 12 Months	7.73	1.17	-7.5	5.26
Dev Peers 24 Months	1.80	1.40	3.71	-.69
Dev Peers 30 Months	1.65	1.37	3.56	1.63
Dev Peers 72 Months	1.66	1.37	3.00	-1.26
Dev Peers 84 Months	1.71	1.19	2.61	-.22
Dev Peers 96 Months	2.20	1.27	2.67	1.05
Dev Peers 108 Months	2.27	1.28	1.67	-1.14
SC Baseline	23.42	6.55	4.19	-1.74
Soc Comp 6 Months	22.66	5.99	4.35	-1.55
Soc Comp 12 Months	22.17	5.63	6.0	1.71
Soc Comp 18 Months	21.49	5.46	6.39	1.60
Soc Comp 30 Months	21.55	5.94	7.78	5.22
TRF Baseline	46.58	8.51	1.62	-2.59
TRF 12 Months	46.93	8.75	1.29	-2.66
TRF 24 Months	48.17	8.73	.50	-2.47
TRF 36 Months	48.69	8.86	.05	-2.47
WJ Baseline	104.38	17.68	.69	.48
WJ 12 Months	108.35	17.22	-.89	.01
WJ 30 Months	109.15	16.48	-1.66	2.22
WJ 84 Months	102.44	11.97	3.00	1.49

Note: BL = baseline, DP = deviant peer association, SC = social competence, TRF = Teacher Report Form, WJ = Woodcock-Johnson Psychoeducational Battery--Revised

TABLE 3

CORRELATIONS AMONG PARENTING MEASURES

	Positive Involvement Baseline	Positive Involvement 12 Months	Skill Encouragement Baseline	Skill Encouragement 12 Months	Problem-Solving Baseline	Problem-Solving 12 Months
Positive Involvement Baseline	1.0					
Positive Involvement 12 Months	.50 **	1.0				
Skill Encouragement Baseline	.44**	.30**	1.0			
Skill Encouragement 12 Months	.24**	.62**	.18*	1.0		
Problem Solving Baseline	.37**	.29**	.34**	.14	1.0	
Problem Solving 12 Months	.32**	.46**	.17*	.35**	.40**	1.0

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

TABLE 4

CORRELATIONS AMONG MONITORING MEASURES

	Parent Report Baseline	Parent Report 6 Months	Parent Report 12 Months	Obs Impress Baseline	Obs Impress 6 Months	Obs Impress 12 Months
Parent Report Baseline	1.0					
Parent Report 6 Months	.17*	1.0				
Parent Report 12 Months	.36**	.34**	1.0			
Obs Impress Baseline	.27**	.06	.26**	1.0		
Obs Impress 6 Months	.07	.21**	.24**	.12	1.0	
Obs Impress 12 Months	.16*	.20**	.37**	.17	.21**	1.0

Note: BL = baseline, PI = parent interview, OI = observer impressions

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

FIGURE 1

AVERAGE LEVELS AND GROWTH IN DEVIANT PEER ASSOCIATION

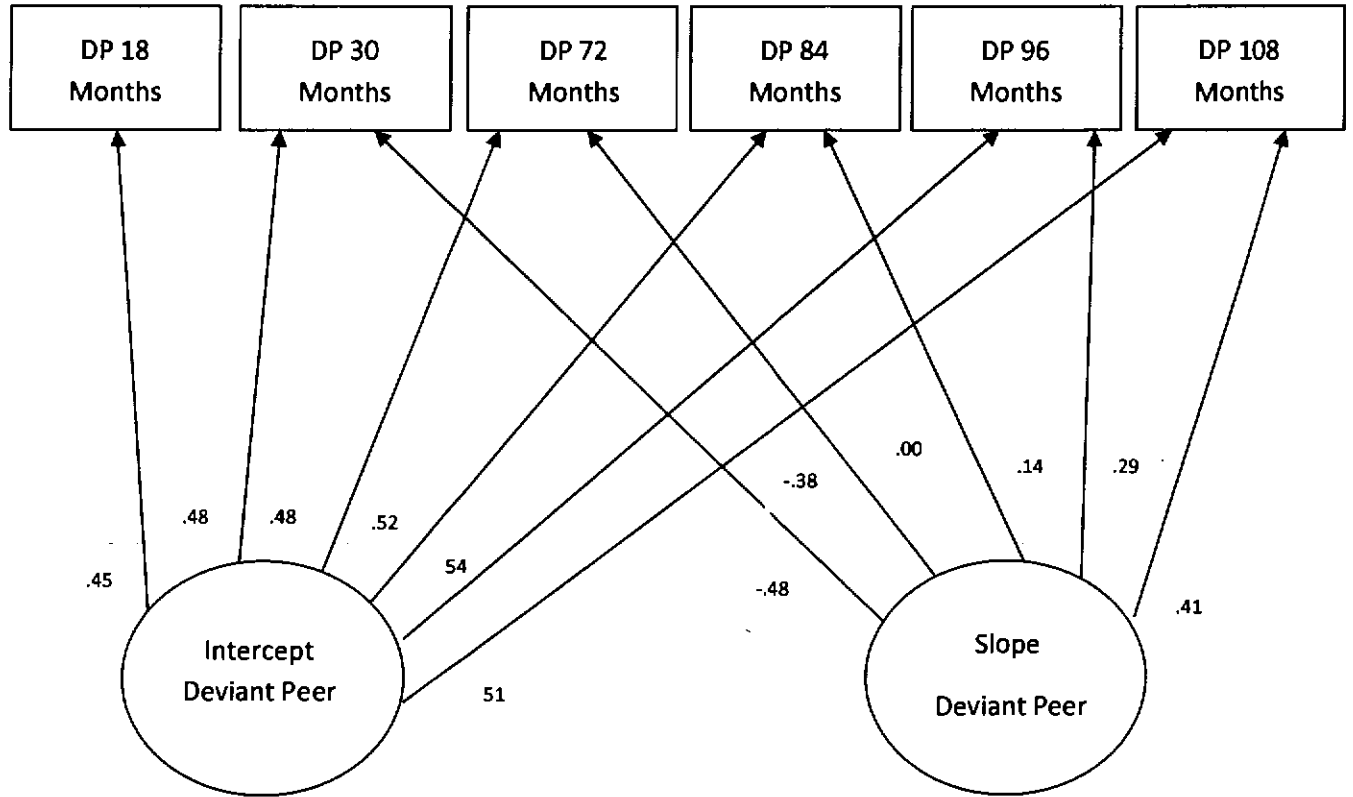


FIGURE 2

EFFECT OF AVERAGE LEVELS AND RATE OF GROWTH OF MONITORING ON AVERAGE LEVELS AND RATE OF GROWTH OF DEVIANT PEER ASSOCIATION

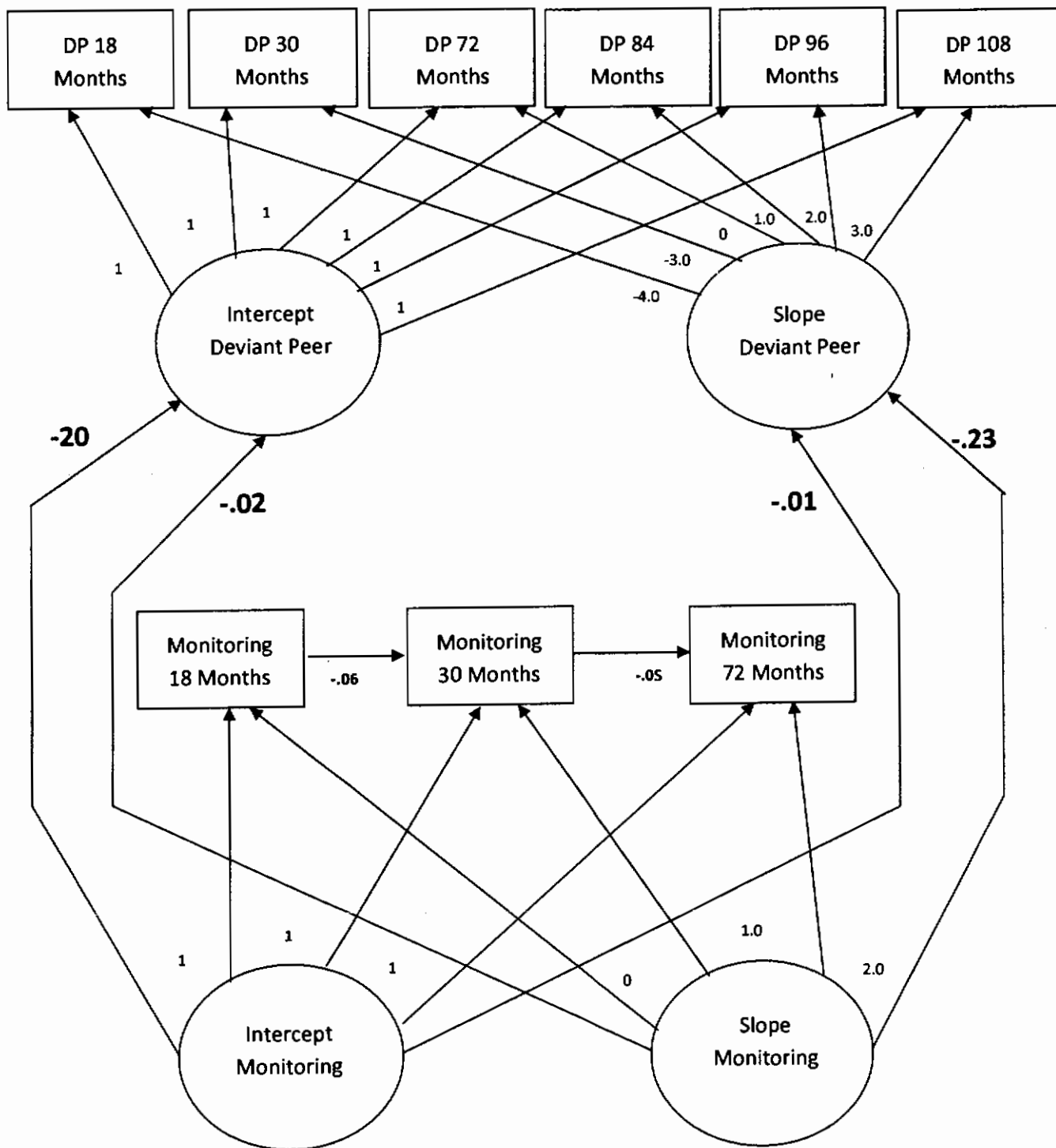


FIGURE 3

ROLE OF PARENTAL MONITORING AS A MEDIATOR BETWEEN INTERVENTION AND DEVIANT PEER ASSOCIATION

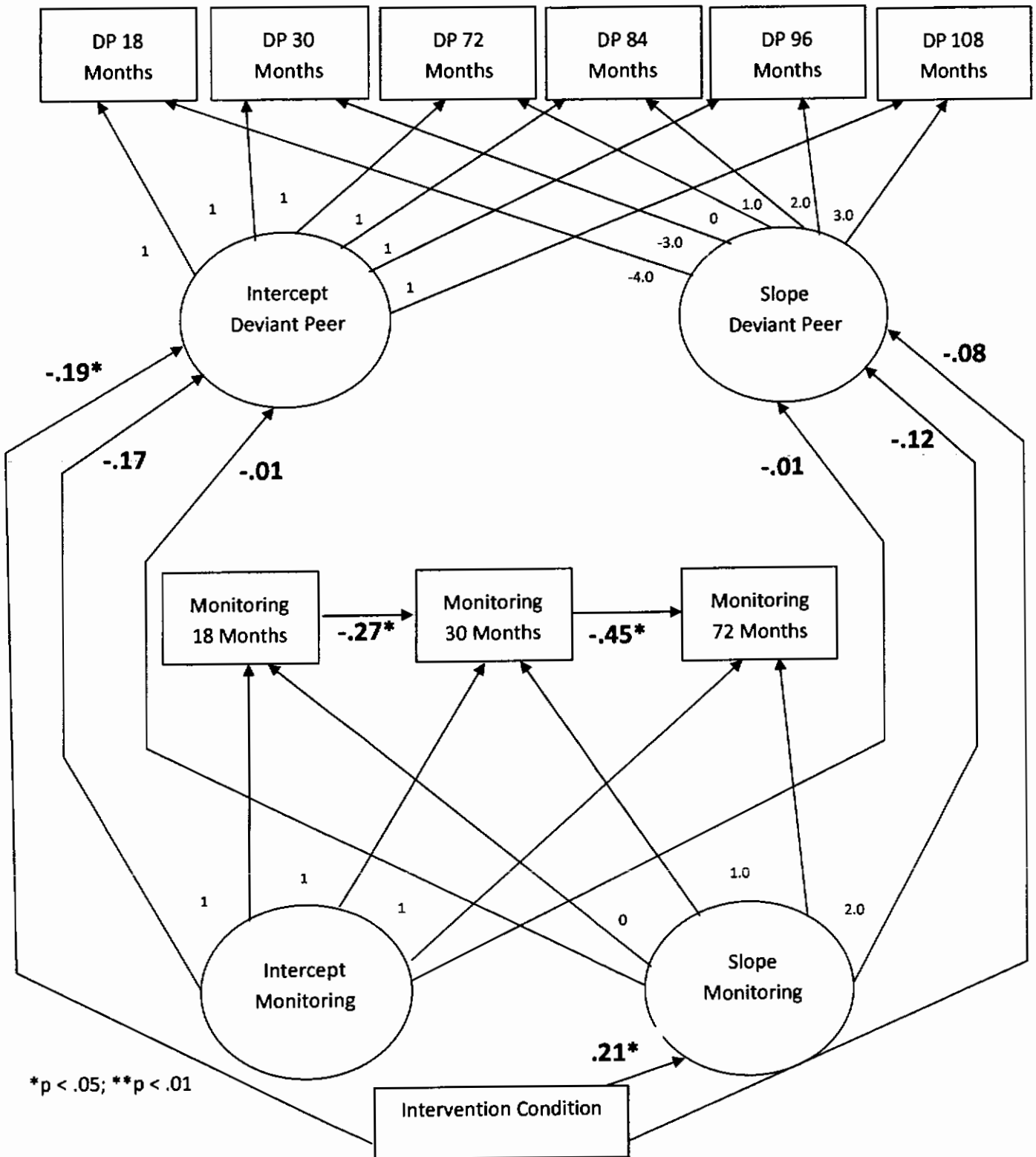


FIGURE 4

COMPARITIVE, NON-MEDIATED MODEL FOR PARENTAL MONITORING

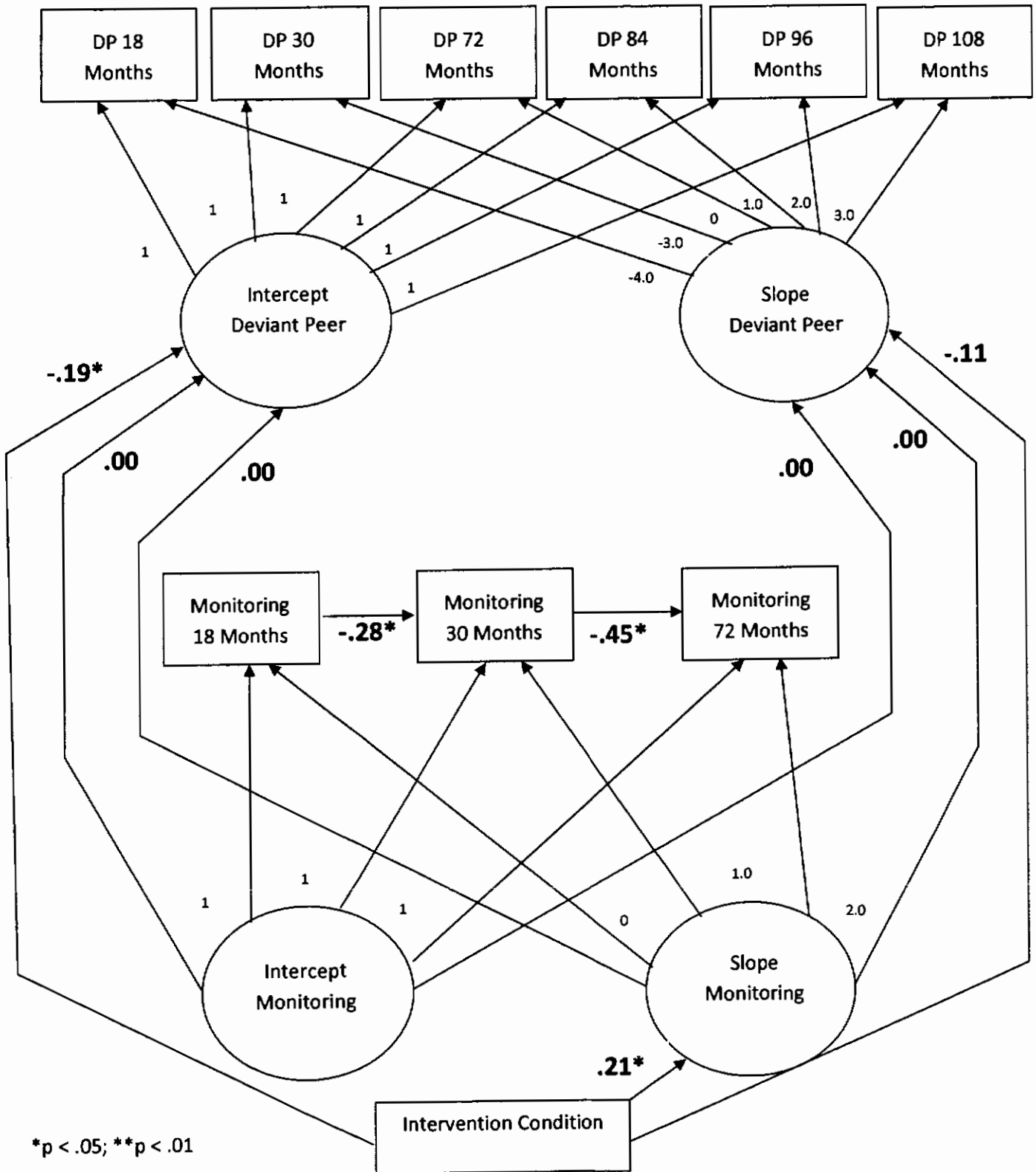
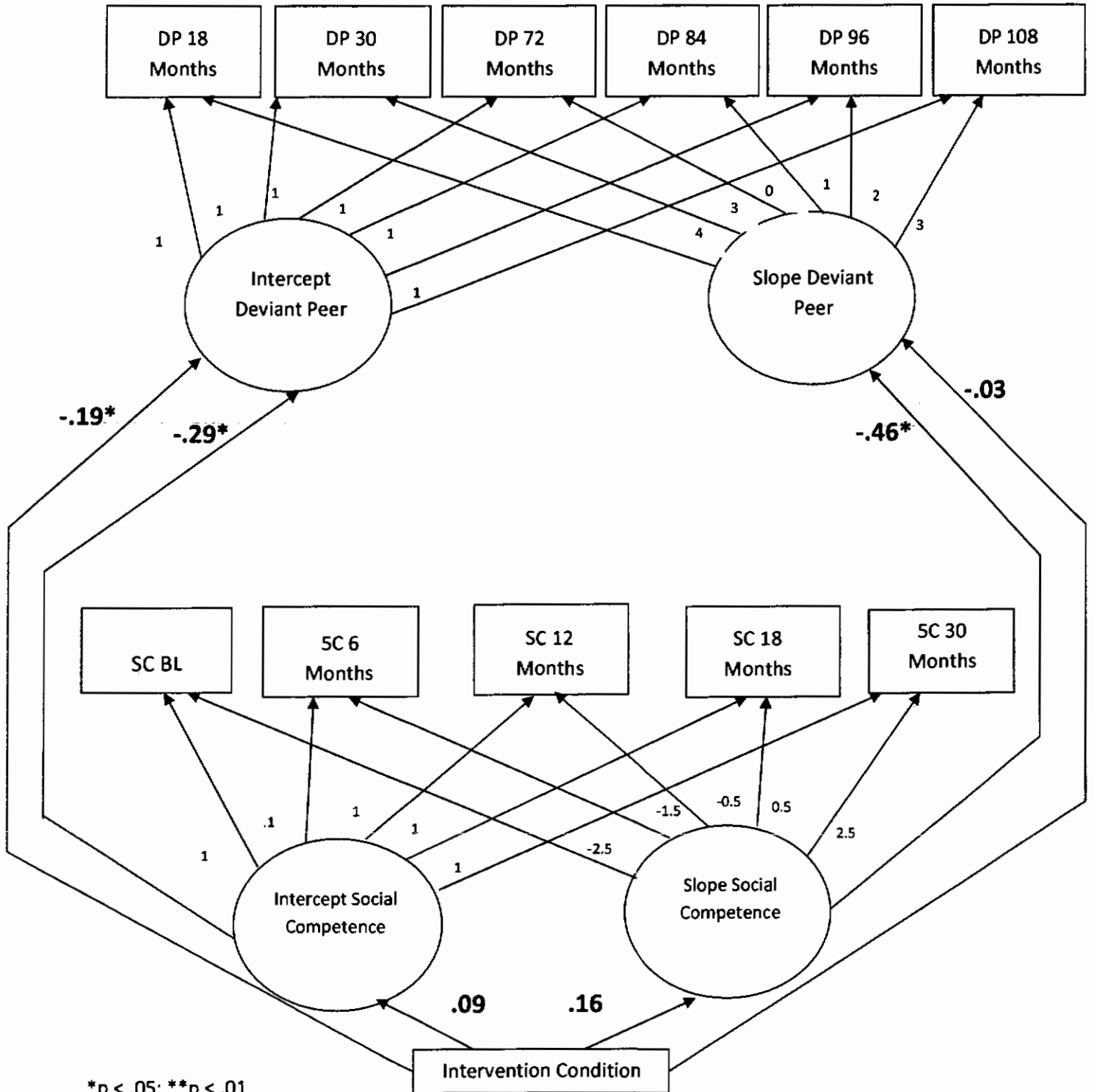


FIGURE 5

EFFECT OF MEAN LEVELS AND RATE OF GROWTH OF SOCIAL COMPETENCE ON AVERAGE LEVELS AND RATE OF GROWTH OF DEVIANT PEER ASSOCIATION



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

FIGURE 6

DIRECT EFFECT OF INTERVENTION ON AVERAGE LEVELS AND RATE OF GROWTH OF DEVIANT PEER ASSOCIATION

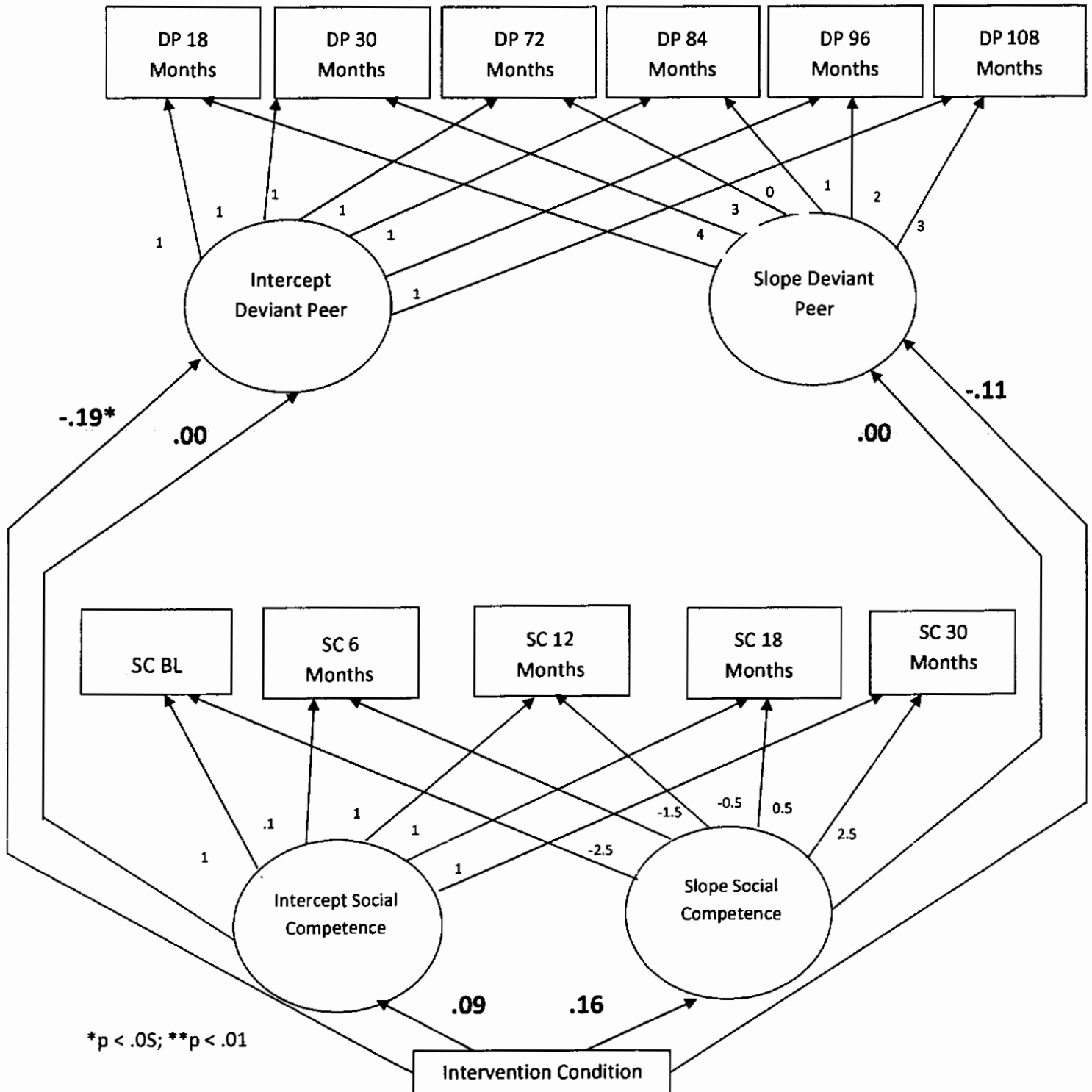


FIGURE 7

ROLE OF SOCIAL COMPETENCE AS A MEDIATOR BETWEEN INTERVENTION, CHANGES IN PARENTING, AND DEVIANT PEER ASSOCIATION

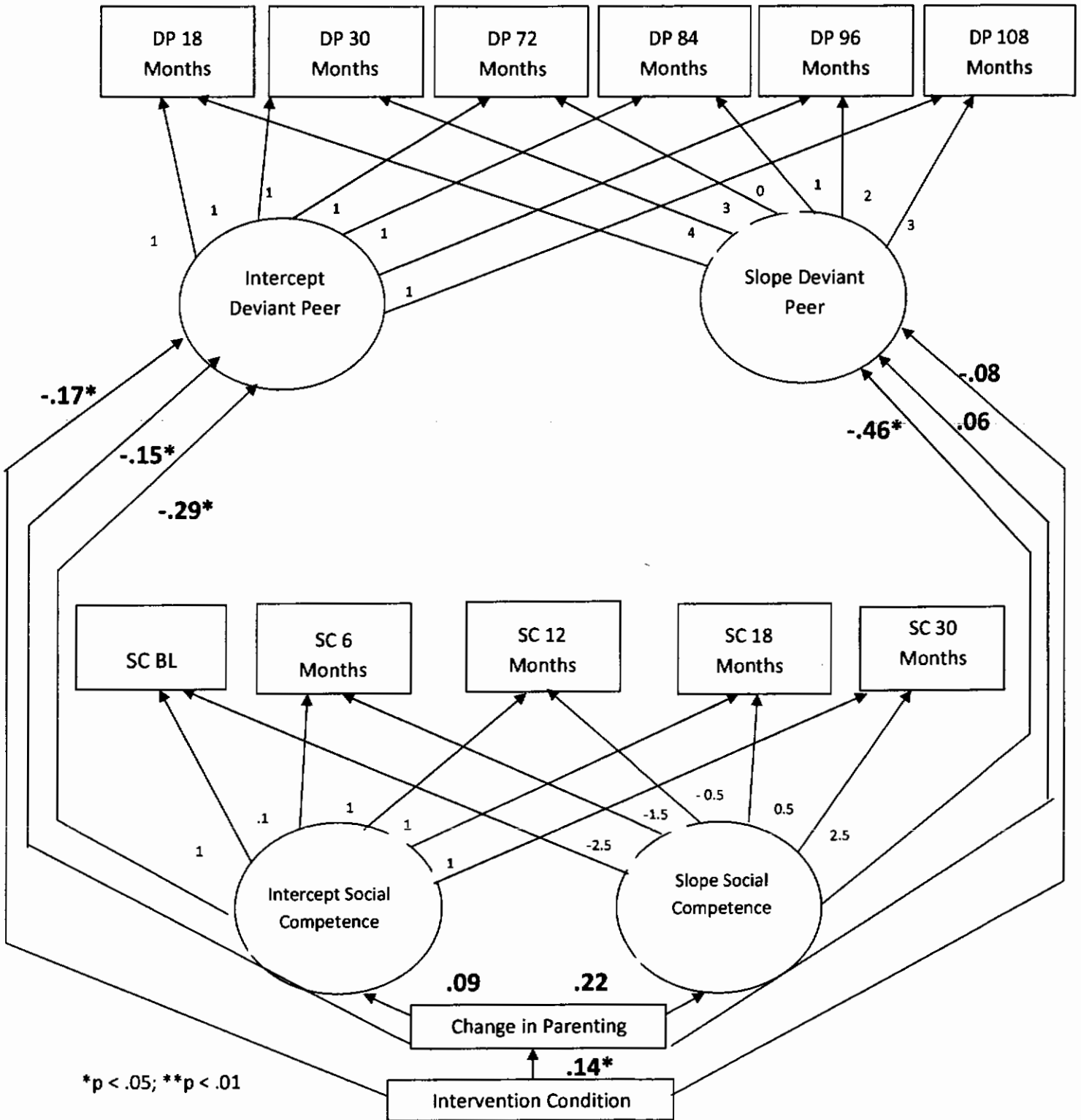


FIGURE 8

NON-MEDIATED, COMPARATIVE MODEL FOR SOCIAL COMPETENCE

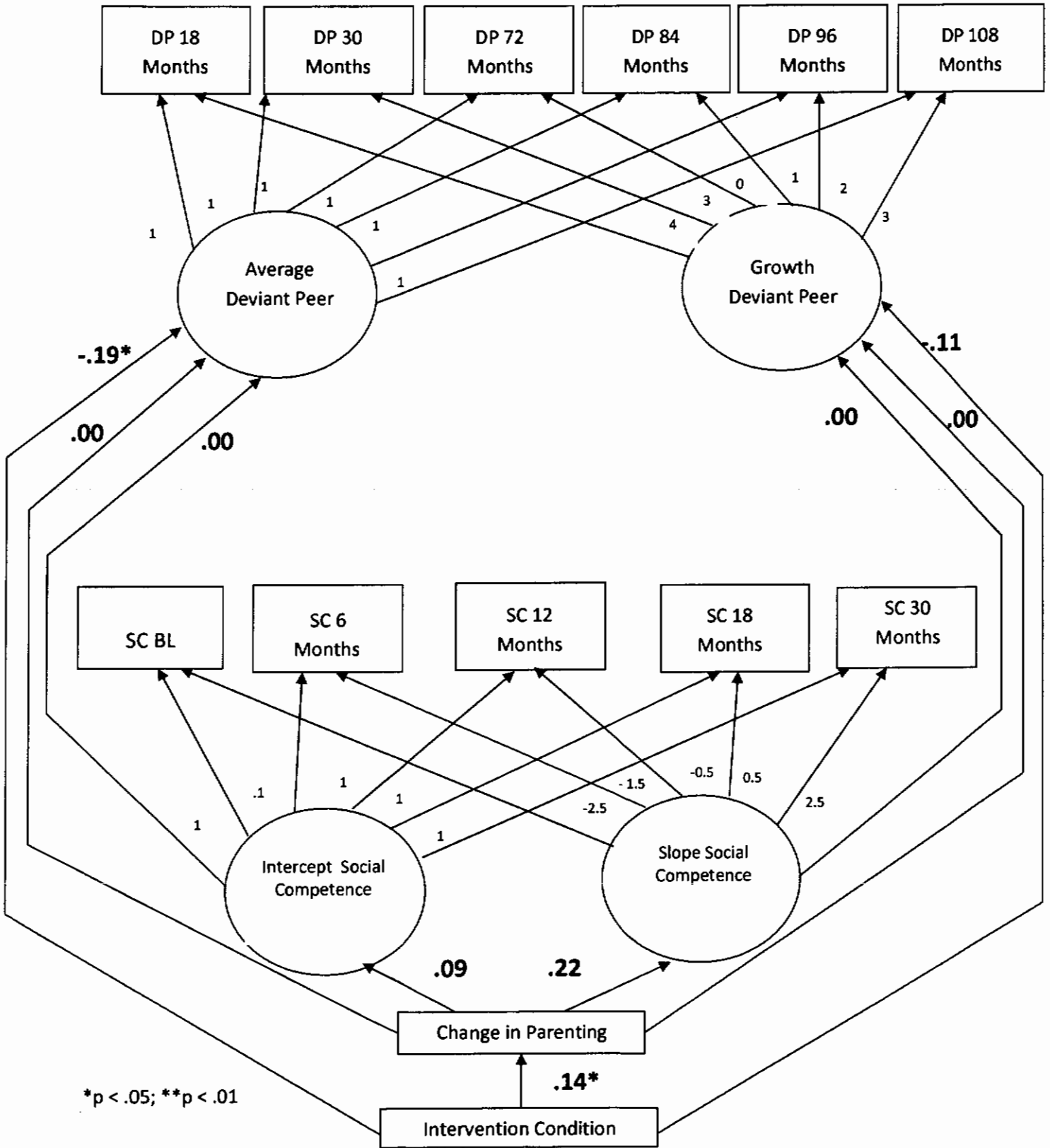


FIGURE 9

EFFECT OF MEAN LEVELS AND RATE OF GROWTH OF ACADEMIC SUCCESS (TRF) ON AVERAGE LEVELS AND RATE OF GROWTH OF DEVIANT PEER ASSOCIATION

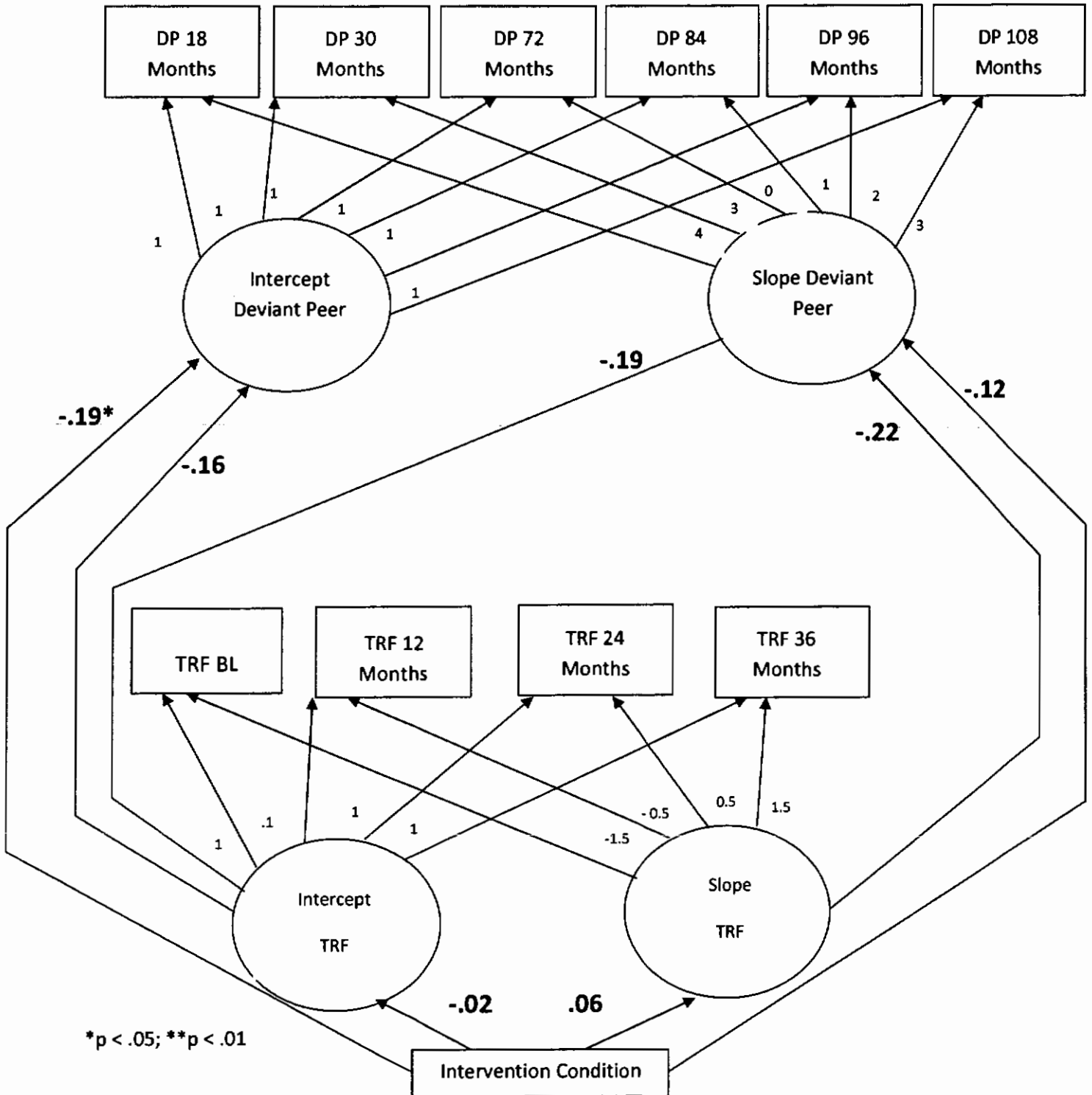


FIGURE 10

DIRECT EFFECT OF INTERVENTION ON AVERAGE LEVELS AND RATE OF GROWTH OF DEVIANT PEER ASSOCIATION

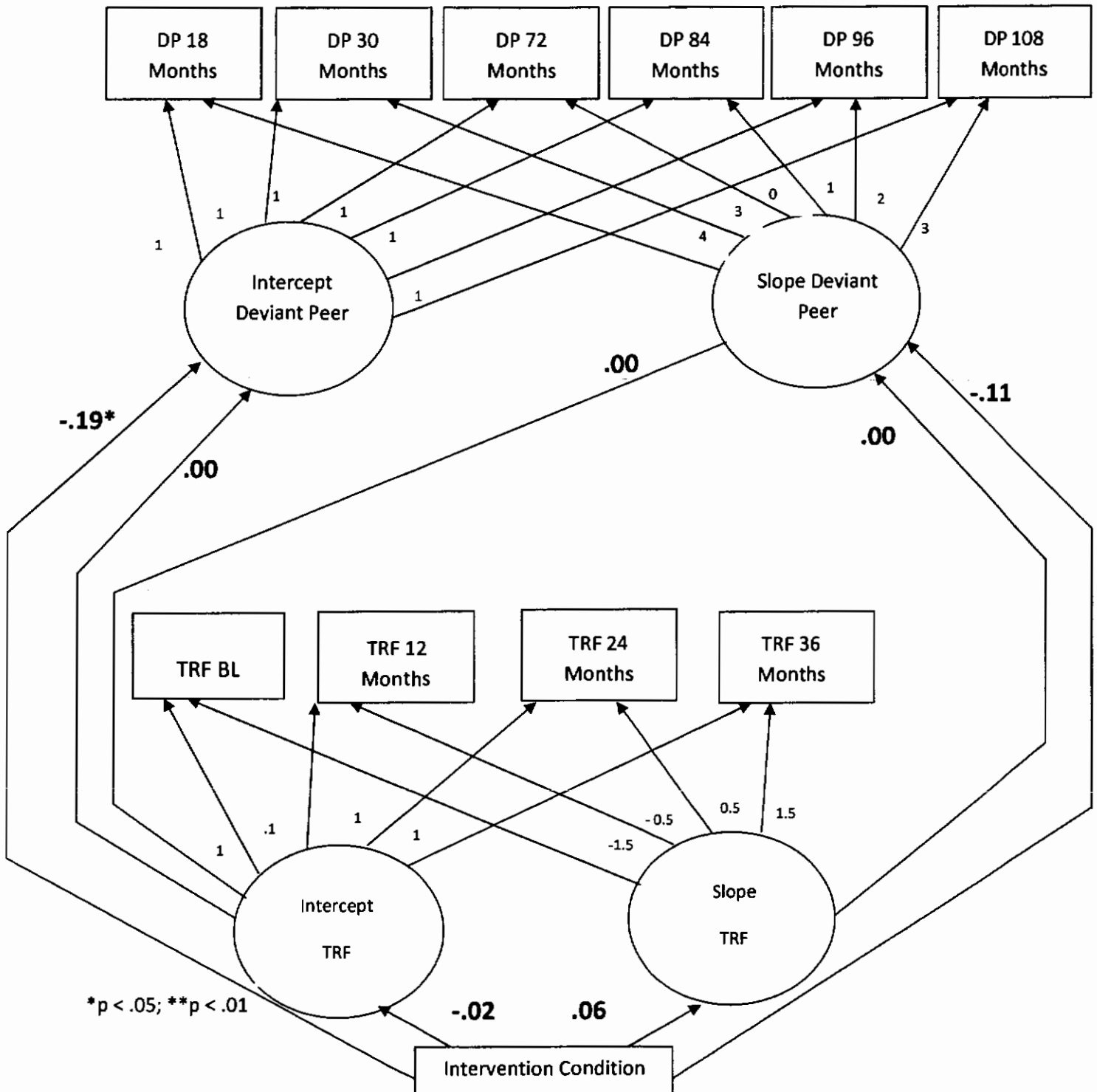


FIGURE 11

ROLE OF ACADEMIC SUCCESS (TRF) AS A MEDIATOR BETWEEN INTERVENTION, CHANGES IN PARENTING, AND DEVIANT PEER ASSOCIATION

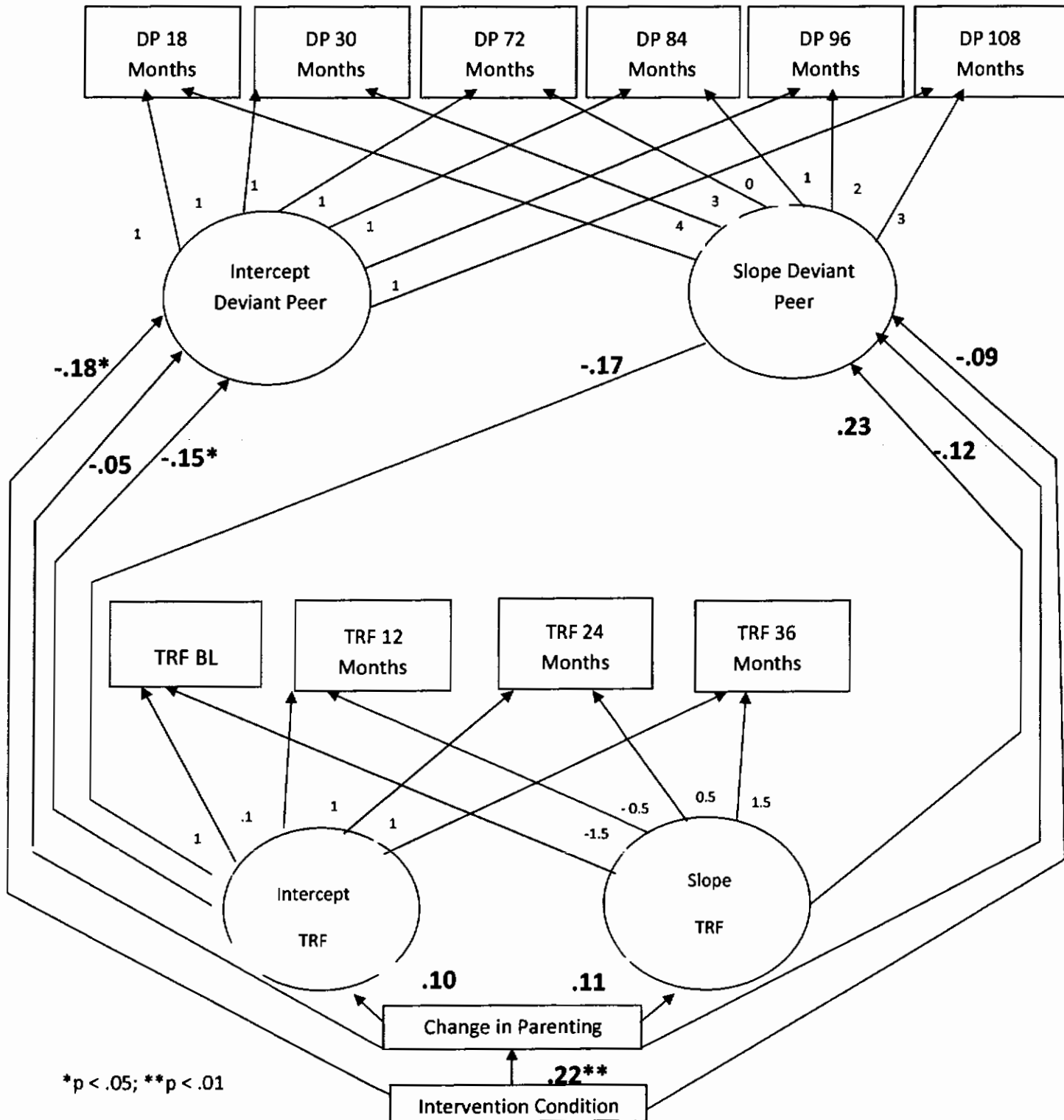
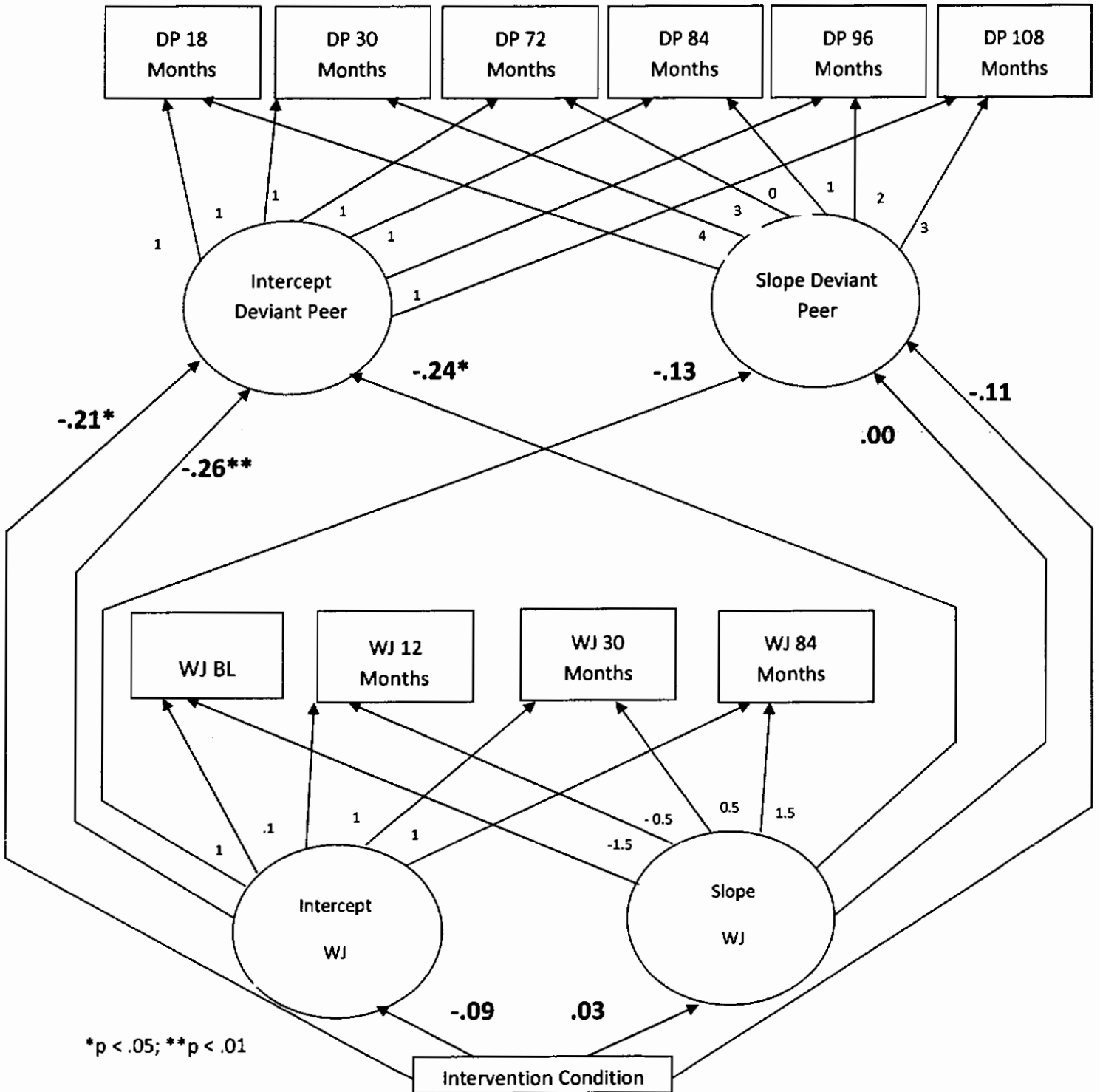


FIGURE 13

EFFECT OF MEAN LEVELS AND RATE OF GROWTH OF ACADEMIC SUCCESS (WJ) ON AVERAGE LEVELS AND RATE OF GROWTH OF DEVIANT PEER ASSOCIATION



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

FIGURE 14

DIRECT EFFECT OF INTERVENTION ON AVERAGE LEVELS AND RATE OF GROWTH OF DEVIANT PEER ASSOCIATION

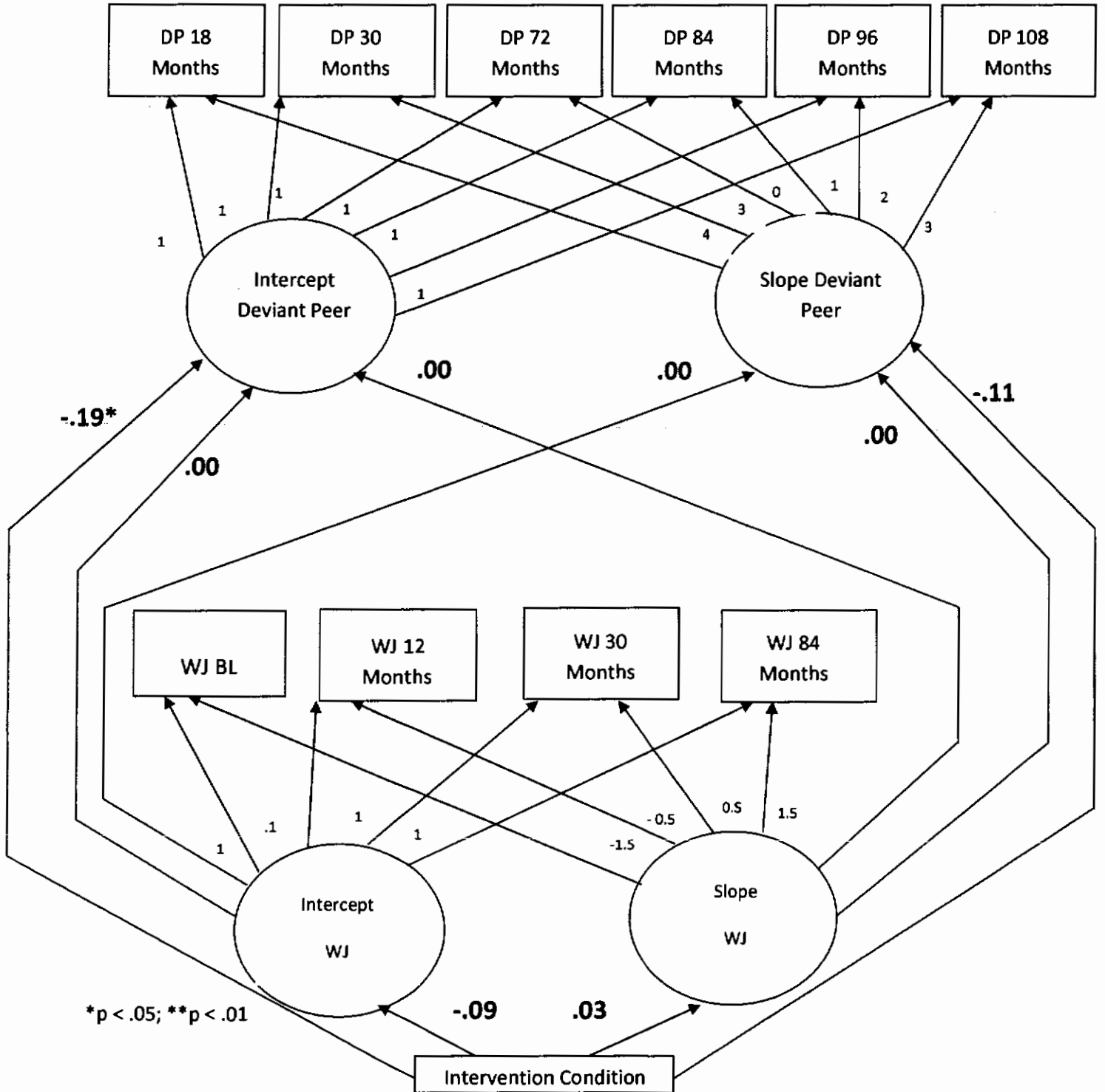
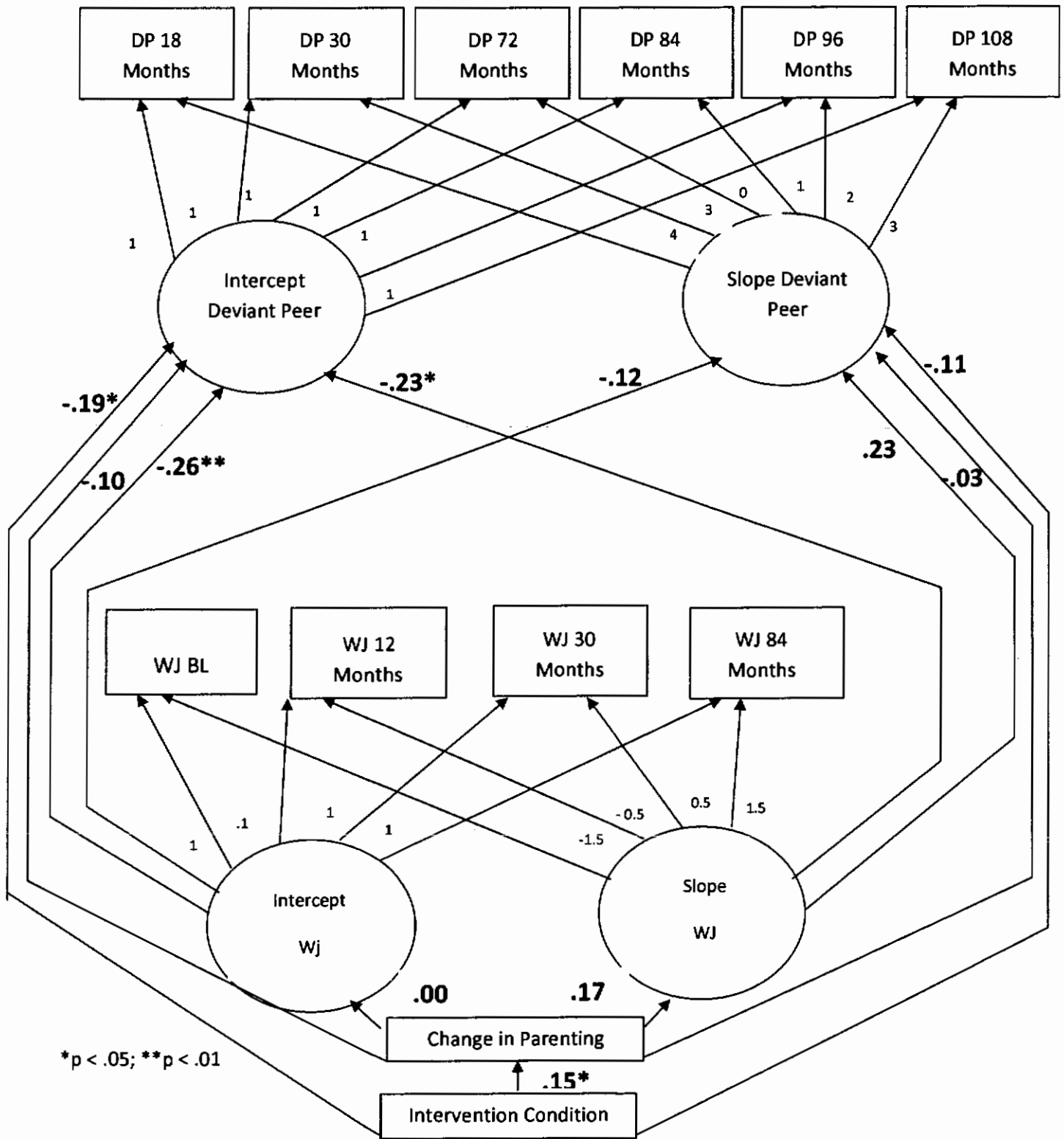


FIGURE 15

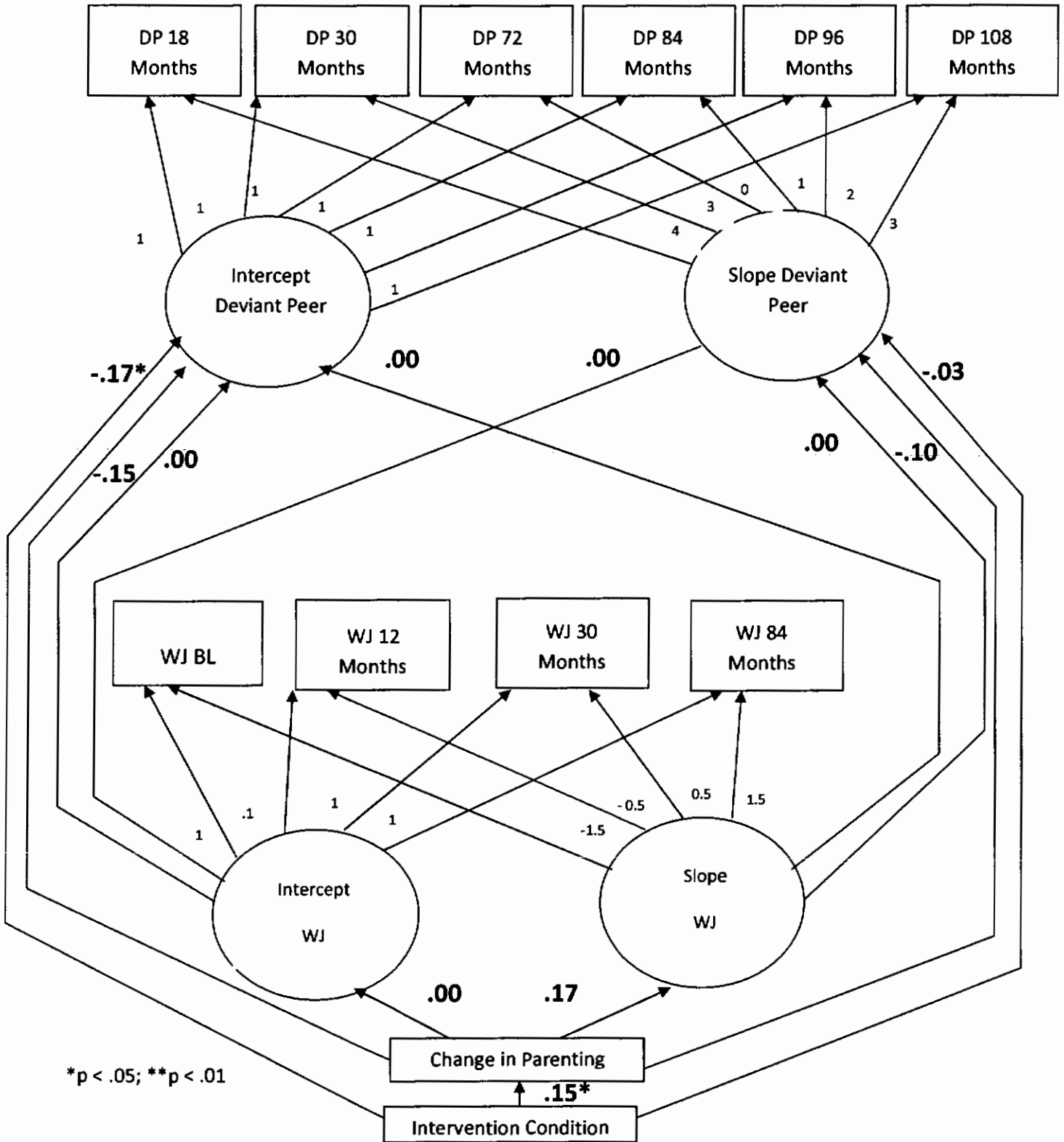
ROLE OF ACADEMIC SUCCESS (WJ) AS A MEDIATOR BETWEEN INTERVENTION, CHANGES IN PARENTING, AND DEVIANT PEER ASSOCIATION



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

FIGURE 16

COMPARITIVE, NON-MEDIATED MODEL FOR ACADEMIC SUCCESS (WJ)



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