

## ABSTRACT

Title of Document: AN EXPERIMENTAL EVALUATION OF AFTER SCHOOL PROGRAM PARTICIPATION ON PROBLEM BEHAVIOR OUTCOMES: DOES PRE-EXISTING RISK MODERATE THE EFFECTS OF PROGRAM PARTICIPATION?

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*Background:* Some prevention programs negatively affect participants. Previous research indicates that peers can cause these negative effects. However, little is known about which students may be most vulnerable to negative peer effects in prevention interventions.

*Purpose:* This study tests the effect of participation in an after-school program (ASP) on student outcomes of peer delinquency, problem behavior and antisocial attitudes and beliefs for students of differing pre-test levels of risk for those outcomes. Drawing on social learning theory, this study examines whether low- and moderate- risk students in the intervention are more likely to acquire delinquent behaviors and beliefs in the ASP than their already-delinquent counterparts.

*Participants:* 447 middle school students attending underperforming schools in Baltimore County, Maryland.

*Intervention:* The data are drawn from an experimental evaluation of an after school program which operated in five middle schools in Baltimore County during the 2006-2007 academic year. The overall evaluation of the program found null effects on the wide range of measured outcomes (including academic achievement and delinquency). I explore whether the lack of beneficial program effects is partially attributable to negative effects among low and moderate risk participants who absorbed negative beliefs and behaviors from high-risk peers in the ASP.

*Research Design:* Randomized, controlled field trial.

*Findings:* Results indicate that low- and moderate- risk youth are not more likely to experience negative outcomes than high-risk youths. On the contrary, low-risk participants are less likely to experience negative effects than high-risk participants. Students who began the program with elevated negative peer influences grew in this characteristic if they often participated in the ASP but declined in negative peer influences if they less often attended the program. Implications for universal prevention are discussed.

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PARTICIPATION ON PROBLEM BEHAVIOR OUTCOMES: DOES PRE-EXISTING  
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Over the past half-century Americans have placed increasing responsibility on public agencies, and schools in particular, to instill in youths the skills and information needed to avoid drugs and other problem behaviors (Catalano, Berglund, Ryan, Lonczak & Hawkins, 2004). Prevention interventions delivered in schools and communities are growing, as is evaluation research on these programs (Gottfredson, 2001; Greenberg, 2004; Hawkins, Catalano & Arthur, 2002). These programs can be delivered to universal, selected, or indicated populations. Selected and indicated interventions target specific problems in individuals displaying risk for or manifesting characteristics of concern (e.g., mental illness, criminal offending, substance use).

Universal prevention interventions for youths target entire populations regardless of risk status (frequently a school or a grade level within a school) with strategies to promote healthful behaviors. Common examples of universal prevention interventions include programs that target disruptive classroom behavior (e.g. The Good Behavior Game; Barrish, Saunders & Wolf, 1969), bullying (e.g. Olweus Bullying Prevention Program; Olweus, Limber, & Mihalic, 1999) or emotional well-being (e.g. PATHS program; Greenberg, Kusché & Mihalic, 1998). This approach to prevention programming for school-aged youth is gaining support within the research community (Derzon, 2007; Fagan, Hanson, Hawkins & Arthur, 2008; Flay, 2002; Hahn, et al., 2007; D. C. Gottfredson, 2007; Greenberg, Domitrovich & Bumbarger, 2001). All youths, even those who are thriving, are presumed to be potential beneficiaries of health-promoting interventions. The push for universal intervention is predicated on the assumption that the worst probable outcome of prevention programs is a null effect.

Meta-analytic synthesis of evidence of the effectiveness of universal interventions indicates that the programs, on average, have small, positive effects (Wilson, Gottfredson & Najaka, 2001; Wilson & Lipsey, 2007). These analyses also show heterogeneity in outcomes across studies. Several rigorous evaluations of prevention programs have documented negative effects of participation (Cho, Hallfors & Sanchez, 2005; Dynarski et al., 2004; G. D. Gottfredson, 1987; Mahoney, 2000; Mahoney, Stattin & Lord, 2004; McCord, 1978; The Multi-Site Violence Prevention Project, 2008; Poulin, Dishion & Burraston, 2001; Weisman et al., 2002). Very few studies examine underlying reasons for program success or failure. However, previous research suggests that negative effects are more likely when programs are unstructured or do not incorporate practices that are known to be effective (Durlak & Weisberg, 2007; D. C. Gottfredson, Gerstenblith, Soulé, Womer & Lu, 2004).

Prior research has suggested that negative effects of group-based interventions may be produced by increased opportunities for “deviancy training,” which occurs when peers reinforce deviant<sup>1</sup> comments or conduct by responding with approval and attention. This can occur in interventions targeting general populations as well as in those targeting high-risk youths. Dishion and colleagues (Dishion, McCord, & Poulin, 1999; Dishion, Spracklen, & Andrews, 1996; Patterson, Dishion, & Yoerger, 2000) have shown that increased exposure to negative peer influences via deviancy training is associated with increased substance use, delinquency, and violence. It is possible that the anticipated positive effects of ineffective or harmful programs were off-set by simultaneous negative effects due to deviancy training (a process also known as peer contagion; Dishion &

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<sup>1</sup> This paper uses the terms “deviant” and “delinquent” interchangeably to refer to illegal and other antisocial behavior.

Dodge, 2006). Furthermore, it is possible that interventions serving high-risk students will generate a greater deviancy training effect as the population is more likely to actively model and encourage deviance. Indeed, research suggests that grouping high-risk youths together for intervention services can increase subsequent delinquency (Cho, Hallfors, & Sanchez, 2005; Dishion, McCord & Poulin, 1999; Lave & Chamberlain, 2005).

Conventional wisdom is to provide prevention services to mixed groups of youths to alter the balance of attitudes and reinforcements in favor of delinquency (Akers, 1999) and to avoid deviancy training in programs. However, universal intervention strategies and those that deliberately recruit low-risk participants to dilute deviant social environments present potential pitfalls of net-widening as youths who are on track for healthy development are enrolled in programs that occasionally have negative effects. Some prevention researchers have suggested recruiting as many well-adjusted youths as possible into programs for higher-risk youths, so the prosocial youth can act as a buffer protecting the antisocial youth from reinforcing each other's delinquent attitudes and conduct (Feldman, 1992; G. D. Gottfredson, 1987). Caution should be exercised when recruiting participants who are not in need of services into interventions. Although health-promotion interventions may improve social skills or related outcomes for both high and low risk youths, they may lead to negative outcomes as well. Accordingly, these programs risk breaking the cardinal rule of intervention: first do no harm.

A growing body of evidence indicates that peer influences in intervention programs may explain the null and negative outcomes documented in previous studies. Yet, little is known about characteristics of individual youths that are associated with vulnerability to peer contagion and negative effects following prevention programs, also

called “backlash” or “boomerang” effects (Ellickson & Bell, 1990; Fishbein et al., 2002). Outcome evaluations of universal interventions usually draw conclusions based on means for treatment and comparison groups without exploring whether subgroups of participants responded differently. Two studies which examined universal prevention program effects for students with differing baseline risk status found that individual propensity for problem behavior did impact the way students responded to the intervention. The studies reached opposing conclusions, however. One found that a program targeting interpersonal violence resulted in worse outcomes only for participants at lower risk for violence (The Multi-Site Violence Prevention Project, 2008) and the other found that substance use worsened after a substance use prevention intervention only for students at high baseline risk for substance use (Ellickson & Bell, 1990).

The questions of who benefits most from intervention programs and conversely who is most likely to be harmed are timely and important as changing political agendas predict that government-subsidized services for youths will be expanding. Upon reviewing available evidence on the extent to which peer contagion is operating in intervention programs, researchers in the field have conjectured that youths of moderate propensity for delinquency could be the most likely to respond to negative peer influences with increased antisocial activity (Dishion & Dodge, 2005; Dodge, Dishion & Lansford; 2006; Lipsey, 2006; Vitaro, Tremblay, Kerr, Pagani, & Bukowski, 1997). This proposition is not well-tested in the literature.

Research conclusions about risk-status and potential for negative treatment outcomes are mixed. See Appendix A for a summary of the existing research on harmful effects of prevention programming. These studies are discussed in more detail in the

following sections of this dissertation. The preponderance of studies in this area have focused on grouping high-risk students for interventions and concluded that it is unwise to do so because troubled students in the intervention influence each other to increase problem behaviors. Several studies which have measured effects for low and moderate propensity students in interventions with high-risk students have found that lower-risk students can also be harmed by influences from high-risk peers. As Moffitt has theorized, well-adjusted students may mimic antisocial peers hoping to acquire the autonomy and social status defiant youth appear to possess (1993). Very few studies have tested for differential effects of programs by propensity including moderate risk as a category separate from low and high risk.

Moderate propensity youths may have the most to gain from participation in health-promoting universal interventions because they may be the most impressionable and open to change. They are willing to engage in delinquency or health-risking conduct but are not strongly committed to doing so. These moderate propensity youth stand in contrast to highly antisocial students, who may reject the messages offered in universal interventions and highly conventional youths who are strongly committed to a conformist lifestyle. Although very little research has distinguished moderate-risk students from high or low risk, research does indicate that both high and low risk students are sometimes harmed by prevention programs and these effects are the likely result of negative peer influences. If combining low and moderate propensity youths with highly antisocial peers is associated with negative outcomes, universal intervention strategies should be avoided for them.

The current study explores negative peer influences in a universal prevention activity, and how it may influence youths at different risk levels differently. Pre-existing risk is only one of several possible moderators of intervention effectiveness.<sup>2</sup> This study focuses on pre-existing risk for two reasons. First, prominent scholars in developmental and intervention research *speculate* that pre-existing risk interacts with program participation in a curvilinear fashion, where moderate risk students are the most susceptible to delinquent peer influences (Dishion & Dodge, 2005; Dodge et al., 2006; Lipsey, 2006; Vitaro et al., 1997), outside of one study (Ellickson & Bell, 1990) this possibility remains untested. Second, a serious examination of the potential for prevention programs to harm youth who do not display signs of maladjustment is warranted. Prevention programs should function to support personal growth for students whose families and schools are unable to meet all of their needs. Students who have few deficits in family or educational support are not likely to benefit much from prevention programs, and as suggested above, may actually be harmed by their participation in these programs. Before the prevention field whole-heartedly endorses treating high and moderate or low risk students in conjunction as in universal prevention programs, we must understand the mechanisms which produce iatrogenic effects of prevention programs so that steps can be taken to minimize or eliminate risk to participants.

The program under study was an after-school program (ASP) serving middle-school youths of mixed risk status, designed to incorporate research-based content into routine after-school program practices. It operated at five sites in Baltimore County,

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<sup>2</sup> Age (Lipsey, 2006; Dishion & Dodge, 2005), gender (Bukowski, Sippola & Newcomb, 2000), parental monitoring (Pettit, Bates, Dodge & Meece, 1999; Lansford, Criss, Pettit, Dodge, & Bates, 2003) and disrupted peer environment (Bukowski, Sippola & Newcomb, 2000) have also been tested as moderators of intervention effectiveness.

Maryland during the 2006-2007 school year. More detail on the program is provided in the methods section. The main outcome evaluation of the program revealed small and nonsignificant effects on all outcomes measured with the exception of time expenditure (D. C. Gottfredson, Cross, Wilson, Connell & Rorie, 2009). Youths in the treatment group reported one-half day less per week of unsupervised socializing than did control students. No differences between groups were found for academic or social adjustment outcomes including delinquency and drug use. A previous study on this project reported that deviancy training was commonplace in the program (Rorie, D. C. Gottfredson, Cross, Wilson & Connell, 2008). Deviancy training may have contributed to the failure of the program to reach its prevention goals.

#### *Deviancy training and social learning theory*

How would we detect deviancy training if it were occurring? Peer contagion is a social learning process; I expect the same outcomes that social learning theory predicts will result from contact with antisocial peers. Social learning theory as developed by developmental psychologist Albert Bandura, is an extension of behaviorist theories conceived during the mid-twentieth century which described the process of acquiring new behaviors as governed by punishment and reinforcement (Bandura, 1969; 1971; 1977; 1986). A different version of social learning theory was developed by criminologist Ronald Akers building on differential association theory (Akers, 1973; 1998; Burgess & Akers, 1966; Sutherland & Cressey, 1955). Both are relevant to the current topic, and I discuss them both.

Behaviorism predicts that behaviors met with punishment will be extinguished while those met with rewards will be repeated as an individual learns through experience with his/her environment. Strict behaviorism denies the role of internal factors and social observation in determining behaviors. Social learning theory adds to behaviorism by introducing two additional types of reinforcers/punishers: self and vicarious. Self reinforcers are internal rewards like pride or other positive self-evaluations. Vicarious reinforcers arise as a function of witnessing the consequences accompanying the performance of others (Bandura, 1971). In later versions of the theory, Bandura specified that direct reinforcement is more powerful than vicarious reinforcement (1986).

A central principle of Bandura's theory of social learning is that people acquire novel behaviors by adopting the observed behaviors of others. He writes, "most human behavior is learned observationally through modeling: from observing others one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action" (Bandura, 1977; p. 22). Effective modeling has four necessary elements: 1) Attention, the learner must attend to the modeled behavior; 2) Retention, the learner must retain memory of the behavior; 3) Reproduction, the learner must be physically able to perform the behavior him or herself; and 4) Motivation, the modeled behavior must appeal to the learner so that he/she will choose to reproduce it. Motivation is influenced by internal characteristics, past experiences with reinforcement or punishment, and vicarious experience with reinforcement and punishment where the learner recalls a previous observed response the behavior elicited when performed by another person.



Sutherland & Cressey's (1955) differential association theory was developed to explain the acquisition of anti-social behaviors. As adapted by Burgess & Akers (1966) in their social learning theory, it makes two major assertions. The first relates to differential reinforcement of actions, stating that behaviors which are rewarded will be repeated and those that are punished will be extinguished in parallel with behaviorism. The second component relates to personal definitions of rule-breaking, stating that one's social environment affects one's beliefs about the importance of following society's laws and informal rules (Akers, 1998, Wikström, in press). A person whose social environment defines rule-breaking as normative will be more likely to adopt those beliefs him or herself and to go on to engage in nonconforming conduct.

If students in the ASP are exposed to extensive modeling of antisocial behavior that is met with social reinforcement, they may internalize these experiences vicariously and gain motivation for reproducing the modeled behavior in the future. Furthermore, association with antisocial peers in an intervention could lead to increased beliefs that rule-breaking is acceptable and decline in conventional, conformist beliefs. While this study does not measure individual participant exposure to reinforcement of negative behavior or attitudes, evidence indicates that much modeling of deviant behavior and values occurred at the ASP sites and was met with encouragement from others. As described in detail in another report from this research initiative, misbehavior was commonplace during the program (Rorie et al., 2009). Students who acted out at the program with violence (actual or feigned) or other inappropriate behavior and conversation (curse words, defying teachers, discussing illegal conduct, making

derogatory comments about others, etc.), tended to be ignored by staff and encouraged by peers.

Being exposed to modeled delinquency and peers who reliably reinforce misbehavior while attending the ASP could affect youths of different risk status differently. Together, Bandura's and Akers' social learning theories predict that two mediating processes produce increases in an individual's antisocial conduct: modeling/reinforcement and changes in definitions/beliefs about the acceptability of such conduct. Modeling and vicarious reinforcement at the ASP might not have affected already-delinquent students because the behaviors modeled at the program were fairly tame and likely familiar to the high-risk participants. According to Bandura, modeling transmits *novel* behaviors. I suspect that the misbehavior displayed in the ASPs was far from novel to high-risk students. Surely, they were doing much of the modeling themselves. Modeling and vicarious reinforcement are more likely to influence the low and moderate risk participants, who may not have been previously exposed to a wide variety of antisocial behavior.

Social reinforcement at the ASP should also have a stronger impact on low and moderate risk students who do not generally act out with negative behaviors. The ASP may be the only, or one of few, contexts in which low and moderate risk students encounter a supportive social environment for delinquency. The ASP could provide a unique opportunity for low- and moderate-risk youths to experiment with negative behaviors under the expectation of social reward. High-risk youths have already acquired negative behaviors, likely through past experiences with direct reinforcement, leaving them less impressionable than their lower-risk counterparts.

The second mediating process operates through increases in beliefs that rule-breaking is acceptable. Students of all risk-states may gain beliefs that antisocial behavior is normative through exposure to peers who demonstrate and relay antisocial beliefs. Low- and moderate-risk students are more prone to learn new antisocial beliefs from antisocial peers. As is the case with reinforcement, high-risk youth are more likely to have familiarity with belief systems that condone rule-breaking and are thus less likely to absorb new beliefs from peers at the ASP. Antisocial peers at the ASP may be introducing such belief systems to low- and moderate-risk participants making them more prone to take on these new beliefs.

Following Akers' social learning theory, all youth who are exposed to delinquent peer networks are at-risk for increasing delinquent behavior. However, low- and moderate-risk youth are more likely to change their behavior in response because they are affected by both modeling/reinforcement and increasing antisocial beliefs. High-risk youth are liable to respond only by increasing antisocial beliefs because they are already entrenched in delinquent peer networks and accustomed to the level of antisocial behavior which occurred in the ASP.

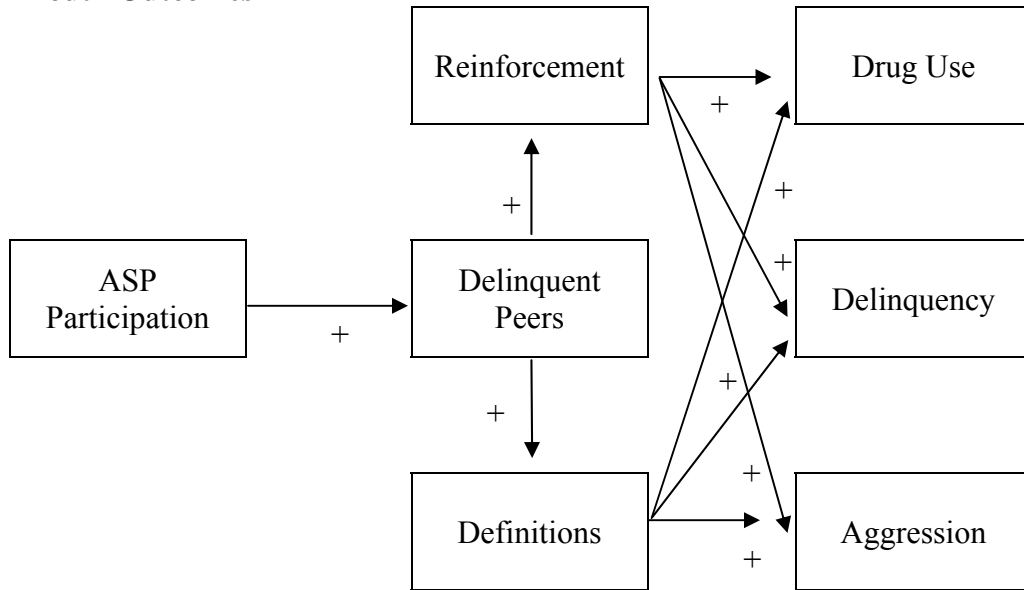
ASP participation is expected to increase association with negative peers which in turn is expected to increase reinforcement of negative behaviors and definitions favorable to rule-breaking. Reinforcement and definitions are expected to lead to increases in problem behavior. All of these relationships are expected to be stronger among low- and moderate-risk youth. The pre-test score on measures of problem behavior and related attitudes and beliefs is expected to moderate the relationship between exposure to delinquent peers and changes in reinforcement and beliefs such that high-risk students are

less responsive to negative peer effects than moderate or low risk students (Figure 1). In the context of a prevention intervention trial with null effects across outcomes, I propose to test whether low- and moderate-risk students evidenced greater increases in delinquent peers, definitions favorable to rule-breaking, and problem behaviors of drug use, delinquency and aggression in response to the intervention than high risk students.

Figure 1 presents a simplified model of the proposed relationships between the ASP intervention, delinquent peers and reinforcement and definitions. The model illustrates only a subset of the potential relationships among the components that could be predicted by social learning theory. For instance, social learning theory states only that behaviors are learned through interaction with others. Therefore, one could hypothesize that the ASP would lead to transmission of prosocial behaviors from low-risk students to high-risk students. Additionally, it is also possible that ASP participation has a direct effect on outcomes other than peer delinquency. The data available for this study were collected at only two time points. Hence, I am unable to test the sequencing of events as implied by social learning theory, only whether ASP participation influences subsequent outcomes. No direct measure of reinforcement is available; I am also unable to test the relationship between ASP participation and reinforcement. I assume that exposure to negative peers increases reinforcement for antisocial behavior.

In the following section, I discuss in greater detail the merits and drawbacks of universal prevention programming which frequently serve populations with heterogeneous propensity for antisocial conduct. Then research on peer influence in intervention programs is reviewed.

**Figure 1. Proposed Association between ASP Participation and Negative Youth Outcomes**



### Universal Prevention Strategy

The universal prevention strategy, as defined earlier, dovetails with the positive youth development movement currently gaining momentum in prevention practice. Beyond prevention of risky behaviors in youth at-risk for antisocial development, positive youth development interventions are designed to capitalize on and strengthen developmental assets (Catalano et al., 2004). This approach to preventing antisocial outcomes is founded on a philosophy that “problem free is not fully prepared” (Roth & Brooks-Gunn, 2003) so that even “problem-free” youths on-track for healthy progress are appropriate targets for intervention services. Positive youth development interventions are expected to promote good character, resilience and citizenship. Such programs could be recommended for even the most well-adjusted child.

Some researchers have advocated universal over specifically targeted interventions for several reasons. First, universal intervention avoids labeling students as having problems. Selecting certain students into intervention programs could damage self-image or publicly stigmatize the student (Barrett & Pahl, 2006; Greenberg et al., 2001). Second, some view delivering interventions to only a subset of potential participants as imprudent because those not selected into the intervention will be denied the benefits of the program (Barrett & Pahl, 2006; Greenberg et al., 2001; Flay, 2002; Derzon, 2007).

Reliably identifying youth who are “at-risk” for adverse developmental outcomes poses challenges. In an analysis of previous research on risk and protective factors widely used to identify youth in need of intervention services, Derzon (2007) found that the strength of association between the factors and outcomes was only modest. He asserted that these factors could not confidently predict which youths would later display antisocial outcomes and concluded that “prevention must maintain a strong commitment to universal intervention based on mere probability” (p. 442). Similarly, Durlak (1995) advocated universal prevention on the grounds that even if a small proportion of low-risk youths grow into antisocial adults, they will still represent a significant proportion of antisocial adults, given that low-risk youth are a large majority of the youth population. He concludes that it is therefore unwise to exclude youths who have yet to present adjustment problems from intervention programs.

Evidence presented in the following section suggests, however, that low-moderate and high-risk students are susceptible to negative peer influences in prevention programs and these influences can lead to increases in negative attitudes and beliefs,

delinquency and substance use. This limited literature highlights an understudied problem in intervention research, namely, adverse effects of treatments designed to aid youth development. Illuminating how these effects occur, and who they affect, will inform future intervention programming and diminish the risk that well-intentioned programs harm the youths who take part in them.

### Negative Peer Influence in Group Prevention Programs

Researcher attention focused on negative peer influences in prevention interventions for groups of adolescents after the publication of an article by Dishion, McCord and Poulin in 1999 which called attention to potential long-term iatrogenic effects of two such programs. These authors stressed the need for precautions against peer contagion in interventions which group high-risk adolescents together. These authors concluded that creating groups of antisocial youth for intervention services may inadvertently foster negative peer dynamics in the program wherein participants reinforce each other's pre-existing delinquent tendencies. They recommended that interventions do not target exclusively high-risk youth. However, aspects of their research and work of other researchers has indicated that low-risk youth are also vulnerable to negative peer influences in intervention programs (G. D. Gottfredson, 1987; The Multi-Site Violence Prevention Project, 2008). Aggregating a mix of high and low-risk adolescents may allow the more delinquent youth to encourage antisocial attitudes and behaviors in non-delinquent peers. Research on peer influence in interventions has studied programs that targeted high-risk populations exclusively and those that served both high and low risk

youth. I will first discuss studies of exclusively high risk populations and then turn to research examining outcomes for high and low risk students in mixed intervention conditions.

*Targeted interventions for high-risk youths.*

The Adolescent Transitions Program (ATP) was one subject of Dishion et al.'s influential paper. ATP employed random assignment of high-risk youths to treatment and control conditions. Evaluation results indicated that youths assigned to the treatment condition were more likely to smoke cigarettes and commit delinquency than were controls three years post-intervention.

Dishion et al. (1999) concluded that peer interactions in the context of treatment delivery led to the observed effects. The ATP study included five conditions, two incorporated peer groups and the three others were a parent-intervention only group, a self-directed treatment group (provided materials to read at home) and a control group. Evaluation results showed negative effects only for youths assigned to receive peer group counseling. The authors speculated that reinforcement for antisocial expressions in the peer group counseling activities lead to the negative effects.

Results from a large, randomized, effectiveness trial of the Reconnecting Youth program also support the notion that grouping together high-risk youths for intervention services may lead to peer contagion effects. Reconnecting Youth targets high school students at-risk of dropping out, is delivered in a classroom setting, and relies on positive peer culture and caring instructors to motivate pro-social changes in participants. An evaluation of the program using a randomized design found only negative effects for



participants on academic and social adjustment outcomes (Cho, Hallfors, & Sanchez, 2005).

The archetypal example of an intervention concentrating highly delinquent youth together is juvenile incarceration. Institutional treatment for juvenile delinquents has raised concerns about creating social reinforcement of delinquency since the beginning of the juvenile justice system (Osgood & Bridell, 2006). Several studies of the topic found, not surprisingly, that juveniles housed together in detention centers or similar facilities exert social influence upon each other, and that this influence translates into increased criminality (Bayer, Hjalmarsson & Pozen, 2008; Gold & Osgood, 1992).

The most compelling study of peer influence on residential treatment is an experimental trial of the effects of group-based out-of-home placements for juvenile offenders (Leve & Chamberlain, 2005). Participants were 153 chronic offenders who were referred to residential placement. About half of these youths were randomly assigned to specialized foster care, where they would be the only delinquent youths living with a foster family. The other half were assigned to a group home (“treatment as usual” for youths referred to out-of-home care). Group homes housed between 2 and 52 delinquents. At 12-month follow up both boys and girls in the foster care condition had fewer re-arrests and reported fewer delinquent associates than youths in group homes. The authors investigated what processes might explain the effect of foster care. They found that the level of delinquent peer associates while in the intervention setting (either foster care or group home) completely mediated the effect of group assignment on outcomes. Although residential treatment of juvenile offenders is an extreme example of exposure to delinquent peers in an intervention setting, this study provides strong caution

about increasing the number of antisocial others in a youth's peer environment for the sake of preventing future antisocial behavior.

The above evidence implies that grouping delinquent youths together is not an effective method for reducing adolescent problem behavior. But, the literature on peer influence in intervention programs is limited, especially in comparison to the amount of research conducted on the effectiveness of prevention interventions in general.

#### *Interventions serving both high and low risk youths*

Low-risk youths are recruited into prevention programs either as a part of universal intervention strategies or in targeted interventions to serve as positive role models for high-risk students who are the actual targets of the intervention. This section will discuss research on programs which serve a mix of high and low risk students.

The second study upon which Dishion et al.'s assertions about peer contagion in group interventions is the Cambridge-Somerville Youth Study (CSYS). The CSYS was a multi-modal prevention strategy in which 10-year-old boys from lower-class, dilapidated neighborhoods were randomized to receive individualized services including academic help, family support, and referrals to community activities and local summer camps. Both boys who displayed problem behaviors prior to the intervention and those who did not were involved in the study. At 30-year follow up, boys assigned to treatment in the CSYS were more likely to have died young, been convicted of a serious crime, or been diagnosed with a serious mental illness than were controls. The most pronounced negative effects were among participants who had attended summer camps on multiple

occasions (McCord, 1978; 1992). Peers at summer camps may have given boys with a proclivity to misbehave an attentive audience to reinforce their negative behaviors.

Another prominent, early study on the effects of peer grouping in mixed prevention programs led to the conclusion that peer aggregation was only harmful for high-risk youths. The St. Louis Experiment (Feldman, 1992; Feldman, Caplinger & Wodarski, 1983) randomly assigned high-risk and low-risk youths between the ages of 7 and 15 into one of three conditions for a group treatment program. Youths in the high-risk category ( $N=263$ ) had been referred by a variety of agencies serving troubled youths. The low-risk category contained voluntary participants enrolled in the Jewish Community Centers Association ( $N=438$ ). Students were either assigned to a high-risk only group, a low-risk only group or a mixed group which contained about 10 low-risk youths and one or two high-risk youth. Youth in the high-risk only groups displayed increased antisocial conduct while high-risk youths in mixed groups reported a slight decrease in antisocial conduct. Low-risk youths in both mixed and low-risk only groups reported little change in antisocial outcomes. Results of this study led the authors to conclude that prosocial youth are not harmed by exposure to delinquent peers and antisocial youth are. Reviewing selected findings and implications from this research, Feldman (1992) wrote that antisocial youths should receive treatment in “contexts that are comprised (sic) of large numbers of prosocial peers” (p. 233).

Other researchers suggest that mixing deviant and non-deviant youth in intervention settings must be done cautiously. Meager, Milich, Harris and Howard (2005) found that deviant youths fared more poorly in mixed intervention groups than in deviant-only groups. In this study, youth who were identified by teachers as high in

externalizing behavior were randomly assigned into groups consisting of only similar students or to mixed groups with prosocial students for a social skills training class. The number of students per group ranged from 5 to 11; mixed groups contained prosocial and at-risk students in a 2:1 ratio. High-risk students showed less externalizing behavior when they participated in the class with other high-risk peers only. Although at-risk youth in both groups decreased externalizing behavior, the at-risk only condition was associated with a greater decrease. Furthermore, students in the at-risk only condition displayed more positive in-session behavior and a tendency to give and receive reinforcement for inappropriate behavior less frequently than did at-risk students in the mixed condition. The study did not report outcomes for low-risk youths. The findings that the at-risk only condition was associated with better outcomes was contrary to the authors' hypotheses. They concluded that more frequent reinforcement of inappropriate behavior in the mixed condition was responsible for the weakened effect of the intervention in that context.

An experimental evaluation of a peer group intervention in Chicago Public Schools revealed that such programs can be harmful to both high and low risk students (G. D. Gottfredson, 1987). The Peer Culture Development program involved daily classroom sessions in which an adult would help students frame open discussions of problems and prosocial students would attempt to use peer pressure to reverse countercultural attitudes held by antisocial group members. Classes consisted of a fairly balanced mix of high and low risk students, although high-risk students were in the majority. The program was designed to influence delinquency, academic outcomes, race relations and student alienation. At the end of a year-long evaluation of the program G.

D. Gottfredson (1987) found that both high- and low-risk high school students in the experimental group fared more poorly on delinquency, “waywardness,” attachment to parents and school tardiness. He concluded that programs which seek to lower student misconduct through modifying peer interactions may do better to avoid such interactions all together.

Two evaluations of universal school-based intervention programs found evidence of negative program effects which may have been attributable to peer contagion. The 21<sup>st</sup> Century Community Learning Centers program is a federally funded and the nation’s largest ASP. A rigorous evaluation of this program found evidence of iatrogenic treatment effects which may be attributable to peer contagion. Participating students were no more likely to finish their homework or feel safe after school, despite these being stated goals of the program. But, middle-school participants were more likely to have had their property damaged, more likely to report they had used or sold drugs, and less likely to rate themselves positively at working out conflicts with others (Dynarski et al., 2004). Elementary student participants were more likely to be suspended and were subject to more disciplinary actions at school than control youth (James-Burdumy, Dynarski & Deke, 2008). The authors found that negative program effects in the elementary sample were attributable to boys who began the program with elevated school discipline problems.

The Multi-Site Violence Prevention Project study (2008) stands out in this literature as one of only a few evaluations of a universal intervention which disaggregated outcomes by risk status of the participants. It was a randomized study involving 5,500 6<sup>th</sup> graders at 37 school sites testing a universal intervention. The

universal intervention used cognitive-behavioral skills training class to teach students strategies to avoid violence. Eighteen of the school sites were randomly assigned to receive the universal intervention. The evaluation examined the possibility of differential results for low-risk v. high-risk students. High-risk students were identified through pre-test aggression measures. The study revealed that low-risk students in the universal intervention schools reported more negative scores over time on several measures of attitudes and beliefs supporting aggression and self-efficacy for non-violent responses to conflict compared to students at comparison schools. In contrast, high-risk students showed improvement over time on similar measures in comparison to high-risk youths who did not receive the intervention. Students who received the universal intervention became more like each other. Low-risk students were negatively influenced by antisocial peers in the intervention, while high-risk students were positively influenced by prosocial peers.

Results from another universal intervention, Project ALERT, do not align with the Multi-Site Violence Prevention Project's (Ellickson & Bell, 1990). This study tested the effects of a social-influence model drug prevention program delivered in 20 junior high schools (10 additional schools were randomly assigned to a control condition) on alcohol, cigarette and marijuana initiation and frequency of use. Program effects were compared across groups of students categorized by base-line risk status. Risk status was defined by level of use at pretest. Students who had never used a given substance were considered low risk, those who had used it only once in the past were considered moderate risk while those who had used the substance more than once or within the past month were considered high risk. Results indicated successful prevention of substance use for

students in the low and moderate risk groups. Students in the low risk category displayed the largest program effects. High-risk students benefited the least and in the case of cigarette smoking, they increased their use of cigarettes after program participation. This study describes a generally successful prevention intervention which had an unintended negative effect on cigarette smoking for baseline smokers. In this case, only high risk students responded negatively to the curriculum.

If peer contagion effects in group interventions do negate or erode the effectiveness of prevention activities, the policy recommendation is clear: treat youths individually. Obvious practical problems with this solution relate directly to the increased funding and resources necessary to treat youths individually in a domain where financial and personnel resources are chronically scarce.

However, a recent meta-analysis on group versus individual intervention suggests that group treatment in and of itself is not less effective than individual treatment. In examining 174 studies of prevention programs for at-risk youths, Lipsey (2006) found that treatments delivered in a group setting were no more likely to result in negative effects than individual treatments. On average, both group and individual formats yielded small, yet statistically significant, positive effects. Analyses by population risk status showed that group interventions were significantly less effective for low-risk youth than individual interventions, suggesting peer contagion may have been undermining program effectiveness for low-risk but not high-risk youth. This finding was especially pronounced for treatment programs involving counseling<sup>3</sup>. Group-based programs for lower-risk youths showed effect sizes that were about one-third smaller than effect sizes for individual programs. In contrast, high-risk youths fared better in group treatments

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<sup>3</sup> The author did not provide details about how studies were coded into the “counseling” category.

than individual treatments. Additional interaction analyses for group versus individual treatment showed that counseling programs are less effective when they operated for longer duration and served youth under age 14 when delivered in a group format. A final set of analyses found reduced effect sizes for programs serving a heterogeneous population in terms of risk status, “a situation that might be conducive to negative influences on less delinquent peers by those more delinquent” (p. 183). Lipsey concluded that delinquent peer influences in group treatment are generally negligible, with one possible exception. That exception was a treatment scenario possessing the following qualities: 1) group treatment 2) for youth with limited involvement in previous delinquency, 3) involving group counseling, 4) more than 12 hours of contact time, 5) serving a heterogeneous mix of juveniles with respect to level of risk for antisocial development, 6) who are under age 14.

The exception identified by Lipsey (2006) very nearly describes the intervention currently under study. To wit, an after-school program serving high-, moderate- and low-risk young adolescents and operating several days a week for an entire school year. The ASP under study did not provide group counseling *per se*, but it did provide a drug use prevention component which employed techniques typical of group counseling such as open discussion of personal experiences with drug use or drug users and the consequences of such experiences. This ASP is similar to the 21<sup>st</sup> Century Community Learning Centers program which resulted in negative effects as described above. After-school programs such as 21<sup>st</sup> Century programs and the one studied here may be especially fertile ground for peer contagion.



Researchers studying peer contagion have conjectured that moderate propensity youth are the most at risk of negative effects due to peer contagion in intervention settings (Dishion & Dodge, 2005; Dodge, Dishion & Lansford, 2006). Although this possibility has rarely empirically tested, one study which was not an intervention evaluation found evidence supporting it. This study suggested that boys with moderate conduct problems are more strongly influenced by deviant peers than either highly disruptive or conforming boys (Vitaro, Tremblay, Kerr, Pagani, & Bukowski, 1997). This research divided 870 11- and 12-year-old boys into four groups based on teacher ratings of classroom behavior: highly disruptive, moderately disruptive, moderately conforming and highly conforming. These groups were then subdivided according to the aggressiveness of their closest friends. Friend-aggressiveness was determined by peer nomination of aggressive classmates. The study found that at age 13, controlling for delinquency at age 11-12, moderately disruptive boys with highly aggressive friends had increased their delinquency more than moderately disruptive boys with no friends, conforming friends, or moderately aggressive friends. Growth in delinquency between ages 11-12 to 13 was not related to friend aggressiveness for either highly disruptive or conforming boys. It appears that moderate propensity youth may be especially sensitive to peer influences.

In summary, both highly targeted programs serving only high-risk youth and programs which mix high and moderate or low risk students either naturalistically (universal programs) or deliberately (targeted programs for high risk youth which recruit low-risk students as part of the intervention strategy) can produce iatrogenic effects that may result from peer contagion. Students can be negatively affected regardless of pre-

existing risk status. In some cases, intervention programs may have adverse effects on youth who are not in need of services.

Previous research does not clearly indicate that one risk group is more likely to be harmed than another. Evidence shows that both high-risk and moderate- or low-risk students may be harmed by participating in interventions. Additionally, some experts on harmful effects of treatment programs suggest that moderate risk students are the most likely to be harmed, but, for the most part, previous studies have neglected to test for non-linear relationships between risk status and intervention outcomes. Of particular interest in the current study is the potential prevention interventions have to interfere with lower risk students' otherwise healthy developmental trajectory.

The present study assesses the effect of participation in a universal prevention program while examining how pre-existing risk of, or propensity for, problem behaviors effects response to delinquent peers encountered in the program. In general, pre-existing risk was measured by baseline level of the outcomes. Half of the participants were randomly assigned to an after-school program which included a drug-prevention curriculum. Although the peers whom youth encountered in the program were school-mates, the ASP provided special opportunities for delinquent influences to occur. Firstly, the ASP was less structured than the school day, and it contained more opportunities for socializing. Secondly, the ASP grouped together youths of different ages and grade levels. Sixth through eighth graders were placed in a social environment in the ASP whereas different grade levels are generally segregated during the school day. The ASP may have been one of relatively few contexts in which sixth and eighth graders interacted.

ASP participation is expected to increase association with negative peers. Negative peer influences in the program are expected to increase reinforcement for delinquency and definitions in favor of rule-breaking. The consequences of negative influences should evidence themselves as changes in definitions and increased delinquent friends who provide reinforcement for antisocial conduct. Reinforcement and definitions are expected to lead to increases in problem behavior. Pre-existing propensity for problem behavior is expected to moderate the relationship between participation in the ASP (and attendant peer interactions) and changes in reinforcement and definitions such that high-risk students are less likely to respond to the ASP negatively than moderate or low risk students. This study tests the following hypotheses:

- I. Participation in a universal ASP increases delinquent peer networks and definitions in favor of rule-breaking more so for youth at low or moderate risk for antisocial conduct than for higher-risk youth.
- II. Participation in a universal ASP increases drug use, delinquency, and aggression more so for youth at low or moderate risk for antisocial conduct than for higher-risk youth.

#### Method<sup>4</sup>

##### *Sample*

Students who participated in this study attended one of the five middle schools in the Baltimore County school district that was involved in an evaluation of an after-school program designed to incorporate research-based procedures into routine ASP practices.

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<sup>4</sup> The research design for the larger study from which the data for this dissertation were drawn is described in Gottfredson et al. (2009). The description of methods in this dissertation is drawn with minor modification from that source.

The ASP ran for three hours a day, on Tuesday, Wednesday and Thursday each week immediately following the end of the school day. The program offered leisure activities (sports, games, computer projects, arts activities, etc.), a social skills/drug prevention component and homework assistance. All students who attended the participating schools were invited to register for the program but school principals were asked to encourage youth whom they considered especially at-risk to enroll. The schools were under-performing academically relative to the rest of the county and state, served high percentages of minority youth (47 – 99% minority population) and large numbers of students who received subsidized meals (49 – 67% receiving free or reduced lunch). Hence, the student population at all five schools could be considered at elevated risk for problem behavior. See Table 1 for demographic characteristics of participating schools.

By the close of the enrollment period, 447 students had registered for the program and taken a pre-test. Random assignment was blocked by school, such that participants had a 50% chance of being assigned to the treatment group within each school. Treatment and control students did not differ in terms of demographics (age, family income, gender, race, single-parent

**Table 1. 2006-2007 Demographic Characteristics of Participating Schools**

Site	Total Enrollment	% Minority	% Subsidized Meals	% Mobility <sup>a</sup>
A	839	64.4	65.0	20.6
B	484	47.1	64.8	21.1
C	683	50.8	67.0	13.8
D	566	97.9	48.9	21.3
E	719	99.3	63.4	16.9
Total	3291	72.4	62.3	18.6

<sup>a</sup> The percentage of students withdrawing for any reason during the school year.  
Source: Gottfredson et al. (2009).

household, receipt of subsidized meals, maternal education, see Table 2), pre-treatment academic indicators (school absences, suspensions, grades, standardized test scores) and differed significantly on only 1 of 20 pre-treatment survey measures. The treatment group youth had higher scores than controls in decision making skills at pretest. One difference out of twenty tests conducted is approximately what would be expected by chance using a critical value of  $p < .05$ .

**Table 2. Demographic Characteristics of Sample – Total and by Experimental Group**

	Total N = 447		Treatment N = 224		Control N = 223	
	Mean or %	N	Mean or %	N	Mean or %	N
Age <sup>a</sup>	12.22 (.99)	447	12.30 (1.03)	224	12.15 (.94)	223
Family Income (Median)	\$32,040	403	\$32,894	204	\$32,000	199
% Male	54	447	53	224	55	223
% Black	71	447	70	224	71	223
% 6 <sup>th</sup> Grade	42	447	42	224	41	223
% 7 <sup>th</sup> Grade	34	447	30	224	37	223
% 8 <sup>th</sup> Grade	25	447	27	224	22	223
% Living With Two Parents	37	447	37	224	37	223
% Subsidized Meals	59	438	59	217	58	221
% Mother is College Graduate	13	438	14	221	12	217

<sup>a</sup>Standard deviation in parenthesis.  
Source: Gottfredson et al. (2009).

**Table 3. Demographic Characteristics of Final Sample, by Site, N = 416**

School	% Eligible Registered	% Male	% Minority	% Subsidized Meals
A	8.5	50.8	76.9	64.8
B	20.9	45.3	67.4	58.4
C	10.5	46.4	65.2	65.3
D	21.2	58.6	98.2	48.3
E	11.5	61.8	100.0	56.6
Total	13.6	52.9	82.7	58.0

As shown on Table 3, demand for the program wasn't particularly high; less than 14% of eligible students enrolled. By comparing the characteristics of youths who participated in the study (Table 2) with the characteristics of their schools' populations (Table 1), we see that participating students appeared to be fairly representative of the general school population, but low-SES students were somewhat under-represented and minority students were somewhat over-represented in the study population.

Students who resemble each other demographically may diverge significantly on risk factors for problem behavior. I compared students in the current sample to the rest of their school populations on three risk factors for which data are available for the entire school population. Table 4 shows students who volunteered for the ASP compared to their general school populations in terms of suspensions, school attendance and standardized test performance in reading (as measured by the percent of students who scored in the "basic" skill level for reading, the lowest of three categories).

**Table 4. Suspensions, Attendance, and Reading Level, ASP Sample and School**

Site	Suspensions per Student <sup>a</sup>		Attendance Rate		% Basic Reading Proficiency	
	ASP	School	ASP	School	ASP	School
A	.54	.57	95.0	94.6	25.0	26.1
B	.75	.82	95.4	93.9	43.8	27.8
C	.48	.45	95.5	94.1	33.3	33.6
D	.27	.34	94.1	93.8	36.5	41.7
E	.69	.64	94.6	94.0	41.0	39.6
Total	.54	.56	94.9	94.1	44.5	40.7

<sup>a</sup>Number of suspensions divided by number of students, includes both in school and out of school suspensions.

Although we have no direct measures of drug use or violence among students who did not enroll in ASP, Table 4 shows that ASP volunteers were fairly representative

of their schoolmates on suspension, attendance and academic failure risk factors. Across schools, ASP volunteers were slightly less likely to be suspended or be absent from school, but they varied in terms of standardized test scores in reading. ASP participants were roughly equivalent to their schoolmates in reading test score at Sites A, C and E, while they were more likely to have low scores at Site B and less likely at Site D.

However, students in the current sample were less likely to use drugs or alcohol than students nationwide. While 17% of 8<sup>th</sup> graders in the current sample reported ever having used an illegal drug, 21% of 8<sup>th</sup> graders in the nationally-representative Monitoring the Future sample reported illegal drug use. And while only 27% of the 8<sup>th</sup> graders in this sample reported ever having used alcohol; 41% of US 8<sup>th</sup> graders had used alcohol. My sample were also less likely to steal (11% of the current sample reported theft of items valued at less than \$50; 25% of the national sample reported doing so), vandalize school property (10% v. 15%) or be involved in gang fights (12% v. 23%) (National Institute on Drug Abuse, 2006). It is not clear whether these differences reflect deviations from the national averages for the schools that participated in the study or for the students who volunteered for the ASP. I cannot rule out the possibility that youth who volunteered to participate in the school-based ASP were less likely to use drugs or engage in delinquency than those who declined to enroll. Recall that only 14% of eligible students enrolled in the program.

At the end of the school year, 416 (93%; 211 treatment and 205 control students) registered students adequately completed a post-test survey. These students compose the sample for the current study. The 31 students (13 treatment and 18 control) who were excluded from outcome analysis due to missing post-test data either refused to take the

post-test (N=10), had transferred out of Maryland schools (N=10), or left more than 40% of the survey items blank (N=11) . About half of the included sample were males (53%), 71% were African Americans, 17% were Caucasian, 8% were multi-racial and the remaining 4% were of another ethnicity. The average age of participants was 12.2 and 58% received subsidized meals at school. Demographic characteristics of the included sample are shown on Table 3.

### *Attrition*

The 31 registered youths who were excluded from the study did not generally differ from those who were included demographically or on a range of pre-treatment measures. Attrition analysis revealed that exceptions were age, attitudes favorable to drug use and days spent with adults after school. The excluded cases scored in the more at-risk direction on these measures. Two of thirty-seven treatment by attrition interactions (reported in D. C. Gottfredson et al., 2009) showed evidence of differential attrition ( $p < .05$ ) by treatment status which could bias the study results both on measures of academic achievement. These analyses suggested that higher achievers were more likely to be lost from the treatment than the control group. None of the measures used in this study show evidence of bias due to differential attrition.

### *Measures*

#### *Outcomes*

Outcome measures used in this report were collected from pre-post youth self-report surveys. Participants completed the pretest survey shortly following registration



and the post-test near the close of the school year. These surveys consisted of 167 items measuring a variety of outcomes targeted by the ASP. Outcomes of interest in this research are proximal and distal outcomes that social learning theory predicts will result from exposure to delinquent peers. Participation in the after school program is expected to increase exposure to negative peer influences. Negative peer influences should increase reinforcement of delinquent actions and definitions favorable to delinquent behavior. These changes in reinforcement and definitions for rule-breaking could then lead to manifest antisocial behaviors such as drug use, delinquency and aggression.

These constructs are measured by seven multi-item scales. All scales have less than 2% data missing and alpha-reliabilities ranging from .75 - .82. See Table 5 for descriptive information of the outcome measures used in this study and Appendix Table B for full scale content.

*Definitions in favor of rule-breaking.* The normative beliefs and commitment to abstain from drug use scales are included as measures definitions favorable to delinquent behavior. Normative beliefs combines items from Hansen's normative beliefs about violence scale (Tanglewood Research, 2008b) and the *What About You* survey (G. D. Gottfredson & D. C. Gottfredson, 1992). This scale assesses beliefs that illegal, violent, and risky behaviors are common and acceptable in the peer group (e.g., most people my age stay away from getting into fights, how wrong is it for someone your age to use marijuana?). This scale contained items with inconsistent answer choice formats. Some items were recoded into dichotomies. For these, recodes were based on natural cut-points in the distribution of responses. For example, with an item with 4 answer choices, if 70% of respondents selected answer choice 1 and 10% selected each of the remaining three

answer choices, the recode would distinguish between answer choice 1 and 2-4. High scores indicated beliefs that antisocial behavior was normative. After all items were dichotomized, the scale was constructed by averaging the dichotomized items it contained.

Commitment to abstain from drug use includes items from the attitudes unfavorable to drug use and commitment scales (G. D. Gottfredson & D. C. Gottfredson, 1992). The commitment scale assesses personal decisions to abstain from drugs (e.g., I will never smoke cigarettes; with response options of true or false). It was constructed by averaging the items it contained. High scores indicated a lack of commitment to abstain. Normative beliefs and commitment to abstain from drug use scales were averaged and combined to form one scale.

*Aggression and Delinquency.* Delinquency is a seven-item scale that measures the number of different delinquent acts in which youth have engaged in the past year (e.g., stealing things worth less than \$50, carrying a weapon to school; G. D. Gottfredson & D. C. Gottfredson, 1992).<sup>5</sup> It was constructed as a count of the number of affirmative responses. The aggression scale measures quasi-violent and violent acts perpetrated during the last 30 days (e.g., How often did you tease someone your age?, How often did you threaten to hurt or hit someone?) (Tanglewood Research, 2006). Answer choices ranged from “Not at all” to “Every day”. The scale was constructed by averaging the items it contained.

Aggression and delinquency scales were highly correlated ( $r = .41$ ). To achieve a more normally distributed outcome variable for analysis, these variables were combined

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<sup>5</sup> The reference period for these items was “last 12 months” at pre-test and “past academic school year” at post test.

after recoding the aggression variables into dichotomies in the same manner that normative beliefs items were recoded.

*Substance use initiation.* The lifetime substance use scale (G. D. Gottfredson & D. C. Gottfredson, 1992) measures initiation of cigarette, alcohol, marijuana, inhalant or other illegal drug use (e.g. Have you ever smoked marijuana?). The scale was coded "1" if the respondent reported having ever used more substances at post test than at pretest. In effect, this variable assesses expanding variety of substance use. If a student reports having ever used more substances at pre-test than at post-test, he or she is scored "1" on the initiation variable. For example a student who reported having used alcohol at pre-test and alcohol and marijuana at post-test, was scored "1" on the initiation variable. A student who reported only alcohol use at pre-test and only alcohol use at post-test, was scored "0". I analyze it using the entire sample and separately selecting only those cases who reported no substance use at pre-test. The latter method captures *substance use debut* during the study period.

*Peer influence.* Peer deviance was measured in two ways. First, peer influence was measured with the negative peer influence scale which draws items from the *What About You* survey (G. D. Gottfredson & D. C. Gottfredson, 1992) and the *Best Friend Influence* questionnaire (Poulin, 2003). It measures the extent to which a youth's friends model and encourage positive and negative behaviors (My best friend is interested in school, In the past three months how many of your friends would you say have used marijuana?). This scale contained items with inconsistent answer choice formats. It was constructed using the same procedure as normative beliefs.

We also use social network data collected on the youth survey to demonstrate whether students were acquiring new delinquent friends. The survey directed youth to answer the same five questions about each of their five closest friends. One question of interest to this study within this set asked whether the friend got in trouble at school (yes/no). These questions are used to calculate *increasing delinquent friends*. It was scored “1” if a student reported more of their friends got in trouble at school at post test than at pretest and “0” otherwise.

The aggression and delinquency variable is still more skewed than ideal. Responses are concentrated on the low end of the scale. Log transformations of this variable will be tested to check for discrepancies in results for the logged and unlogged version of this outcome.

Correlations among the variables to be used in the analysis are shown on Table 6. While negative peer influence shares a large amount of variability with both definitions and aggression and delinquency, I did not combine it with another variable because it is a theoretically distinct construct and wanted to be able to draw conclusions about negative peer influence independent of other outcomes.

**Table 5. Scale Descriptives**

	N Items	Range	Pre-Test						Post Test					
			Mean	SD	N	Skew- ness	Kurt- osis	$\alpha$	Mean	SD	N	Skew- ness	Kurt- osis	$\alpha$
Definitions in Favor of Rule-Breaking	17	0 – 1	.30	.21	416	.63	-.40	.78	.39	.23	416	.25	.91	.90
Aggression and Delinquency	13	0 – 1	.19	.20	416	1.31	1.75	.78	.30	.23	415	.65	-.17	.82
Substance Use Debut	5	0 – 1	-	-	-	-	-	-	.21	.41	333	1.41	-.02	-
Substance use Initiation	5	0 – 1	-	-	-	-	-	-	.25	.43	416	1.19	-.59	-
Increase in Delinquent Friends	5	0 – 1	-	-	-	-	-	-	.36	.48	416	.58	1.67	-
Negative Peer Influence	12	0 – 1	.16	.19	413	1.59	2.86	.75	.21	.22	415	1.19	.83	.77

**Table 6. Correlations Dependent Variables, Time 2, N=416**

	Definitions	Aggression and Delinquency	Substance Us Initiation	Increased Delinquent Friends
Definitions	1.00			
Aggression and Delinquency	0.53*	1.00		
Substance Use Initiation	0.37*	0.36*	1.00	
Increased Delinquent Friends	0.16*	0.11*	0.10	1.00
Negative Peer Influence	0.49*	0.44*	0.27*	0.19*

\*  $p < .05$

### *Independent variables*

*Pre-test risk.* I hypothesize that base-line tendency for antisocial beliefs and behaviors interacts with exposure to peers in the ASP. Pre-test risk for each dependant variable is operationalized as an individual’s pretest score, or pre-existing level of the outcome of interest. So, pre-test risk for negative peer influence is measured by a student’s pre-test score for negative peer influence, while pre-test risk for aggression and delinquency is measured by the student’s pre-test score on aggression and delinquency, etc.

Number of pretest delinquent friends is used to measure likelihood of making delinquent friends. For analyses of substance use initiation for the entire sample, I used the extent of involvement with substances at pretest. The pre-test score for this variable was operationalized as a trichotomy valued at “0” if the student had no pretest substance use, “1” if the student reported only alcohol *or* cigarette use and “2” if the student reported any illegal drug use or alcohol *and* cigarettes.

When analyzing this variable as substance use debut, only for cases where pre-test substance use was zero, a different pre-test measure had to be used. To find a measure of likelihood that a student would begin using substances I looked at substance use debut’s

relationships with other outcomes. I created two composite measures for negative behaviors by averaging the z-scores of component scales. The first combined behavioral indicators of anti-social propensity: impulsivity, delinquency, aggression, and disruptive classroom behavior. The second included attitudes about antisocial conduct and included belief in conventional rules, commitment to education and attitudes unfavorable to drug use. The behavioral propensity measure was more highly correlated with substance use debut ( $r = .20$ ) than the attitudinal propensity measure ( $r = -.17$ ). Therefore, in the analysis of substance use debut, I used the behavior propensity composite to measure pre-test risk for initiating substance use.

*Program participation.* I measure program participation in two ways. Firstly, I define participation as assignment to the treatment group. Secondly, I capture actual exposure to the program using days of attendance. Student attendance was highly variable within the treatment group. About a third of participants attended less than 15 days of the program while another third attended 50 days or more. Five control students attended more frequently than the eight times they were scheduled to. In fact, one control student attended almost every day the program was open.

### *Control variables*

The larger evaluation from which this study is drawn was a randomized, controlled experiment, obviating the need for multivariate statistical models including controls for pre-existing differences between groups when assessing outcomes of the treatment. The report on the larger experimental study has been completed. Results showed no differences between experimental groups on any outcome other than time

expenditure. All models in the current analysis include dummies for school site to account for clustering by school.<sup>6</sup> Models testing the hypothesis under the days of attendance definition of participation do not compare groups to which students were assigned randomly and so I sought to control for characteristics that distinguished high-attending students from low-attending students. I control for measured characteristics that are related to both the participation variable and the dependent variable in models where days of attendance is the measure of program participation. The only variable measured in this study that was correlated with program attendance was school absences.<sup>7</sup> Students who were frequently absent from school during the previous school year also attended the program less.

### *Analysis Strategy*

In order to test the hypothesis that participation in an ASP increases training for deviancy and antisocial outcomes moreso for youth at low or moderate risk than for higher-risk youth, I first examined the form of the association between the pre-test measures and each outcome. If pre-test risk is not linearly related to each outcome, it would be important to recode those measures to reflect this non-linearity. In the first

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<sup>6</sup> An analysis conducted as part of the larger project from which these data are drawn found that very little of the variance in the time 1 measures was between schools. Intraclass correlations ranged from .000 to .023 and for the most part did not reach nominal levels of statistical significance (Gottfredson et al., 2009). Nevertheless, dummy variables for school were included in all analyses as a precaution.

<sup>7</sup> Typically, students who attend ASPs more frequently are less delinquent than those who drop out or attend infrequently (Weisman & Gottfredson, 2002) and so it is striking that lower-risk youth in this sample showed no tendency to attend more often than high-risk students. A unique circumstance affected program attendance in this ASP. The reason for the non-association between attendance and pre-existing risk is likely related to program content advertised during recruitment. Before the program began, students were told that the ASP would offer one-on-one tutoring but implementation difficulties prevented the tutoring program from getting off the ground. Interviews with participants who dropped out indicated that some did so because the tutoring was not offered. High-risk students who typically drop out of ASPs and low-risk students who were disappointed when tutoring wasn't provided may have dropped out of this program in equal proportions, leaving no discernable pattern of program attrition.



phase, I tested for non-linearities in the relationships between pre-test score and outcomes using the following formula:

$$(1) y_i = \alpha + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \beta_4 X_{i4} + \beta_5 X_{i5} + \beta_6 X_{i6} + \varepsilon_i$$

Where:

For each student ( $i$ ),  $X_1$  through  $X_4$  are dummies indicating school membership,  $X_5$  is the grand-mean centered pre-test score on the outcome, and  $X_6$  is the square of the centered pre-test score.

All analyses use OLS regressions for continuous variables (aggression and delinquency, definitions in favor of rule-breaking, and positive peer influence) and logistic regression for the substance use initiation and increasing delinquent friends.<sup>8</sup>

Significant squared terms indicate a non-linear relationship between pre-test score and the outcome. Squared terms are maintained in the next phase if they are significantly related to the outcome. If not, they are dropped and only the linear association between pre-test score and each outcome is examined in the second stage of the research.

In the second phase, I test for interactions between pre-test score and participation in the ASP. Models which define participation as assignment to the intervention group and as days of attendance in the intervention are run separately where a covariate for school absence is included in models testing days of attendance. These models follow this formula if the squared pre-test score term is not significant in phase one:

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<sup>8</sup> Previous analysis indicated that program effects did not differ across schools (Gottfredson et al., 2009)..

$$(2) y_i = \alpha + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \beta_4 X_{i4} + \beta_5 X_{i5} + \beta_6 X_{i6} + \beta_7 X_{i7} + \varepsilon_i$$

Where:

For each student ( $i$ ),  $X_1$  through  $X_4$  are dummies indicating school membership,  $X_5$  is the grand-mean centered pre-test score on the outcome,  $X_6$  is the measure of ASP participation (grand-mean centered when days of participation) and  $X_7$  is the cross-product of centered participation and pre-test score.

The models follow this formula if the squared term is significant in phase one:

$$(3) y_i = \alpha + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \beta_4 X_{i4} + \beta_5 X_{i5} + \beta_6 X_{i6} + \beta_7 X_{i7} + \beta_8 X_{i8} + \beta_9 X_{i9} + \varepsilon_i$$

Where:

For each student ( $i$ ),  $X_1$  through  $X_4$  are dummies indicating school membership,  $X_5$  is the grand-mean centered pre-test score on the outcome, and  $X_6$  is the measure of ASP participation (grand-mean centered when days of participation),  $X_7$  is the square of the pre-test score,  $X_8$  is the cross-product of centered participation and pre-test score and  $X_9$  is the cross product of the square of the centered pre-test score and participation.

Continuous independent variables (pre-test scores for aggression and delinquency, definitions in favor of rule-breaking and negative peer influence as well as days present at the ASP) were centered around their grand means before the interaction terms were computed. In these equations, the grand-mean centered components of the interaction term are used in the regression testing the significance of the interaction. This analysis determines whether pre-test score interacts with ASP participation to create different outcomes of participation for youth of differing pre-test risk.

## Results

### *Opportunities for Deviancy Training*

Before testing my hypotheses, I examined the sample to assess the overall risk status of the students in the ASP. An earlier analysis, covered in the Methods section of this paper, illustrated that youth who signed up for the ASP were less likely to use drugs or engage in delinquency than a national sample of same-aged youths. It is not clear whether they were also slightly more conforming than their classmates who declined to enroll in the ASP. The more delinquent youth in the program, the more opportunities I'd expect for deviancy training. I wanted to assess the extent to which delinquent youth attended the program.

The population currently under study was relatively low-risk both at face value and in comparison to a national sample, but not homogeneously so. Several students did report considerable drug use and delinquency. A majority of students (67%) in the current sample reported no delinquency or drug use at pre-test.

To describe the extent to which students attending the after school programs were exposed to delinquent influences, I identified experienced delinquents who attended the programs frequently. I defined "experienced delinquent" and "frequent participant" based on natural cut-points in the data and included control group students in the analysis because several of these students attended regularly. I sought to show both how many highly delinquent students volunteered for the program and how many attended the programs frequently. "Frequent participation" was defined as attending the mean number of days (19 days) or more. This mean was calculated over the entire population of

students who enrolled. “Experienced delinquent” was defined as falling within the top tenth of the distribution for this variable.

Overall, two-thirds of students engaged in no delinquent or substance behaviors, 15% engaged in one of the 12 acts (these consisted of 5 substance use and 7 otherwise illegal behaviors, e.g. vandalism, theft, fighting), 8% engaged in 2, and the remaining 11%, who engaged in 3 or more delinquent acts, constitute the “experienced delinquent” category ( $n=51$ ; 26 in the treatment group and 25 in the control group).<sup>9</sup> Compared to their counterparts, youths in the highly delinquent category were also significantly more likely to have been suspended from school ( $d = .36, p < .05$ ), have lower overall GPA ( $d = -.41, p < .01$ ) and were considered less socially competent by their teachers ( $d = -.36, p < .05$ ). Only 11 of these youth attended the program frequently. Two highly delinquent, frequent participators attended sites A and E, three attended sites B, and D and one attended site C. Table 7 shows the distribution of frequent attenders, experienced delinquents and students who fall into both categories by school. At each site, at least one student was a likely source of negative peer influences.

**Table 7. Experienced Delinquents and Frequent Participators by School and Overall.<sup>a</sup>**

School	# Enrolled	Experienced Delinquents	Frequent Participators	Frequently Participating Experienced Delinquents
A	71	3	19	2
B	101	12	40	3
C	72	9	21	1
D	120	16	39	3
E	83	11	26	2
Total	447	51	145	11

<sup>a</sup>Includes control group students and those who did not provide post-test data.

<sup>9</sup> Numbers do not sum to 100 due to rounding.

*Linearity of Relationships between Pre-Test Score and Outcomes*

Next, I tested for non-linearities in the relationships between pre-test score and outcomes. Results are displayed on Table 8. These analyses showed no evidence that pre-test score had a curvilinear relationship with aggression and delinquency<sup>10</sup>, definitions in favor of rule-breaking, negative peer influence or increasing delinquent friends. A curvilinear relationship between pre-test score and substance use initiation was apparent, however.<sup>11</sup> The distribution of substance initiation across pre-test category is displayed on Table 9. Moderate propensity youth were more likely to initiate a substance (43% did so) than either high (33%) or low risk students (21%). Additional analyses showed that moderate risk students were most likely to initiate alcohol (33%) or inhalants (26%), high risk youth were most likely to initiate marijuana (21%) or cigarettes (30%) and low risk youth were most likely to initiate alcohol (15%). Squared terms are maintained in the next phase for substance initiation and dropped otherwise.

**Table 8. Regression Models Testing Non-Linear Pre-Test -Outcome Relationships, B Coefficients, N = 416.**

Variable	Aggression and Delinquency	Definitions	Negative Peer Influence	Substance Initiation	Increase Delinquent Friends
School 1	0.021	0.035	0.044	0.192	0.477
School 2	-0.016	0.067*	0.083**	0.510	1.141**
School 3	-0.035	0.008*	0.064*	0.179	0.880**
School 4	-0.038	-0.010	0.007	-0.245	0.495
Pre-test Score	0.675**	0.533*	0.680**	1.838**	0.003*
Pre-Test Squared	-0.113	-0.046	-0.215	-0.784*	-0.105

\* p < .05, \*\* p < .01

<sup>10</sup> All analyses of delinquency and aggression were repeated using a log-transformed dependent variable. Results did not differ substantially.

<sup>11</sup> Results for substance use initiation in analyses including only those youth who had not initiated substance use at pretest (substance use debut) were not substantially different than in analyses including all cases. Only results from analyses which include all cases are presented.

**Table 9. Substance Initiation by Pre-Test Propensity**

Propensity	% Initiating a Substance	% Initiating Cigarettes	% Initiating Alcohol	% Initiating Marijuana	% Initiating Inhalants	% Initiating Other
Low (N = 330)	21	5	15	3	7	1
Moderate (N = 37)	43	14	33	15	26	11
High (N = 49)	33	30	6	21	16	11

*Interactions between pre-test score and ASP Participation*

Results from phase two analysis are displayed on Tables 10 – 14. Results are presented for models which tested treatment status as the measure of program participation and those that tested days of attendance as the measure of participation. Each model was tested in two stages. First, without interaction terms (Model 1) and then with them (Model 2). Only one participation and pre-test interaction is significant at  $p < .05$ . Negative peer influence appears to respond differently to days of attendance in the

**Table 10. Regressions of Increasing Delinquent Friends on Program Participation, N=416**

Variable	Model 1				Model 2			
	Treatment	SE	Days Present	SE	Treatment	SE	Days Present	SE
School Absences	-	-	-	0.016	-	-	1.001	0.001
School 1	1.667	0.333	1.001	0.355	1.669	0.334	1.782	0.578
School 2	3.170**	0.335	1.786**	0.351	3.124**	0.335	3.003**	1.099
School 3	2.288**	0.311	3.015**	0.322	2.282**	0.311	2.132*	0.757
School 4	1.737	0.344	2.144	0.353	1.747	0.345	1.622	0.483
Pre-Test Score	0.690**	0.095	1.624**	0.098	0.736*	0.134	0.719**	0.330
Participation	0.978	0.212	0.695	0.004	1.060	0.246	0.996	0.004
Pre-Test * Participation	-	-	-	-	0.883	0.192	0.998	0.002
	-2 Log Likelihood = 512.63		-2 Log Likelihood = 475.27		-2 Log Likelihood = 512.21		-2 Log Likelihood = 475.05	

Note: Odds ratios from logistic regression displayed, days of participation centered on its grand mean.

†  $p < .10$ ; \*  $p < .05$ , \*\*  $p < .01$

**Table 11. Regression of Negative Peers on Program Participation, N=416**

Variable	Model 1				Model 2			
	Treatment	SE	Days Present	SE	Treatment	SE	Days Present	SE
School Absences	-	-	0.000	0.002	-	-	0.000	0.001
School 1	0.166	0.021	0.047	0.031	0.051 <sup>†</sup>	0.029	0.047	0.031
School 2	0.015**	0.029	0.095**	0.031	0.092**	0.029	0.101**	0.031
School 3	0.033*	0.027	0.073**	0.028	0.073**	0.027	0.076**	0.028
School 4	0.036	0.030	0.016	0.031	0.012	0.030	0.014	0.031
Pre-Test Score	0.554**	0.051	0.592**	0.055	0.458**	0.069	0.595**	0.054
Participation	0.016	0.019	0.029	0.036	0.017	0.019	0.036	0.036
Pre-Test * Participation	-	-	-	-	0.201*	0.101	0.006**	0.002
	R <sup>2</sup> = .255		R <sup>2</sup> = .276		R <sup>2</sup> = .262		R <sup>2</sup> = .292	

Note: Odds ratios from logistic regression displayed, days of participation centered on its grand mean.

<sup>†</sup> p < .10; \* p < .05, \*\* p < .01

program depending on individuals' baseline level of negative peers (Table 11). Pre-test interacts significantly with participation as defined as either assignment to the treatment group or days of attendance. Program participation and pre-existing risk do not interact to produce systematic changes in the dependent variables I studied.

**Table 12. Regression of Definitions in Favor of Rule-Breaking on Program Participation, N=416**

Variable	Model 1				Model 2			
	Treatment	SE	Days Present <sup>a</sup>	SE	Treatment	SE	Days Present <sup>a</sup>	SE
School Absences	-	-	-	0.002	-	-	-0.001	0.002
School 1	0.035	0.031	0.025	0.034	0.038	0.031	0.027	0.034
School 2	0.067*	0.032	0.073*	0.034	0.068*	0.032	0.075*	0.034
School 3	0.010	0.029	0.004	0.030	0.012	0.029	0.005	0.030
School 4	-0.016	0.033	-0.014	0.034	-0.017	0.033	-0.017	0.034
Pre-Test Score	0.476**	0.048	0.476**	0.050	0.437**	0.070	0.474**	0.050
Participation	0.014	0.020	0.086*	0.039	0.014	0.020	0.088*	0.039
Pre-Test * Participation	-	-	-	-	-0.075	0.097	-0.002	0.002
	R <sup>2</sup> = .209		R <sup>2</sup> = .216		R <sup>2</sup> = .210		R <sup>2</sup> = .219	

Note: Unstandardized b coefficients from OLS regression displayed, pre-test score and days of participation centered on their grand means.

<sup>a</sup>Coefficient for days present x 100,

<sup>†</sup> p < .10; \* p < .05, \*\* p < .01

**Table 13. Regression of Aggression and Delinquency on Program Participation, N=416**

Variable	Model 1				Model 2			
	Treatment	SE	Days Present <sup>a</sup>	SE	Treatment	SE	Days Present <sup>a</sup>	SE
School Absences	-	-	0.003 <sup>†</sup>	0.002	-	-	0.003 <sup>†</sup>	0.002
School 1	0.027	0.030	0.007	0.032	0.029	0.029	0.007	0.032
School 2	-0.012	0.031	-0.001	0.032	-0.011	0.029	-0.001	0.032
School 3	-0.033	0.028	-0.029	0.029	-0.030	0.027	-0.028	0.029
School 4	-0.038	0.031	-0.035	0.032	-0.037	0.030	-0.035	0.032
Pre-Test Score	0.600**	0.050	0.610**	0.051	0.566**	0.069	0.611**	0.051
Participation	0.001	0.020	0.030	0.037	0.001	0.019	0.031	0.037
Pre-Test * Participation	-	-	-	-	0.067	0.101	0.001	0.002
	R <sup>2</sup> = .279		R <sup>2</sup> = .306		R <sup>2</sup> = .280		R <sup>2</sup> = .306	

Note: Unstandardized b coefficients from OLS regression displayed, pre-test score and days of participation centered on their grand means.

<sup>a</sup>Coefficient for days present x 100,

<sup>†</sup> p < .10; \* p < .05, \*\* p < .01

**Table 14. Regressions of Substance Use Initiation on Program Participation, N=416**

Variable	Model 1				Model 2			
	Treatment	SE	Days Present	SE	Treatment	SE	Days Present	SE
School Absences	-	-	1.037*	0.017	-	-	1.039*	0.017
School 1	1.209	0.352	1.188	0.375	1.220	0.354	1.206	0.379
School 2	1.573	0.347	1.432	0.367	1.571	0.350	1.429	0.371
School 3	1.168	0.330	0.928	0.346	1.177	0.332	0.943	0.349
School 4	0.794	0.395	0.719	0.404	0.775	0.398	0.711	0.410
Previous Use Category	1.457*	0.157	1.499*	0.162	7.338*	0.980	7.346**	0.762
Participation	1.055	0.231	1.004	0.004	1.118	0.271	1.006	0.005
Pre-Test * Participation	-	-	-	-	0.717	1.438	0.968	0.031
Pre-Test <sup>2</sup>	-	-	-	-	0.429	0.518	0.429*	0.396
Pre-Test <sup>2</sup> * Participation	-	-	-	-	1.158	0.752	1.016	0.016
	-2 Log Likelihood = 454.25		-2 Log Likelihood = 413.06		-2 Log Likelihood = 449.96		-2 Log Likelihood = 475.05	

Note: Odds ratios from logistic regression displayed, days of participation centered on its grand mean.

<sup>†</sup> p < .10; \* p < .05, \*\* p < .01



Although, participation does not interact with pre-test risk. baseline propensity predicts outcomes for all variables, school site is inconsistently related to outcomes and days absent does not contribute to explained variance in the outcomes. Analysis also indicates that increased attendance was associated with a marginally significant increase in definitions in favor of rule-breaking. Regardless of risk status, students who attended the program more showed a tendency to increase antisocial beliefs more than students who attended less. This finding is in conflict with multiple previous analyses conducted on this dataset (Gottfredson et al., 2009; Cross et al., 2009), which have found that program participation had no effect on the outcomes measured other than unsupervised time with peers. The scale construction of the conventional beliefs variable is unique to this study, however. This finding is not a robust one as it is specific to a particular configuration of a variable measuring antisocial beliefs. I do not discuss it further.

Table 15 shows descriptive statistics of change in negative peers for categories of pre-test risk and attendance. Students who began the program more at risk for negative outcomes, that is, they had a more antisocial peer group, increased more in antisocial peers if they attended the program more. However, students who had lower levels of negative peers at baseline were not any more or less likely to increase in negative peer influences if they participated in the program more often. This finding is counter to the study's hypothesis. High risk students evidenced more negative effects from program participation than low or moderate risk students.

**Table 15. Change in Negative Peer Influence by Program Attendance and Propensity**

	Negative Peers T1	Negative Peers T2	$\Delta$
Low propensity			
Lower attendance (N=170)	0.04	0.14	0.10
Higher attendance (N=57)	0.02	0.12	0.10
High propensity			
Lower attendance (N=140)	0.32	0.30	-0.02
Higher attendance (N=46)	0.31	0.34	0.03

### Conclusion and Discussion

This study sought to test whether youth with moderate or low propensity for problem behavior may be at increased risk for harmful outcomes as a result of attending prevention programs where they are exposed to negative peers. Previous research on this topic has found that group-based prevention interventions for exclusively high-risk youth can leave students worse off than comparison students who did not receive the intervention. Because interventions that group youth at high risk for negative adult outcomes have been associated with increased problem behaviors, interventions are now commonly delivered to both high-risk and low or moderate risk students at once. However, some past research has found that low- and moderate-risk students may be vulnerable to negative outcomes when they attend programs with high-risk youth. Experts on the topic of harmful intervention outcomes have conjectured that moderate propensity youth might in fact be the most likely to suffer unintended negative consequences of participating in prevention interventions, but this possibility has not been thoroughly tested. Predictions drawn from social learning theory anticipated that low and moderate-risk students may be harmed more than high-risk students because they are likely naive to the delinquent behaviors and attitudes modeled and reinforced by

negative peers at the ASP and therefore more likely to consider adopting these new behaviors and attitudes. Disruptive and delinquent youth, by contrast, have previously considered adopting antisocial behaviors and attitudes and decided in the affirmative.

I hypothesized that participation in a universal ASP would increase delinquent peer networks and definitions in favor of rule-breaking moreso for youth at low or moderate risk for antisocial conduct than for higher-risk youth, and that ASP participation would increase drug use, delinquency, and aggression moreso for youth at low or moderate risk for antisocial conduct than for higher-risk youth. I analyzed data in two phases. First, I tested for non-linear relationships between pre-existing risk and outcomes. In general, these analyses indicated that propensity had a linear relationship with outcomes. However, moderate-propensity youth were more likely than low or high propensity youth to initiate substance use. The second phase tested the effect of interactions between pre-test score and program participation on outcomes. These analyses indicated no interactions in the predicted direction (worse outcomes for lower risk students), hence no support for either of my hypotheses. The interaction of ASP participation and pre-test score were significant in the direction opposite of that predicted for negative peer influence. High-risk youth gained more in negative peers if they participated in the program than lower risk youth.

The finding that, regardless of program participation, moderate-propensity youth are more likely to initiate new substances than either high or low propensity youth, but not more or less likely to increase in any other outcome, suggests we may have measured these youths in the process of deciding whether or not to become involved with substances. Students who had tried smoking or drinking were more likely to continue to

expand the variety of substances they had used during the study period than students who had never tried substances or students who had already used multiple substances or illegal drugs.

Participation in the prevention intervention currently under study did not show any tendency to harm lower risk youth. But I did find evidence that participation led to a small increase in negative peer associations among students who began the program with a more negative peer group. However, the increase in negative peers was not accompanied by increases in negative behaviors. Students from all risk categories in this study did not show a statistically reliable tendency to respond to ASP participation with increased, aggression, delinquency or drug use.

Given the small number of delinquent youths present per site, was it logical to expect peer contagion effects to emerge among the low - and moderate – propensity participants in the first place? I believe it was for several reasons. First, previous research has found that low-risk youth increase in negative behaviors when treated in interventions with high-risk peers (Gottfredson, 1987; Multisite Violence Prevention Project, 2008). Second, data from another section of the larger project from which this study draws data, showed that reinforcement for misbehavior was rampant at the ASP sites (Rorie et al., 2009). Third, the drug use and violence prevention curriculum delivered in this ASP gave delinquent students an unintended and potent means to broadcast their antisocial points of view to their peers.

The drug use and violence prevention curriculum was delivered in a classroom style format for 45 minutes twice a week at each site. This activity, the All Stars Prevention Program, created a stage on which even one delinquent student could make

big impressions on his or her classmates. I observed the ASPs on many occasions to collect data on implementation fidelity. Discussion of personal experiences with or impressions of drug use and drug users were common during All Stars. My understanding was that these discussions were intended to give the instructor an opportunity to correct students' misperceptions about substance use, allow students to express their feelings, thus creating bonds among youth and instructors, and highlight examples of real people who have suffered due to consequences of substance abuse. However, the conversations could drift away from the serious topics planned and into light and humorous discussions about celebrities who have received negative publicity for episodes involving intoxication or sad and personal stories about family members with addictions during which other students and the instructor would sympathize with the story-teller and focus on them. An analysis of data related to deviant talk during the ASP found that deviant talk was more common in All Stars than in other activities and that instructors were more likely to reward students for deviant comments during All Stars than in other activities (Gottfredson et al., in press).

Youth who appeared to be the most antisocial and troubled were often instigators of joking about drug use in the All Stars classes. Other participants seemed eager to relax and have fun and would quickly follow the lead of a bolder youth who was willing to make inappropriate comments during All Stars, especially knowing that instructors' reactions were likely to be tempered by the supportive emotional climate fostered by All Stars.

A particularly poignant example of how one delinquent student can exert a forceful influence on others was in a situation in which the instructor was delivering a

lesson intended to instill the belief that using drugs can prohibit a person from achieving life goals and having a happy life. One student began to contradict the instructor's statements, saying that it was not true that you could not have a happy life if you use drugs. This student had many friends and was well-liked by his peers. The teacher responded with very mild, conciliatory requests that the student not come to that conclusion too quickly and that drug use has hidden effects. After arguing with the teacher further, the student stood up and began walking out of the room and loudly said that his father uses drugs and he is just fine and none of the bad things the teacher was describing had happened to his father and that this class "sucks" or "is stupid" or something to that effect. After the student left, the teacher seemed concerned and upset and the other students seemed sympathetic to their friend. All Stars invited conversations about delinquent acts, and delinquent students responded with much to add to these conversations.

All in all, peer contagion from delinquent youth to conforming youth at the ASP was possible, but it was not detected. The evidence of negative effects of peer influences that was found for students with high pre-existing levels of negative peers indicated that it is possible that delinquent peers are not necessary to transmit negative influences. In fact, the model proposed in this paper may be incorrect in its assertion that delinquent peers transmit negative influences by reinforcing and modeling antisocial conduct. Any peer contact may provide reinforcement for delinquency. As Haynie and Osgood (2005) found, exposure to non-delinquent peers can cause an increase in negative behavior. The relatively unstructured context in which the ASP occurred may have allowed non-delinquent youth to encourage each other's acting out.

The current study tested the possibility underlying the null program effects for participants in the ASP were a combination of positive effects among high-risk students and negative effects for low- and moderate- risk students which canceled each other out when means for treatment and comparison groups were compared. This study has ruled out that possibility for the outcomes examined. It is possible that the delinquent youth were too small a minority of the population to exert a strong influence on their less delinquent peers, as Feldman concluded in his study when he found that low-risk youth weren't affected by group interventions with several high-risk members (1992).

### *Limitations*

The most serious limitation of this study the fact that I only had data on two time points. This makes it impossible to test the hypothesized sequence of effects as shown in Figure 1. This study's main finding, that ASP participation is related to a small increase in delinquent peers for high-risk youth only, while non-participating high-risk youth declined in delinquent peers. This finding is in agreement with the findings of Burdumy et al. (2008) who studied an ASP quite similar to the one under current investigation. Without follow-up data on this sample, I am unable to determine if increased delinquent peers for high risk students translated into increased later problem behaviors. Although the current data do allow me to conclude that ASP participation did not lead to concurrent increases in delinquent peers and delinquent behavior.

Two final limitations affect this research. Results from this study will not generalize to other populations. Results from this study will not necessarily apply to other populations or prevention programs. Additionally, the outcome data are

exclusively self-reported. I am able to verify that the self report data in this study are related to teacher reports and school records (see “Presence of Highly Delinquent Youth” section), but I cannot identify or control instances of false self-reports. Problems with self-report data have been widely discussed in the field and consensus reached: self-reports, even from youth, are reliable indicators of the underlying concepts of interest (Hirschi, Hindelang, & Weiss, 1980; Huizinga & Elliot, 1986).

In conclusion, I’d like to return to the primary issue which motivated the study: concern that the expansion of universal prevention interventions may lead to low- and moderate- risk youth becoming involved in potentially harmful treatments which interfere with otherwise healthy development. Thankfully, this study revealed no indications low-risk youth were harmed by taking part in the universal prevention program. It did reveal two important issues for researchers and practitioners of universal prevention interventions.

1. The generally low-risk youth who opted-in to this program did not experience benefits. This study did not find any evidence that low-risk youth gained positive peers, strengthened prosocial beliefs or decreased in problem behaviors. This finding is perhaps not surprising because low-risk youth began the program with high levels of positive peers, conventional beliefs and low problem behavior. The question becomes, then, are voluntary ASPs which attract primarily low-risk participants a wise investment of public resources? Previous research has shown that many prevention programs are effective (<http://www.colorado.edu/cspv/blueprints>), but research on voluntary ASPs is



much more equivocal. Funds may be better spent on programs which have demonstrated effectiveness.

2. High-risk youth who opted-in were harmed by participation. Students who began the program with elevated levels of negative peer influence, gained slightly in negative peers if they participated frequently, while those who did not participate frequently experienced a slight decline in negative peers. Targeting program content to specifically address needs of troubled youth would be more likely to result in positive outcomes for these youth. Targeted programming for high-risk youth could also incorporate strategies for restricting negative peer interactions. This program was designed to have broad appeal and did not focus services on youth in need. If it had, fewer well-adjusted youth would have participated but the high-risk students who did may have benefited instead of growing in the risk factor of delinquent peers.

In the future researchers may wish to study ways in which reinforcement for negative behaviors can be minimized in recreational activities for youth. Intervention efforts which seek to instill positive attitudes and create supportive relationships among youth and adults may be undermined by peer reinforcement of negative behaviors. Staff training that specifically addresses productive staff response to negative peer interactions could ameliorate harmful effects of peer reinforcement of antisocial conduct.

**Appendix Table A. Summary of Previous Literature on Harmful Effects of Prevention Programming.**

<b>Author</b>	<b>Intervention</b>	<b>Sample Risk Status</b>	<b>Outcomes Reported</b>	<b>Conclusions</b>
Cho, Hallfors & Sanchez (2005)	Reconnecting Youth. A class designed to motivate positive behaviors for youth at risk of school drop-out.	All high risk	On the range of outcomes studied, no students were found to benefit from the program and some harmful effects for participants were found.	Group interventions for high risk youth may lead to increase negative behaviors
Dishion, McCord & Poulin (1999)	Cambridge-Somerville Youth Study. Social worker provided a variety of individualized services to youth	High and low risk	Treatment youth who attended camps on more than two occasions had worse long term outcomes than those who didn't.	Group interventions are likely to provide opportunities for reinforcement of negative behaviors
Dishion, McCord & Poulin (1999)	Adolescent Transitions Program. Several treatment conditions, some involving peers and other not for a substance use prevention activity.	All high risk	Treatment youth in intervention conditions involving peers worsened in substance use and delinquency.	Group interventions for high risk youth are likely to increase negative behaviors
Dynarski et al. (2004)	21 <sup>st</sup> Century Community Learning Centers. After school program.	High and low risk	Student participants experienced no positive outcomes and some negative outcomes. High risk, elementary schoolers increased the most in negative outcomes.	Does not disaggregate by risk status, but finds harmful effects overall student participants
Ellickson & Bell (1990)	Project ALERT. Drug prevention curriculum delivered during health class.	High and low risk	Generally positive findings for drug prevention. Low risk youth displayed the most positive outcomes, followed by moderate risk youth. High risk youth displayed some increase in substance use.	High-risk students can respond negatively to otherwise successful intervention programming.
Feldman, Caplinger & Wodarski	St. Louis Experiment. Delivered group treatment to groups of exclusively high-risk youth or groups consisting of mostly low-risk youth with one or two high-risk	High and low risk	High-risk youth in high-risk only group increased antisocial conduct after the intervention, while high-risk youth in the mixed group decreased slightly. Little change for low-risk youth.	High-risk students are harmed when treated in groups with each other. Low risk-students are not harmed by treatments including high-risk students.

**Appendix Table A. Continued.**

<b>Author</b>	<b>Intervention</b>	<b>Sample Risk Status</b>	<b>Outcomes Reported</b>	<b>Conclusions</b>
Gottfredson (1987)	Peer Culture Development program. Classroom sessions where conventional students would attempt to exert positive influences on delinquent schoolmates.	High and low risk	Both high and low risk participants fared more poorly on a range of outcomes after the intervention.	Assembling peer groups to influence students with behavior problems is inadvisable for both high and low-risk students.
Leve & Chamberlain (2005)	Treatment foster care. Adjudicated youth randomly assigned to placement in a group home or in a foster home.	All high risk	Foster care youth had better outcomes than group home youth and authors found that effect of placement in foster care was completely mediated by number of delinquent associates while in correctional placement	Increasing high risk youths' contact with each other leads to negative outcomes.
Meager et al. (2005)	Social skills training class, for high-risk only or mixed groups of students.	High and low risk	Students in the high-risk only condition decreases in externalizing behavior more than high-risk youth in the mixed condition. High-risk only condition youth also displayed better in-session behavior. Does not report outcomes for low risk youth.	Youth in the high-risk only intervention were more likely to reinforce each other's good behavior. The mixed condition was associated with increased reinforcement of inappropriate behavior.
Multisite Violence Prevention Project (2008)	A class teaching cognitive-behavioral techniques for avoiding violence.	High and low risk	Low-risk students who received the intervention showed more negative scores on several violence-related outcomes, while high-risk students showed improvement in similar measures.	Students in an intervention become more like each other. Students who are well-behaved acquire negative behaviors from students who are poorly behaved and vice versa.

**Appendix Table B. Scale Content**

Items	Response Format
Definitions in Favor of Rule-Breaking	
<b>How much do you agree with the following statements...</b>	
my friends think fighting is an OK way to settle differences	Strongly Disagree Disagree Agree Strongly Agree
most people my age stay away from getting into fights	
my friends think people who pick fights are really dumb	
<b>How wrong is it for someone your age to do each of the following things...</b>	
cheat on school tests?	Not wrong at all A little bit wrong Wrong Very Wrong
purposely damage or destroy property that does not belong to them?	
steal something worth less than \$5?	
hit or threaten to hit someone without any reason?	
break into a vehicle or building to steal something?	
steal something worth more than \$50?	
use marijuana?	
use alcohol?	
get drunk once in a while?	
use prescription drugs such as amphetamines or barbiturates (ex: speed, downers, Valium) without a prescription?	
give or sell alcohol to a person under 18?	Mostly True Mostly False
I will never smoke cigarettes	
I will never try marijuana or other drugs	
I will never drink beer, wine, or hard liquor	
Delinquency and Aggression	
<b>Since the beginning of this academic school year, have you...</b>	
purposely damaged or destroyed property belonging to a school?	Yes No
purposely damaged or destroyed <u>other property</u> that did not belong to you, not counting family or school property?	
been involved in gang fights?	
used force or strong-arm methods to get money or things from a person?	
stolen or tried to steal things worth less than \$50?	
stolen or tried to steal something at school, such as someone's coat from a classroom, locker, cafeteria, or a book from the library?	
belonged to a gang that has a name and engages in fighting, stealing, or selling drugs?	
<b>In the last 30 days, how often...</b>	
did you tease someone else your age?	Not at all Once or twice A few times a week Every day
did you encourage other people your age to fight?	
were you angry most of the day?	
did you push, shove, hit, or kick someone?	
did you call someone your age a bad name to their face?	
did you threaten to hurt or hit someone?	

**Appendix Table B continued.**

Lifetime Substance Use	
<b>Have you ever...</b>	
smoked cigarettes?	Yes No
drunk beer, wine or hard liquor?	
smoked marijuana?	
used inhalants?	
used another illegal drug?	
Positive Peer Influence	
<b>Respondents are asked to think about their friends....</b>	
My friends often try to get me to do things the teacher doesn't like	Mostly True Mostly False
Most of my friends think getting good grades is important	
<b>Respondents are asked to think about their best friend...</b>	
Is interested in school	Mostly True Mostly False
Always attends classes	
Gets into trouble at school	
<b>During the past three months, how many of your friends would you say have....</b>	
Used Marijuana?	None Some Most
Gotten drunk once in a while?	
Sold or given beer or wine to another student?	
I have been at a party where someone brought beer, wine or wine coolers to drink.	True False
<b>How often do you and your best friend talk about these topics?</b>	
How we could get cigarettes	Never Infrequently Sometimes Often Very Often
How to make trouble in the neighborhood	
How we could get alcohol or drugs	

*Note.* Increase in Delinquent Friends scale contained the question “Does this friend get in trouble at school?” (y/n) in reference to five friends.

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