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The Influence of Parental Monitoring and Peer Deviance on Substance Use Among
Middle School Students

A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Science at Virginia Commonwealth University.

by

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Abstract

THE INFLUENCE OF PARENTAL MONITORING AND PEER DEVIANCE ON
SUBSTANCE USE AMONG MIDDLE SCHOOL STUDENTS

By Sally Ann Mays

A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Science at Virginia Commonwealth University.

Virginia Commonwealth University, 2007

Major Director: Albert D. Farrell
Professor, Department of Psychology

Substance use is a significant problem among middle school students in the United States. Research indicates that the early use of substances increases the likelihood of negative outcomes including long-term use and abuse. Both parenting and peer variables exert strong influences on children's decisions to use or abstain from substances. As children age, peers begin to exert a stronger influence, but parenting practices can significantly reduce peers' harmful influences. In this study, three waves of data (collected at the end of 6th grade, and the beginning and end of 7th grade) from a large multi-site study were used to examine the role of peer deviance as a mediator of the

influence of parental monitoring on substance use among an ethnically diverse sample of over 2,500 middle school students. Structural equation modeling was used to examine the longitudinal interrelations among parental monitoring, peer deviance, and substance use among middle school students, and to investigate potential group differences by gender and family structure. The hypotheses that peer deviance and substance use would influence one another over time were upheld. The two variables were interrelated such that peer deviance produced increases in substance use over time, but so too did substance use produce peer deviance over time. The prospective relation between substance use and peer deviance was stronger than the converse relation, suggesting that substance using peers seek one another out. Parental monitoring was associated with decreases in substance use over time, but its influence was small. Parental monitoring was more strongly associated with decreases in peer deviance. However, parental monitoring's effect on substance use was not mediated by peer deviance over these 3 waves in that parental monitoring at Wave 1 did not predict substance use 1 year later. Contrary to hypothesis, substance use was not associated with changes in parental monitoring over time, although peer deviance was associated with less monitoring. In general, parental monitoring was more closely linked to peer deviance than it was to substance use. This study found no convincing evidence to suggest group differences in the overall pattern of findings according to gender or family structure.

Chapter 1

Introduction

Substance use occurs at relatively high levels during early adolescence. According to the most recent National Survey on Drug Use and Health, 15% of 12 to 13 year-olds reported having used marijuana at least once (Substance Abuse and Mental Health Services Administration, 2005). Another recent study found that substance initiation occurs at a young age: 64% of children had used alcohol and 13% had used marijuana by age 13 (Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000). Whereas risk of alcohol initiation peaks before age 11, risk of marijuana initiation rises throughout adolescence (Kosterman, et al., 2000).

The middle school years may be a particularly appropriate time for the study of substance use. Early initiation of substance use is associated with a greater likelihood of experiencing more substance-related negative outcomes throughout development, including a greater risk of abuse and dependence (e.g., DeWit, Adlaf, Offord, & Ogborne, 2000). One study of over 27,000 current and former drinkers found that age of alcohol initiation is an extremely strong predictor of later abuse and dependence: over 40% of individuals who began drinking before age 14 reported ever receiving a diagnosis of alcohol dependence, compared to less than 10% of those who began drinking after age 20 (Grant & Dawson, 1997). Early initiation of substance use has strong associations with

problem behavior in early adolescence as well. Early initiation (before age 11) of cigarette smoking was found to be the strongest correlate of 16 health risk behaviors, such as substance use, violence, and suicidality, among sixth through eighth grade students in one large survey (DuRant, Smith, Kreiter, & Krowchuk, 1999). Other strong correlates of health risk behaviors included early initiation of other substances such as alcohol, marijuana, and cocaine use. Additionally, Ellickson, Tucker, Klein, and Saner (2004) found that early initiates of marijuana use were more likely to abuse marijuana, use hard drugs, use more than one drug, and to have low grades and academic intentions by grade 10.

Adolescence is also a developmental period in which substance use is on the rise. Older children and adolescents are more likely to use substances than are younger children and adolescents. General delinquency and the use of cigarettes, alcohol, and marijuana increase across adolescence (Duncan et al., 1998; Scaramella et al., 1999). Compared to younger adolescents, older adolescents also tend to consume more substances when they do use them, compared to younger adolescents (Richards et al., 2004). Moreover, adolescents who initiate substance use earlier have steeper increases in use across adolescence (Barnes et al., 2000).

The middle school years may be an important time to examine variables that may differentially increase substance use among boys and girls in later adolescence. Although boys tend to use substances at higher rates than girls in high school, in middle school girls and boys use substances at roughly equal rates (e.g., Johnston, O'Malley, Bachman, & Schulenberg, 2006). The Monitoring the Future survey indicates that lifetime use of cigarettes (26% for boys and girls), alcohol (41% for boys and girls), marijuana (8% for

boys and 6% for girls), and any illicit drug (11% for boys and 13% for girls) varies very little between male and female eighth grade students. Rates of past 30-day use are similarly comparable (Johnston et al., 2005). Some research indicates that gender differences in rates of substance use that do emerge may be attributable to higher aggregations of risk factors among boys (e.g., Farrell, Danish, and Howard, 1992).

Early adolescence is also an appropriate developmental period for the examination of parent and peer variables contributing to substance use. During middle school, the influence of both parents and peers is in flux, and the relation between these two influences on youths' decisions to use substances may be at a unique point in development. As children enter adolescence, the proximal influence of parents tends to wane, as the influence of the peer group becomes more salient (Bailey & Hubbard, 1990; Larson, Richards, Moneta, Holmbeck, & Duckett, 1996). Although peers begin to exert a stronger influence as children age, parenting practices can still significantly reduce peers' harmful effects.

Parent and peer influences are two of the strongest predictors of adolescent substance use. Parental monitoring in particular has been found to be a stronger predictor of substance use in adolescence than several other parental variables, such as communication (e.g., Griffin, Botvin, Scheier, Diaz, & Miller, 2000). Parental monitoring, often conceptualized as parental knowledge of child activities, may be a result of both firm, authoritative parenting as well as a marker of warmth and disclosure in the parent-child relationship (Kerr & Stattin, 2000), and is consistently predictive of lower levels of substance use among adolescents. Peer influences have also consistently been found to be strong predictors of substance use in early adolescents (van den Bree &

Pickworth, 2005). Variables that have been measured and found to be predictive include norms surrounding substance use in the peer group, peer substance use, measured according to the target adolescent's perception as well as by direct report of the peer, and a more general measure of peer deviance, reflecting a tendency of one's peers to be involved in substance use and delinquency.

Support has been found for a general model in which peer substance use or deviance mediates the relation between parental monitoring and substance use (e.g., Ary et al., 1999; Cleveland, Gibbons, Gerrard, Pomery, & Brody, 2005; Kim, Heatherington, & Reiss 1999; Oxford, Harachi, Catalano, & Abbott., 2000; Rodgers-Farmer, 2000). In this model, monitoring exerts all or part of its effect on substance use by reducing negative peer influences, which in turn results in decreased rates of substance use among youth. Although support has been found for this model, several issues are yet to be fully explained. Findings vary in terms of the extent to which peer variables have been found to mediate parental monitoring. Some studies have found that parental monitoring is fully mediated by peer influences (i.e., has no direct effect on adolescent substance use) (e.g., Duncan, Duncan & Strycker, 2006; Rodgers-Farmer, 2000; Simons-Morton, Haynie, Crump, Eitel, & Saylor, 2001), whereas others have found support for partial mediation (e.g., Ary et al., 1999; Macauley, Griffin, Gronewold, Williams, & Botvin, 2005; Miller & Plant, 2003).

Both the prevalence and effects of substance use, parental monitoring, and peer deviance appear to vary across demographic variables, including gender and family structure (e.g., Ellickson et al., 2004; Farrell & White, 1998; Kim et al., 1999; Kung & Farrell, 2000; Richards, Miller, O'Donnell, Wasserman, & Colder, 2004; Svensson,

2003). For example, many researchers have found that children from intact families in which parents have never divorced have lower rates of substance use than youth from single-parent families or stepfamilies (e.g., Duncan et al., 2006; Ellickson et al., 2004; Griffin et al., 2000; Griffin et al., 2003). Some studies have found that the fit of the mediational model differs across gender and family structure (e.g., Kim et al., 1999; Svensson et al., 2003), whereas others have not (e.g., Ary et al., 1999). These differences may also account for different patterns of findings across studies that have not examined these variables.

The designs and analyses that many researchers have used to examine these issues have had several significant limitations. Several earlier studies were cross-sectional, making it difficult to draw causal inferences from their findings. Although more recent studies have been longitudinal, most have contained only two waves of data. Consequently, the mediating variable, peer deviance, and the outcome variable, substance use, were measured at the same wave. No study could be found that measured all three variables (parental monitoring, peer deviance, and substance use) at more than two waves. Examining changes across three waves makes it possible to control for baseline levels of all three variables, truly test mediation, and allows for the testing of alternate pathways and reciprocal effects as compared to the analysis of a mediational model without the benefit of temporal separation of the variables of interest.

Although it is likely that parental monitoring does exert some of its influence through the medium of peer deviance, research suggests that other relations between the three variables are tenable (Farrell, 1994). For instance, some research suggests that substance use may be perpetuated over time because it leads to lower parental monitoring

and more associations with deviant peers (Aseltine, 1995). Other pathways are also plausible, such as youth's substance use increasing deviant peer associations or deviant peer associations resulting in increased monitoring efforts, (e.g., Dishion, Bullock, & Granic, 2002; Galombos, Barker, & Almeida, 2003; Stice & Barrera, 1995).

This defense describes a study designed to examine the relation between parental and peer factors in predicting substance use. This study attempts to address several critical gaps in the current literature. First, it will test competing models regarding the direction of effects among the variables using three waves of data. Additionally, the subjects will be drawn from a middle school age group for whom substance use is particularly relevant, and with whom intervention may be very salient. Finally, it will use a large ethnically and socio-economically diverse sample drawn from four U.S. cities with sufficient power to test for differences based on gender and family structure.

Chapter 2

Review of the Literature

This section discusses the literature examining the impact of parental monitoring and peer deviance on the development of substance use in early adolescence. An emphasis is placed on demographic differences in prevalence and impact of these elements on substance use outcomes. Additionally, available research on reciprocal relations between the proposed predictors and substance use is highlighted. Research examining the role of peer deviance as a mediator of the relation between parental monitoring and substance use is then reviewed. This section concludes with a discussion of studies examining competing models to explain relations among monitoring, peer deviance, and substance use. These include the impact of aspects of the child's behavior on parents, of peer relationships on parenting techniques, and of a child's behavior on his or her peers.

Monitoring and Other Parenting Techniques

Parental monitoring, or knowledge of a child's whereabouts, is an important parenting technique associated with decreased risk for substance abuse among middle school-aged youth (e.g., Barnes et al., 2000; Cottrell et al., 2003; Li, Stanton, & Feigelman, 2000). In a 1998 review, Dishion and McMahon defined parental monitoring as "a set of correlated parenting behaviors involving attention to and tracking of the

child's whereabouts, activities, and adaptations" (p. 61). Parental monitoring as a construct emerged from the Oregon Youth Study (OYS) (Capaldi & Patterson, 1989; Patterson, Reid, & Dishion, 1992), and was defined by two elements: "first, the network of rules and expectations parents have concerning the amount of information they require from their adolescent; and second, how much time the adolescent is with their parents" (Hayes, Hudson, & Matthews, 2003). More recently, parental monitoring has been operationalized mainly as parental knowledge of child whereabouts (Hayes et al., 2003). As Kerr and Stattin (2000) noted, although most researchers conceptualize parental monitoring as a deliberate action on the part of the parents to track their child's whereabouts, most researchers *operationalize* the construct differently: "the measures that are most commonly used do not address what parents do, only what they know" (Kerr & Stattin, 2000, p. 366).

According to a social interactional theory of substance use (Dishion & McMahon, 1998), parental monitoring is one element in a triadic model of parenting which is embedded within the social interactions of family members. Other elements are parental motivations and beliefs, including norms, values and goals, and behavior management, which includes all parental attempts to direct child activity, using techniques such as rewards, punishment, setting and enforcing rules, and negotiation of boundaries. If parent-child relationships are poor, children may be resistant to monitoring attempts, and parents may be reluctant to keep trying. In this case, family relationships may require work before increased monitoring has its effect (Dishion & McMahon, 1998).

Research indicates that parents generally believe they are knowledgeable about their adolescent's activities, although their knowledge varies across categories of activity.

One study found that parents are more likely to indicate that they know where their adolescent is after school and at night than they are to know with whom their adolescent spends their time (Cottrell, et al., 2003). Mothers tend to be more knowledgeable about their children's daily lives and whereabouts than are fathers (Crouter, Helms-Erikson, Updegraff, & McHale, 1999). Parents who engage in information-seeking (a form of monitoring) are also more likely to engage in other child management techniques, such as communicating preferences and disapproval, and supporting positive friendships (Tilton-Weaver & Galambos, 2003).

Low Parental Monitoring is Related to Substance Use and Other Externalizing Outcomes

Parental monitoring has been found to be more effective than several other parenting techniques in predicting substance use outcomes among youth, including attitudes, caring, child satisfaction with the parental relationship, communication, and parental modeling of substance use (Dishion & Loeber, 1985; Forehand, Miller, Dutra & Chance, 1997; Griffin et al., 2000; Miller & Plant, 2003). Although fewer studies have examined the effect of adolescent behavior on parenting, or whether over time the two influence each other reciprocally, those that have indicate that whereas monitoring predicts reduced substance use over time, so too does substance use predict reduced monitoring (e.g., Laird et al., 2003; Stice & Barrerra, 1995). This decrease in monitoring may in turn lead to greater levels of use (Aseltine, 1995). Parents employ higher levels of monitoring for girls and younger adolescents than boys and older adolescents (e.g. Barnes et al., 2000; Richard et al., 2004); higher levels are also seen among youth from two-parent families (e.g. Kim et al., 1999). This may explain some of the differences in substance use among these groups. Some research indicates that the processes by which

parental monitoring works are similar across ethnic groups, and thus monitoring is an effective predictor of lower levels of substance use for diverse races (e.g., Forehand et al., 1997).

Parental monitoring has been associated with decreased risk for adolescent externalizing behaviors, including use of substances (e.g., Duncan et al., 1998), risky sexual behaviors, history of arrest, and fighting (Buehler, 2006, DeClemente, Wingood, Crosby, Sionean, Cobb, Harrington, et al., 2001). High parental monitoring was linked to both lower levels of initial alcohol misuse (amount of alcohol consumed, number of times drunk, and number of times five or more drinks were consumed in the past year) as well as a less extreme increase in alcohol misuse over the teenage years in a large and ethnically diverse sample of adolescents measured over six waves (Barnes et al., 2000). Being closely monitored was found to reduce the risk of smoking or drinking to about 80 to 90 percent of the risk (odds ratios of 0.83 for lifetime smoking and 0.89 for lifetime alcohol use) of children who were not monitored (Griffin et al., 2003). Li et al. (2000) found that good parental monitoring is protective against a variety of negative outcomes, including drug use and drug trafficking, in a sample of urban, African American adolescents followed from age 9 to age 14. Another study of predominantly rural adolescents and parents found that adolescents' perceptions of parental monitoring was predictive of lower levels of smoking, drinking, marijuana use, and sexual activity over the previous six-month period (Cottrell et al., 2003).

Child management, a construct comprised of monitoring, consistent discipline, and quality time, provides both buffering and compensatory effects on adolescent delinquency and substance use. White, rural adolescents whose parents were below the

median on child management in seventh and eighth grade showed higher levels of delinquency and substance use from eighth to twelfth grade, and steeper slopes in the growth of these behaviors across high school when compared to other adolescents (Scaramella et al., 1999). For example, boys whose parents were below the median on child management in seventh and eighth grade showed twice the amount of externalizing behaviors in twelfth grade compared to boys whose parents were above the median on child management in seventh and eighth grade. Scaramella and colleagues were more interested in the effects of child management as an aggregate construct, however, and thus this study did not isolate the effects of parental monitoring.

“Latchkey” children, who regularly care for themselves after school, may also be at increased risk of alcohol, tobacco, and marijuana use (Richardson et al., 1989).

Although not a test of parenting technique per se, one study with an ethnically diverse sample found that eighth grade students who care for themselves for 11 or more hours a week were at twice the risk of substance use compared to those who did not care for themselves, supporting the notion that lack of supervision alone is a risk factor (Richardson et al., 1989). Although the authors found that some of the influence of self-care was articulated through an increased affiliation with substance-using peers, latchkey children were also more likely to use substances by themselves than were non-latchkey children (Richardson et al., 1989).

Monitoring may be one of the more effective parental techniques studied in terms of effectively predicting substance use among youth (e.g., Reifman, Barnes, Dintchiff, Farrell, & Uhteg, 1998). For instance, Miller and Plant (2003) found that parental monitoring had a direct effect on adolescent substance use, and was the only one of the

parenting variables measured, including parental attitudes toward smoking, drinking, and illicit drugs, parental rules about behavior, parental caring, and child's satisfaction with the parental relationship, to have a significant relation with all measures of substance use. In several studies, monitoring was a stronger predictor of use than was communication. In a study with a sample of minority, urban sixth grade students, monitoring was found to have the most impact on outcome of any parenting variable studied, including communication (Griffin et al., 2000). Across two ethnic groups, African-American and Hispanic, and several geographical locations in the United States and Puerto Rico, Forehand, Miller, Dutra, and Chance (1997) found that higher levels of parental monitoring predicted lower levels of adolescent deviance, including substance use. On the other hand, a measure of communication (i.e., "My mother and I can talk about almost anything;" "I find it easy to discuss problems with my mother", p. 1038) had no relation with level of deviance in a regression analysis that included parental monitoring. Dishion and Loeber (1985) found that parental monitoring was more highly correlated with alcohol ($r = -.36$) and marijuana use ($r = -.43$) than was parental modeling of alcohol use. Parental modeling was not significantly correlated with adolescent alcohol use, and had only a small ($r = .17$) correlation with marijuana use.

Whereas parental monitoring is consistently beneficial, in that it is predictive of lower levels of problem behavior in late childhood and adolescence, other parenting techniques may be harmful. For example, in one sample of 13 year-olds, adolescent and parent-reported monitoring accounted for 10% of the variance in adolescent-reported delinquent behavior, whereas parental psychological control was actually related to

higher levels of delinquent behavior, as well as anxiety and depression (Pettit et al., 2001).

Relatively few studies have found monitoring to be an ineffective predictor of substance use in adolescence. Galambos et al. (2003) found that parental behavioral control alone was not related to the initial level of problem behavior, including substance use, in sixth grade. One study of changes in substance use across early adolescence found that family influences, including supervision or monitoring, were not related to the initial level or change over time of alcohol use (Duncan et al., 2006). Crosnoe, Erickson, and Dornbusch (2002), in an ethnically and socioeconomically representative sample of high school students, found that parental monitoring was not associated with any reduced risk of cigarette, alcohol, marijuana, or other illegal drug use in males or females.

Whereas many studies have examined the effect of parenting variables on adolescent substance use and other problem behaviors, fewer have examined the effect of adolescent behavior on monitoring, or whether there may be reciprocal relations between the two over time. In one of the few studies on the topic, Stice and Barrerra (1995) found a fully reciprocal relation between parental control, which includes monitoring, and adolescent substance use over the course of a year, such that control was associated with less substance use a year later, but so too was substance use associated with less control over the same time period. Similar findings emerged for parental support and substance use. Conversely, the authors found that child externalizing behaviors affected parenting over time, but that the reverse was not true, possibly because externalizing behaviors begin in childhood and are already established by early adolescence. Aseltine (1995) also found an indirect pathway that serves as a mechanism for explaining the perpetuation of

drug use in adolescence: initial levels of marijuana use lead to lower parental monitoring in a second wave, which resulted in continued marijuana use at wave three. However, because this study did not contain a measure of monitoring at the first wave, it is possible that stability in that construct over time may have contributed to an overestimation of the path between initial use and later monitoring.

In conclusion, parental monitoring is an effective parenting tool related to lower levels of substance use among middle school youth. The construct has been tested and found effective as a predictor in ethnically and geographically diverse samples of youth followed over several years in early adolescence. Although studies that have examined the impact of child behavior such as substance use on parental use of monitoring have generally found that monitoring and control decrease, more research is needed on child influences on parenting as well as reciprocal effects between parental monitoring and substance use in early adolescents over time.

Parental Monitoring and Its Effects Vary by Gender, Ethnicity, Age, and Family Structure

In general, girls are more closely monitored by their parents than are boys (Barnes et al., 2000; Chilcoat, Breslau, & Anthony, 1996; Cottrell et al., 2003; Crosnoe et al., 2002; Flannery, Vazsoni, & Rowe, 1996; Kerr & Stattin, 2000; Kim et al., 1999; Kung & Farrell, 2000), although there is also a tendency for parents to know more about their same-sex, as opposed to opposite sex, child (Crouter et al., 1999). Parents are also more likely to practice peer management techniques, such as communicating preferences and seeking information about friends, with daughters than with sons (Tilton-Weaver & Galambos, 2003). This pattern holds true among urban middle school students (e.g., Li,

Feigelman, & Stanton 2000, Richards et al., 2004) as well as urban high school students (Borawski, Ievers-Landis, Lovegreen and Trapl, 2003), in that girls are more likely to be well-monitored and have lower levels of negotiated unsupervised time than are boys.

Parental monitoring has been studied as a mediator of the relation between gender and problem behaviors in adolescents. One study of urban African American early adolescents found support for this in that the higher levels of delinquency, drug use, and aggression among boys and older adolescents were partially a function of the lower levels of monitoring these groups received (Richards et al., 2004). Barnes et al. (2000) also found an indirect effect of male gender on adolescent alcohol misuse through the impact of the lower monitoring males received relative to their female counterparts.

Research is not consistent as to whether parental monitoring is more protective for one gender compared to the other. One body of research indicates that parental monitoring is a more effective technique for boys. For instance, among minority, urban sixth grade students, monitoring was found to be protective against alcohol use in boys, but was associated with increased use for girls (Griffin et al., 2000). No absolute differences were found in level of monitoring by gender or family type in this sample. One Swedish study (Svensson, 2003) also found that low monitoring was more effective in predicting substance use among males than among females, and Barnes et al. (2005) found that after taking into account age, SES, race, impulsivity and moral disengagement, higher levels of parental monitoring led to less alcohol misuse and other drug use for males only; for females, effects were better accounted for by other variables.

Another body of research found that girls may be more responsive to the effects of parental monitoring. In the previously described study of minority, urban sixth grade students, Griffin et al. (2000) found that whereas monitoring was more protective for boys, unsupervised time at home was associated with more smoking among girls than among boys. This effect for girls was stronger for those from two-parent families (Griffin et al., 2000). According to research by Pettit, Laird, Dodge, Bates, and Criss (2001), monitoring is associated more strongly with lower levels of delinquent behavior for girls as compared to boys. Another study found that fathers' inadequate parenting (consisting of low monitoring knowledge, inconsistency, and intrusiveness) is associated with externalizing behavior for girls, but not for boys. This gender difference was not found for mothers' parenting (Buehler, 2006).

Other research indicates that parental monitoring may level the playing field in samples in which boys on average exhibit higher levels of externalizing behaviors than do girls, such that well-monitored boys are comparable to poorly monitored girls in terms of outcome. For instance, a study of White, rural adolescents from two-parent homes found that child management practices, including monitoring, were associated with lower levels and slower increases in externalizing behavior (substance use and delinquency) from eighth to twelfth grade for both males and females. However, because boys' absolute levels of externalizing behavior were found to be significantly higher than girls', girls whose parents were below the mean on child management practices such as monitoring in the seventh and eighth grade showed virtually the same slope (absolute levels and increase across high school) as boys whose parents were above the mean on child management practices during the same time period (Scaramella et al., 1999). Other

studies have found that whereas girls are more likely to be well-monitored compared to boys, there are no gender differences in the effect of monitoring on adolescent adjustment (including delinquency, substance use, peers' delinquency, school problems, depressed mood, and family discord) (Kerr & Stattin, 2000).

Most research on ethnic differences in parental monitoring find that levels of parental monitoring are roughly equivalent across ethnic groups, and that it is an equally effective tool for preventing substance use for parents of different ethnicities. For example, in a study of Caucasian and Hispanic urban middle school students, Flannery et al. (1996) found that the developmental processes regulating substance use were similar across ethnicity; Caucasian and Hispanic children reported similar mean levels of drug use, and a model including parental monitoring predicted drug use well for students of both ethnicities. In a similar vein, Forehand et al. (1997) found that parental monitoring is an effective predictor of lower levels of adolescent deviance across both African American and Hispanic populations in diverse geographical settings, a finding that the authors pointed out is "particularly impressive as Black Americans and Hispanics have substantially different historical backgrounds and cultural values, which can result in differing parenting beliefs" (p. 1040). Another study found that whereas parental monitoring did not vary by ethnicity or SES, White students and higher SES students reported negotiating more unsupervised time than did African American or Hispanic students and lower SES students (Borawski et al., 2003).

Only one study reviewed found that parental monitoring and its effect differ according to ethnicity. Shakib et al. (2003) found that ethnic differences occur in the absolute level of parental monitoring, as well as the extent to which it functions as a

protective factor for adolescent smoking. In this sample of sixth grade students, Asians reported less parental monitoring than did Latinos; and that relative to Latinos, parental monitoring was more protective for White adolescents. This study did not, however, include any African American participants (Shakib et al., 2003).

Monitoring appears to be most salient in late childhood and early adolescence (Chilcoat and Anthony, 1996). In a sample of urban children, low parental monitoring increased the risk of earlier drug initiation for alcohol, tobacco and other drug use, but only for children under 11 years old; for older children, there was no difference in risk based on parental monitoring. Statistical analyses indicated a two-year delay in the onset of drug initiation for highly monitored youths, indicating the protective effect of parental monitoring. Further analyses suggested that risk for use may be further sustained for harder drugs (i.e., marijuana, cocaine and inhalants vs. alcohol and tobacco use) among low-monitored youth. Children in the highest quartile of parental monitoring in middle childhood were found to be just over three times less likely to initiate inhalant, marijuana or cocaine use over the next two years compared to children in the lowest quartile of monitoring in middle childhood. Decreases in parental monitoring, holding initial monitoring levels constant, also predicted increased risk of initiation of inhalants, marijuana, or cocaine (Chilcoat & Anthony, 1996). Some studies have found that parental monitoring tends to decrease with age. This may be related to increased use of substances as adolescents grow older (Barnes et al., 2000; Crouter et al., 1999). Within smaller, restricted age ranges, researchers find that parental monitoring is unrelated to age. For instance, in a discrete period of late childhood, no relation was found (Chilcoat et al., 1996).

Family structure has also been found to have associations with parenting behaviors and adolescent outcomes. Family structure has been categorized in many different ways. It has sometimes been dichotomized by whether a child lives with two parents or does not; the latter category has encompassed a variety of different living situations. Other researchers have studied the effect of living in blended, or step-families, as well as in extended families, in which households contain grandparents, aunts, uncles, or other non-nuclear family members. In many populations, single, blended, or extended families are nearly as prevalent as intact families headed by a biological mother and father. For instance, Kung and Farrell (2000) found that 32% of predominantly low-income African American seventh grade students lived in an intact family, 28% in a single-parent family, 22% in a single-parent extended family (with roughly a third living with grandparents, a third with other adults, and a third with both grandparents and other adults), and 18% in stepfamilies. Several studies have found lower levels of parental monitoring in households headed by single-parents. For instance, one study found that in late childhood (ages 8 to 11), parental monitoring was highest among married mothers, followed by divorced mothers, followed by never married mothers; never married mothers were twice as likely to be in the lowest quintile of monitoring compared to married mothers in this study (Chilcoat et al., 1996). Pettit et al. (2001) also found lower levels of monitoring in households with single mothers of 13 year-old children. Students in two-parent homes or households headed by grandparents, foster parents, or others reported higher levels of monitoring than those headed by single fathers or mothers (Borawski et al., 2003). Children in two-parent homes are also less likely to be latchkey children (take care of themselves after school); however, the risk of substance use

associated with being a latchkey child is invariant across family type and income (Richardson et al., 1989).

Other researchers have studied whether parental monitoring increases in households with extended family members, such as grandparents or aunts and uncles. Farrell and Kung (2000) found that in a sample of urban, African American families of middle school students, the presence of extended family members in the home did not increase the likelihood of positive parenting, including monitoring, and intact families were found to provide more positive parenting than were single-parent extended families. The authors cautioned that these findings should be investigated further, however. Several contextual variables that could contribute to the outcome could not be assessed, such as overcrowding, the relationship of the additional adults in the home to the child, the adults' involvement in parenting the child, and the duration of the living arrangement (Farrell & Kung, 2000). Parental monitoring also varies between step-families and intact families. One study found that both mothers and stepfathers monitor children's activities less than do mothers and fathers in intact families. Lower monitoring by a stepfather was related to greater association with deviant peers for girls, but not boys (Kim et al., 1999).

In conclusion, a review of the literature indicates that parental monitoring is more prevalent among girls, younger children, and children from two-parent homes. Research also indicates that parental monitoring may be a more effective strategy with younger versus older adolescents. On the other hand, the results of individual studies examining whether parental monitoring more effectively predicts substance use among one gender are contradictory and inconclusive. No studies were found that investigated whether parental monitoring is more effective for children living in families with different

structures. More generally, it appears that parental monitoring is an effective parenting tool for members of various ethnic backgrounds.

Peer Deviance and Other Peer Variables Related to Early Adolescent Substance Use

Peer characteristics are proximal and extremely strong influences on a child's decision to use substances or engage in other problem behaviors. The social development model (see Catalano & Hawkins, 1996) provides a framework for understanding the role of many sources of influence on crime, delinquency, and aggression. Derived from social control theory and social learning theory, it postulates that strong social bonds to family, school, and community reduce the incidence of association with deviant peers, resulting in lower levels of delinquent behavior. Conventional bonds may reduce adolescent deviance over time both by reducing associations with deviant peers and decreasing individual susceptibility to the negative influences of peers (e.g., Erickson, Crosnoe and Dornbusch, 2000). According to Sutherland's 1939 differential association theory (see Williams & McShane, 1993), deviant behaviors and beliefs about those behaviors, including substance use, are learned in small social groups, often of peers (Petraitis et al., 1995). Reformulations and advances in social learning theories assert that association with deviant or substance using peers will first result in the observation of those behaviors, leading to imitation comprised of experimentation with substance use. This experimentation will be reinforced socially through encouragement and support for future use (Petraitis, et al., 1995).

The mechanism of deviant peer association on delinquency may operate via peer choice (i.e., the flocking of already aggressive youth to like-minded peers) or peer influence, via modeling of behavior and opportunities (see Giordano, 2003). Although

substantive research indicates that friends are similar in their use of substances, some researchers (e.g. Fisher & Bauman, 1988) have argued that friendship selection is a better, or at least equally plausible, explanation for the phenomenon than peer influence. In other words, youth already using substances will choose as their friends other youth who are also doing so (Petraitis et al., 1995).

Peer deviance, that is, associating with other youth who use substances, are antisocial, aggressive, or delinquent, is consistently predictive of substance abuse among youth (e.g., Dishion & Medici Skaggs, 2000; Duncan et al., 1999; Oxford et al., 2000; Walden et al., 2004). Norms surrounding the acceptability of substance use in the peer group, as well as direct offers and pressure from peers to use substances, may play a part in the strong influence peers have on youths' own substance use (e.g., Farrell & White, 1998). Moreover, although more research is needed on the topic, these peer effects are most likely reciprocally related to youths' own use of substances. Research indicates that youth not only increase their substance use with exposure to deviant, substance-using peers (e.g., Dishion & Medici Skaggs, 2000), so too do youth using substances seek out or "flock" to other youth who use substances (e.g., Pardini, Loeber, & Stouthamer-Lober, 2005). There are most likely demographic differences in the prevalence and impact of peer influences on substance use outcomes. The research on gender differences is inconclusive, with some research finding males to experience more peer influence, and others females. On the other hand, the limited research available on family structure differences indicates that association with deviant peers is less likely among children from two parent homes (e.g., Kim et al., 1999).

Association with deviant peers is generally measured according to how many friends a child has who are involved in a variety of activities considered deviant from the norm of early adolescent behavior, such as substance use, delinquency (destruction of property, for example), and aggressive behavior, such as fighting. Association with deviant peers has been associated with externalizing problems in a variety of studies (e.g., Buehler, 2006). In one study of 11 and 12 year-olds, association with deviant peers had the strongest and most temporally proximal influence on substance initiation in a model also containing prosocial family process variables (Oxford et al., 2000). Among 14-16 year-olds, peer deviance had a strong direct effect on adolescent problem behaviors, including substance use, antisocial behavior, academic failure and risky sexual behavior (Ary et al., 1999). Walden et al. (2004) found that peer deviance was related to number of substances used by age 14 for both males and females, and was a strong unique predictor of adolescent substance use. In a Swedish study, both genders were found to be more likely to use drugs in the presence of deviant peers (Svensson, 2003). Not only is association with deviant peers associated with adolescent use of substances, but in addition, research has shown that adolescents who increase their association with deviant peers have a faster acceleration of substance use over time (Duncan et al., 1999). Moreover, monthly changes in exposure to peers of whom parents do not approve or who use substances were correlated with increases or “bursts” of substance use in that month, for both boys and girls (Dishion & Medici Skaggs, 2000). On the other hand, Galambos et al. (2003) found that having deviant peers in sixth grade was related to externalizing behavior at that time, but was not predictive of growth in externalizing over the next 3.5 years. Another study found that although peer deviance was a significant independent

predictor of substance use among a group of high-risk urban middle school students, it did not predict change in substance use status over the course of middle school after controlling for sibling deviance (Stormshak et al., 2004).

Other researchers of substance use outcomes have narrowed the focus of their investigations from a more general measure of peer deviance (which often do but may not always include items on substance use) to the study of peers who use substances or encourage substance use. Research indicates that general peer deviance and peer use or pressure are all effective predictors of substance use. For instance, Duncan et al. (2006) found that both general peer deviance as well as having friends who encourage an adolescent to use alcohol was related to an increase in the use of alcohol across early adolescence. Children with friends who encourage alcohol use have a higher initial rate of use and a steeper increase in use as they age, reflecting the influence of peers.

Having substance-using friends has a strong direct relation with substance use (Cleveland et al., 2005; Erikson et al., 2000). Adolescents often “mirror” the substance use habits of close peers. One study of sixth through twelfth grade African American students found that almost 70% of students indicated that they belonged in the same drinking category (abstainer, light drinker, moderate drinker, heavy drinker) as their best friend (Forney et al., 1991). In another study, peer influences were shown to have strong direct effects on substance use for adolescents, particularly having friends who smoke marijuana. The odds ratios associated with peer use of substances were much larger than those for other significant predictors, including several parental monitoring, attitude, and relationship variables (Miller & Plant, 2003). Farrell et al. (1992), found that predominantly African American urban seventh grade students with friends who used

drugs were 8 times more likely to use marijuana than those without, 4 times more likely to drink liquor, 3 times more likely to use drugs other than marijuana, 2 times more likely to smoke cigarettes, and 2 times more likely to drink beer or wine.

One study of middle school students found that having friends who used substances exerted a greater influence on whether the student used substances than did direct peer pressure. Those with two or more friends who smoked were almost ten times more likely to smoke than those with no friends who smoked, and those with two or more friends who drank were 4.5 times more likely to drink. In comparison, experiencing peer pressure only increased the likelihood of smoking by a factor of 1.78, and drinking by 1.48 (Simons-Morton et al., 2001). Farrell et al. (1992) also showed higher indices of relative risk for those with friends who used drugs versus feeling pressure to use drugs or having friends who approved of drugs. Peer pressure has, however, emerged as a strong predictor of substance use. Farrell and White (1998) found that peer pressure accounted for 39% of the variance in past month frequency of drug use among primarily African American tenth grade students.

Some research has tried to establish whether reciprocal relationships between peer use and youth's own use are likely. Certain theories of substance use in youth, particularly peer cluster theory (Oetting & Beauvais, 1987), would hypothesize such a relationship. Like social learning theories, peer cluster theory emphasizes the role of peers ("gangs," best friends, or couples) in determining the initiation and ongoing use of substances among adolescents. Other factors, such as parenting techniques and personality, are presumed to prime the adolescent for either positive or negative behavior, but the peer cluster is the most proximal and influential agent of change. Youth use

drugs for the first time with peers, gain access to drugs through peers, and formulate their attitude towards drugs through their interactions with peers. Peer clusters can determine through consensus when it is normal to use drugs, how often drugs should be used, in what contexts, and so on. Oetting and Beauvais make an important distinction between the effects of the peer cluster and peer pressure per se:

[Peer pressure] implies either a general attitude in an entire age cohort toward drugs or implies that an innocent youth is being coerced into taking drugs by a ‘pusher’ or by deviant companions. The youth in a peer cluster is not an innocent victim, but is a part of the cluster, helping shape its attitudes and behaviors, equally a recipient and a source of drug encouragement (1987, p. 138).

Peer cluster theory, in stating that the child is “equally a recipient and a source” of drug encouragement promotes the investigation of reciprocal relations over time between the target child and his peers. In this way, the authors suggest that young adolescents are both influenced in their substance use habits by peers, but may also “flock” to like-minded peers, and in turn influence those peers’ substance use (Oetting & Beauvais, 1987).

Empirical studies shed light on the possibility of reciprocal relationships between peers’ and youths’ own substance use. One study sought to test two questions unresolved by previous examinations of interpersonal variables that contribute to the development of adolescent problem behavior (Aseltine, 1995). Firstly, it is unclear whether peer deviance influences subsequent problem behavior through a socialization or peer pressure process, or whether already similar peers choose each other as friends. For instance, although Dishion and Medici Skaggs (2000) demonstrated that monthly changes in

exposure to deviant peers were associated with substance use in that month, the direction of the relation was unclear (i.e., from increased deviant peer exposure to substance use, or from substance use to the acquisition of deviant peers). Secondly, most studies rely on self-report measures of peer deviance, despite previous findings that peers are not good estimators of their friends' deviant behaviors. To address this limitation, the Aseltine (1995) study used data directly obtained from one nominated friend to measure the construct.

Findings indicated that friends' levels of drug use were much more highly correlated with each other than were friends' levels of delinquency. Having a friend who used marijuana (at Time 3) was the strongest predictor of concurrent marijuana use (all data on reciprocal peer relations come from Time 3). The path coefficient from own marijuana use to friend marijuana use at Time 3 was almost as large as that from friend to own use, but did not achieve significance due to instability. However, the author suggested that the relation between friend and own use was most likely reciprocal, lending credence to the theory that like-minded peers seek each other out. Moreover, peer relationships also sustain drug use, in that paths existed between use of marijuana to friends' later use of marijuana to own use of marijuana, and vice versa, from friends' use of marijuana to own later use of marijuana to friends' use of marijuana (Aseltine, 1995).

Clearer findings on reciprocity emerged from two longitudinal studies, one using data from the National Youth Survey, and the other from the Pittsburgh Youth study. Reed and Rountree (1997) examined three waves of National Youth Survey data from 1977 to 1979 to examine reciprocity between adolescent substance use and having friends who use substances. These longitudinal analyses revealed that differential association

with peers who use substances did predict substance use in youth over time, and so too did substance use predict increased affiliation with deviant peers. Analysis of six waves of data from the Pittsburgh Youth Study (Pardini, Loeber, & Stouthamer-Loeber, 2005) also indicated that reciprocity exists in relations between youth deviance and peers' deviance over time. This study of adolescent boys, starting in sixth and followed through eleventh grade, found that increases in peers' delinquency were associated with an increase in beliefs regarding the acceptability of delinquency. This relation held true for all five consecutive years assessed in this study. By middle adolescence (a time corresponding with high school entrance), increases in tolerant beliefs about delinquency were in turn related to the acquisition of more delinquent peers. This reciprocal relation did not, however, emerge until middle adolescence. Increases in tolerant beliefs about delinquency were not associated with an increase in deviant peers in the years which roughly corresponded with middle school enrollment (i.e., years 1 through 4).

In contrast, Farrell and Danish (1993) did not find reciprocal effects between peer drug models, peer pressure, and adolescent gateway drug use. Nor did Wills and Cleary (1999), in two longitudinal studies using ethnically diverse samples of middle school students in urban and suburban public schools. Latent growth curve analyses in both studies revealed that baseline levels of peer use were predictive of growth in adolescent substance use, while the reverse was not true. The authors found no evidence of selection effects, nor of a reciprocal relation between adolescents' and peers' use over time.

In conclusion, research indicates that general peer deviance, substance use, and pressure have a strong, direct, and temporally proximal influence on adolescent substance abuse and problem behavior. Peer influences are linked to substance initiation, number

of substances used, and faster acceleration of substance use across adolescence. Youth are also more likely to use substances in the presence of their peers. Although more research is needed, peer deviance may influence subsequent behavior through a socialization or peer pressure process, but so too may already similar peers choose each other as friends based on substance use behaviors.

Peer Variables and Their Effects Vary by Gender, Ethnicity, Age, and Family Structure

With increasing age comes an increase in time spent with peers, and a shift in the balance between parental and peer sources of primary influence for many youth. Research indicates that peer influences on substance use become stronger as children age. Peer deviance or substance use may be an especially salient influence at the onset of substance use for youth (Duncan et al., 2006).

Findings vary regarding gender differences in both exposure to peer substance use, deviance, and peer pressure, and the strength of the relations between these variables and a child's own use. Some studies (e.g., Dishion & Medici Skaggs, 2000) have found that girls are more likely than boys to endorse having contact with deviant peers, whereas others (e.g., Svensson, 2003) have found that boys are more likely than girls to be exposed to peer substance use and to feel peer pressure (e.g. Kung & Farrell, 2000). Whereas Crosnoe et al. (1998) found that girls' and boys' friend groups did not vary in terms of substance use, Ary et al. (1999) found that girls reported more variance than did boys in their peers' substance use.

Some studies have found that peer variables related to the use of substances are more prevalent among boys than among girls, and exert a stronger influence on boys as

well. For instance, in a large ethnically and socio-economically diverse sample of high school students, Crosnoe et al. (2002) found that although boys tended to have more delinquent friends than did girls, boys' and girls' friend groups did not differ in terms of substance use. (It is however important to note that friend group composition may vary as a function of both gender and age, such that findings from high school students may not generalize to middle school students). Nonetheless, the impact of substance-using peers appeared to be greater for boys compared to girls: having friends who used alcohol or marijuana was a risk factor for increased use for both girls and boys, but this risk was significantly stronger for boys for both substances. On the other hand, having friends who used tobacco was related to increased tobacco use a year later for girls, but not for boys, in a model containing protective family and school factors. Only the impact of friends' use of illegal drugs other than marijuana did not vary across gender in this study: it was approximately equally risky for both girls and boys (Crosnoe et al., 2002).

Additional studies also show that peer deviance and substance use is more strongly related to adolescents' own substance use for boys than girls. For instance, a Swedish study found that males are more likely to be exposed to peer substance use than are girls; in addition, peer substance use was more predictive of own substance use for boys (Svensson, 2003). Erikson et al. (2000) found that having substance-using friends has a strong direct relation with substance use, but this pathway is stronger for males than for females (Erikson et al., 2000).

However, other studies have more complex findings. For instance, Kung and Farrell (2000) found that among African American seventh grade students, peer pressure for drug use was higher among boys compared to girls. Although approximately equal

numbers of boys and girls had been offered beer, wine, or liquor in the past 30 days (about 37%), 25% of boys vs. 16% of girls had been offered drugs. There was an even greater gender discrepancy in perceived pressure: 16% of boys vs. 8% of girls felt pressure to drink, and 12% of boys vs. 4% of girls felt pressure to use drugs (Kung & Farrell, 2000). Despite these discrepancies in peer pressure by gender, there were no significant differences between girls and boys in past month use of cigarettes, beer, wine, liquor or having been drunk, although more boys (22%) than girls (11.5%) had used marijuana. Moreover, in a moderation model, the authors found that peer pressure accounted for more of the variance in drug use for girls than for boys (Kung & Farrell, 2000). In a 1998 study of tenth grade students, Farrell and White also found that the relation between peer pressure and frequency of past-month substance use was stronger for girls than boys.

Some studies indicate that peer influences may be more salient for female students. Simons-Morton et al. (2001) showed that peer variables have a greater impact on girls' substance use than on boys' use. Girls with two or more friends who used substances were 7.6 times more likely to smoke or drink, compared to boys, who were 2.8 times more likely to smoke or drink than those without substance-using friends. Buehler (2006) found that association with deviant peers was more strongly predictive of externalizing for girls than boys. The association between inadequate parenting control (including monitoring) and deviant peers was also stronger for girls, although the pattern of findings differed somewhat by parental gender (Buehler, 2006). In addition, another study found that at age 19, deviant peers may put girls, not boys, at more risk: for males, peer deviance predicted later alcohol misuse and other drug use, whereas for females it

predicted not only those outcomes but also increased risk for gambling and delinquency (Barnes et al., 2005).

Many researchers who include ethnic comparisons in the study of peer deviance and related variables do not find variations in influence of deviant peers by race or ethnicity. For instance, in a study of predominantly White middle school students, with a substantial (24%) representation of African American students, Simons-Morton et al. (2001) found no significant differences in peer pressure by race. Stormshak et al. (2004) found that although African American children reported more warmth in sibling relationships than did White children, there were no ethnic differences in sibling deviance. Conversely, Duncan et al. (2006), with a roughly equal sample of African American and White young adolescents, found that peer deviance was associated with White ethnicity, and Brown, Miller, and Clayton (2004) found that over time, peer substance use was predictive of substance use for Caucasian, but not African American adolescents.

Many research reports do not include information on ethnic differences in peer variables or of their effects on substance use in youth (e.g., Buehler, 2006; Dishion & Skaggs, 2000; Duncan et al., 1998; Miller & Plant, 2003; Oxford et al., 2000). Some researchers choose not to measure ethnic differences in peer variables, or are not able to due to lack of ethnic variation in the sample or small sample size. Galambos et al. (2003) used a sample consisting solely of White early adolescents. Stormshak et al. (2004) did not report analyses for ethnic differences in peer deviance; additionally, the sample size ($n = 161$) was not large enough for the inclusion of ethnicity (or gender) in the final structural equation model predicting substance use over time. In another study, ethnicity

was not entered into the final multivariate regression equation to predict substance use, but was kept as a control variable (Simons-Morton et al., 2000). In a study of Swedish children, Svensson (2003) does not report ethnic differences in peer variables or their effects on substance use outcomes. In a predominantly African American sample of middle school students, Farrell and Danish (1993) also did not examine ethnic differences. More research is needed on the possible variations in the prevalence of peer deviance and its effect on substance use outcomes for children and adolescents of difference ethnicities.

Family structure, particularly membership in an “intact” family may also serve a protective function against association with deviant peers for youth. Kim et al. (1999) found that children living with mothers and stepfathers were more likely to associate with deviant peers than were children from intact families. The authors also found that for all girls and for boys in stepfather families, peer delinquency was the strongest predictor of externalizing, but for boys in intact families, a parent variable (maternal negativity) was the strongest predictor. Farrell and White (1998) found that family structure moderated the relation between peer pressure and frequency of past month drug use such that it was stronger for tenth grade students without a father or stepfather in the home.

In conclusion, research results vary on how several key demographic differences impact substance use outcomes among youth. Whereas studies have found that membership in a two-parent family is associated with decreased exposure to deviant peers, there is less consistency in the findings of studies that report gender and ethnic differences. Some studies indicate that girls are exposed to higher levels of peer influence, such as peer pressure or direct substance offers, whereas others indicate that

boys are. The literature is also inconclusive as to whether peer influences have a stronger relative influence on behavior for one gender or the other. Many researchers do not analyze ethnic differences due to samples limited in ethnic heterogeneity; however, those that do have produced contradictory findings. Some studies have found no differences in peer variables by ethnicity while others have found that peer deviance is associated with White ethnicity. Factors that might influence these discrepant findings include differences in sample characteristics (e.g., gender and ethnic composition), level of risk (i.e., neighborhood or school characteristics), and type of peer variable measured. For instance, it may matter whether the peer variable is measured more distally: i.e., deviance among peers generally or classroom levels of deviance, or more proximally: i.e., deviance among friend groups or in best friend dyads.

Predicting Substance Use: Parental vs. Peer Variables

Parenting and peer influences have both been found to be effective and strong predictors of adolescent substance use. However, in studies that include both parental and peer variables, peer variables tend to have a stronger relation with externalizing adolescent outcomes than do parental variables (e.g., Farrell & Kung, 2000). A recent meta-analysis of 364 reported effects of parental and peer variables on substance use also indicated a stronger correlation between general peer variables and substance use ($r = .298$) compared to general parental variables and substance use ($r = .163$) (Allen, Donohue, Griffin, Ryan, & Mitchell Turner, 2003). Assuming that parental monitoring does indeed exert all or part of its influence through the mechanism of the child's association with deviant peers, it is not surprising that peer variables display a much

stronger influence on substance use outcomes than does parental monitoring in studies that do not test for mediation.

For instance, in a cross-sectional study of middle school students, Simons-Morton et al. (2001) found that having substance-using peers had a stronger relation to an individual student's substance use than did parenting variables, including expectations and involvement. For example, the odds ratio for drinking when one has two or more friends who smoke or drink was found to be 4.52; the odds ratio for those with high vs. low parental involvement was 2.5 (Simons-Morton et al., 2001). The authors found that although the parenting variables monitoring, support, and conflict predicted substance use in bivariate analyses, they were not significant in the final regression analysis, in which peer pressure and number of friends who use substances were added. Dishion and Loeber (1985), also using cross-sectional data, found that in a multiple regression analysis, peer deviance was the strongest predictor of adolescent self-reported substance use (standardized $b = .28$ for alcohol use, standardized $b = .31$ for marijuana use) in a model that also included parental monitoring and mother's alcohol use as predictors. Parental monitoring was found to be a stronger predictor of alcohol use than mother's alcohol use, but did not reach significance. Parental monitoring and peer deviance were highly correlated ($r = .53$) in this study. Despite the high correlation between the variables, both peer deviance and parental monitoring were found to be significant predictors of self-reported marijuana use in this sample, indicating the possibility of specificity of predictors by type of substance (Dishion & Loeber, 1985).

Another cross-sectional study (Griffin et al., 2003) found that interpersonal variables, such as peer behaviors, were the best predictors of substance use and

aggression in a minority (predominantly African American and Hispanic), inner-city population of sixth grade students, accounting for 22% of the variance in smoking and 21% in alcohol use. Bonding to conventional institutions, a composite variable that included parental monitoring, was found to explain much less variance: only 3% of alcohol use and 7% of smoking (Griffin et al., 2003). Similarly, in a cross-sectional study of sixth and seventh grade Caucasian and Hispanic children, researchers found that for both ethnicities and genders, the strongest predictors of substance use were having a friend who drinks, and susceptibility to peer pressure (measured by responses to peer pressure scenarios) (Flannery et al., 1994). Parental monitoring did not emerge as a significant predictor. Monitoring was found to be negatively correlated with substance use in this sample (Flannery et al., 1994).

Other studies have reported that whereas family variables are related to more minor substance use, peer variables are stronger predictors of more frequent, serious, or regular use. For instance, Svensson (2000) examined cross-sectional data in a logistic regression analysis and found that lack of parental monitoring and peer deviance both predicted the sporadic use of alcohol and tobacco, whereas of the two variables, only peer deviance predicted regular use of the substances. In another longitudinal study, of 21 well-established risk factors assessed at the first wave, involvement in substances by self and peers was one of the four strongest predictors of initiation and progression to regular use, as well as failure to discontinue use of marijuana among middle and high school students one year later (van den Bree & Pickworth, 2005). More varied risk factors were related to the early stages than the later stages of use, which were heavily dominated by peer variables. Family variables exerted relatively few significant influences at any

stage, although the family variables chosen (“family relations,” “activities with mother,” for example) were vague (van den Bree & Pickworth, 2005). This study builds upon the previous cross-sectional studies by controlling for baseline levels of use in the regression analyses and indicating that peer variables are stronger predictors of substance use than are parental variables over time.

Norms research also reveals a stronger influence of perceived peer norms compared to parental or religious norms in relation to adolescents’ own norms and drug use. One cross-sectional study found that adolescents were more likely to use alcohol and marijuana if their parents or religion proscribe drug use than if their peer group does (Krohn, Akers, Radosevich, & Lanza-Kaduce, 1982). In addition, compared to parental variables, peer variables have been shown to have a stronger relation with prosocial indicators as well. Erickson et al. (2000) found using path analysis with longitudinal data that educational commitment, community involvement and teacher attachment all showed stronger path relations to association with deviant peers compared to parental supervision.

Mediational Models: Does Parental Monitoring Exert its Influence through the Child’s Association with Deviant Peers?

Theoretical models of substance use suggest that one pathway to substance use for youth occurs when parenting characteristics predispose youth to a greater likelihood of associating with peers who may then exert negative influences on their choices and behaviors. For example, according to social control theory (Gottfredson & Hirschi, 1990), in the absence of strong bonds to parents and the social order (operationalized as relationships to conventional persons, institutions, or activities), individuals are “free” to

engage in deviant behaviors such as drug use and delinquency. One context in which this freedom may be expressed is an association with deviant peers.

The social development model (Hawkins, Lisher, Catalano, & Howard, 1986) mirrors social control theory by noting that one way in which the level of deviance of individuals with a lack of strong social bonds will vary is according to the types of influences to which they are exposed. Behaviors that are rewarded are more likely to be repeated. Whether substance use or other deviant behavior is rewarded socially is a function of the peer (as well as family and school) group to which the individual belongs. Parental behaviors determine the extent to which youth will have the opportunity for involvement with deviant peers. Hawkins et al. (1986) stated:

We suggest that the formation of strong bonds to family and school will decrease the likelihood that youths will develop early attachments to drug abusing peers in early adolescence, since we postulate that the behaviors rewarded in family and school and those likely to be rewarded by drug abusing youths are not compatible (p. 35).

Peer cluster theory (Oetting & Beauvais, 1987) also lends itself to the study of peer deviance as a variable that transmits the influence of parenting practices such as monitoring to adolescent drug use outcomes. Young adolescents whose parents do not keep close watch over their activities may be more likely to associate with peers whose own activities are undesirable. Conversely, a more involved parent who knows with whom a child spends his or her time would be more likely to discourage those friendships.

If parents exert much or all of their influence through the medium of increased child exposure to deviant peers, a mediated effect is postulated. Many studies have demonstrated the importance of examining mediated effects in order to correctly weigh the influence and mechanism of multiple variables to accurately predict a given outcome. The total influence of any given variable on another is composed of direct and indirect effects; direct effects are those that influence an outcome directly, whereas indirect effects operate through their influence on one or more mediating variables, which then influence outcome. Variables that in direct effects analyses have shown weak effects or no effects at all, in mediated effects analyses may be shown to exert considerable influence through an intervening variable. Such has generally been the case in recent examinations of the role parenting variables such as monitoring play in influencing a child's choice in peers, the level of peer pressure they're likely to experience in their peer group, and the norms surrounding drug use in that same group.

According to Baron and Kenny (1986), several conditions must be met in order to show mediation. One of these conditions is that the presumed mediator, in this case peer deviance, must be significantly related to the distal variable, in this case parental monitoring. Several studies indicate that poor parental monitoring and other parenting factors do predict involvement with deviant peers in youth. In a predominantly White sample of 206 9 to 10 year-old boys followed through age 12, Dishion, Patterson, Stoolmiller, and Skinner (1991) found that parental monitoring and discipline practices both significantly predicted later involvement with deviant peers. However, in a model in which previous (at ages 9 to 10) levels of the child's involvement with deviant peers was added, parental monitoring was no longer statistically significant (Dishion et al.,

1991). It is possible that association with deviant peers may begin earlier in this sample, which was drawn from neighborhoods with high levels of delinquency (Dishion et al., 1991).

In the Pittsburgh Youth Study (Pardini et al., 2005), researchers found support for an indirect model of parental influences on adolescent outcomes among predominantly White and African-American students (over-sampled for delinquent youth). Family conflict, low warmth, and poor parent-child communication were associated with increases in delinquent peers for youth from sixth to ninth grade, and subsequently beliefs about the acceptability of delinquency; these indirect parental effects were not maintained through the high school years, however (Pardini et al., 2005). Although this study provides interesting findings about longitudinal relations between parenting and peer variables over time, and illustrates how parental variables can be seen more clearly in indirect effects analysis, parental conflict and parental monitoring are conceptually distinct. Whereas parental conflict appeared in this study to have exhausted its influence by the high school years, during which peer deviance and increasing youth deviance became self-perpetuating, parental monitoring is a more active, positive technique that could produce different results. Parental monitoring could theoretically prevent the cycle of increasing deviance among youth and their peers from escalating during the high school years by preventing association with deviant peers in middle school.

Additional support for the influence of family variables on peer affiliation was found in an intervention study. Dishion et al. (2002) showed that exposure to a non-specific family-based intervention for middle school students reduced increases in associations with deviant peers from sixth to ninth grade. Of those children who received

the intervention, those who were initially highest on deviant peer affiliation received the greatest benefit in terms of smallest increases in deviant peer associations. Larger effects were also seen for children from families who used the family resources in the intervention more often.

Other studies have directly studied a mediational model in which parental monitoring predicts level of involvement with deviant peers, which in turn predicts a child's substance use initiation or level of substance use. For example, Kim et al. (1999) found that parental monitoring influenced externalizing behavior both directly and indirectly, through association with deviant peers. Kung and Farrell (2000) tested several cross-sectional models representing the relations between parenting practices, peer pressure and substance use among urban, predominantly low-income African American seventh graders. They found that poor parenting, comprised of inconsistent discipline and poor monitoring, had both direct and indirect effects on past 30-day substance use (being drunk, smoking cigarettes, and using beer, wine, liquor, and marijuana). Indirect effects of poor parenting occurred through the medium of peer pressure (offers of substances and perceived pressure to use substances from friends), which was associated with a higher incidence of substance use.

Poor parental monitoring and association with deviant peers accounted for 52% of the variance in a problem behavior construct including substance use, antisocial behavior, academic failure and risky sexual behavior in a study of 14-16 year old, primarily Caucasian, adolescents (Ary et al., 1999). Peer deviance had a strong direct effect on adolescent problem behaviors, as did parental monitoring, to a lesser degree. Additionally, the mediational pathway of low monitoring on problem behavior through

deviant peers was significant. However, parental monitoring and peer deviance were measured concurrently in this study, six months prior to the measurement of problem behavior outcomes. The authors also found that low monitoring mediated the relation between family conflict and association with deviant peers one year later.

One study of 11 and 12 year-olds found that prosocial family processes such as rules, monitoring, and attachment, in combination with association with deviant peers, explained 60 percent of the variance in cigarette, alcohol, and marijuana initiation. Prosocial family processes were found to work both indirectly, by reducing associations with deviant peers, and directly, resulting in reduced substance initiation. Association with deviant peers had the strongest and most temporally proximal influence on substance initiation (Oxford et al., 2000). Kosterman et al. (2000) found that proactive family management techniques, including monitoring, were not a significant predictor of alcohol initiation once parents' alcohol use norms and friends' use of alcohol were taken into account, suggesting complete mediation.

One method of examining the relations between parent and peer factors in predicting adolescent substance use involves integrating and testing competing theories. One 2000 study (Rodgers-Farmer) created a new model by combining two models. In the first, monitoring was hypothesized to predict peer group association, which in turn predicted substance use; in the second, low monitoring directly predicted substance use, which impacted deviant peer associations, resulting in more or continued use. The results of this study revealed direct and indirect relations between the variables of monitoring, importance of substance use to peers, and adolescent substance use. Although parental monitoring had no direct effect on substance use a year later, it exerted indirect effects

through its relation with concurrent substance use, which predicted association with substance-using peers. Another indirect pathway from monitoring occurred through associations with substance-using peers two years later, which predicted concurrent adolescent substance use. Because peer group association was not measured at Time 1, the model did not address whether peer group association has a prospective relation with adolescent substance use or monitoring. However, this study does support the integration of the two models, suggesting the possibility that when adolescents are not well-monitored, the peer group can reinforce existing substance use *or* socialize adolescents to substance use (Rodgers-Farmer, 2000).

Erickson et al. (2000) also tested an integrated model of deviance, in which the central processes assumed by social control and differential association theories were assumed to work concurrently. Strong social bonds, such as those between parents and children, were found to make associations with deviant and substance-using peers less likely, and to make children less likely to display deviance or substance use themselves when associating with such peers. Cross-sectional analyses were done at the first wave of this longitudinal study to examine the contemporaneous associations between social bonds, peer substance use, adolescents' susceptibility to peer influence, and own substance use behavior. Findings indicated that parental supervision displayed a relatively weak, though significant relation ($\beta = -.07$) with close friends' substance use, in comparison with the other bond elements measured, such as educational commitment ($\beta = -.16$) and community involvement ($\beta = -.11$). Parental attachment was not found to be a significant predictor of peer substance use. Susceptibility to the influence of substance-

using peers was significantly related to both parental supervision ($\beta = -.17$) and parental attachment ($\beta = -.08$) (Erickson et al., 2000).

Erickson et al.'s (2000) longitudinal model using the same variables revealed that the bond elements of parental supervision and attachment both significantly predicted overall substance use one year later. Mediation models showed that when friends' substance use and susceptibility to friends' use were entered, the effects of parental supervision and attachment on adolescent substance use were attenuated but still significant. The final model, including baseline levels of teens' own substance use, accounted for 60% of the variance in teens' subsequent substance use. This study did not test a more general form of peer deviance as a mediator of parental variables and substance use, only peer substance use (Erickson et al., 2000).

Cleveland et al. (2005) tested a longitudinal model in which parenting, peers, and the child's cognitions were hypothesized to predict substance use among non-urban African American children. In a model that only included parenting and peer drug use variables, there were direct effects of effective parenting (monitoring, communication, and warmth) and friends' use on youths' level of substance use, and a mediational pathway through friends' use. In three waves of data, parenting predicted friends' use of substances, which predicted the child's use. The influence of parenting was found to be primarily indirect, through peer associations and the child's cognitions. When cognitions were added to the model, there were no direct effects of parenting variables on substance use at Wave 3. However, the model only accounted for 11% of the variance in adolescent drug use, perhaps because of the low (10%) prevalence of any kind of substance use at Time 1, when the subjects were 10 and 11, and the five-year gap

between measurement at Time 1 and measurement at Time 3 (Cleveland et al., 2005).

Using slightly different variables, Macauley et al. (2005) showed that effective parenting (monitoring, anti-drug messages, and discipline) predicted lower perceptions of peer drug use norms and pro-drug attitudes, which in turn predicted drug use in a mediational pathway, although significant direct effective parenting effects remained.

In reviewing the available literature on the relations between effective parenting, particularly parental monitoring, and peer deviance, only one study was found that concluded that peer variables do not mediate the relation between effective parenting and substance use. Aseltine (1995) found no support for the theory that peer marijuana use mediates the relation between low parental monitoring and offspring marijuana use, as there were no significant paths between any parenting variables and friends' marijuana use. However, because the authors separated the delinquency and drug use models, it is unclear from their study whether a more general measure of peer deviance might have mediated the relation.

Does the Mediational Model Differ by Gender and Other Demographic Variables?

Several studies testing a mediational model did not report any demographic differences in model fit or outcome (e.g., Aseltine, 1995; Cleveland et al., 2005; Coker & Borders, 2001; Macauley et al., 2005; Rodgers-Farmer, 2000). Dishion et al. (2001) were unable to test for gender differences, in that their sample included only boys. More research is needed on differences in model fit according to gender and family structure due to research reviewed earlier that indicates differences in all three components of the model (monitoring, peer deviance, and substance use) according to those variables.

Erickson et al. (2000) found that although social bonds, including parental supervision, appeared to be about equally protective for males and females, associating with deviant or substance using peers was more strongly associated with deviance or substance use for males than it was for females. Kung and Farrell (2000) found the opposite; in their mediational model, the path from parenting to peer pressure was stronger for boys, whereas the path from peer pressure to drug use was stronger for girls. Ary et al. (1999) found that the model fit equally well for boys and girls. Some researchers did not analyze and/or report whether their model deviated by gender. For instance, Pardini et al. (2005) used a sample composed only of boys. Additionally, Pardini et al. (2005) did not test their longitudinal investigation of shifts in parent and peer influences on delinquent behaviors among early adolescent boys separately by ethnicity, but controlled for it, and determined that the inclusion of race (and SES) did not change the significance of their paths.

One study was found that systematically examined group differences in model fit according to more than one demographic variable, specifically, gender and family type (Kim et al., 1999). This cross-sectional examination used a predominantly White sample of 10 to 18 year-old youth, and found that the relations among various parental variables, including monitoring and negativity, antisocial peer association, and externalizing variables varied as a function of both gender and family type. Dividing the sample into four groups (boys and girls in non-stepfamilies, and boys and girls in stepfather families), the authors found many differences according to group membership. For instance, boys in stepfather families differed from boys in non-stepfather families in the strength of the effect of peer deviance on externalizing: in the former group, it was the strongest

influence measured; in the latter, maternal negativity was a stronger predictor. For girls in both family types, peer deviance was the strongest predictor. Other differences were found between the four groups in the strength and significance of paths between maternal and stepfather monitoring and peer deviance and externalizing outcomes. The authors also found that although peer deviance becomes a stronger predictor of externalizing with age for all groups, this effect was stronger for boys from stepfamilies compared to the other three combinations of family type and gender (Kim et al., 1999). A longitudinal analysis of group differences in model fit would allow inferences about directional causality not possible in this study.

In conclusion, few researchers have examined group differences in mediational processes, despite research that indicates that monitoring, peer deviance, and substance use often vary according to gender and family structure (although in the case of gender, research has not been consistent as to the direction of effect). Although one study reviewed (Kim et al., 1999) did study a mediational model by gender and family structure, this study was not longitudinal. In his review of theories of substance use in adolescence Petraitis et al. (1995) notes:

This omission might be justified if gender and ethnic differences in [experimental substance use] arise simply because boys and Whites have higher levels on mediating variables (such as risk taking) than girls or non-Whites. However, it is not justified if gender or ethnicity moderate or interact with other causes of [experimental substance use]. In such a case, gender and ethnicity would be protective factors and would require difference models of [experimental substance use] for boys, girls, Whites and non-Whites (p. 83).

Because some research already suggests that at least for gender, differences in prevalence may indeed be due, at least in part, to gender differences in number of risk factors (e.g., Farrell et al., 1992), it is important to further clarify whether there are demographic differences in how models operate. More longitudinal research is needed that can examine differences in parenting and peer influences on substance use outcomes among youth that takes into account gender and family structure.

Competing Models: Are Other Pathways Plausible?

Over time, many relations may exist among parental monitoring, peer deviance, and substance use. One of the most studied models, with which this project is most focused, is that from low parental monitoring to association with deviant peers to substance use. However, other plausible models are possible or likely. For instance, peer cluster theory (Oetting and Beauvais, 1987) acknowledges the likelihood of complex, reciprocal relations between “stage-setting” variables, such as parenting techniques, as well as between peer cluster variables and drug use itself, noting that, for instance, drug use and deviant peer affiliation can increase hostility and rebellion in an adolescent, which might then negatively impact family relationships.

One possibility is that a child’s behaviors can have longitudinal influences both on their parents’ behaviors as well as on their peer group affiliation. Whereas most research has focused on the effect of parenting qualities on youth outcomes over time, several researchers have examined the effect child behaviors have on parenting practices over time. According to Scarr and McCartney’s (1983) model, children’s development progresses not only as a function of direct parental control and guidance, but also as a function of the reactions elicited by their own characteristics and behaviors. Youth who

use substances may inspire frustration, anger, fear, or exhaustion in their parents, which is likely to have an impact on their parenting practices. In this case, monitoring efforts may be redoubled in an effort to rein in a problem-behaving child. On the other hand, in the face of adolescent substance use, monitoring may decrease or be given up entirely as an ineffective tool. For instance, perhaps not surprisingly, parental knowledge is higher among parents of expressive and sociable vs. inexpressive, non-sociable children (Crouter et al., 1999). The secrecy and lying necessary to use substances in spite of parental strictures might lower child expressiveness and result in lower parental knowledge and monitoring as a function of decreased child sharing of activities or decreased parental attempts to solicit them. Alternatively, Pardini et al. (2005) found that changes in adolescents' beliefs about the acceptability of delinquency over time are not associated with increases or decreases in the quality (conflict, warmth, and communication) of the parent-child relationship.

Affiliation with a deviant peer group may prospectively influence parental behaviors. According to Tilton-Weaver and Galambos (2003), although some parents feel that "their adolescents' friendships lie outside of the parents' legitimate authority....when parents become concerned with their adolescents' safety and security, they are more likely to view their adolescents' activities as falling within their purview" (p. 271). In fact, Tilton-Weaver and Galombos (2003) found that parents of adolescents who were already engaging in problem behaviors such as substance use and associating with deviant peers reported feeling more concerned about their adolescent's friends. Moreover, the more problem behaviors the adolescent was engaged in, the more likely his or her parents were to seek information about their friends. Because these data were

not longitudinal, however, it does not preclude the possibility that parenting practices such as information-seeking may actually lead to increases in adolescents' deviant peer associations and problem behaviors.

Chapter 3

Statement of the Problem

Substance use in adolescence, particularly when initiated as early as sixth to eighth grade, is a serious public health concern that is related to far greater risk for eventual abuse or dependence (Grant & Dawson, 1997), and associated problem behavior outcomes, including aggression, delinquency, early or risky sexual behavior, and school dropout (Ary, Duncan, Duncan, & Hops, 1999; Donovan & Jessor, 1985). The prevention of substance use at its earliest stages, before additional negative outcomes accrue, is an important end goal of research on adolescent substance use. Studies that seek to clarify the relations between risk factors thought to contribute to the initiation and maintenance of substance use are necessary to create more targeted, effective interventions. For instance, when studying the variables of parental monitoring and peer deviance without taking into account mediated effects, it would be logical to conclude that the peer variable, as the strongest, most proximal influence (e.g., Farrell & Kung, 2000) on adolescent substance use, should be solely targeted by prevention programming. However, mediated effects analyses indicate that parental monitoring may be quite effective at reducing the likelihood that adolescents will have the opportunity to interact with peers that use substances and are aggressive or delinquent (Ary et al., 1999), and who induce them to engage in or reinforce them in similar behavior.

This study examined the influence of parental monitoring and peer deviance on gateway substance use among middle school students, with an emphasis on mediated effects and reciprocal relations. When children are well-monitored, parents know where they are, and with whom they associate. In this way, parenting may act to decrease association with peers, who are the most proximal agents of substance use influence. The study of reciprocal relations in the area will add to the less populated literature on the effect of children's substance use on parenting and peer behaviors. Studies that seek in this way to clarify the relations between risk factors thought to contribute to the initiation and maintenance of substance use are necessary to create more targeted, effective interventions. The theoretical models for this study are shown in Figures 1 through 3. The current study tested the following hypotheses across three waves of data:

- 1) Peer deviance at Time 1 will predict subsequent changes in substance use, both directly and indirectly through continued involvement with deviant peers.
- 2) Low parental monitoring at Time 1 will have direct effects on subsequent changes in substance use, but this effect will not be as strong as the effect of peer deviance on substance use.
- 3) Peer deviance will mediate the relation between low parental monitoring at Time 1 and substance use at Time 3. This relation is shown in Figure 1.

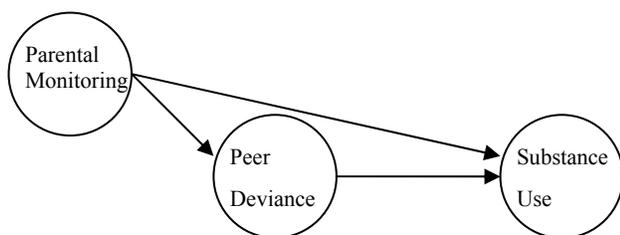


Figure 1. Peer deviance partially mediates the longitudinal effect of low parental monitoring on substance use.

4) Substance use at Time 1 will be associated with a difference (direction unspecified) in parental monitoring at Time 2, and thus with a change in involvement with deviant peers and substance use at Time 3. Figure 2 (a and b) illustrates how substance use may influence parental monitoring, peer deviance, and subsequent substance use.

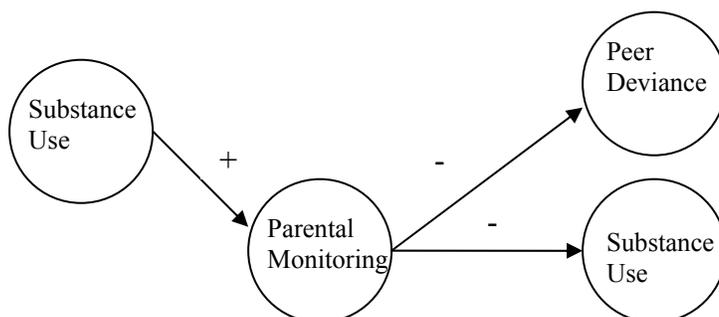


Figure 2a.

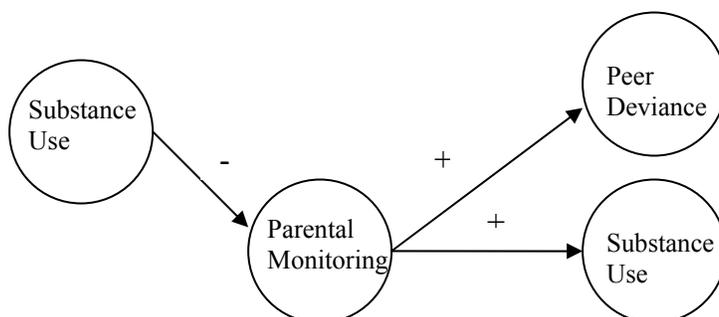


Figure 2b.

Figure 2 illustrates two possible influences of substance use on parental monitoring. An increase in parental monitoring is expected to be associated with a decrease in deviant peer involvement and substance use. A decrease in parental monitoring is expected to have the opposite effect.

5) Peer deviance will also have a direct effect on parental monitoring.

6) Substance use at Time 1 will be associated with greater association with deviant peers at Time 2, and increased substance use at Time 3. This relation is shown in Figure 3.

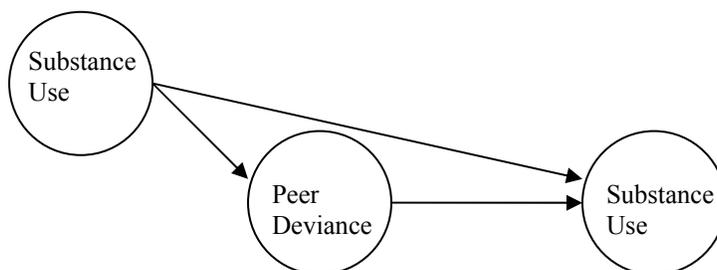


Figure 3. Substance use is maintained over time partially through affiliation with like-minded peers in a “flocking” mechanism.

7) Mean levels of parental monitoring will differ by gender and family structure. Girls and those from two-parent families are predicted to experience higher levels of parental monitoring.

The current study added to the available literature on parent and peer influences on adolescent substance use in several ways. None of the studies reviewed that used a mediational design to examine the relations between parental variables and peer substance use and deviance was able to do so with a large sample of the middle school youth for whom substance use is becoming very salient, with measurement of all three variables at three or more time points. This study used such a sample, collected from 37 schools at four sites throughout the United States, at three points in early middle school (Multisite Violence Prevention Project, 2004). Doing so added to the literature in several ways.

First, the design addressed methodological problems present in earlier studies that could not examine the interrelations among parental monitoring, peer deviance, and substance use across all three time points. The conclusion that mediated effects are present rests on a firmer basis when the proposed mediator variable is measured at a separate, intermediate point in time from the distal variable (parental monitoring), and the outcome variable (substance use). For example, Oxford et al. (2000) measured peer deviance and drug initiation at the same time point. As the authors stated, “temporal separation of these two constructs would provide better evidence of time ordering between these two constructs” (p. 611). This is a common problem in mediational research on this topic. Ary et al. (1999), Erickson et al. (2000), and Rodgers-Farmer (2000) also tested mediation by measuring the proposed mediator (peer deviance) at the same time point as either parental monitoring or substance use outcome. This is often due to the limitation of data collection to two time points.

Moreover, research indicates that reciprocal effects between any of the three variables in this study are quite plausible (e.g., Farrell, 1994). For instance, a child’s substance use could lead to increases in parental monitoring, leading to decreases in the peer deviance and substance use; or could lead to decreases in parental monitoring as parents “give up,” resulting in increased association with deviant peers and substance use. Additionally, peer cluster theory and other empirical research indicate that it is likely that peer influences lead to adolescent substance use, but so too do adolescents “flock” to peers who use substances if they do so themselves; this congregation of like-minded peers is likely to lead to continued substance use for youth. This study will be able to determine whether such effects, which have yet to be systematically established, exist.

A large and more varied sample allowed for the examination of differences in the strength or direction of the causal relations among the three constructs to be studied according to differences in gender and family structure. Small sample sizes have inhibited some researchers from including additional explanatory variables in their analyses, including gender, ethnicity, and family management (e.g., Stormshak et al., 2004). It has been speculated (Kung & Farrell, 2000) that the influence of gender may vary across different populations (e.g., for urban, African American youth versus White, middle class youth). Although previous researchers have indicated that the study of gender and ethnicity is important, few have had access to samples large and varied enough to have sufficient statistical power to test for demographic differences.

Additionally, both theory (e.g., on the effects of family disorganization, Petraitis et al., 1995) and previous research (e.g., Kim et al., 1999) indicate that family structure is likely to influence the amount of monitoring a child receives, and, perhaps relatedly, his or her likelihood of using substances. This study will be able to test directly whether families with different structures monitor their children differently, show differences in the child's association with deviant peers, differences in substance use, or a different pattern of relation among the three variables. Although previous researchers have indicated that the study of demographic variations is important, few have had access to samples large and varied enough to have sufficient statistical power to test for demographic differences.

Chapter 4

Method

Participants

Participants were 2,643 middle school students recruited as part of a larger longitudinal study investigating the effects of a youth violence prevention program (Multisite Violence Prevention Project, 2004). Self-report data were collected from students at the end of their sixth grade (Spring of 2003), and beginning and end of the following school year (Fall 2003 and Spring 2004).

This sample constitutes the second cohort of students attending 37 schools randomly assigned to one of four conditions (targeted intervention, universal intervention, combined intervention, or control) of a violence prevention evaluation conducted at four sites. At each school, a random sample of approximately 100 sixth grade students was selected, excluding students in self-contained special education classrooms. All sixth grade students at the three participating Chicago schools were selected due to class sizes smaller than 100 students. Of all students sampled at both intervention and control schools, 78% consented to participate in the study; of those consented, 98% were assessed. Fifteen percent ($n = 98$) of students in the current sample were lost to attrition by the end of the seventh grade, most often because they no longer attended the school at which they were initially assessed.

Approximately half (49%) of the sample was male. The sample was 41% African American, 23% Hispanic, and 22% Caucasian, but these proportions vary widely by the city in which the participating schools were located. The table below presents the ethnic

breakdown of the sample by site (numbers based on intervention and control schools for Cohort 1 and may vary slightly for the current sample).

Table 1

Ethnic Composition of Sample by Site

	Northeast Georgia	Chicago	Durham	Richmond	Total
Black Non-Hispanic	29%	38%	55%	75%	48%
Hispanic	12%	48%	8%	5%	21%
White Non-Hispanic	45%	3%	22%	6%	18%
Multiracial	10%	6%	8%	10%	8%

Family constellations varied by site, but did not range as widely as ethnicity. In the current sample, 51% of students lived with two biological parents, 33% with a single parent (with or without the presence of other generations in the home), and 16% lived in another family constellation (for example, with a parent and step-parent (9%), with another adult relative (4%), in a non-specified “other” situation (2%), or with a foster family (less than one percent)).

Procedure

Active parental consent and student assent were obtained from all participants. Students received a small incentive for returning the consent form, regardless of their decision to participate in the study. Students also received gift cards for their participation in the study. Students completed computer-administered measures at each wave in small groups outside the classroom (i.e., media center or cafeteria). Identifying information was entered into the laptop computers prior to students entering the testing area. Students received standardized instruction from researchers on the use of laptop

computers used to administer the measures and the types of questions they would be answering. The full computer-assisted survey interview (CASI), which included measures not used in this study, took students on average 41 minutes to complete.

Students both read the survey questions and instructions on the computer screen and heard audio clips via headphone. The audio-taped voices were of both males and females and individuals of different ethnic backgrounds. Students were prompted to re-enter answers if their responses fell outside of the possible values for any question. Students could actively refuse to answer a question by typing “R,” but could not leave a question unanswered. Computerized administration facilitated more complex response patterns, by for example skipping to the next appropriate question if a participant answered “no” to a stem question with follow-up questions. Additionally, the computerized survey was designed to result in a quiet, orderly collection of data, increase privacy in responding, and with the addition of the audio-taped clips, increase comprehension of the instructions and survey questions.

Measures

Parental monitoring

Parental monitoring was assessed using the Parenting Practices (Monitoring & Involvement Scale). This was a parenting practices scale with questions developed in the Pittsburgh Youth Survey, a longitudinal survey of youth aged 7 to 15 with a disproportionate representation of those at high risk for youth violence (Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998). The Parenting Practices scale was originally designed to measure positive parenting, discipline effectiveness, avoidance of discipline, and extent of monitoring and involvement. A confirmatory factor analysis

of those scales using a sample of inner-city, predominantly minority youth found two factors: Discipline and Monitoring (Gorman-Smith, Tolman, Zelli, & Huesmann, 1996).

The 12-item Parenting Practices scale assessed students' perception of the extent of their parents' monitoring and involvement. The measure pertains to parental knowledge of child whereabouts (e.g., "How often does a parent talk to you about what you had actually done during the day?"; Responses were 1 – *Don't know*, 2 – *More than 30 days ago*, 3 – *Within the last 30 days, but not within the last week*, 4 – *At least once this week, but less than once a day*, 5 – *Every day or almost every day*) as well as caregiver involvement in daily activities and routines (e.g., "In the past 30 days, how often did a parent have time to listen to you when you wanted to talk with one of them?"; Responses were 1 – *Hardly ever*, 2 – *Sometimes*, 3 – *Often*). Response categories varied according to the wording of the question, but were designed to assess the child's perception of the frequency of the behavior. In a sample of inner-city, predominantly minority youth, researchers found that alpha coefficients for the parenting scales ranged from .68 to .81 (Gorman-Smith et al., 1998). Pilot testing of this measure using students from classrooms at all four sites in the current study found evidence for high internal consistency, $\alpha = 0.85$.

The monitoring measure used in the current study includes items that assess active solicitation of child activities not usually found in pure monitoring scales. For example, Borawski et al. (2003) used a scale validated in an urban, African American sample by Li et al. (2000) that used six self-report items to assess the degree to which parents know where and with whom students are and the activities they are engaging in (e.g., "When I go out at night, my parents know where I am," scored 1 – *Never* to 4 – *Always*). Simply

assessing children's perception of the level of the parents' knowledge of their whereabouts is the typical method of estimating parental monitoring (Kerr & Stattin, 2000), but when conceptualizing monitoring as a parenting practice it is important to know if parents actively gather information. Additionally, the current measure includes items on involvement, which is theorized to serve the same function as monitoring in terms of serving as a barrier to youth association with deviant peers. Specifically, when parents monitor a child's whereabouts and are involved in their day-to-day lives, children are less likely to have the opportunity to associate with peers engaging in drug use and other antisocial behavior. Dishion and McMahon (1998) conceptualized involvement and monitoring as highly correlated dimensions of parenting, and suggested that "schemes that presuppose orthogonal dimensions of parenting (e.g. warmth and control) may not be empirically or conceptually justified" (p. 64).

Peer deviance

Peer deviance was measured using the Peer Problem Behavior scale, 10 items that assess the student's perception of how many of their close friends engaged in antisocial behavior in the past three months (adapted from the Things My Friends Have Done scale used by the Fast Track prevention study, Conduct Problems Prevention Research Group, 2004). This scale provides a proximal measure of peer influence based on student report of how many of his or her close friends engaged in a variety of problem behaviors in the specified time period. Students were first asked, "How many friends would you consider to be close friends? These are friends who you see more than once a week. These are friends you spend time with and enjoy doing things with." The directions instructed students to think of those close friends when answering questions about the frequency of

their behaviors, including aggression (5 items, e.g., “Hit someone with the idea of really hurting that person”), delinquency (4 items, e.g., “Gone into or tried to go into a building to steal something”), and alcohol use (1 item, “Drank alcohol”). The instructions also reminded students that researchers would not tell students’ friends or anyone else about their responses. Responses were on a 0 to 4 point scale ranging from 0 – *None of them* to 4 – *All of them*. Pilot testing of this measure using students from classrooms at all four sites in the current study found evidence for high internal consistency, $\alpha = 0.86$.

Frequency of substance use

Substance use was measured using the 6-item Drug Use subscale of the Problem Behavior Frequency Scale (Farrell, Kung, White, & Valois, 2000). Student self-report was used to assess past 30-day frequency of use of “gateway” drugs (Kandel, 1975) including beer, wine, liquor, being drunk, cigarettes, and marijuana (e.g., “Drunk beer, more than a sip or a taste”). Responses were based on a 6-point scale ranging from 1 – *Never* to 6 – *20 times or more*. Pilot testing of this measure using students from classrooms at all four sites in the current study found evidence for high internal consistency, $\alpha = 0.83$.

Family structure

Family structure was measured by asking students “Who else lives with you?” Responses were assigned to categories based on the content of the student’s response. Preliminary response categories included two-parent family, multi-generational single-parent family, parent with step-parent or significant other, single-parent with or without other adults, foster family, adult relative with neither parent, and other. For greater ease

of data analyses and consistent with previous research, responses were recoded to create three groups: two-parent family, single-parent family, and other.

Data Analysis

Structural equation modeling was used to test the fit for a model in which peer deviance mediates the effect of parental monitoring on substance use, and to test other hypothesized paths. Preliminary analyses used multi-group models to test differences in model fit according to site. The four sites used in this study varied in their ethnic compositions. Ethnicity has been linked to differences in parental monitoring (e.g., Shakib et al., 2003) and peer deviance (e.g., Brown et al., 2004; Cleveland et al., 2005) in previous research. Therefore, it was hypothesized that differences in the ethnic composition of the sample by site may affect the fit of the predicted model. Any differences that were to have emerged in model fit were to be addressed with subsequent planned comparisons between sites. For example, Richmond and Durham both have a large proportion of African American participants, so those sites would be compared to Chicago and Northeast Georgia, respectively, on the variables of interest. Multi-group models were also used to examine differences in model fit based on gender and family structure.

Figures 4 through 7 represent the proposed structural models that were tested. Figure 4 is a fully saturated model with all hypothesized paths drawn. This model was used to test the proposed hypotheses for this study. Figures 5 through 7 were not tested directly, but are theoretical models illustrating hypothesized relations among study variables.

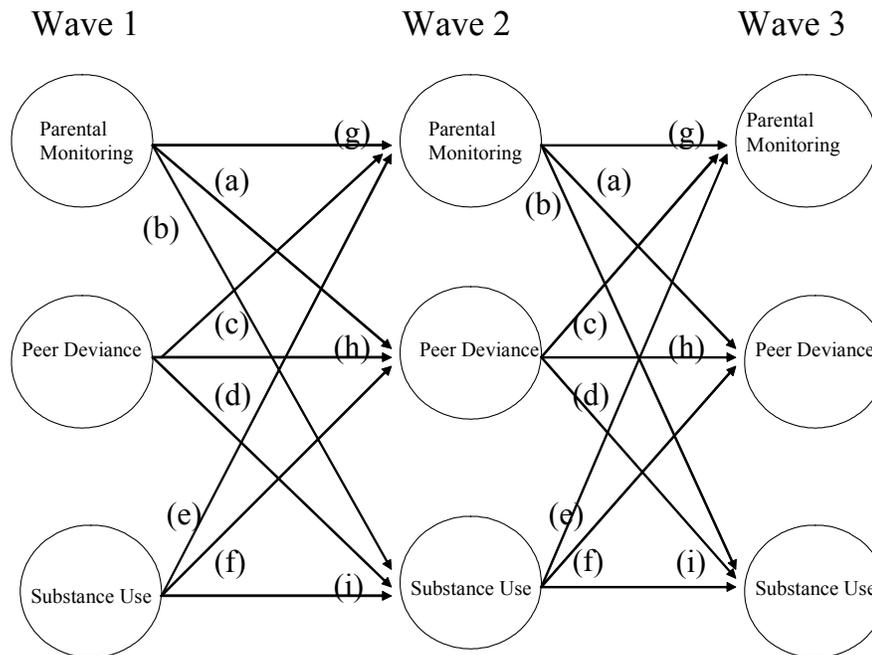


Figure 4. Model A: All Hypothesized Pathways

Hypothesis 1 was tested by ascertaining that path coefficients d and h were positive and significant, suggesting that peer deviance has direct and indirect effects (through continued involvement with deviant peers) on adolescent substance use. Hypothesis 2 was tested by ascertaining that path coefficients b were negative and significant, but smaller in absolute value than paths d, suggesting that parental monitoring is associated with decreases in substance use, but the relation is weaker than that between peer deviance and substance use. Hypothesis 3 was tested by examining paths a and d; a significant negative coefficient for path a and a significant positive coefficient for path d would give preliminary support for mediation. Mediation was further tested by examining the relation between Wave 1 monitoring and Wave 3

substance use (path not shown) with and without the indirect effect through paths a x d included. Mediation would be indicated if that relation was significantly weakened or eliminated by the a x d effect. Hypotheses 4 and 5 were investigated by examining paths c and e to study the impact of peer deviance and substance use on parental monitoring. Hypothesis 6 was tested by ascertaining that path coefficients f, h, and d were positive and significant, suggesting that substance use is associated with increases in peer deviance, which is in turn associated with increases in substance use.

Figures 5 through 7 are nested within this model. Figure 5 shows two competing models for the relations between substance use and parental monitoring, one in which low parental monitoring is a causal factor in changes in adolescent substance use, and one in which substance use precedes changes in monitoring.

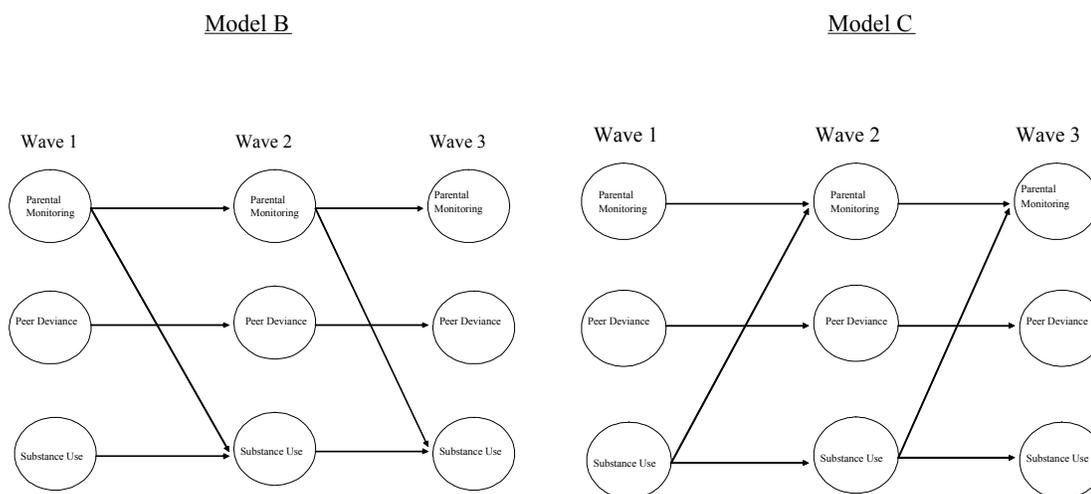


Figure 5. Models B and C illustrate the competing pathways possible for the variables of parental monitoring and substance use. Low parental monitoring could result in subsequent increases in substance use, but other research suggests that use of substances affects parental behaviors, resulting in subsequent changes in parental monitoring. These

effects could also be reciprocal in nature (not shown). These models are nested within Model A.

Figure 6 shows two competing models for the relations between substance use and peer deviance, one in which peer deviance precedes changes in substance use, and one in which the reverse is true. A likely possibility (not shown) is that the relations between substance use and parental monitoring and peer deviance are reciprocal in nature, with each predicting changes in substance use over time, but also subsequently changing as a result of substance use.

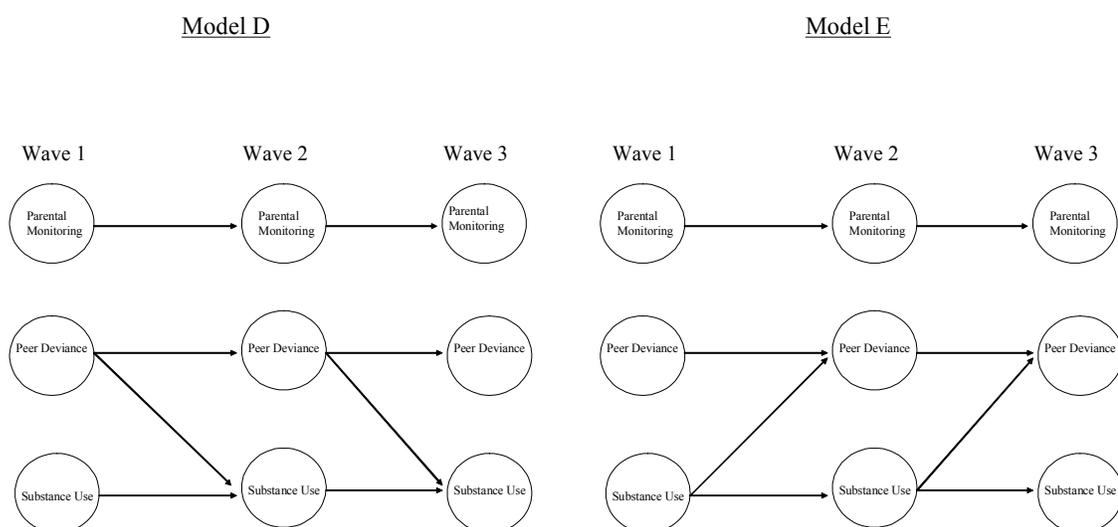


Figure 6. Models D and E illustrate the competing pathways possible for the variables of peer deviance and substance use. Association with deviant peers could result in subsequent increases in substance use through a variety of mechanisms (ex., modeling, greater availability of substances), or substance-using children could “flock” to other substance-using children, as in Model E. These effects could also be reciprocal in nature (not shown). These models are nested within Model A.

Figure 7 illustrates the hypothesis that peer deviance mediates the effect of parental monitoring on substance use over time.

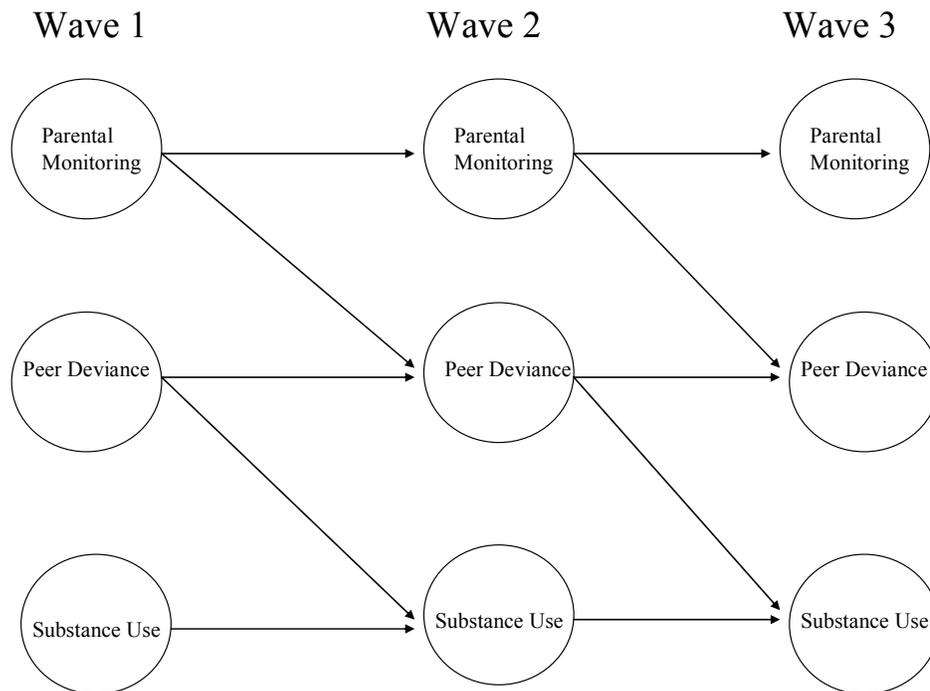


Figure 7. Model F: Hypothesized Mediation Effects. Model F illustrates the hypothesized mediational pathway of parental monitoring to peer deviance to substance use. Low parental monitoring is hypothesized to predict greater association with deviant peers at subsequent waves, which is hypothesized to predict higher levels of gateway drug use at subsequent waves. This model is nested within Model A.

Cole and Maxwell's (2003) guidelines for the testing of mediational models using SEM with longitudinal data were followed with one exception. Because this study used single indicators of each construct, procedures involving latent variables and the measurement model were not relevant. Mediational and direct effects were tested. The total effects of variables were measured by estimating the effect of Wave 1 variables on

Wave 3 variables, representing the effect a one unit change in the Wave 1 variable would have on the Wave 3 variable across the course of the study. The indirect effect is the degree to which the Wave 2 variables mediate the relation between Wave 1 and Wave 3 variables. The direct effect is that part of the Wave 1 variable's effect on a Wave 3 variable that is not mediated by a Wave 2 variable. Mediation was tested by determining whether the path coefficient representing the effect of the Wave 1 variable on the Wave 3 outcome variable was significantly reduced by the introduction of indirect paths through the hypothesized Wave 2 mediator variable.

Chapter 5

Results

Descriptive statistics for parental monitoring, peer deviance, and substance use were calculated, and gender differences were examined using one-way analyses of variance (ANOVA). Correlational analyses were performed to evaluate the relations among the three variables. Path analysis using version 4 of MPlus (Muthen & Muthen, 2006) was used to determine longitudinal relations among the variables over time. Multi-group modeling was performed to determine if there were significant differences in the relations among variables based on site (Richmond, Chicago, Durham, and Northeast Georgia), and to determine if the relations among variables differed based on gender and family structure.

Descriptive Analyses

Table 2 reports the percentage of boys and girls reporting any substance use in the past 30 days at each wave (end of sixth grade, and beginning and end of seventh grade). Approximately one-fifth of boys and girls reported drinking beer or wine in the past 30 days; relatively fewer students indicated that they had drunk liquor, were drunk, or smoked cigarettes. However, by the end of the seventh grade, at least 15% of students reported they had smoked cigarettes, at least 12% had been drunk, at least 14% had drunk liquor, and at least 9% had used marijuana in the past 30 days. Prevalence rates were not significantly different between boys and girls at any wave except that a higher percent of

boys (11%) than girls (7%) reported having been drunk in the past 30 days at the end of the sixth grade.

Table 2

Past 30-Day Prevalence Rates of Students Reporting Any Substance Use (Percentages)

Item	Wave 1			Wave 2			Wave 3		
	Boys	Girls	χ^2 ^a	Boys	Girls	χ^2 ^a	Boys	Girls	χ^2 ^a
Drunk beer	19	17	8.61	21	19	10.50	22	24	3.99
Drunk wine	20	19	2.41	21	22	3.19	21	26	8.45
Smoked cigarettes	13	12	6.08	14	13	0.82	16	15	5.71
Been drunk	11	7	14.12*	10	9	6.08	13	12	0.78
Drunk liquor	11	9	1.88	13	12	1.55	15	14	7.15
Used marijuana	7	4	9.74	9	7	8.87	11	9	8.16

Note. *N*s ranged from 1148 to 1335 for boys and 1166 to 1368 for girls due to missing data.

^a Chi square with 1 degree of freedom comparing prevalence for boys and girls.

**p* < .05.

Table 3 displays the percentage of boys and girls reporting having at least one friend exhibiting behaviors listed on the Peer Problem Behavior Scale at each of the three waves. Participants reported higher rates of substance use by peer than by themselves, and many of these rates of deviant peer behavior differed significantly between boys and girls. With a few notable exceptions, boys reported more deviant peer behaviors than did girls at every wave. Stealing, weapon-use, and joyriding by peers were all more prevalent among boys at the end of the sixth grade, and beginning and end of the seventh grade. Several other deviant peer behaviors were reported more often by boys than by girls at earlier waves, but were no longer significant at later waves. Examples of this pattern can be found in skipping school and hitting, both which began with more boys reporting having at least one friend who had engaged in the behavior, but ended with roughly equal numbers of the genders reporting having such a friend. Having at least one

friend who drank alcohol in the past three months did not differ between boys and girls at the first two waves of data collection; however, at the end of the seventh grade, more girls than boys reported having at least one friend who drank alcohol. A consistent finding across waves was that over twice as many girls as boys reported having at least one friend who hit or slapped a boyfriend/girlfriend in the past three months.

Means and standard deviations for the drug use, parental monitoring, and peer deviance scales are reported in Table 4 at each wave for boys and girls. The Cohen's *d* estimate of effect size is reported for the analyses of variance (ANOVA). This is particularly important because the large sample size provided statistical power to detect rather small differences between means. A *d* of 0.2 is considered a small effect size, 0.5 a medium effect size, and 0.8 a large effect size (Cohen, 1992). ANOVAs revealed several significant gender differences. Girls reported higher levels of parental monitoring than did boys at every wave. Conversely, boys reported higher levels of peer deviance than did girls, but only at the end of the sixth grade. These effect sizes were quite small.

Table 3

Prevalence Rates of Students Reporting One or More Friends Engaging in Specific Behaviors in Past Three Months by Gender (Percentages)

Item	Time 1			Time 2			Time 3		
	Boys	Girls	χ^2	Boys	Girls	χ^2	Boys	Girls	χ^2
Skipped school without an excuse	33	28	12.21**	31	28	5.58	33	33	0.67
Stolen something worth less than \$100	30	23	20.82**	27	20	18.26**	30	24	15.34**
Gone into a building to steal	20	16	8.19*	19	14	9.92**	22	14	23.23**
Gone joyriding	14	10	10.94**	15	10	17.04**	19	12	18.25**
Hit someone to really hurt them	40	36	13.13**	38	32	10.95**	41	37	3.37
Attacked someone to really hurt them	17	11	18.71**	16	11	16.37**	18	13	10.68**
Used a weapon, etc. to get things	14	7	31.64**	11	7	17.62**	14	8	21.94**
Drank alcohol	24	26	0.74	25	27	2.0	32	38	8.77*
Been in a gang fight	22	15	21.19**	19	16	2.79	21	17	7.60*
Hit or slapped a boyfriend/girlfriend	22	45	164.61**	17	41	167.93**	21	44	135.43**

Note. Ns ranged from 1145 to 1331 for boys and 1166 to 1363 for girls due to missing data.

^a Chi square with 1 degree of freedom comparing prevalence for boys and girls.

* $p < .05$. ** $p < .01$.

Table 4

Means and Standard Deviations for Each Scale by Gender

Scale	Boys		Girls		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Wave 1					
Drug Use	0.16	0.33	0.13	0.29	0.10*
Monitoring	3.67	1.04	3.77	0.99	0.10*
Deviance	0.34	0.48	0.31	0.40	0.07*
Wave 2					
Drug Use	0.18	0.36	0.16	0.33	0.06
Monitoring	3.71	1.09	3.83	1.01	0.11*
Deviance	0.32	0.47	0.30	0.42	0.04
Wave 3					
Drug Use	0.21	0.38	0.20	0.37	0.03
Monitoring	3.69	1.12	3.78	1.06	0.08*
Deviance	0.37	0.51	0.35	0.45	0.04

Note. *N*s ranged from 1080 to 1335 for boys and from 1120 to 1368 for girls due to missing data.

* $p < .05$

In Table 5, the results of a repeated measures ANOVA of gender and time are reported. The partial Eta squared statistic, another measure of effect size, is reported. The partial Eta squared in this table represents the amount of variance accounted for by gender and by wave. For drug use and peer deviance, there was a significant effect of wave, such that scores on these scales increased over time. For monitoring, wave exhibited a quadratic effect, such that monitoring increased at the beginning of the seventh grade before decreasing again. Gender had a significant effect on monitoring, such that girls reported higher levels of monitoring than did boys, as seen in the previous table. These effects were very small, representing less than one percent of the variance in scale scores. There were no interactions between gender and wave, suggesting that any differences between girls and boys were consistent over time.

Table 5

Repeated Measures ANOVA: Gender by Wave

Variable	Main Effects		Interaction
	Gender	Wave	
Drug Use	$\eta^2 = .001$	$\eta^2 = .028^{**}$	$\eta^2 = .001$
Monitoring	$\eta^2 = .003^*$	$\eta^2 = .003^a^*$	$\eta^2 = 0$
Peer Deviance	$\eta^2 = .001$	$\eta^2 = .012^{**}$	$\eta^2 = 0$

Note. Statistic reported is the partial Eta squared, a measure of effect size.

* $p < .05$. ** $p < .01$. ^a Quadratic relation.

Table 6 displays means and standard deviations for each scale for those in two-parent families, single-parent families, and other family types. The overall F value for each comparison was significant. Tukey post-hoc analyses indicated that at Waves 1 and 3, parental monitoring was higher for those in two-parent families than those in single-parent ($d = .15$ for Wave 1, $.19$ for Wave 3) or other ($d = .20$ for Wave 1, $.30$ for Wave 3) family types, but there were no differences between single-parent families and other family types. At Wave 2, monitoring in two-parent families was higher than in single-parent families ($d = .15$), which in turn was higher than in other family types ($d = .21$). At Waves 1 and 2, peer deviance was significantly lower for those in two-parent families compared to those in single-parent ($d = .19$ for Wave 1, $.14$ for Wave 2) and other family types ($d = .27$ for Wave 1, $.27$ for Wave 2), with no significant differences between the latter two groups. At Wave 3, peer deviance was significantly lower for those in two-parent families compared to other family types ($d = .16$), but no other group differences were seen. At Waves 1 and 2, drug use was higher in other family types than in either two-parent families ($d = .18$ for Wave 1, $.21$ for Wave 2) or single-parent families ($d = .12$ for Wave 1, $.19$ for Wave 2), which were not significantly different from each other.

At Wave 3, the only significant difference in drug use was that those from two-parent families reported less use than those from other family types ($d = .12$). The effect sizes representing the magnitude of these differences are fairly small.

Table 6

Means and Standard Deviations for Each Scale by Family Structure

Scale	Two-parent		Single-parent		Other		F
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Wave 1							
Drug Use	0.13	0.30	0.15	0.30	0.19	0.35	7.40**
Monitoring	3.81	1.00	3.66	1.02	3.60	1.04	9.32**
Deviance	0.27	0.40	0.35	0.45	0.39	0.48	15.56**
Wave 2							
Drug Use	0.15	0.32	0.16	0.32	0.23	0.42	9.54**
Monitoring	3.90	0.98	3.75	1.05	3.52	1.12	20.88**
Deviance	0.26	0.39	0.32	0.47	0.38	0.49	12.64**
Wave 3							
Drug Use	0.19	0.37	0.20	0.36	0.24	0.43	3.65*
Monitoring	3.87	1.03	3.67	1.11	3.54	1.17	16.51**
Deviance	0.33	0.45	0.38	0.49	0.41	0.52	5.50**

Note. *N*s ranged from 1080 to 1238 for those in two-parent families, 694 to 858 for those in single-parent families, and from 402 to 494 for those in other family types due to missing data.

* $p < .05$. ** $p < .01$

In Table 7, the results of a repeated measures ANOVA for family structure and wave are reported. There were small main effects for family structure for each of the three dependent variables in this analysis. There was one small interaction of family structure and wave, for parental monitoring, which can be seen in Figure 8. Children from two-parent and single-parent families reported higher levels of monitoring at Wave 2 than at Wave 1 or 3, while those from other family types reported less monitoring at Wave 2 than Wave 1 or 3. A small main effect of wave is again seen for drug use and peer deviance in this analysis.

Table 7

Repeated Measures ANOVA: Family Structure by Wave

Variable	Main Effects		Interaction
	Family Structure	Wave	
Drug Use	$\eta^2 = .007^*$	$\eta^2 = .025^*$	$\eta^2 = .000$
Monitoring	$\eta^2 = .020^*$	$\eta^2 = .000$	$\eta^2 = .005^{*a}$
Peer Deviance	$\eta^2 = .010^*$	$\eta^2 = .010^*$	$\eta^2 = .000$

Note. Statistic reported is the partial Eta squared, a measure of effect size.

^a Quadratic relation.

* $p < .05$.

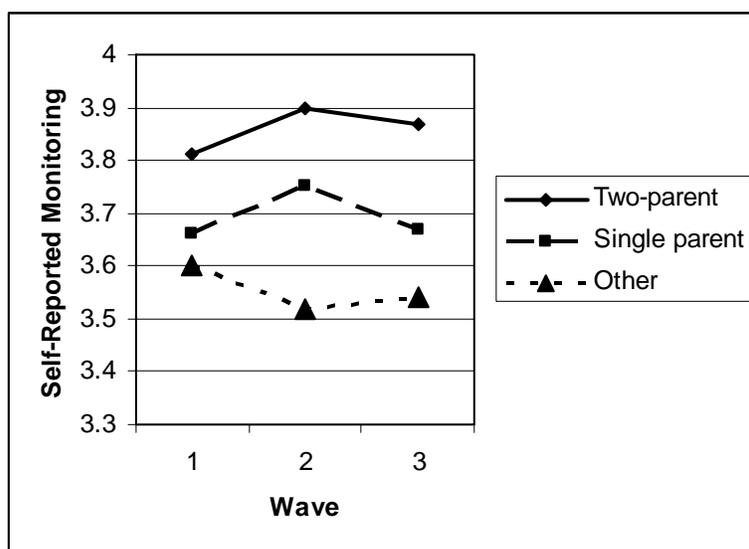


Figure 8. Self-reporting monitoring over time by family structure.

Correlations Among Measures

Correlations among all scales used in this study were statistically significant at each wave at $p < .05$ (see Table 8). Correlations for boys and girls were compared using a test for independent correlations (Cohen, Cohen, West, & Aiken, 2003). The drug use measure was strongly correlated across waves, showing significant stability. The correlation between drug use at Wave 2 and drug use at Wave 3 was significantly larger for girls ($r = .72$) than for boys ($r = .57$) indicating greater stability for girls between the

beginning and end of the seventh grade. The monitoring scale was also strongly correlated across waves (with correlations ranging from .52 to .68). This scale showed greater stability for girls as compared to boys between the end of sixth and beginning of seventh, as well as across the seventh grade. Peer deviance exhibited moderate to strong correlations across waves (with r values ranging from .41 to .56) and was also more strongly correlated for girls than for boys across all waves. The scales in this study were also moderately to highly correlated across the first and third waves of data collection. Moderate cross-wave correlations were found for drug use and peer deviance, and small cross-wave correlations were found for drug use and monitoring. Small cross-wave correlations were also found for monitoring and peer deviance. In addition to the gender differences in stability coefficients, drug use at Wave 2 was more highly correlated with peer deviance at Wave 3 for girls ($r = .45$) than for boys ($r = .35$).

Table 8

Correlation Coefficients Among Observed Variables

Variable	1	2	3	4	5	6	7	8
Wave 1								
1. Drug Use	--							
2. Monitoring	-.18	--						
3. Deviance	.47	-.18	--					
Wave 2								
4. Drug Use	.64	-.18	.32	--				
5. Monitoring	-.15	.58/.64	-.19	-.20	--			
6. Deviance	.38	-.18	.50	.48	-.21	--		
Wave 3								
7. Drug Use	.52	-.12	.31	.57/.72	-.17	.41	--	
8. Monitoring	-.13	.52/.60	-.17	-.19	.57/.68	-.20	-.19	--
9. Deviance	.32	-.16	.41/.48	.35/.45	-.23	.46/.56	.51	-.22

Note. All correlations are significant at $p < .05$ level. Coefficients are reported separately for boys/girls only if difference is statistically significant.

Path Analyses

Structural equation modeling was used to test competing models of the relations among parental monitoring, peer deviance, and substance use across three waves. The nesting of the students within schools was accounted for using bootstrap estimation (Asparouhov & Muthen, 2006), and models controlled for intervention condition. First, a main effects model based on the full sample was constructed to examine relations among the variables over time. Multigroup analyses were used to test the consistency of models across the four sites. Multigroup models were also used to test for differences in model fit by gender and by family structure. Finally, a model was constructed to test the hypothesis that peer deviance mediates the relation between parental monitoring and substance use over time.

Several indicators of model fit were used to determine how well each model fit the sample data, and to compare fit of different models. The chi-square statistic was examined, which in this case represents the difference between the observed covariance matrices and those estimated by the specified model. Smaller chi square values represent better-fitting models. A non-significant chi-square value would be ideal, indicating the specified model was not significantly different from the sample covariance, but this is unlikely in large samples in which even small differences from a perfect fit are significant. Models were also compared by calculating a chi-square difference test, which compares the fit of related models. The overall model fit was also evaluated using the comparative fit index (CFI), the Tucker-Lewis index (TLI) and the root mean square error of approximation (RMSEA). The CFI and TLI compare the proposed model fit to that of a baseline model in which no relations among the variables are

specified (i.e., they are assumed to be zero), and as such are considered “incremental fit” indices. Values exceeding .90 are generally considered to represent a good model fit (Bentler, 1990). The RMSEA is an absolute fit index, with values of .06 or less indicating a close fit, and values of .06 to .08 indicating an acceptable fit (Brown & Cudeck, 1993). The Bayesian Information Criterion (BIC) is an indicator of model fit that places more value on parsimonious models, and penalizes models with a greater number of specified paths (Schwarz, 1978). Lower values are indicative of better-fitting models, and the BIC can be used to compare non-nested models.

Main Effects Model and Multigroup Models

An initial model was constructed to examine the longitudinal relations among parental monitoring, peer deviance, and substance use over three waves. In this model, all Wave 2 and 3 variables were regressed on variables at the preceding waves. This model did not adequately fit the data, $\chi^2(9) = 228.47, p < 0.01, CFI = 0.95, TLI = 0.70, RMSEA = 0.106$. Previously reported correlational analyses indicated that all of the measures were moderately to strongly correlated not only between adjacent waves, but also between the first and last wave. In an effort to improve model fit, paths were added to the model from parental monitoring, peer deviance, and substance use at Wave 1 to the corresponding measures at Wave 3. Adding these coefficients improved the model fit significantly, $\chi^2_{diff}(3) = 220.03, p < 0.01$. This overall model fit the data well, $\chi^2(6) = 8.44, p = 0.21, CFI = 1.0, TLI = 1.0, RMSEA = 0.01$.

Multigroup models were constructed to test the consistency of relations among variables across the four participating sites. These models had the same structure as the

main effects model, but parameters were allowed to vary across groups. The fit statistics for the overall model and all multigroup models can be seen in Table 9.

Table 9

Model Fit Statistics

Model	Chi square	df	CFI	TLI	RMSEA	BIC	Chi square difference
Full Sample	8.44	6	1.0	1.0	0.01	34098.36	
Site Groups							73.34*
Constrained	104.92*	60	0.99	0.97	0.03	34725.58	
Unconstrained	31.58	24	1.0	0.99	0.02	34917.19	
Gender Groups							40.55*
Constrained	66.58	33	0.99	0.98	0.03	34274.74	
Unconstrained	26.03	12	1.0	0.97	0.03	34370.87	
Family Structure Groups							46.19*
Constrained	70.04	60	1.0	1.0	0.01	32464.24	
Unconstrained	23.85	18	1.0	0.99	0.02	32712.18	

Note. CFI is the Comparative Fit Index, TLI is the Tucker-Lewis Index, RMSEA is the Root Mean Squared Error of Approximation, BIC is the Baysean Information Criterion. * $p < .001$.

The results of the multigroup modeling process revealed that a model in which path coefficients were allowed to vary freely between the sites fit the data better than one in which coefficients were constrained to be equal across all sites, $\chi^2_{\text{diff}}(36) = 73.34$, $p < .001$. The unconstrained model fit the data well, $\chi^2(24) = 31.58$, $p = 0.14$, CFI = 1.0, TLI = 0.99, RMSEA = 0.02. However, the constrained model also fit the data very well, with more than acceptable values on the CFI, TLI, and RMSEA: $\chi^2(60) = 104.92$, $p < 0.0001$, CFI = 0.99, TLI = 0.97, RMSEA = 0.03. Additionally, the very large sample size used in this study resulted in the power to detect very small differences which may not be of practical significance. Comparing the BICs for the constrained (34726) and unconstrained (34917) models favored the more parsimonious constrained model over the unconstrained model. Raftery (1993) suggested that BIC differences of 5 indicate strong

evidence and differences of 10 indicate conclusive evidence of differences between models; the BIC difference of 191 found here provides conclusive evidence in favor of the constrained model. Because strong evidence for site differences in the relations among variables was not found, further analyses were done pooling the data across sites.

Multigroup analyses were also used to compare models across groups that differed in gender and family structure. Models in which specific sets of parameters were constrained across gender were compared to an unconstrained model; this process was repeated for groups of different family structures. Although unconstrained models fit that data better than constrained models across both gender ($\chi^2_{\text{diff}}(21) = 40.55, p < .001$) and family structure ($\chi^2_{\text{diff}}(42) = 46.19, p < .001$). The constrained models also fit the data very well (see Table 9). In both cases, a lower BIC value favored the fit of the constrained over the unconstrained models. It was again assumed that differences in model fit leading to significant chi square difference tests for gender and family structure multigroup models were likely due to the large amount of available power.

Due to the absence of persuasive evidence to suggest group differences in model fit, the remainder of the analyses proceeded using the full sample of students. A model representing the longitudinal relations between variables can be seen in Figure 9. Within this model, parental monitoring, peer deviance, and substance use exhibited considerable stability over time. Path analyses suggested differences in relations among variables from the end of sixth grade to the beginning of seventh (an interval of approximately 3 months) compared to relations from the beginning to end of the seventh grade school year (an interval of approximately 9 months). Consistent with hypotheses, there was a

significant relation between peer deviance and substance use at both waves, suggesting that having deviant peers at Waves 1 and 2 was associated with subsequent increases in substance use ($b = .06$ and $.13$). This relation was smaller in magnitude than the positive prospective relation between substance use and peer deviance ($bs = .17$). Substance use was associated with an increase in association with deviant peers, also consistent with hypothesized effects.

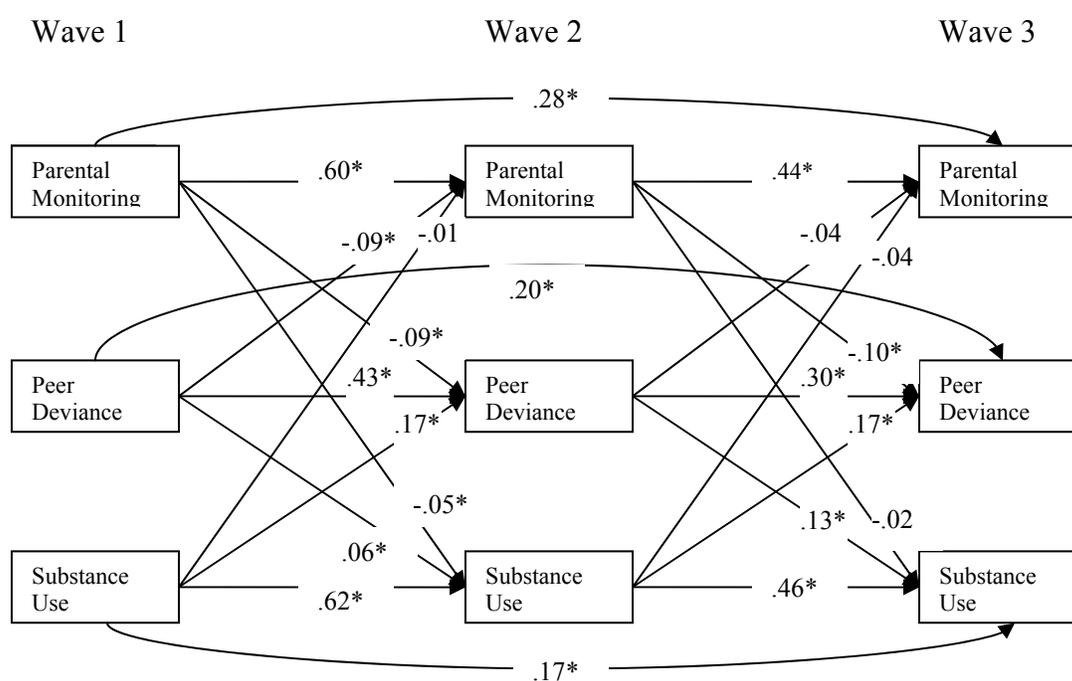


Figure 9. Overall path model representing the relations among variables over time. Values are standardized path coefficients. * $p < .05$.

Parental monitoring also had a small negative relation with substance use, such that parental monitoring at Wave 1 was associated with decreases in substance use at Wave 2. This relation was not significant across Waves 2 and 3. There was, however, a negative, significant relation between parental monitoring and subsequent peer deviance

across both waves, suggesting that parental monitoring predicts decreases in peer deviance over time.

It was also hypothesized that substance use and peer deviance would influence parental monitoring over time. Higher levels of peer deviance at Wave 1 predicted lower levels of parental monitoring at Wave 2, but this relation was not significant across Waves 2 and 3. Substance use did not predict subsequent parental monitoring at any wave.

Mediator Models

Path modeling was also used to determine the extent to which peer deviance mediated the impact of parental monitoring on frequency of substance use. The initial overall model supported mediation, in that monitoring at Wave 1 predicting peer deviance at Wave 2, which subsequently predicted substance use at Wave 3. Longitudinal mediation was tested by examining the relation between parental monitoring at Wave 1 and substance use at Wave 3 with and without the inclusion of the variable of peer deviance at Wave 2. In this more stringent test in which the effect of Wave 1 monitoring on Wave 3 substance use was mediated by peer deviance at Wave 2, mediation was not supported. Whereas parental monitoring at Wave 1 was predictive of lower levels of peer deviance at Wave 2 (standardized path coefficient = $-.09$, the path from Wave 1 monitoring to Wave 3 substance use was non-significant both with and without the inclusion of the path from Wave 2 peer deviance to Wave 3 substance use in the model (Figure 10).

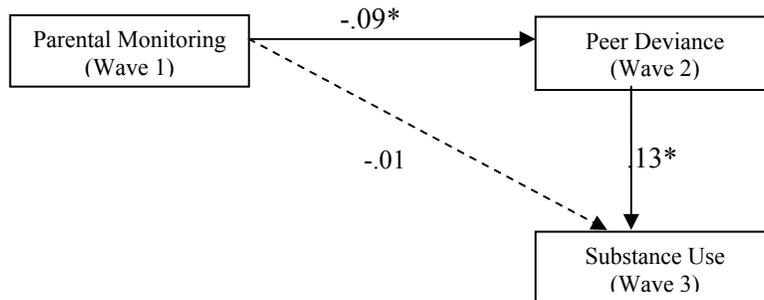


Figure 10. Simplified path diagram with peer deviance as a mediator of the relation between parental monitoring and substance use by gender. Figures represent standardized path coefficients. * $p < .05$.

Chapter 6

Discussion

The purpose of this study was to examine the longitudinal interrelations among parental monitoring, peer deviance, and substance use among middle school students. The hypotheses that peer deviance and substance use would influence one another over time were upheld. Support was found for reciprocal effects, with slightly more evidence for a differential association effect. Parental monitoring was, as hypothesized, associated with decreases in substance use over time, but its influence within the overall model was small. Parental monitoring was more strongly associated with decreases in peer deviance. Support was not found for the mediated model in that parental monitoring at Wave 1 was not predictive of substance use 1 year later. Contrary to hypothesis, substance use was not associated with changes in parental monitoring over time. Peer deviance, in comparison, was associated with reductions in parental monitoring over the first two waves. In general, parental monitoring was more closely linked to peer deviance than it was to substance use. This study found no convincing evidence to suggest group differences in these findings across site of data collection, gender, or family structure.

Prevalence of substance use and peer deviance were found to increase over time in this study, consistent with previous research (e.g. Duncan et al., 1998). Parental

monitoring increased momentarily at the beginning of the seventh grade before decreasing again, but it is unclear whether this was a developmental or seasonal phenomenon (i.e., perhaps higher monitoring was associated with the beginning of a new school year). In this study, deviant peer behaviors were perceived as being more prevalent than students' own deviant behaviors. This finding is consistent with previous research indicating that social norms for risky behaviors can be perceived as more accepting than they in fact are (Kandel, 1996).

The current study found that boys and girls did not differ in level of substance use, and a trend appeared to be emerging in which girls were catching up to boys in their report of deviant peer behaviors. Although previous research has found that boys more commonly use substances and have deviant peers, other recent research, particularly with younger middle school samples, has shown that girls at this age may not differ from boys in their level of certain risky behaviors such as substance use and deviant peer association (Johnston et al., 2005). In fact, this study found that girls were nearly twice as likely to report having a friend who has hit or slapped a boyfriend or girlfriend than were boys. Other studies have found dating violence to more often be perpetrated by females in this age group (Foshee, 1996). Like many previous studies, the current study also found higher mean levels of parental monitoring of girls than of boys (Barnes et al., 2000; Chilcoat, Breslau, & Anthony, 1996; Cottrell et al., 2003; Crosnoe et al., 2002; Flannery, Vazsoni, & Rowe, 1996; Kerr & Stattin, 2000; Kim et al., 1999; Kung & Farrell, 2000).

Consistent with previous research, mean levels of monitoring were higher in two-parent families than other family types and mean levels of peer deviance and substance

use were lower in two-parent families (e.g., Griffin et al., 2000; Kim et al., 1999). The finding that parental monitoring decreased slightly among those in the “other” family structure group at the beginning of seventh grade rather than increasing slightly as was the case for those in two-parent and single-parent families is difficult to explain. This “other” group is comprised primarily of those from stepfamilies, but also includes those living with an adult relative other than a parent, those living with a foster family, and those who didn’t fit into any provided categories. It is possible that not only was monitoring on average lower in this group, it may also have been less responsive to common seasonal (i.e., beginning of school year) changes.

Multigroup analyses conducted for this study indicated that there were differences between the sites, genders, and those of different family structures in terms of the relations among the study variables. However, there was not clear evidence to suggest these differences were more than small variations detected due to the large amount of power derived from the large sample size of this study. The findings from this study do not, however, preclude future research on specific demographic differences on the relations between these variables if new findings generate targeted hypotheses about where those differences might lie.

In general, however, the overall findings from this study are robust across different sites, genders, and family types. This is promising, because it suggests that parental monitoring may have similar protective effects against deviant peer association for girls, boys, and those from different family types. Because parental monitoring is similarly effective, and peer deviance is similarly risky, it underscores the need for

interventions to encourage greater knowledge of behavior, associations, and whereabouts, and to decrease deviant affiliations, for boys and youth from homes without two parents. In this way, these groups may be prevented from engaging in future substance use across later adolescence at greater rates than girls and those from two-parent families, which may ultimately prevent school difficulty, substance abuse, and other negative outcomes (i.e., Richards et al., 2004).

This study found that parental monitoring was associated with small reductions in substance use from the end of the sixth to the beginning of the seventh grade, but not from the beginning to the end of the seventh grade. It is possible that monitoring has greater influence earlier in middle school, when youth are more receptive to parental supervision, whereas as youth age, monitoring may become unwanted, resulting in conflict or deceit. However, this study found that monitoring consistently predicted decreases in peer deviance over time. It is possible that monitoring is more closely related to with whom youth spend their time because parents have some control over their children's mobility at this age, and can exercise some authority in where and with whom youth can go. On the other hand, substance use typically occurs when parents are not present, and thus they may have little direct influence in this arena.

Mediation was not supported longitudinally because parental monitoring at the end of the sixth grade was not predictive of substance use one year later, despite the influence of parental monitoring on peer deviance, and peer deviance on substance use. However, Shrout and Bolger (2002) suggest that Baron and Kenny's (1986) recommendation that a requirement to making a reasonable conclusion of mediation

includes first finding a prospective relation between X (parental monitoring) and Y (substance use) may not be necessary in cases where the effect is hypothesized to be small, as they are in the current study. Although statistical mediation was not established, this study has advanced the state of knowledge on the relations between parental monitoring, peer deviance, and substance use over time by creating a clear temporal separation between the variables. This study showed that parental monitoring was associated with decreases in peer deviance several months later, which in turn was associated with increases in substance use a year later. Some previous research suggesting a mediational effect that measured the peer deviance at the same wave as either parental monitoring or substance use (i.e., Ary et al., 1999; Oxford et al., 2000) was not designed to reveal this temporal ordering of effects, and the direction of influence was assumed rather than tested.

In this study, peer deviance was associated with decreases in parental monitoring. One possible interpretation is that parents “give up,” and react to peer deviance with decreases in monitoring. This does not preclude the possibility that if measured at an earlier age, peer deviance would be associated with increases in parental monitoring. Perhaps the effect seen in this study represents a wearing down of parenting efforts over time. However, it is not clear from this study what the prospective relation between peer deviance and monitoring would look like if monitoring were measured by parent report as well. It is possible that youth and parents see monitoring behaviors very differently, or that much of the decrease in monitoring seen in the current study reflects a child-motivated decrease in parent knowledge and involvement in their activities. Youth who

are using substances may report that they talk to their parents less, and thus provide them with less information over time about their behaviors and associations. This study also found that whereas peer deviance predicted changes in parental monitoring, its predictive power was not stable over time. Peer deviance was associated with decreases in parental monitoring only from Wave 2 to Wave 3. Many studies have demonstrated the influence of parenting practices such as monitoring in preventing peer deviance and substance use among adolescents (e.g., Griffin et al., 2000); this study adds to previous research suggesting that for some youth, their behaviors can influence parenting practices as well.

Peer deviance predicted changes in substance use over both periods studied. This finding is consistent with findings from many previous studies on the influence that peers can exert on young adolescents' drug use behaviors. Another consistent finding of this study was that substance use predicted peer deviance prospectively. This is consistent with Farrell (1994), who found that adolescents' alcohol use was best represented as a cause of deviant peer associations (not a consequence), and Farrell and Danish (1993), who found that changes in peer drug models (self-report of friends' use) were predicted by previous levels of gateway drug use. In the current study, the relation between peer deviance and substance use was best conceptualized as reciprocal in nature, with adolescents' substance use both influencing and being influenced by the behavior of their peers. This study provides important evidence to suggest that peers are extremely influential in youth's substance use at this age, and that their influence may increase over time as substance-using youth continue to seek out deviant peers. Peer groups may

become increasingly homogeneous in their delinquent and substance using behaviors over time, providing few opportunities for youth to interact with more prosocial peers.

Study Limitations and Directions for Future Research

Several limitations of this study must be kept in mind in interpreting hypotheses that were supported and potentially explaining why some were not. For example, in this study, path models examined relations among observed rather than latent variables, and thus it lacks some of the benefits of the latter method, such as estimation of the amount of measurement error and the ability to control for correlated measurement error over time. Additionally, this study relied on single reporter self-report measures, allowing for the possibility of systematic underreporting of sensitive risk behaviors such as substance use and friends' deviance. Although students were assured of confidentiality, they may have underreported their substance use. Using more than one source of data would have strengthened findings by corroborating student report. This limitation may be particularly salient in the case of parental monitoring, in which parental report would have added important information and may even have increased the predictive power of the construct. Many previous studies that have found parental monitoring to be protective against problem behavior in youth have used both parent and child reports (e.g., Griffin et al., 2000; Henry et al, 2001; Kim et al., 1999).

Another potential limitation involves the way monitoring was measured in this study. Although self-report measures of monitoring have been found to be reliable (Dishion & McMahon, 1998), one 2000 study indicated that the beneficial effects associated with higher levels of monitoring may be due mostly to information willingly

disclosed by children to parents (Kerr & Stattin, 2000). In other words, although when parents knew where and with whom their children were when they're not at home or at school it was associated with less incidence of substance use, delinquency, and peer deviance, this effect was found to be associated mostly with information offered up willingly by children. Other, more controlling, monitoring strategies were linked with negative outcomes, including having deviant peers, internalized distress, and substance use and delinquency (Kerr & Stattin, 2000). If the solicitation of information or the direct control of child whereabouts are in fact indirectly associated with negative outcomes, and have much weaker associations with reduced substance use and delinquency as compared to willing child disclosure, it has important implications for prevention.

Additionally, the current study is limited by a failure to take into account family context variables surrounding parental monitoring. Parenting behaviors are most likely inter-related, and monitoring behaviors that occur in the absence of either warmth and acceptance or discipline and appropriate consequences if monitoring uncovers problem behaviors may not be as effective. A behavioral analysis approach to parental monitoring assumes that behaviors are repeated if reinforced, and thus an examination of the antecedents and consequences of monitoring are necessary to discovering how monitoring can be effectively perpetuated (Hayes et al., 2003).

Although studies which investigate the effect of parenting variables on externalizing outcomes generally find that monitoring is a stronger predictor than parental attachment (e.g., Griffin et al., 2000), it is possible that "monitoring" as currently

measured may in fact mediate the relation between parental attachment and child outcome, in that children who feel closer to their parents may be more likely to willingly disclose where and with whom they spend their time. In support of this possibility, Barnes et al. (2000) found that parental monitoring mediates the relation between parental support, defined as “behaviors toward the adolescent indicating to her or him that she or he is valued and loved” (p. 179) and increasing alcohol misuse over adolescence. Additionally, Ary et al. (1999) found that high parental conflict and low involvement predict poor monitoring, leading to association with deviant peers and problem behavior outcomes in older adolescents. Future studies should continue to refine the optimal measurement and parental use of monitoring in order that parenting interventions to reduce problem behavior are able to more clearly communicate the simplest and most effective parenting techniques. Although studies conducted over the past 10 to 20 years have fairly conclusively found that monitoring operationalized as mostly consisting of parent knowledge, has a strong relation with child outcomes, including substance use, examination of a more complex construct allows for the possibility of more targeted and effective parenting interventions.

This study is also limited by a failure to take into account neighborhood characteristics. A developmental-ecological perspective assumes that developmental influences such as family and peer characteristics vary depending on neighborhood context (i.e., Gorman-Smith, Tolan, & Henry, 2000). For instance, although Gorman-Smith et al. found that “exceptionally functioning” families characterized by high levels of parenting practices such as monitoring, high levels of cohesion, and strong beliefs

about the importance of family were found in roughly equal proportions across urban neighborhoods with varying levels of poverty, crime, business investment, concerns about safety and functioning social process, the relation between family types and child outcome varied across neighborhood type. Although being from a highly functioning family was associated with better youth outcomes, in the most high-risk neighborhoods, children were still at greater risk for delinquency; on the other hand, children who came from “struggling families” in which discipline, monitoring, and beliefs were low were not at increased risk for delinquency if they lived in neighborhoods with high levels of social organization (Gorman-Smith et al., 2000). Thus, it is important to take neighborhood context into account when examining the impact of parental variables on child outcome and potential preventative efforts to be gained from modifying family processes.

In addition, research indicates that parenting must be particularly well-calibrated in high-risk neighborhoods. Parenting in neighborhoods characterized by high levels of crime and delinquency has been described in previous studies as more authoritarian and controlling compared to parenting in lower-risk neighborhoods as parents respond to the dangers of the neighborhood environment (Eamon, 2001; Taylor, 2000). However, over-control or lack of support also has been shown to be associated with externalizing outcomes in high-risk neighborhoods (Pettit, Bates, & Dodge, 1997; Taylor, 2000). High-risk neighborhoods may require a very targeted level of monitoring. Future research should investigate to what extent a parental monitoring construct comprised of control and solicitation is more effective in high-risk contexts as compared to low-risk

contexts, and what level of monitoring is optimal for maximizing positive child outcomes and minimizing negative child outcomes.

The time points chosen for measurement must also be considered. This study improves on many previous studies by including three waves of data collection, but it is possible that a more accurate picture of the relations between these variables might be seen with more closely spaced data points, if for instance, the impact of parental monitoring on substance use is quick-acting. It is also important to consider whether equilibrium in the relations among variables had already been established during earlier developmental periods given the stability these constructs showed in the current study. For instance, the effect of parental monitoring on substance abuse may have been established at an earlier developmental period, such that current substance use was much more strongly related to prior levels of substance use than parental monitoring itself. Moreover, there were not equal differences in the elapsed time between waves, and thus differences in the relations between variables over the first to second waves versus the second to third waves could not be assessed. It is difficult to disentangle the effects of other factors (such as season, students' age, and time of school year) from other influences on the study variables.

Parental monitoring was found in this study to have fairly small effects on substance use, particularly at the end of 7th grade. Parenting interventions are expensive and time-consuming, and it is important to be able to justify their inclusion in programs designed to prevent or reduce substance use or other problem behavior in youth. However, due to the limitations above, it is premature to conclude that improving

parental monitoring is not an effective point of intervention for this population.

Increasing measurement specificity, the timing of data collection, and the consideration of contextual variables is necessary before coming to conclusions about the utility of this construct.

Parental monitoring was found to reduce deviant peer associations over time, and although a more rigorous statistical examination did not reveal a mediational effect, deviant peer associations were associated with increases in substance use. Thus, parent training may over time reduce substance use through a reduction in associations with deviant peers. Another potential point of intervention suggested strongly by the results of this study is at the peer level directly. Not only did deviant behaviors among youth's friends in this study increase their substance use, so too did their substance use increase their association with deviant friends. Middle school might be a time in which youth are forming the friendships that will shape the course of their future behavior, and play some part in determining the trajectory of problem behaviors. Deviancy training may occur wherein the sharing of problem behaviors may serve as a bond that promotes affiliation and positive affect among youth, increasing levels of problem behavior among both members of a friend dyad (Dishion, Spracklen, Andrews, & Patterson, 1996). Peer-based interventions for problem behaviors must be careful not to promote deviancy training and "peer contagion" effects by providing greater opportunities for youth already involved in deviant behaviors to affiliate. Attempts to carefully design and calibrate such peer interventions are valuable and of current interest (see Dishion & Dodge, 2005).

Despite certain limitations, this study made important contributions to the literature on substance use risk in early adolescence. Specifically, the opportunity to examine the relations between parental monitoring, peer deviance, and substance use over three waves allowed a built-in “replication” of effects, provided temporal separation of peer deviance as a hypothesized mediator, and allowed for the investigation of more complex relations between variables over time than was possible in previous studies with two or fewer waves of data. This study found strong evidence for reciprocal influence over time between peer deviance and substance use, which has important implications for prevention. While parental monitoring did not emerge as a strong predictor of substance use in this sample, it had a small initial association with substance use and slightly larger negative associations with peer deviance, suggesting that parental monitoring may effectively reduce deviant peer contacts. Open questions about the measurement of parental monitoring in this study can be addressed in future research. Moreover, these data were collected from a large and diverse sample of middle school students, lending additional weight to the findings of this study, which multigroup analyses suggested can be generalized across gender and family structure type.

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APPENDIX A

Parenting Practices (Monitoring and Involvement Scale)

Response Formats:

Questions 1 and 3:

- 1 = Don't know
- 2 = More than 30 days ago
- 3 = Within last 30 days, but not within the last week
- 4 = Within the last week, but not yesterday or today
- 5 = Yesterday/today

Questions 2 and 4:

- 1 = Don't know
- 2 = Less than once a month
- 3 = Within the last 30 days, but less than once per week
- 4 = At least once this week, but less than once per day
- 5 = Every day or almost every day

Questions 5 to 12:

- 1 = Hardly ever
- 3 = Sometimes
- 5 = Often

Scale Instructions: The following questions have to do with the kinds of things that you may have talked about or have done with a parent. Please choose the answer that fits best.

1. When was the last time that you talked with a parent about what you were going to do for the coming day?
2. How often does a parent talk to you about what you are going to do for the coming day?
3. When was the last time that you talked with a parent about what you had actually done during the day?
4. How often does a parent talk with you about what you had actually done during the day?
5. In the past 30 days, how often did you help with family fun activities?
6. In the past 30 days, how often did you like to get involved in family activities?
7. In the past 30 days, how often did a parent have time to listen to you when you wanted to talk with one of them?
8. In the past 30 days, how often did you and a parent do things together at home?
9. In the past 30 days, how often did you go with members of the family to movies, sports events, or other outings?
10. In the past 30 days, how often did you have a friendly talk with a parent?

11. In the past 30 days, how often did you help with chores, errands and/or other work around the house?
12. In the past 30 days, how often did a parent talk with you about how you are doing in school?

APPENDIX B

Peer Problem Behavior Scale

Response Format: The following 5-point scale is used for all of the items: 0 = *none of them*, 1 = *very few of them*, 2 = *some of them*, 3 = *most of them*, 4 = *all of them*.

Scale Instructions: Question one first determines how many friends the participants considers close friends:

1. How many friends would you consider to be close friends? These are friends who you see more than once a week. These are friends you spend time with and enjoy doing things with. _____ (Enter total number of friends).

Now I want to ask you about the behavior of these closest friends. In particular, I want to know how many of them, as far as you know, have done any of these things in the last 3 months. None of them? Very few of them? Some of them? Most of them? Or all of them? Remember we won't tell them or anyone else what you said. As far as you know how many of your friends have....

2. Skipped school without an excuse?
3. Stolen something worth less than \$100?
4. Gone into or tried to go into a building to steal something?
5. Gone joyriding, that is, taken a motor vehicle such as a car or motorcycle for a ride or drive without the owner's permission?
6. Hit someone with the idea of really hurting that person?
7. Attacked someone with a weapon or other thing to really hurt that person?
8. Use a weapon, force, or strong arm methods to get money or things from people?
9. Drank alcohol?
10. Been in a gang fight?
11. Hit or slapped a boyfriend/girlfriend?

APPENDIX C

Drug Use Subscale of the Problem Behavior Frequency Scale

Response Format: The following 6-point scale is used for all the items: 0 = *never*, 1 = *1-2 times*, 2 = *3-5 times*, 3 = *6-9 times*, 4 = *10-19 times*, 5 = *20 or more times*.

Scale Instructions: In this next section, we ask questions about your behavior and behavior of other kids in your school. In the LAST 30 DAYS, how many times have you....

1. Drunk beer (more than a sip or taste)
2. Drunk wine or wine coolers (more than a sip or taste)
3. Smoked cigarettes
4. Been drunk
5. Drunk liquor (like whiskey or gin)
6. Used Marijuana (pot, hash, reefer)

Curriculum Vitae

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