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Parenting Practices as Moderators of the Relationship Between Peers and Adolescent Marijuana Use

Using data from a probability sample of 4,987 adolescents, we examine the degree to which closeness to mother, closeness to father, parental support, and parental monitoring buffer the relationship between peer drug use and adolescent marijuana use. The relationship between peer drug use and adolescent marijuana use was attenuated by both closeness to father and the perception that parents would catch them for major rule violations. These findings confirm the value of conceptualizing certain family characteristics as separate variables and verify that authoritative parenting may help insulate adolescents from peer pressure to use drugs.

Theoretically, family and peer relations are two of the most important socializing forces affecting adolescent behavior. Through these relationships, adolescents learn to conform to or deviate from societal standards. For example, associations with drug-using peers have consistently been one of the strongest predictors of adolescent substance use, second only to previous drug experimentation (Brook, Brook, & Richter, 2001; Reed & Rountree, 1997; Thornberry & Krohn, 1997). In addition, researchers have identified a number of family characteristics associated with the likelihood of drug use, particularly parental support and control (Hawkins, Catalano, & Miller, 1992; Jessor, 1987; Kandel, 1996; Peterson & Hann, 1999; Wright, Cullen, & Wooldrege, 2000).

Although researchers have verified the importance of peer factors in predicting drug use, the findings regarding family characteristics have been inconsistent (Wright & Cullen, 2001). In some studies, family factors had negative associations with the probability that an adolescent will use drugs (Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Jessor, Chase, & Donovan, 1980; Marshal & Chassin, 2000), whereas in others, the coefficients of family characteristics were small or insignificant, net of peer influences (Aseltine, 1995; Bahr, Maughan, Marcos, & Li, 1998; Hoffmann & Su, 1998).

One possible reason for this inconsistency is the different conceptual models used to study how parents influence their children's drug use. In much existing research, a direct model was used in which parental characteristics were tested against peers to see which was a stronger predictor of adolescent drug use (Hoffmann, 1993). Newcomb (1992) referred to this approach as a tug-of-war between pro- and antidrug forces, the winner of which was assumed to have the greater influence on whether an individual will become involved with drugs. In this tug-of-war, peers consistently had stronger associations with adolescent drug use than family variables (Brook et al., 2001; Hoffmann; Wills, Mariani, & Filer, 1996). In some research, family characteristics had only small or negligible associations with adolescent drug use (Bahr et al., 1998; Seydlitz, 1993).

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An alternative model is to examine family characteristics as moderators that may attenuate the relationship between peers and adolescent drug use (Brook et al., 1990; Mason, Cauce, Gonzonles, & Hiraga, 1994). In Coombs, Paulson, and Richardson's (1990) study, for example, it was reported that drug-oriented peers had less influence on adolescents who had close relationships with their parents. Similarly, Vitaro, Brendgen, and Tremblay (2000) and Wills et al. (1996) observed that family support tended to moderate or lessen the influence of peers on delinquency and drug use. Stacy, Newcomb, and Bentler (1992) discovered that moderators have received relatively little attention in the study of social influences on drug use. One of the needs in adolescent drug research is to explore more fully whether and to what extent family variables moderate the relationship between peers and adolescent drug use.

Two family variables found to be associated with adolescent drug use are parental support and control. Adolescents are less likely to use alcohol and other drugs when their parents are warm and supportive, and provide clear rules and appropriate discipline (Jessor, 1987). Baumrind (1967, 1991) identified four parenting styles according to levels of support and control: authoritative, authoritarian, indulgent, and neglectful. Being warm and demanding are key components of authoritative parenting (Baumrind, 1991). A number of researchers have confirmed that children with authoritative parents tend to be higher on various dimensions of social competence than children from Baumrind's other three parenting types (Gray & Steinberg, 1999; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994). Nevertheless, there is a need to examine the different dimensions of parenting as they relate to adolescent drug use and to explore the interaction of authoritative parenting and peers as they relate to the risk of adolescent drug use (Gray & Steinberg). To this end, the purpose of this paper is to examine the extent to which parental support and control may moderate the relationship between peers and adolescent marijuana use.

Direct Model

In the direct model, the reason for focusing on family and peer relationships is a matter of social learning and social control. According to Social Learning Theory, an individual learns to be deviant in small, informal groups (Bahr et al., 1998; Petraitis, Flay, & Miller, 1995). It is in these intimate settings that people are taught, through imitation and reinforcement, to hold attitudes that are favorable or unfavorable to a particular deviant behavior (Reed & Rountree, 1997). For example, adolescents who associate with peers who use marijuana are likely to acquire favorable attitudes toward marijuana use. It is in this setting that adolescents observe drug-specific behavior and begin to imitate it by using marijuana (Wills et al., 1996). Often the act of using a drug results in positive social reinforcement from the peer group. Through this experience, adolescents tend to develop positive cognitive definitions about marijuana use, including expectations for future social and psychological encouragement when they use marijuana (Petraitis et al., 1995).

The premise of social control theory is that deviance is normal and conformity, rather than deviation, must be explained (Hirschi, 1969). Implicit in this theory is the understanding that all adolescents have impulses toward deviance and would act on these desires if not for prosocial controls provided through families and other social institutions (Hirschi). In the context of adolescent marijuana use, social control theorists maintain that when adolescents are close to their parents, adolescents feel obligated to act in nondeviant ways that please their parents (Rankin & Kern, 1994; Wright & Cullen, 2001). Hence, they refrain from marijuana use. When they are not close to their parents, however, adolescents do not feel as constrained to conform to the desires of their parents, and they are more likely to experiment with drugs.

In a similar way, it is predicted that monitoring may influence marijuana use among adolescents. When monitoring is high, teens feel constrained to act in prosocial ways because they believe their parents are watching them and expect them to conform. When monitoring is low and adolescents do not perceive that their parents are supervising their activities closely, they are more likely to let their own preferences guide their behavior. When this happens, adolescents may act on their deviant impulses and use marijuana (Vitaro et al., 2000).

Social learning theorists focus on peers because of the significance adolescents place on friends as they mature and gain autonomy from their parents. Social control theorists concentrate on parents because they are likely to constrain the deviance of their children. In both theories, the relationships

between adolescents and their parents and peers are critical in predicting whether adolescents will choose to use drugs. When closeness to parents and monitoring are strong, marijuana use should be low. Alternately, adolescents with friends who use marijuana are likely to use marijuana themselves. Although both of these predictions are supported in the literature, a limitation of this approach is that it does not indicate how families may lessen the influence of peers on the risk of adolescent drug use. This is an important practical and theoretical question: What can parents do to lessen peer influences that may draw their children toward drugs?

Moderator Model

The moderator model attempts to answer the question of what happens when high levels of risk, such as having peers who use drugs, combine with high levels of protection, such as appropriate levels of parental monitoring and closeness. Although moderator variables are important theoretically, they have received relatively little attention in the drug use literature (Petraitis et al., 1995; Stacy et al., 1992). The concept of family as a moderator of delinquency is not new, however.

In 1957, Reckless, Dinitz, and Kay developed Containment Theory, which postulates that certain characteristics can insulate boys from the deleterious effects of living in high-delinquency neighborhoods. Implicit in this theory is the notion that inner controls (such as favorable self-concepts) and outer controls (such as parental support and control) can act as buffers against peer pressure toward deviance (Scarpitti, Murray, Dinitz, & Reckless, 1960). An important aspect of this approach is the theoretical inclusion of family characteristics as moderator variables. Containment theorists might postulate that families may buffer or lessen the power of peers to encourage marijuana use.

Since the development of Containment Theory, a number of researchers have suggested that moderator variables may act as buffers or protective factors that attenuate the influence of peers on adolescent delinquency and drug use (Brook & Brook, 1990; Hoffmann & Su, 1998; Stacy et al., 1992). Wills et al. (1996) observed that adolescents were particularly vulnerable to substance abuse if they felt they had little support from their parents. Similarly, Barrera and Li (1996) concluded that parental support appeared to buffer the effects of having friends who smoke cigarettes. According to the moderator model, family characteristics such as support and control may help insulate youth from the influence of their deviant friends. As a result, peers are likely to be more predictive of adolescent marijuana use when support and control are weak versus when they are strong.

In sum, both direct and moderating models offer a theoretical rationale for including family and peers as key predictors of adolescent drug use. In the next section, we review the empirical research relevant to parental and peer influences on adolescent drug use with an eye toward developing specific hypotheses.

Previous Literature

As noted earlier, Baumrind (1967, 1991) identified four styles of parenting according to levels of parental support and control. Authoritative parents tend to be high on support (warmth, nurturance, and acceptance) and control (rules, limits, monitoring, and discipline). Baumrind referred to authoritative parents as responsive and demanding. There is evidence that adolescents with authoritative parents are less likely to use drugs than adolescents raised in other parenting styles (Baumrind, 1991; Gray & Steinberg, 1999). In this section, we examine existing literature on support and control as it relates to adolescent drug use.

Parental Support and Closeness to Parents

Limitations of existing research on this topic are inadequate conceptualization and measurement of family characteristics. Terms such as support, closeness, warmth, nurturance, and attachment have been used somewhat loosely. Some researchers have not differentiated clearly between feelings of the child and the behavior of the parents, particularly in the delinquency literature (Wright & Cullen, 2001).

To improve the precision of these concepts, we refer to parental support as nurturing behavior of parents toward their children. Supportive behaviors include affection, acceptance, warmth, encouragement, and praise (Peterson & Hann, 1999). Over a period of more than 60 years, researchers have reported consistently that parental support has negative associations with drug use, delinquency, and other antisocial behaviors in youth (Barnes & Farrell, 1992; Mounts, 2002; Peterson & Hann; Wright et al., 2000).

We differentiate support from closeness to parents and define closeness as adolescent feelings of affection for their parents. Although closeness to parents may be influenced by supportive behaviors of parents, closeness is the feeling of the adolescent for the parent and not the behavior of the parent (Wright & Cullen, 2001). Because feelings of closeness to one parent may differ from feelings toward the other, we separate it into closeness to mother and closeness to father.

A common finding is that adolescent drug use and delinquency are negatively associated with closeness to parents (Brook et al., 2001; Marshal & Chassin, 2000; Petraitis et al., 1995; Seydlitz & Jenkins, 1998). The correlations have tended to be small and the findings have been inconsistent, but perhaps is due to inadequate conceptualization and measurement (Bahr et al., 1998; Seydlitz, 1993).

Parental Monitoring

A key concept in the literature on child socialization and antisocial behavior is parental control. For years, researchers have explored how various aspects of parental control may affect the behavior and competence of children (Peterson & Hann, 1999). Control refers to attempts by parents to direct, guide, and modify behavior in their children and includes suggestions, instructions, commands, rules, threats, and punishments (Rollins & Thomas, 1979).

Research on the effect of parental control has been equivocal. Some researchers have reported that control has a significant influence on adolescent behavior, whereas others have found that control has little or no effect (Bahr et al., 1998; Barnes & Farrell, 1992; Barrera & Li, 1996). The inconsistent findings may be due to the fact that control is a multidimensional concept, and researchers have not always differentiated adequately among the different types of control (Peterson & Hann, 1999; Rollins & Thomas, 1979). One important aspect of control is parental monitoring, which is the extent to which parents are observant and aware of their children's associations and activities (Bahr et al.; Larzelere & Patterson, 1990; Mounts, 2002).

A number of researchers have found a negative association between parental monitoring and adolescent drug use (Mounts, 2002; Peterson & Hann, 1999; Seydlitz & Jenkins, 1998). The likelihood of adolescent drug use tends to be greater when monitoring is low rather than high (Chassin, Pillow, Curran, Molina, & Barrera, 1993; Hawkins et al., 1997). According to Dishion and Loeber (1985), children who are not monitored may "have more opportunities to associate with peers who use drugs and are involved in antisocial behavior" (p. 13), whereas children who are monitored closely have fewer opportunities for deviance.

In addition, monitoring might moderate the influence of peers on the risk of adolescent drug use. When adolescents feel they are being closely observed, they may refrain from using drugs even if their friends participate. There has been relatively little research on the moderating effects of parental monitoring. Vitaro et al. (2000) reported that monitoring did not moderate the influence of friends' deviance on later delinquency. Adamczyk-Robinette, Fletcher, and Wright (2002) observed, however, that parental supervision had a moderating effect on adolescent tobacco use. One of the objectives of this research was to examine whether parental monitoring moderates the relationship between peers and adolescent marijuana use.

To improve conceptual precision, we have differentiated between two different types of monitoring. First is parental knowledge of adolescent activities and friends. The second is whether adolescents perceive that their parents are likely to catch them for major rule violations. Being caught for serious violations such as skipping school or drinking alcohol appears to be different from a general awareness of friends and activities.

Peers

The influence of peers on an adolescent's decision to use drugs is well documented (Hawkins et al., 1992; Reed & Rountree, 1997; Thornberry & Krohn, 1997). When an adolescent's peer group uses drugs, the youth is much more likely to use drugs (Brook et al., 2001; Vitaro et al., 2000; Wills et al., 1996). In addition, when adolescents feel that their friends approve of people who use drugs, they are more likely to use drugs themselves (Hawkins et al.). These findings indicate that the importance of peers may stem from their ability to offer a combination of psychological encouragement as well as observable behavior to entice adolescents toward deviance. When family and peer influences conflict, research indicates that adolescents are more likely to follow the deviant behavior of their peers rather than the

prosocial behavior of their parents (Akers & Cochran, 1985).

Control Variables

Because age, gender, ethnic status, parental education, and family structure are associated with adolescent drug use, each of these variables was included as a control variable. Age was included because drug use tends to increase with age (Hoffmann & Johnson, 1998). The exposure of adolescents to drugs is a developmental process that changes over time as relationships with parents and peers evolve (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996). Gender is important because drug use is more prevalent among boys than girls (Hoffmann & Johnson). The acceptability and use of drugs varies among different ethnic groups (Gil, Vega, & Biafora, 1998; Hoffmann & Johnson). Parental education is related to a number of variables that are associated with adolescent drug use, including type of neighborhood, family income, and commitment to school (Hawkins et al., 1992). Family structure has been found to be associated with adolescent drug use as well as to other characteristics that tend to be related to drug use (Gil et al.; Hoffmann & Johnson). These control variables are related not only to drug use but also to some of our independent variables. Therefore, it is essential to include them in our analyses in order to specify our models correctly.

HYPOTHESES

The objective of this article was to examine family characteristics that may minimize adolescent drug use. This was accomplished through the comparison of direct and moderating models of adolescent marijuana use. To test these models, it was necessary to refine the conceptualization of family characteristics that might affect an adolescent's decisions to use marijuana. We developed three sets of hypotheses. First, we assert two hypotheses regarding the conceptualization of closeness to parents, support, and monitoring:

1. Closeness to mother, closeness to father, and parental support are three related but distinct concepts.
2. Parental knowledge of activities and the perception that parents would catch an adolescent for major rule violations are two related but distinct aspects of parental monitoring.

Second, we propose two hypotheses regarding the direct associations of peers and parents with drug use:

3. Peer drug use has a large, significant association with adolescent marijuana use.
4. Closeness to mother, closeness to father, parental monitoring, and parental support have modest but significant associations with adolescent marijuana use.

The third set of hypotheses is based on the moderating model:

5. Closeness to mother, closeness to father, and parental support moderate the association between peer use and adolescent marijuana use. As closeness and support increase, the association between peer use and adolescent marijuana use decreases.
6. Both types of parental monitoring moderate the association between peer use and adolescent marijuana use. As parental knowledge of activities and the perception of being caught increase, the association between peer use and adolescent marijuana use decreases.

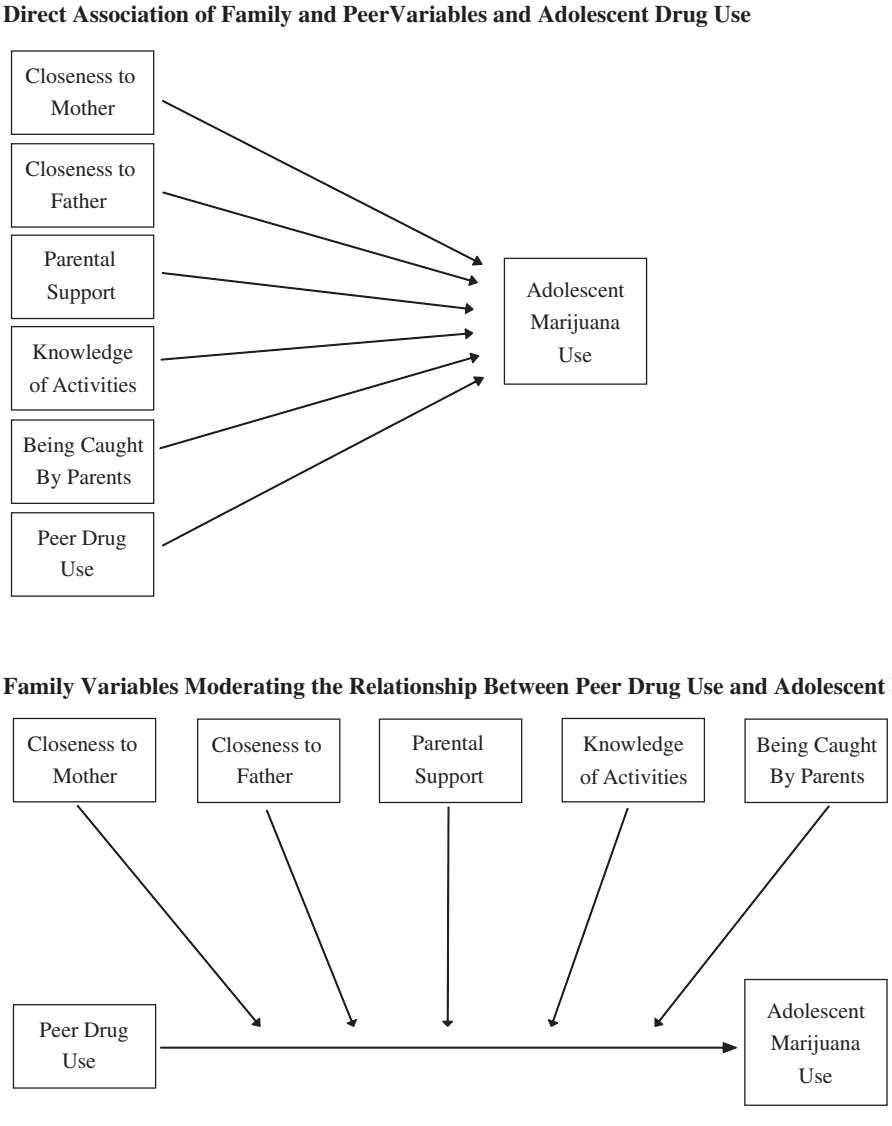
The direct and moderating models (hypotheses 3–6) are diagrammed in Figure 1. For simplicity, the control variables discussed earlier were not included in Figure 1.

METHOD

Sample

The data are from a multistage probability sample collected in an intermountain state in 1997 from 5,137 students in Grades 7–12. The final sample was 82% of the total number of students enrolled in the sample classrooms at the time of the survey. In addition to regular public schools, alternative schools were included as an oversample, and 272 of these students (5.3% of the total respondents) were included. Compared to the state population of students in Grades 7–12, our sample had a slight overrepresentation of girls, minorities, and junior high students. The sample ranged from 12 to 19 in age, with a median age of 15. About half (51%) of the respondents were girls and 72.6% lived with both of their parents. Thirteen percent lived in a single-parent home, 11% with the mother, and 2% with the father. Eleven percent lived with one parent and a stepparent, 9% in a mother-stepfather home, and 2% with the father-stepmother. Forty-two percent said their father had graduated from college, and 35% reported that their mother had graduated

FIGURE 1. DIRECT AND MODERATING FAMILY INFLUENCES ON ADOLESCENT MARIJUANA USE



from college. In terms of ethnicity, 88% indicated that they were White and not of Hispanic origin.

There are two major questions about the validity of the data. First, was the sample biased because of absentees and dropouts who were not surveyed? And second, did students respond validly to the questionnaire?

Sampling bias was minimized by a vigorous follow-up of the absentee students. Seven percent of the final respondents were absent the day of the survey but completed the questionnaire at a later time. As noted above, the final number of respondents comprised 82% of the students on the school rolls.

To help minimize the bias from dropouts, students from alternative schools were included in the sample. This was done because teachers and school counselors indicated that students at alternative schools were similar to dropouts, and many students who eventually drop out attend

alternative schools for a period. The alternative students who completed the questionnaire were 5.3% of the total respondents, which is slightly larger than the dropout rate reported by the State Office of Education. We used these alternative students as a proxy for dropouts. The rate of reported marijuana use would have been 1.4% lower if the alternative students had not been included in the final sample. Consistent with our findings, Johnston, O'Malley, and Bachman (1998) found that the omission of dropouts from their national sample had relatively small effects on estimates of drug use.

There are two pieces of evidence relevant to the question of student response accuracy. First, a *lie* variable was created to identify those students who reported using a nonexistent drug or those who responded inconsistently regarding their use of a specific drug. Of the total sample, 150 students (2.9%) reported having taken a nonexistent drug or responded inconsistently to a series of questions dealing with drug use. These cases were excluded from the analysis, leaving 4,987 cases for analysis. Second, in a previous survey we conducted of the same population, correlations between a social desirability scale and drug use were small, indicating that students did not underreport or overreport drug use in order to respond in a socially acceptable manner.

Measurement

Support was measured by three questions about parental recognition and praise. Closeness to each parent was measured by three questions about feelings of closeness, sharing thoughts, and spending time with the parent. To verify our conceptualization, we tested three structural equation models. In the first model, all nine items were assumed to be indicators of one underlying concept of parental support. In the second model, we assumed that the three support items measured one concept and the six closeness items measured a second concept. In the third model, closeness to father, closeness to mother, and parental support were assumed to be three distinct concepts.

We used four indicators to assess the overall fit of the structural equation models: First, the Tucker-Lewis Index (TLI) compared the model to a baseline model of independence. The TLI is used because it has a correction for model complexity (Kline, 1998). A TLI of close to 1 indicates a very good fit. The second fit indicator is chi-square, which needs to be small and insignificant to demonstrate that the model fits the data well. One limitation of chi-square is that its value is influenced by sample size, which is particularly relevant here because we have a large sample (Kline). Third, we used the ratio of the chi-square to its degrees of freedom (CMIN/*df*). A value of less than 5 indicates that the fit is adequate, whereas a score of less than 3 indicates a good fit (Arbuckle & Wothke, 1999). Fourth, a value of .05 or less on the root mean square error of approximation (RMSEA) indicates a good fit for a model (Arbuckle & Wothke).

A summary of the structural equation models for the measurement of closeness and support is shown in Table 1. Models one and two did not fit the data well, although model three was consistent with the data. The chi-square for model three was significantly smaller than for the other two models, and the scores were within acceptable ranges on the four criteria. We concluded that in this sample, closeness to mother, closeness to father, and parental support are three related but distinct concepts.

Five questions dealt with parental knowledge of activities and friends, and three questions asked about adolescent perceptions regarding whether their parents would catch them if they skipped school, drank alcohol, or carried a handgun. To verify that parental knowledge and being caught were distinct aspects of monitoring, we tested two structural equation models. In the first model, all eight items were assumed to be indicators of one underlying concept of parental monitoring. In the second model, we assumed that the five knowledge items measured one concept and that the three questions on being caught were indicators of a second concept. A summary of these structural equation models is shown in Table 2. Model one did not fit the data well, whereas model two fit the data reasonably well. We concluded that in this sample, parental knowledge of activities and perceptions of being caught are two related but distinct aspects of monitoring.

Because the response categories were identical for each relevant question, we constructed our measures of the family variables by summing the items for each construct. Closeness to mother, closeness to father, parental support, and being caught all consisted of three items with individual question responses ranging from 0 to 3. Thus, the scale scores ranged from 0 to 9, with higher values representing higher levels of closeness, support,

TABLE 1. COMPARISON OF THREE ALTERNATIVE MEASUREMENT MODELS OF PARENTAL SUPPORT ($N = 4,987$)

			Fit Indices[a]			
Model	Concepts in Model	Indicators	TLI	Chi Square	CMIN/*df*	RMSEA
One	1. Parental support	Parents praise. Parents notice a good job. Parents tell you they're proud. Feel close to mother. Share thoughts, feelings with mother. Enjoy spending time with mother. Feel close to father. Share thoughts, feelings with father. Enjoy spending time with father.	0.86	7743.2	336.7	0.26
Two	1. Parental support	Parents praise. Parents notice a good job. Parents tell you they're proud.	0.87	6674.3	303.4	0.25
	2. Closeness to parents	Feel close to mother. Share thoughts, feelings with mother. Enjoy spending time with mother. Feel close to father. Share thoughts, feelings with father. Enjoy spending time with father.				
Three	1. Parental support	Parents praise. Parents notice a good job. Parents tell you they're proud.	0.99	72.9	3.6	0.02
	2. Closeness to mother	Feel close to mother. Share thoughts, feelings with mother. Enjoy spending time with mother.				
	3. Closeness to father	Feel close to father. Share thoughts, feelings with father. Enjoy spending time with father.				

[a]TLI = Tucker Lewis Index: RMSEA = Root Mean Square Error of Approximation: CMIN/*df* = Chi Square divided by degrees of freedom.

and being caught. Parental knowledge of adolescent activities consisted of five questions and its scores ranged from 0 to 15. Alpha coefficients for these scales ranged from .75 to .89.

Peer drug use was based on four questions that asked if any of the respondent's four best friends smoked cigarettes, tried alcohol, used marijuana, or experimented with other illegal drugs during the past 12 months. This scale ranged from 0 (*none of the adolescent's four best friends used drugs in the past year*) to 16 (*each of the four best friends used all four types of drugs during the past year*). The alpha coefficient for the peer use scale was .89.

Marijuana is typically the first and most widely used illicit drug (Hoffmann, 1995). We used *past-month marijuana use* as the dependent variable because it reflects the adolescent's current behavior. There were seven response categories ranging from *0* to *40 or more* occasions to reflect intervals of potential use. Because this variable was highly skewed, it was inappropriate to use ordinary least squares regression. We collapsed these categories to construct the following ordinal scale: 0 = *no use*; 1 = *used 1–2 occasions*; 2 = *used 3–9 occasions*, and 3 = *used 10 or more occasions in the previous month*. This scale provided a small set of ordered categories appropriate for logistic regression that enabled us to capture variation among infrequent, occasional, and regular users.

As shown in Table 3, 9% of the sample had used marijuana during the past month. The students from the alternative schools comprised 5% of the sample but were 17.6% of the marijuana users.

As noted earlier, we controlled for age, gender, ethnic status, parental education, and family structure. Age ranged from 12 to 19. Gender was coded 0 for *male* and 1 for *female*. Ethnic status was coded 0 for *White, not of Hispanic origin*, and 1 for all *others*. Education of parents

TABLE 2. COMPARISON OF TWO ALTERNATIVE MEASUREMENT MODELS OF PARENTAL MONITORING ($N = 4{,}987$)

Model	Concepts in Model	Indicators	Fit Indices[a] TLI	Chi-square	CMIN/*df*	RMSEA
One	1. Parental Monitoring	Family rules clear. Parents ask if homework is done. Parents know friends, activities. Parents would know if I came home late. Parents want me to call if I will be late. If I drank, I would be caught by parents. If I carried a handgun, I would be caught by parents. If skipped school, I would be caught by parents.	0.97	1677.5	83.9	0.13
Two	1. Parental Knowledge of Activities	Family rules clear. Parents ask if homework is done. Parents know friends, activities. Parents would know if I came home late. Parents want me to call if I will be late.	0.99	256.0	13.5	0.05
	2. Perception of Being Caught by Parents	If I drank, I would be caught by parents. If I carried a handgun, I would be caught by parents. If I skipped school, I would be caught by parents.				

[a]TLI = Tucker Lewis Index; RMSEA = Root Mean Square Error of Approximation; CMIN/*df* = Chi Square divided by degrees of freedom.

was coded on a scale from 0 to 5 (4 = *completed college* and 5 = *graduate or professional school after college*). Family structure was coded into four dummy variables: (a) *lives with both biological parents*; (b) *lives with one parent in a single-parent home*; (c) *lives with one parent and a step-parent*;, or (d) *other family type*. Descriptive statistics for all variables are shown in Table 3.

Analysis

Given that the dependent variable, past-month marijuana use, was an ordinal-level variable, we utilized ordinal logistic regression to estimate the models. Ordinal logistic regression assumes the existence of an underlying continuous latent variable and models the cumulative probability of persons sharing particular characteristics falling somewhere along the continuum. Because the latent variable that underlies marijuana use was not measured directly, an ordinal variable with different cutpoints assumed to underlie the latent variable was used (Powers & Xie, 2000). Similar to a binary logistic regression model, the regression coefficients represent shifts in log-odds for continuous predictor variables or log-odds ratios for dichotomous predictor variables.

A key analytic issue revealed during preliminary analyses involved a quadratic relationship between peer drug use and 30-day marijuana use. A bivariate scatterplot indicated clearly that the relationship between peer drug use and marijuana use was concave. We suspected that this was due to a reciprocal relationship between adolescents and their peers (Hoffmann & Su, 1998); as adolescents are more involved in marijuana use, they often associate with people who also use marijuana. Hence, selection and reinforcement are reciprocally related and create a nonlinear association between the level of peer drug use and adolescent marijuana use. Given the cross-sectional data, we could not test this relationship fully. As an alternative, we included the squared value of peer drug use ($peer^2$) in the regression equation for both the direct and moderating models. Essentially, this allowed us to analyze the association between peers and adolescent marijuana use at two different levels, because the slope of the relationship changed.

A final analytic issue involved the collinearity problem that was created when multiplicative

TABLE 3. DESCRIPTIVE STATISTICS OF VARIABLES ($N = 4{,}987$)

Variable	Range	*m*	*sd*	α	Skewness	Kurtosis
Parental Support	0–9	6.07	2.260	0.850	−0.499	−0.372
Closeness to mother	0–9	6.69	2.260	0.860	−0.959	0.461
Closeness to father	0–9	5.83	2.610	0.890	−0.668	−0.374
Knowledge of activities	0–15	11.55	2.820	0.750	−0.928	1.045
Being caught	0–9	5.64	2.640	0.780	−0.348	−0.880
Peer use	0–16	3.13	4.458	0.890	1.413	0.894
Age	12–19	15.12	1.730		0.055	−0.951
Gender (1 = *female*)	0–1	0.49	0.500		0.045	−1.999
Ethnic status (1 = *non-White*)	0–1	0.12	0.324		2.348	3.513
Education of mother	0–5	3.10	1.080		−0.186	−0.652
Education of father	0–5	3.32	1.170		−0.418	−0.563
Live with both parents	0–1	0.73	0.446		−1.016	−0.967
Single-parent family	0–1	0.13	0.332		2.247	3.052
Step-parent family	0–1	0.12	0.327		2.309	3.332
Other family type	0–1	0.03	0.181		5.137	24.396
Dependent Variable	Value	Past-Month Use			%	
Past-Month Marijuana Use	0	None			90.7	
	1	1 or 2 times			3.5	
	2	3 to 9 times			2.7	
	3	10 or more times			3.2	

terms were included in the moderating model (e.g., peers x monitoring). To attenuate the likelihood of collinearity problems, the constituent variables were standardized ($m = 0$; $sd = 1$) prior to creating the interaction terms. As discussed by Aiken and West (1991), this approach minimizes collinearity between interaction terms and their constituent terms. After taking these steps, the largest variance inflation factor is 8.72, which is less than the recommended cutoff point (10.0) for detecting multicollinearity problems (Fox, 1991).

The sample was a multistage cluster sample in which schools were sampled within geographical districts and classrooms were sampled within schools. To compensate for the lack of independence of observations within clusters, we adjusted the standard errors for clustering in the ordinal logistic regression analysis.

The respondents were instructed to leave a question blank if it did not apply to them. Nonresponse varied from 0.3% on age to 8.4% on parental support. Because the amount of missing data was relatively small, we used listwise deletion in the analysis. In analyses using listwise deletion with known populations, Allison (2002) found that logistic regression yields consistent estimates of the slope coefficients and their standard errors. He also reported that with regression analysis, listwise deletion is more robust to violations of the assumption that data are missing at random than are other methods of handling missing data.

A comparison of usage rates between students who responded to the series of questions related to closeness to father and mother and those who did not indicates that although the rates of marijuana use were greater among students who had missing data, including or excluding the cases from analysis had a negligible impact. Of the 151 students (3% of the final sample) who did not answer the series of closeness-to-mother questions, 21.2% used marijuana in the past 30 days, compared with 10.6% of the students in the final sample. When the excluded cases were added to the valid sample, overall use increased only slightly, from 10.6% to 11.0%. Similarly, of the 162 students who did not report or had invalid responses to the closeness-to-father series, 17.9% used marijuana in the past 30 days, compared with 12% of the students analyzed in this article. When the excluded reports of marijuana use (and nonuse) were included to the closeness-to-father variable, the marijuana use rate decreased from 12.2% to 11%. Because the usage rates did not change considerably for either closeness variable, when the excluded cases were added to the analysis, we feel that their exclusion does not greatly impact the overall fit of the model or the model results.

Another concern was the measurement of closeness to noncustodial parents. Among students in mother-father homes, the amount of missing data on closeness to father was 5.5%, compared to 9.1% among students who did not live with

TABLE 4. ORDINAL LOGISTIC REGRESSION MODELS OF PAST-MONTH MARIJUANA USE ($N = 3,887$)

Variable	Model 1	Model 2
Age	−0.035	−0.042
Gender (1 = *female*)	0.358*	0.350*
Ethnic status (1 = *non-White*)	0.177	0.153
Education of mother	−0.055	−0.048
Education of father	−0.033	−0.035
Single-parent family	0.065	0.047
Step-parent family	0.501*	0.473*
Other family type	0.624*	0.586*
Peer use	2.204***	1.896***
Peer use squared	−0.244***	−0.202***
Closeness to mother	−0.007	0.108
Closeness to father	−0.015	−0.297*
Parental support	−0.044	−0.105
Parental knowledge of activities	−0.025	0.155
Perception of being caught	−0.142***	−0.691***
Closeness mother × Peer		−0.070
Closeness father × Peer		0.065*
Parental support × Peer		0.003
Parental knowledge × Peer		−0.059
Being caught × Peer		0.220*

*$p < .05$. **$p < .01$.***$p < .001$.

their fathers. Thus, it appears that even when adolescents did not live with their fathers, more than 90% were able to respond to the questions about their closeness to them. The amount of missing data on closeness to mother was 4.3% for students in mother-father homes and 5.3% among students who did not live with their mothers. Overall, we concluded that the amount of missing data was relatively small, and a large majority of the students were able to respond to the questions about how close they were to their mothers and fathers.

RESULTS

Table 4 displays the results from several ordinal logistic regression models. Model 1 provides a test of the direct model. After controlling for several key variables, the association between peer use and adolescent marijuana use remained strong. In fact, including several control and family-relevant variables lessened the association between peers and marijuana use only modestly. Only one family variable, however, remained significantly associated with marijuana use once all of the variables were in the model. The association between being caught and marijuana use, although reduced by more than one half, remained significant. The other family variables were not significantly related to marijuana use in the direct model. Hence, a direct model of family variables and marijuana use was only weakly supported by the analysis.

Model 2 provides the results for the moderator model. The main effects of peer use remained highly significant. Only two family variables significantly moderated the association between peer drug use and marijuana use, however: closeness to father and being caught by parents. In partial support of hypotheses 5 and 6, the direction of the coefficients suggests that the association between peers and marijuana use was diminished at higher levels of either closeness to fathers or being caught by parents. These interactions are shown graphically in Figures 2 and 3. The association between peer use and adolescent marijuana use is weaker when closeness to father is high rather than low. Similarly, the association between peer use and adolescent marijuana use is weaker when the perception of being caught by parents is high rather than low. Figures 2 and 3 show how the association between peer use and adolescent marijuana use is moderated or lessened by closeness to father and by youth perceptions that their parents will catch them for rule violations. As shown in Table 4, both of these interactions are statistically significant.

SUMMARY AND DISCUSSION

We had two major objectives in the present study. First, we examined the extent to which closeness to mother, closeness to father, and parental support are three distinct concepts, and the extent to which two types of monitoring (parental knowledge of adolescent activities and youth perceptions of being caught by parents) are separate constructs. Second, we explored the degree to which closeness to parents, parental support, and parental monitoring moderate the association between peer drug use and adolescent marijuana use.

We developed a series of six hypotheses to test our conceptual refinements and models. We used a series of three structural equation models to test hypothesis one: Closeness to mother, closeness to father, and parental support are three related but distinct concepts. The model with the best overall fit supported this hypothesis. Further, we have demonstrated that the differentiation between closeness to mother and closeness to father is a useful distinction. If we had not differentiated between closeness to father and closeness to mother, we would not have discovered the importance of closeness to father as a moderator variable.

FIGURE 2. ASSOCIATION BETWEEN PEER DRUG USE AND PROBABILITY OF MARIJUANA USE, BY CLOSENESS TO FATHER

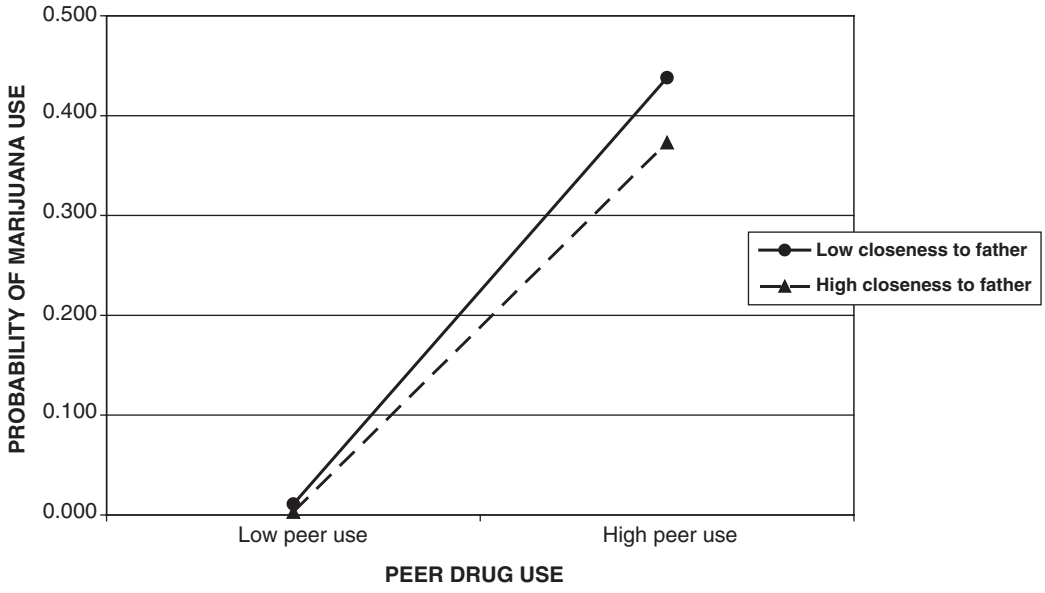
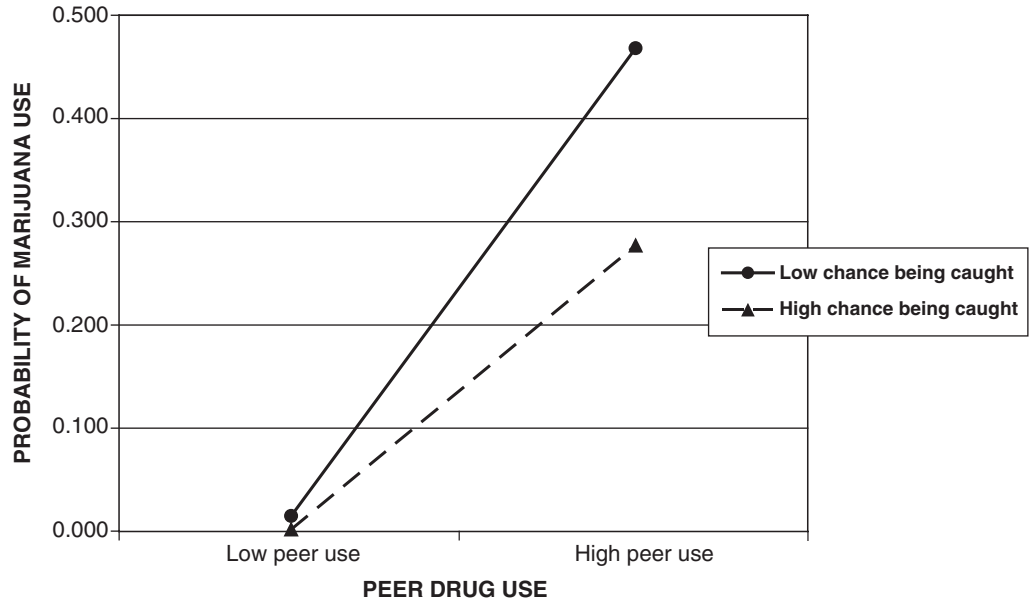


FIGURE 3. ASSOCIATION BETWEEN PEER DRUG USE AND THE PROBABILITY OF MARIJUANA USE, BY PERCEPTION OF BEING CAUGHT BY PARENTS



In our test of hypothesis two, we found that parental knowledge of activities and the perception of being caught appear to be distinct constructs. Having differentiated between knowledge of activities and being caught, we discovered that the perception of being caught moderated the association between peer drug use and adolescent marijuana use.

Hypotheses three and four were derived from the direct model. Based on hypothesis three, we anticipated that peer drug use would have a significant, positive association with adolescent drug use, a hypothesis that was supported. Moreover, this association diminished only slightly when several control and family variables were introduced into the model. This finding is consistent with social learning theory, which holds that adolescents are taught by their peers, through imitation and reinforcement, to foster attitudes and behaviors favorable to deviance (Petraitis et al., 1995; Thornberry & Krohn, 1997).

Unexpectedly, we found little support for hypothesis four, which stated that closeness to mother, closeness to father, parental support, parental knowledge of activities, and the perception of being caught would each have a modest but significant association with adolescent marijuana use. Once age, gender, parental education, family structure, and peer drug use were included in the model, only the perception of being caught had a significant association with marijuana use. This finding does not support social control theory, which postulates that an adolescent's normal desire for deviation is weakened by his or her closeness to parents and prosocial others (Rankin & Kern, 1994; Seydlitz & Jenkins, 1998; Vitaro et al., 2000; Wright & Cullen, 2001).

According to hypothesis five, parental support, closeness to mother, and closeness to father should buffer the relationship between peer use and adolescent marijuana use. This hypothesis was only partially supported by our data. Only closeness to father moderated the association between peer use and adolescent marijuana use. Closeness to mother and parental support were not significant.

Our findings for hypothesis six also were mixed. Consistent with hypothesis six, when the perception of being caught was higher, the association between peer drug use and adolescent marijuana use was weaker. Parental support, however, did not moderate the relationship between peer use and adolescent marijuana use.

There were a number of limitations to our study. Because our sample was cross-sectional, we were not able to account for the reciprocal relationships among family variables, peer use, and adolescent drug use. Peer influences may have been overestimated because of our inability to account for temporal order selection effects (Aseltine, 1995; Hoffmann & Su, 1998). Kandel (1996) estimated that peer influence is inflated by a factor of at least two when the temporal influence of parents on peer selection is not taken into account. Therefore, in our results, the coefficients for family characteristics may have been underestimated. We hope that future research with longitudinal data will explore reciprocal paths of family characteristics, peers, and drug use over time. Such research could illuminate the complex ways that family and peer groups may influence adolescents' decisions to use drugs.

Second, adolescent reporting of parental support and monitoring may not reflect the actual behavior of parents. As noted by Gray and Steinberg (1999), however, parental reports are not necessarily more accurate than adolescent reports. Further, adolescent perceptions of parental behavior appear to be as important in adolescent development as the actual behavior of parents (Gray & Steinberg).

Third, the sample did not include dropouts. To minimize this limitation, we included students from alternative schools in the sample. Nevertheless, we recommend replication among adolescents who have dropped out of school.

Fourth, the prevalence of marijuana use was relatively low. Only 9% of the sample used marijuana during the past month. The prevalence of marijuana use in our sample appears somewhat less than reported in national data. In their national sample of 8th-, 10th-, and 12th- grade students, Johnston et al. (1998) reported that 16.6% of the students had used marijuana during the past month, compared with 10.8% among the 8th, 10th, and 12th-grade students in our sample. It would be useful to study adolescents where marijuana use is more prevalent. In addition, there is a need to explore these questions using drugs—such as alcohol and tobacco—that are used more frequently by adolescents.

Fifth, because of our focus on parenting practices as moderators, we assumed that parents are generally against drug use. This assumption was useful in exploring the practical question of what parents can do to help minimize peer influences that may draw their children toward drugs. We

did not examine the direct involvement of parents in promoting adolescent drug use. Studies on the etiology of adolescent drug use have shown that the risk of adolescent drug use increases if parents use drugs or have permissive attitudes toward drug use (Brook & Brook 1990; Hawkins et al., 1992; Seydlitz & Jenkins, 1998). In the future, it would be helpful to explore attitudes and behavior of parents toward drug use along with authoritative parenting.

In light of our findings, it is important for other researchers to distinguish between closeness to mother and closeness to father, and between the two types of parental monitoring. Much existing research has not differentiated between these concepts and, as we have shown, without these distinctions, we would not have discovered some important findings.

Additional research on moderator variables also is needed. As noted earlier, there has been relatively little research on moderator variables in family research even though they are theoretically important and reflect the complexity of family dynamics (Stacy et al., 1992). In future research, it is important to replicate and elaborate the finding that closeness to fathers is a significant moderator variable.

Our findings suggest that during the adolescent period, father involvement may be important in helping adolescents resist peer pressure to use drugs. Consistent with our findings, Marshal and Chassin (2000) also found that closeness to father lessened the influence of peers on adolescent drug use. Similar findings in two different studies lend support to the conclusion that closeness to father may be an important resource for helping adolescents resist peer influences toward drug use.

A current question is the extent to which parents influence the behavior of their children. Harris (1995) argued that parenting has little influence on the behavior of children. Our findings are important because they indicate that parents who monitor their children closely and develop close relations with them may have a significant influence on their children's decisions to use marijuana.

According to Baumrind (1991), authoritative parents are highly demanding and highly responsive. Highly demanding parents are likely to monitor their children closely and catch them if they skip school or drink alcohol. Highly responsive fathers are likely to be involved with their children and develop close relationships with them. Baumrind (1991) found that authoritative parents tend to be successful in protecting their adolescents from drug use. Consistent with her findings, the influence of drug-using peers on adolescents appeared to diminish somewhat among demanding parents whose children perceived that they would be caught for violating major rules. Similarly, adolescents who had friends who used drugs were less likely to use marijuana if they were close to their fathers than if they were not. Our findings add additional evidence that authoritative parenting helps diminish the likelihood that adolescents will choose to take drugs, even when they have friends who use drugs. These findings have practical implications regarding what parents can do to help insulate their children from peer pressures to experiment with drugs such as marijuana.

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