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Parent-child relations and peer associations as mediators of the family structure-substance use relationship

Lizabeth A. Crawford and Katherine B. Novak

Abstract

Using data from the National Education Longitudinal Survey of 1988, the authors assess the extent to which adolescents' levels of parental attachment and opportunities for participating in delinquent activities mediate the family structure-substance use relationship. A series of hierarchical regressions supported the hypotheses that high levels of substance use among adolescents residing with stepfamilies would be explained by low parental attachment, whereas heightened opportunities for participating in deviant activities would account for the substance use behaviors of individuals living in single-parent households. More generally, the findings suggest that family structure has a moderate effect on youth substance use; that parental and peer relations are better predictors than family structure of levels of alcohol and marijuana consumption; and that variations in parental attachment, parenting style, and peer relations across family types explain some, but not all, of the effects of family structure on adolescents' substance use behaviors.

During the past quarter century, there has been a substantial shift in the structure of the family within this country. In 1970, almost 90% of children resided with either both biological or adoptive parents (Fields & Casper, 2001). Thirty years later, only 64% of children resided in such households (National Survey of America's Families, 2002), with an increasing number of children living in single-parent and stepfamilies (Cherlin & Furstenberg, 1994; Fields & Casper, 2001). Individuals emphasizing the importance of the traditional family as an agent of socialization have cited these changes in family organization as a source of a variety of negative outcomes, including the use of alcohol and other drugs, among today's youth (Clayton, 1992).

Adolescents living in single-parent and stepfamilies report higher levels of substance use than children who reside with both biological parents (Flewelling & Bauman, 1990; Hoffmann, 1995, 2002; Hoffmann & Johnson, 1998; Kierkus & Baer, 2002; Needle, Su, & Doherty, 1990; Stern, Northman, & Van Slyck, 1984), especially when the loss of a custodial parent is recent (Gil, Vega, & Biafora, 1998; Kurdek, Blisk, & Siesky, 1981). It is, however, yet to be determined how particular family forms, and marital disruption more generally, enhance adolescents' risks for the use of alcohol and other drugs (Demo & Acock, 1988; Hoffmann, 1995; Kierkus & Baer, 2002). Interestingly, neither decreased economic resources nor increased residential mobility, two factors frequently associated with marital disruption, account for substantial amounts of the variability in these behaviors across family types (Acock & Kiecolt, 1989; Amato & Keith, 1991; Hoffmann & Johnson, 1998).

Differences in patterns of parent–child interaction across family forms may provide a better explanation for the higher levels of substance use found among adolescents residing with single-parent and stepfamilies. From a social control perspective, bonds to conventional society, in particular ties to one’s parents, are key to preventing delinquency. Presumably, adolescents who are emotionally detached from their parents are at risk for a variety of deviant behaviors, including the use of alcohol and other drugs, because they do not have the internal control mechanism that prohibits others from engaging in these activities (Hirschi, 1969). Rooted in this assumption, the process variable most commonly examined within the literature on family structure and substance use is parental attachment (Adlaf & Ivis, 1996; Hoffmann, 1994, 1995; Kierkus & Baer, 2002; Sokol-Katz, Dunham, & Zimmerman, 1997). Other aspects of the parent-child relationship examined in many of these studies reflect adolescents’ opportunities for engaging in delinquent behavior.

The importance of opportunity as a precursor to deviant behavior was acknowledged by Hirshi (1969), who argued that adolescents involved in conventional activities were at low risk for substance use and other forms of delinquency because they have little free time within which to engage in these types of endeavors. Within the family structure-substance use literature, this bond to society, termed *involvement* (Hirshi, 1969), has been conceptualized as frequency of parent-child interaction (Hoffmann, 1993, 1994, 1995). However, frequency of interaction may better reflect parental attachment than opportunities for engaging in deviant behaviors (e.g., see Kierkus & Baer, 2002, for a more detailed discussion of this issue). Another process variable, presumably more reflective of adolescents’ opportunities for participation in substance use and other forms of delinquency, examined in earlier studies is parenting style, typically measured as parents’ monitoring of and control over their children’s behaviors.

A number of these analyses indicate that these measures of parent-child relations account for the high levels of drug use observed among adolescents who do not reside with both biological parents (Adlaf & Ivis, 1996; Kierkus & Baer, 2002; Sokol-Katz et al., 1997). Furthermore, additional studies suggest that patterns of parent-child interaction may mediate the relationship between specific types of disrupted families and substance use in a manner consistent with earlier hypotheses.

Because the presence of a nonbiological parent often increases family tension, researchers have speculated that adolescents residing with stepfamilies may be at risk for conflict with their parents, which undermines the quality of their relationships (Amato, 1987; Free, 1991; Seltzer, 1994). Less restrictive parenting styles, on the other hand, may be more characteristic of single-parent households, giving these children greater opportunities for participating in deviant activities (Amato, 1993; Cookston, 1999; Free, 1991; Nock, 1988; Steinberg, 1987). In support of the latter contention, a composite measure of family processes emphasizing parental control over parental attachment mediated the effects of residing with a single-parent family on marijuana use in one recent study (Kierkus & Baer, 2002). Other related analyses (Hoffmann, 1993, 1994, 1995, 2002) suggest that quality of parent-child relations explains much of the family structure-drug use relationship among adolescents living in stepfamilies. Hoffmann

(2002) examined the role of parental monitoring as well as parental attachment as a potential mediating variable; the former measure increased levels of alcohol and marijuana consumption, suggesting that it was quality of parent-child relations that accounted for high levels of substance use among adolescents residing with stepfamilies.

Additional research suggests that peer behavior may be another intervening variable, linking family structure to adolescents' substance use behaviors. Using path analytic techniques, Hoffmann (1995) found that the quality of parent-children relations mediated the family structure-marijuana use relationship among adolescents from both single-parent and stepparent households. The effects of parental attachment on drug use in this analysis were, however, indirect, with poor parent-child relations enhancing respondents' risks for marijuana consumption by increasing their affiliations with drug-using friends. This finding is consistent with research indicating that family conflict may increase adolescents' risks for the use of alcohol and other drugs by making interactions with substance-using peers seem more appealing (Baer & Bray, 1999; Jenkins & Zunguze, 1998; Simmons, Robertson, & Downs, 1989).

It is primarily through interactions with peers that adolescents learn to define substance use as an acceptable and desirable activity (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979). Active participation in a peer culture supportive of substance use further reinforces these beliefs and often serves as the basis for the formation of an alternative social identity (Thornberry, Lizotte, Krohn, Farnsworth, & Jang, 1994). Peer relationships centered on drug use may also enhance adolescents' opportunities for engaging in this form of delinquency by increasing their access to illegal substances and by providing an interactive context conducive to their consumption.

Drawing on the routine activities model of crime victimization (Cohen & Felson, 1979), Hawdon (1996, 1999) has reconceptualized Hirchi's (1969) concept of involvement to include a variety of routine activity patterns, including participation in unstructured peer interactions, which directly reflect adolescents' opportunities for using alcohol and other substances. A number of studies indicate that this dimension of adolescents' peer relationships, which includes a range of conventional activities (e.g., driving around with friends or just hanging out) low in both purpose and visibility (Hawdon, 1996), is an especially important determinant of their degree of involvement in these behaviors (Crawford & Novak, 2002; Flannery, Williams, & Vazsonyi, 1999; Hawdon, 1996, 1999; Osgood, Wilson, O'Malley, Bachman, & Johnston, 1996; Riley, 1987). Despite these findings, little attention has been given to the relationship between family structure, drug use, and adolescents' routine patterns of peer interaction. Prior studies of the effects of family structure on substance use have focused almost exclusively on friends' use of alcohol and other drugs (Hoffmann, 1993, 1994, 1995; Jenkins & Zunguze, 1998; Needle et al., 1990), ignoring the frequency with which adolescents interact with peers in contexts that provide them opportunities to participate in deviant activities.

In this article, we assess the effect of involvement in unstructured peer interactions low in visibility, peer support for substance use, parenting style, and parental attachment as potential mediators of the family structure-substance use relationship. Using longitudinal data, we

examine the relative impact of specific family forms on these variables and the extent to which they explain variations in adolescents' substance use behaviors. Drawing on the literature reviewed earlier, we hypothesize that measures reflective of opportunity (parenting style and peer relations) will explain high levels of substance use among adolescents in single-parent households. Insofar as peer relations conducive to substance use coincide with increases in autonomy, it seems likely that this variable would be of the greatest relevance to youths residing in single-parent households. Parental attachment, on the other hand, should better account for the substance use behaviors of adolescents residing with stepfamilies. Given the emotional strain associated with marital disruption, along with what are often abrupt changes in routine patterns of familial interaction (Hoffmann, 1993; Seltzer, 1994; Simmons, 1996; Stewart, Copeland, Chester, Malley, & Barenbaum, 1997), it seems likely that both attachment and opportunity will be of relevance to the substance use behaviors of adolescents who have recently experienced the dissolution of their parents' marriage.

Method

Sample

The data used in this study are from the National Education Longitudinal Survey of 1988 (NELS:88). Data collected in 1988, when respondents were in the eighth grade, were combined with data from the first and second follow-up interviews collected when students were sophomores and seniors in high school, respectively.

Using the first through third waves of the NELS data, collected during a 6-year time frame, enabled us to assess both the short- and more long-term effects of family structure on adolescents' substance use behaviors. Moreover, the inclusion of measures of family composition in both the first and second waves of the NELS data allowed for the construction of a measure of family structure that both reflected adolescents' pre-high school household composition and encompassed a number of changes in family form between Grades 8 and 10.

The NELS was conducted, in part, to provide researchers with a database that allowed for comparisons in educational processes and outcomes across students from different racial and ethnic categories. For this reason, individuals of Asian and Latino descent were oversampled. We adjusted for the disproportionate stratified sampling techniques used in selecting the NELS respondents by applying the designated National Center for Education Statistics (NCES) panel weights. In all analyses, we used survey estimation in Stata to adjust the standard errors to account for the clustered and stratified sampling design of the NELS data.¹ We imputed values

¹ Survey commands (svy) in Stata use Taylor-series linearization methods to produce correct standard errors for samples that were drawn using a stratified cluster design (StataCorp, 2003).

for the missing data on all variables except for demographic characteristics and substance use ($n = 10,704$).²

Measures

Family structure. Using questions about the composition of respondents' households when they were in the 8th and then later in the 10th grade, we constructed a series of 10 dummy variables reflecting different family forms. The five stable family types (i.e., family forms that did not change between Grades 8 and 10) are both biological/adoptive parents, which serves as the reference category; mother only; father only; mother-stepfather; and father-stepmother. In addition, four dummy variables were created to represent respondents who experienced the dissolution of the parental relationship during this 2-year period: both parents to mother only; both parents to father only; both parents to mother-stepfather; both parents to father-stepmother. Because having other adults in the home is likely to be a potentially confounding variable (e.g., see DeLeire & Kalil, 2002; Dornbusch et al., 1985), respondents who lived with one or more adults in addition to their parent(s) were given scores of 0 on all of the above measures. These individuals, along with respondents who did not live with either biological/adoptive parent, were given scores of 1 on a final variable representing all other family forms.³ Because this measure encompasses a mixture of different family types and is thus of little theoretical interest, it serves only as a control variable in our subsequent analyses.

Parental and peer relations. Items used to construct our measures of parental and peer relations are presented in the appendix. An index of the quality of child-parent relations at Grade 10 similar to Hoffmann's (2002) measure was constructed by adding respondents' scores on five items focusing on how well they liked and got along with their parents during their sophomore year in high school. Each item was scored using a set of response options ranging from 1 = *false* to 6 = *true* ($\alpha = .83$). Frequency of parent-child interaction was measured using a single item asking respondents to report how often they engaged in shared activities with their parents (1 = *rarely or never*, 2 = *less than once a week*, 3 = *once or twice a week*, 4 = *every day or almost every day*). Parental monitoring was measured by summing students' responses to the five items used by Hoffmann (2002) to construct his measure of parental supervision. In this case, each question had response options ranging from 1 = *not at all* to 4 = *a lot* ($\alpha = .80$). Similarly, a measure of parental control was constructed by adding respondents' answers to 10 items that reflected the degree to which they felt that their parents actually regulated their behaviors, with response options ranging from 1 = *I decide by myself* to 5 = *parents decide* ($\alpha = .78$). All measures were scored such that high values indicated the characteristic in question (i.e., quality parent-child relations, high parental monitoring, or high parental control).

² Imputations were done by best-subset regression based on the demographic variables. All analyses were rerun with listwise deletion of missing cases (data not shown); the results did not differ substantively.

³ See Hoffmann (1994) and Hoffmann and Johnson (1998) for a similar classification scheme.

Our two final process measures, indicating the nature of adolescents' peer relationships as high school sophomores, were scored in the following manner. Adolescents' participation in unstructured peer interactions low in visibility was constructed by summing respondents' answers to two questions concerning the frequency with which they visited with friends at the local hangout and drove around with friends in a motor vehicle. Each of these questions was coded using a 4-point scale ranging from 1 = *rarely or never* to 4 = *every day or almost every day* ($r = .42$). A second characteristic of adolescents' peer relationships, the extent to which their peer group supported drug use when they were in the 10th grade, was measured using students' responses to a question asking them to indicate how important it was to be "willing to party or get wild" among their friends. Scores on this variable ranged from 1 = *not important* to 3 = *very important*.

Each of the parent and peer relation indicators were standardized and then factor analyzed to determine the extent to which they reflected similar underlying constructs. A principal components analysis, with an orthogonal rotation of the factor matrices, revealed that three underlying factors explained 68% of the variance in these six process measures. All factor loadings were above .70, and communalities for the six indices ranged from .586 to .731 (data not shown). As anticipated, quality of parent-child relations and frequency of parent-child interaction loaded on a common factor, labeled "parental attachment." Parental monitoring and parental control loaded on a second factor, termed "restrictive parenting style." Similarly, unstructured peer interaction and peer support for substance use reflected a third underlying construct, referred to as "peer relations." Presumably, both parenting style and peer relations reflect adolescents' opportunities for participating in deviant activities.

Control variables. Socioeconomic status and residential mobility, considered as potential mediators of the family structure-substance use relationship in earlier studies, were included in all higher order analyses. Respondents' socioeconomic background was measured using the composite index of socioeconomic status provided by the NCES. This variable included parental education and income, as well as a range of indicators of cultural capital (e.g., owning a home computer). Scores on this measure were standardized yielding a sample mean of approximately 0, a standard deviation of approximately 1, and a range of -2.22 to 2.30. Residential mobility was measured as the number of times respondents had moved since the eighth grade. Scores on this variable ranged from 1 = *none* to 4 = *three or more times*. Indicators of gender and race were also included as control variables. Gender was measured as the dummy variable, female, where females received scores of 1 and males received scores of 0. Race was measured as a series of four 0/1 dummy variables (Asian, Black, Latino, and Native American), with White students serving as the reference category.

Dependent variables. Our dependent variables reflect frequency of alcohol and marijuana consumption rather than severity of use. Because focusing on only a particular time frame (e.g., the past month) is not likely to capture adequately general patterns of substance use among this age group (Shope, Copeland, & Dielman, 1994), we created the dependent variables using indicators of lifetime, yearly, and monthly consumption. As suggested by Shope et al.(1994), we

also included the number of times respondents consumed five or more drinks in one sitting during the previous 2 weeks in the index of overall alcohol use (see the appendix for this and other substance use indicators).

The latter measurement (binge drinking) could raise concerns in terms of face validity, as it may be an indicator of a different underlying concept (i.e., binge drinking may be a different behavior than occasional underage drinking). To partially address this issue, the items were evaluated using principal component factor analysis. The indicators were unifactorial and explained 73% of the variance (Eigenvalues = 2.91 and 2.93; α s of standardized values = .87 and .88 during the sophomore and senior years, respectively). Orthogonal rotations were used to extract the predicted factors and thereby create the outcome variables. The scoring coefficients suggest that the outcome variables represent general drinking (lifetime and past-year measurements have larger coefficients) as opposed to “problem drinking” as it is defined for the adult population.

Although binge smoking was not included as a measurement of marijuana use, for continuity the measure of marijuana consumption was constructed in a similar fashion. We used students’ responses to three questions about their use of this substance (times they used marijuana at any point in their lives, during the past year, and during the past month) administered when they were high school sophomores and high school seniors. Indexes were created with Eigenvalues of 2.51 and 2.52 and standardized α s of .78 and .80 for sophomore and senior years, respectively. The three indicators had relatively equal scoring coefficients and accounted for 83% of the variance.

Analysis Plan

Taking an approach similar to that used in earlier studies within the literature on family structure and delinquency (e.g., Adlaf & Ivis, 1996; Demuth & Brown, 2004; Hoffmann, 1994, 2002; Kierkus & Baer, 2002), we conducted a path analysis using ordinary least squares (OLS) regression to assess the relationships between family structure, the three process variables (parental attachment, parenting style, and peer relations), and substance use. The advantage of this procedure is that it enables one to assess the indirect as well as the direct effects of a series

of causal variables on a given outcome (Duncan, 1966).⁴ An indirect, or mediating, effect is evident when there are significant paths between an exogenous variable and the intervening variable and between the latter measure and the dependent variable, and the coefficient for the exogenous variable decreases in magnitude when the intervening variable is added into the statistical model (Baron & Kenny, 1986).

In an initial set of analyses, we regressed the three parenting and peer variables on measures of family structure (with both biological/adoptive parents serving as the reference category) and other respondent background characteristics. In a second set of analyses, measures of alcohol and marijuana use during the sophomore year were regressed on the latter three process variables (parental attachment, parenting style, and peer relations), along with the measures of family structure and the various control variables. In a final set of analyses, we investigated the effects of family structure and the family and peer process variables on alcohol and marijuana consumption during the senior year, controlling for earlier substance use (during the sophomore year). Making use of the longitudinal nature of the data as such enabled us to better assess the effects of our causal variables on later substance use by minimizing problems with endogeneity (Menard, 1991).

Results

Summary statistics for the demographic variables and the percentage of respondents who reported using alcohol and marijuana as high school sophomores and then, 2 years later, as high school seniors, are presented in Table 1. Overall, the patterns of alcohol and marijuana use

⁴ Two concerns arise from our use of ordinary least squares (OLS) regression. The first is the potential endogeneity of our measures of parent-child relations and peer associations (parental attachment, parenting style, and peer relations) in the cross-sectional analyses. Not only might they affect adolescent drug use, but also they might be influenced by it. This is both most likely and most problematic for our peer relations variable: An adolescent's choice of friends and what he or she does with those friends may be influenced by tastes for drug use. If so, our measure of the impact of peer relations on drug use would likely be biased upward. Finding a solution to this problem is challenging, however. No variables that might influence peer relations but not drug use arise that might be used as instruments, and fixed-effect techniques are unlikely to be fruitful because an adolescent's choice of friends is likely to change over time with any changes in tastes for drugs. As a result, we are cautious in the interpretation of our estimates of this process variable.

The second concern is the use of OLS in place of a more sophisticated structural equation model with latent variables. We do this for largely practical reasons. OLS is substantially less computationally demanding, encouraging the use of more sophisticated techniques only when they are particularly appropriate for the problem at hand. This is not likely the case for our application. In particular, consistent estimation of a structural equation model with latent variables requires not only the accurate specification of the underlying distributions of the latent exogenous factors and errors—a difficult undertaking—but also confidence in the identification of the model. Identification is usually obtained by exclusion restrictions in the (possibly implied) structural submodel—for example, variables that influence parental attachment or peer relations but not drug use that can be used as instruments—or an independence assumption on the measurement error for multiple indicators of each latent factor. Although it is possible to find environments where at least one of these conditions holds, ours does not: As described above, instruments are hard to find, and measurement errors are likely to be correlated across indicators of a given factor (e.g., errors that cause respondents to underestimate one measure of parental control are likely to spill over into other measures). Without identification, parameter estimates from these more sophisticated approaches are biased, often in very complicated ways. In contrast, if our process measures suffer from measurement error, the likely bias in an OLS regression is toward zero, yielding conservative estimates of their true effect (DeShon, 1998).

Table 1. Weighted Mean Estimates and Standard Errors for 1988-1992 Panel Sample ($n = 10,704$)

	<i>M</i>	<i>SE</i>
Female	.53	.007
Race		
Asian	.10	.007
Black	.07	.005
Latino	.14	.009
Native American	.01	.001
White (reference)	.68	.011
Family Structure		
Stable family forms		
Mother only	.05	.003
Father only	.01	.001
Mother and stepfather	.05	.002
Father and stepmother	.01	.001
Both biological parents (reference)	.52	.007
Recent marital disruption		
Both parents to mother only	.01	.001
Both parents to father only	.01	.001
Both parents to mother-stepfather	.01	.001
Both parents to father-stepmother	.00	.001
Other family forms	.33	.007
Socioeconomic status	.06	.018
Number of moves since Grade 8	1.41	.010
Used alcohol: Grade 10	.81	.005
Used marijuana: Grade 10	.17	.005
Used alcohol: Grade 12	.88	.005
Used marijuana: Grade 12	.28	.006

reported among the Grade 8 to Grade 12 panel sample used in our analyses are consistent with the results of other national surveys of substance use among U.S. high school students during this time frame (e.g., Centers for Disease Control and Prevention, 1991).

Effects of Family Structure on Parental and Peer Relations

In our first set of analyses, we tested our hypotheses that parent-child relations would suffer in stepfamilies, that adolescents from single parents would have the most opportunities to participate in deviant activities, and that decreases in parental attachment and increases in opportunities for delinquency would characterize the experience of adolescents who endured recent changes in family structure, in particular the dissolution of the marriage of their biological or adoptive parents. The results of these analyses are presented in Table 2.

As predicted, adolescents living in stepfamilies (mother-stepfather or father-stepmother) exhibited significantly lower levels of parental attachment than those who lived with both biological parents. In further support of our hypotheses, there was substantial evidence that residing with a single-parent family increased adolescents' opportunities for substance use. As expected, both mother-only and father-only families were characterized by less restrictive parenting practices. Although respondents living with only a mother in the home did not

Table 2. Unstandardized Ordinary Least Squares Estimates for Regression of Measures of Parental and Peer Relations on Family Structure and Controls ($n = 10,704$)

Dependent Variable	Parental Attachment <i>b (SE)</i>	Parenting Style <i>b (SE)</i>	Peer Relations <i>b (SE)</i>
Constant	.31 (.05)***	-.01 (.05)	.20 (.05)***
Female	.19 (.04)***	.38 (.04)***	-.43 (.05)***
Race			
Asian	-.35 (.07)***	-.05 (.07)	-.73 (.07)***
Black	.08 (.08)	.29 (.07)***	-.56 (.07)***
Hispanic	.03 (.07)	.12 (.06)*	-.23 (.07)**
Native American	-.37 (.18)*	-.31 (.24)	-.29 (.21)
Family structure			
Mother only	-.13 (.09)	.27 (.09)**	.06 (.09)
Father only	-.20 (.23)	-1.00 (.19)***	.64 (.21)**
Mother-stepfather	-.33 (.09)***	-.15 (.09)	.16 (.08)*
Father-stepmother	-.81 (.18)***	-.17 (.22)	.01 (.21)
Both to mother	-.27 (.20)	-.09 (.15)	.42 (.16)**
Both to father	.48 (.32)	-.58 (.20)**	.29 (.34)
Both to stepfather	-.69 (.25)**	-.16 (.24)	.26 (.20)
Both to stepmother	-.25 (.29)	-.16 (.21)	-.44 (.33)
Other family	-.14 (.05)**	-.12 (.05)**	.04 (.04)
Socioeconomic status	.16 (.03)***	.05 (.03)	-.08 (.03)**
Moved	-.17 (.03)***	-.09 (.03)***	.04 (.03)
R^2	.027	.024	.043

* $p < .05$

** $p < .01$

*** $p < .001$

significantly differ in their peer affiliations from individuals from intact families, living in a father-only household was associated with peer relationships likely to provide social contexts conducive to substance use. Adolescents from mother-stepfather families also had significantly higher scores on the peer relations variable than individuals from dual-parent households.

Overall, the effects of marital disruption on the parenting and peer variables were less consistent. Moving from an intact to a stepfamily was associated with low levels of parental attachment, but this effect was strong enough to reach significance only for the transition to a household with a mother and stepfather. As was the case in single-parent families described above, transitioning from a dual-parent to a mother-only or a father-only household primarily affected opportunities for substance use. Respondents who went from intact to father-only families were more likely than individuals who consistently lived with both parents to report that they experienced unrestrictive parenting practices. The movement from an intact to a mother-only household, on the other hand, increased adolescents' likelihoods of having peer affiliations conducive to the use of alcohol and drugs.

Family Structure, Parental and Peer Relations, and Grade 10 Substance Use

In the initial statistical model, Grade 10 alcohol use was regressed on measures of family structure, students' demographic characteristics (gender, race/ethnicity, and socioeconomic

Table 3. Unstandardized Ordinary Least Squares Estimates for Regression of Grade 10 Substance Use on Family Structure and Parental and Peer Relations ($n = 10,704$)

Dependent Variable	Alcohol Use		Marijuana Use	
	<i>b</i> (<i>SE</i>)	<i>b</i> (<i>SE</i>)	<i>b</i> (<i>SE</i>)	<i>b</i> (<i>SE</i>)
Constant	-.05 (.03)	-.08 (.02)***	-.16 (.03)***	-.17 (.02)***
Female	-.06 (.02)	.07 (.02)***	-.07 (.02)***	.01 (.02)
Race				
Asian	-.42 (.04)***	-.29 (.03)***	-.20 (.03)***	-.13 (.02)***
Black	-.47 (.04)***	-.33 (.04)***	-.19 (.03)***	-.11 (.03)***
Latino	-.05 (.04)	.01 (.03)	.06 (.04)	.09 (.04)*
Native American	-.09 (.12)	-.07 (.10)	.13 (.10)	.13 (.11)
Family structure				
Mother only	.14 (.04)***	.11 (.03)**	.13 (.05)**	.11 (.05)*
Father only	.47 (.10)***	.27 (.09)**	.48 (.16)**	.36 (.16)*
Mother-stepfather	.20 (.05)***	.14 (.04)***	.11 (.05)*	.06 (.05)
Father-stepmother	.07 (.11)	.01 (.09)	.31 (.15)*	.25 (.14)
Both to mother	.13 (.08)	.02 (.07)	.13 (.11)	.06 (.10)
Both to father	.17 (.14)	.10 (.12)	.28 (.20)	.26 (.17)
Both to stepfather	.21 (.11)	.11 (.09)	.09 (.10)	.00 (.09)
Both to stepmother	-.22 (.20)	-.15 (.17)	-.20 (.11)	-.17 (.11)
Other family	.09 (.02)***	.07 (.02)***	.10 (.02)***	.08 (.02)***
Socioeconomic status	.09 (.02)***	.12 (.01)***	.03 (.01)*	.05 (.01)***
Moved	.06 (.01)***	.04 (.01)***	.10 (.01)***	.08 (.01)***
Parental attachment		-.05 (.01)***		-.07 (.01)***
Parenting style		-.05 (.01)***		-.03 (.01)***
Peer relations		.21 (.01)***		.12 (.01)***
R^2	.054	.258	.026	.113

* $p < .05$

** $p < .01$

*** $p < .001$

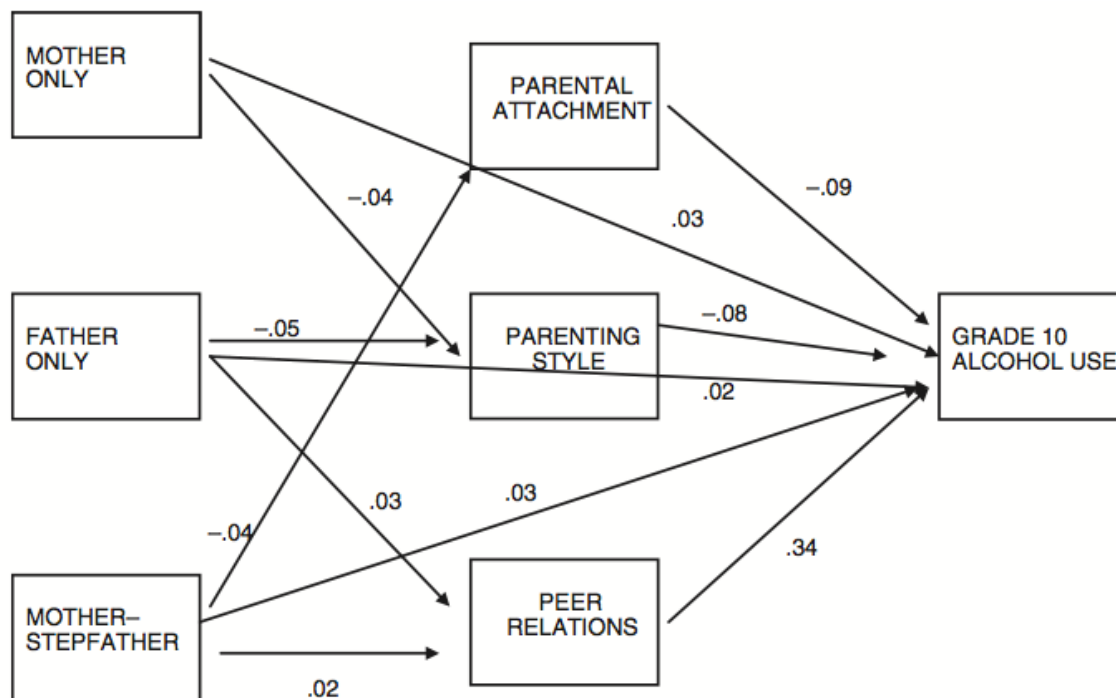
status), and their levels of residential mobility. In a second analysis, the three process variables (parental attachment, parenting style, and peer relations) were added into the regression equation, enabling us to assess the extent to which the characteristics of adolescents' familial and peer relationships mediate any effects of family structure on drinking behavior. The results of both sets of analyses are presented in Table 3. As shown in the first column of this table, only three of the family types under consideration (mother only, father only, and mother-stepfather) were significantly related to alcohol consumption when gender, race, socioeconomic status, and residential mobility were held constant.

As shown in column 2 of Table 3, each of the three process variables (attachment, parenting style, and peer interaction) was significantly related to adolescent drinking behavior, and adding these variables into the regression model substantially increased the proportion of explained variation in scores on the dependent variable, from 5% to more than 25%. Additional analyses using standardized versions of all independent variables in the model (data not shown) indicated that much of this increase was due to the strong relationship between peer relations and Time 1 alcohol use.

Although it retained its significance, the magnitude of the effects of residing with a father-only (relative to an intact) family decreased substantially when the measures of parental and peer relations were included in the statistical model, a finding in support of the mediation hypothesis. Additional calculations, using coefficients from Table 2 and column 2 of Table 3, indicated that peer relations explained a substantial portion of this effect. The fact that adolescents living in father-only families were subjected to among the least restrictive parenting practices further contributed to their high levels of alcohol consumption during the sophomore year in high school. These indirect effects are displayed graphically in Figure 1.⁵

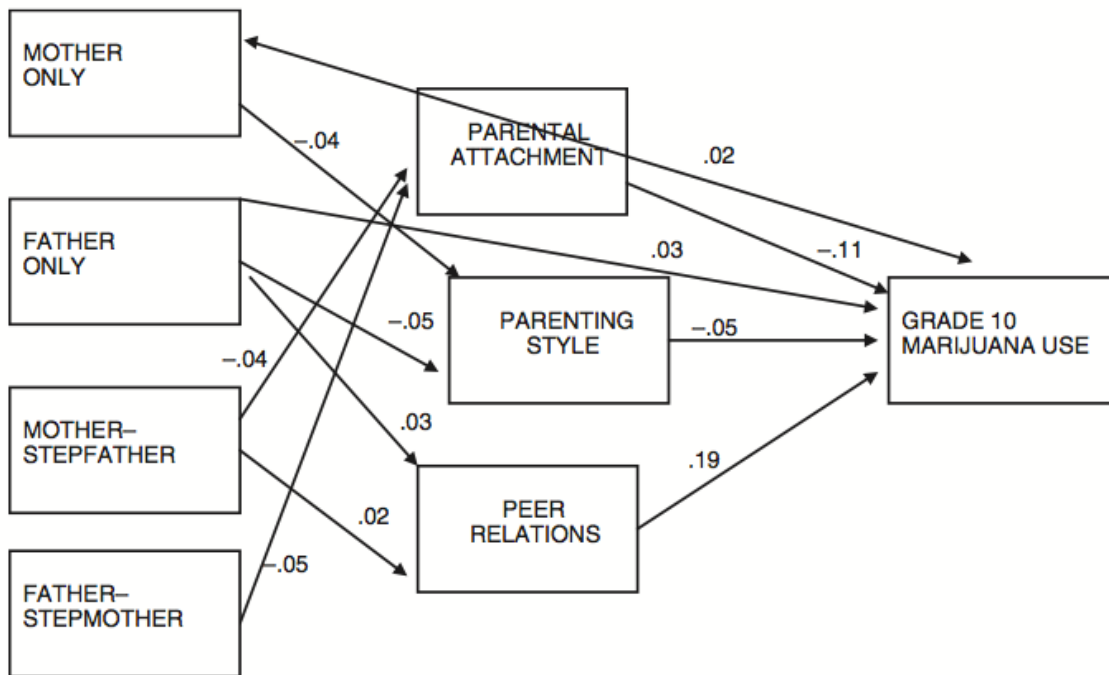
There was also some evidence that the three process variables explained some of the relationships between living with a mother only, or with a mother and stepfather, and alcohol use. As shown in Figure 1, adolescents residing with the latter type of family were at risk for drinking in part because they had peer relationships conducive to participation in deviant activities as well as low levels of parental attachment. Although more of the effect of living in a mother-stepfather household on Grade 10 drinking was accounted for by peer relations than by parental attachment, the peer interaction variable itself explained a greater proportion of the father-only alcohol use relationship. While the impact of living in a mother-only household on levels of alcohol consumption was mediated by the measure of parenting style, this effect was also relatively minimal.

Figure 1. Effects of Standardized Family Structure and Parental and Peer Relations Variables on Grade 10 Alcohol Use ($n = 10,704$)



⁵ The coefficients presented here, and in all subsequent figures, were derived using standardized variables so that the magnitude of various paths may be compared.

Figure 2. Effects of Standardized Family Structure and Parental and Peer Relations Variables on Grade 10 Marijuana Use ($n = 10,704$)



In the next phase of our analysis, a series of regressions comparable to those presented earlier were run with levels of marijuana consumption serving as the dependent variable. The results of this procedure are presented in columns 3 and 4 of Table 3. As shown here, coefficients for all of the four stable family forms (mother only, father only, mother-stepfather, father-stepmother) were large enough to reach statistical significance (column 3), and variations in parental attachment, parenting style, and peer relations between these types of households and intact families accounted for at least some of these effects. As shown in column 4 of Table 3, only respondents who lived in mother- or father-only families had significantly higher levels of marijuana use than adolescents who lived with both biological/adoptive parents when the three process variables were included in the regression equation. Moreover, adding the process variables into the statistical model increased the proportion of explained variation in composite marijuana use scores from less than 3% to more than 11%. Once again, peer relations had a larger impact than parental attachment and parenting style on levels of Grade 10 marijuana consumption (Figure 2), although its effect was somewhat smaller than in the model predicting early drinking (see Figure 1).

Consistent with our hypotheses, it was primarily parental attachment that linked stepfamilies to marijuana consumption, whereas opportunities for participation in deviant activities mediated the single-parent-marijuana use relationship. As shown in Figure 2, the strong inverse association between living with a father and stepmother and parental attachment explained the effect of this

family form on marijuana use during the sophomore year in high school. Adolescents from father-only families, on the other hand, appeared to be at risk for marijuana use primarily because of the nature of their peer relationships. As was the case when levels of alcohol consumption served as the dependent variable, none of the transitional family forms were associated with a risk for early marijuana use via either direct or indirect pathways.

Effect of Family Structure and Parental and Peer Variables on Grade 12 Substance Use

In a final set of analyses, we used data from Grades 8, 10, and 12 to assess the more long-term effects of family structure and parental and peer relations on adolescents' use of both alcohol and marijuana. These results are presented in Table 4. Although their coefficients were somewhat smaller than those observed in the cross-sectional sample, the same three family types that affected earlier drinking (mother only, father only, and mother-stepfather) significantly increased adolescents' risks for alcohol use 2 years later when they were high school seniors (Table 4, column 1). None of these variables, however, retained their significance when Grade 10 alcohol use along with measures of parental attachment, parenting style, and peer relations were entered into the regression equation (Table 4, column 2). This suggests that earlier patterns of parental and peer interaction, along with earlier drinking behavior, measured during the sophomore year explained these relationships.

The indirect effects of family structure on levels of Grade 12 alcohol consumption, via Grade 10 parental and peer relations and Grade 10 drinking behavior, are displayed in Figure 3. Although parenting style did not significantly affect alcohol use during the senior year in high school, there was a negative association between parental attachment and Time 2 drinking. Moreover, the peer interaction variable had a substantial impact on subsequent levels of alcohol consumption. In support of our hypotheses, parental attachment contributed to the high levels of alcohol use observed among adolescents living with a mother and a stepfather, and peer relations (our most direct measure of adolescents' opportunities for engaging in substance use and other forms of delinquency) mediated the father-only alcohol use relationship. None of the process variables influenced the relationship between living in a mother-only household and levels of alcohol consumption.

The impact of family structure and measures of Grade 10 parental and peer relations on Grade 12 marijuana consumption was somewhat different in that adolescents from stepfamilies were not at risk for this behavior. However, as was the case with Time 2 alcohol use, adolescents who lived with their mother only had higher levels of Grade 12 marijuana use than respondents from intact families (Table 4, column 3). As shown in Figure 4, the effect of living in a single-mother family on this form of drug use was mediated by earlier marijuana use (during the sophomore year) and parenting style. Although the difference was not quite strong enough to reach statistical significance ($b = .21, p < .07$), respondents who lived in father-only families between Grades 8 and 10 also exhibited higher levels of marijuana use at Grade 12 than individuals who resided with both biological or adoptive parents. Once again, a portion of this effect was explained by the peer relations variable.

Table 4. Unstandardized Ordinary Least Squares Estimates for Regression of Grade 12 Substance Use on Family Structure, Grade 10 Substance Use, and Parental and Peer Relations ($n = 10,704$)

	Alcohol Use		Marijuana Use	
	Column 1 <i>b</i> (<i>SE</i>)	Column 2 <i>b</i> (<i>SE</i>)	Column 3 <i>b</i> (<i>SE</i>)	Column 4 <i>b</i> (<i>SE</i>)
Constant	.07 (.03)**	.10 (.02)***	-.08 (.02)***	-.01 (.02)
Female	-.15 (.02)***	-.10 (.02)***	-.13 (.02)***	-.06 (.02)**
Race				
Asian	-.42 (.04)***	-.15 (.03)***	-.24 (.03)***	-.12 (.02)***
Black	-.46 (.04)***	-.17 (.04)***	-.25 (.02)***	-.12 (.02)***
Latino	-.06 (.04)	-.02 (.03)	.03 (.04)	.02 (.02)
Native American	-.10 (.14)	-.05 (.10)	.20 (.11)	.14 (.09)
Family structure				
Mother only	.09 (.04)*	-.00 (.03)	.10 (.04)*	.03 (.03)
Father only	.28 (.10)**	-.03 (.09)	.21 (.12)	-.06 (.09)
Mother-stepfather	.15 (.04)***	.03 (.04)	.08 (.04)	.01 (.04)
Father-stepmother	.03 (.09)	-.02 (.08)	.18 (.11)	.01 (.05)
Both to mother	.09 (.09)	-.01 (.06)	.20 (.09)*	.11 (.07)
Both to father	.20 (.13)	.09 (.12)	.02 (.14)	-.12 (.12)
Both to stepfather	.06 (.12)	-.08 (.11)	-.06 (.08)	-.14 (.08)
Both to stepmother	-.11 (.24)	.03 (.15)	.01 (.16)	.12 (.14)
Other family	.06 (.02)**	.00 (.02)	.09 (.02)***	.03 (.02)*
Socioeconomic status				
Moved	.09 (.01)***	.04 (.01)***	.08 (.01)***	.07 (.01)***
Parental attachment				
Parenting style		-.02 (.00)***		-.03 (.00)***
Peer relations		-.01 (.01)		-.01 (.00)**
Grade 10 alcohol		.05 (.01)***		.05 (.00)***
Grade 10 marijuana		.56 (.01)***		.47 (.01)***
R^2	.056	.413	.039	.353

* $p < .05$

** $p < .01$

*** $p < .001$

Interestingly, although the four transitional family forms encompassed by our analyses, including movement from an intact to a mother-only family, were not significantly associated with either measure of Time 1 substance use or Time 2 drinking, adolescents from the latter family type did have significantly higher levels of Time 2 marijuana use than individuals from intact families. Furthermore, as shown in Figure 4, the effect of this family form on subsequent marijuana consumption was mediated by the peer relations variable but not by the Time 1 marijuana use variable.

Discussion

Consistent with prior research (Flewelling & Bauman, 1990; Hoffmann, 1993, 1995, 2002; Hoffmann & Johnson, 1998; Kierkus & Baer, 2002; Needle et al., 1990; Stern et al., 1984), we found that residing with a single-parent or stepfamily increased adolescents' risks for substance use. Although the latter effects were relatively modest, especially in comparison to those of the process variables examined, they are comparable in magnitude to the results of earlier studies (Hoffman, 1993, 1995; Hoffman & Johnson, 1998; Needle et al., 1990).

Figure 3. Effects of Standardized Family Structure and Parental and Peer Relations Variables on Grade 12 Alcohol Use ($n = 10,704$)

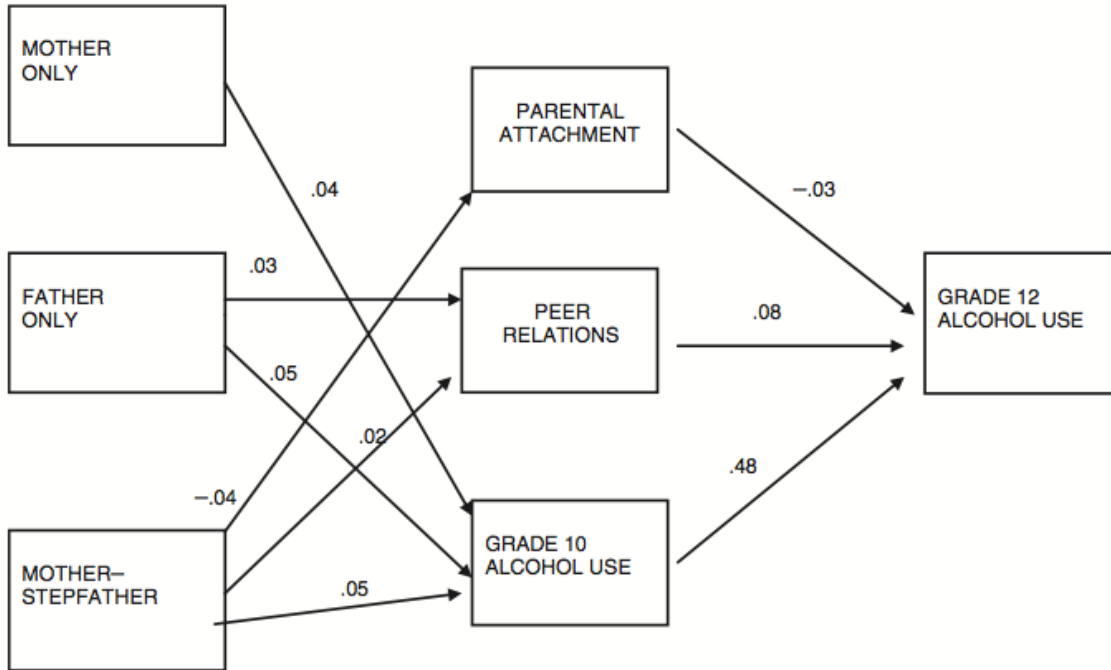
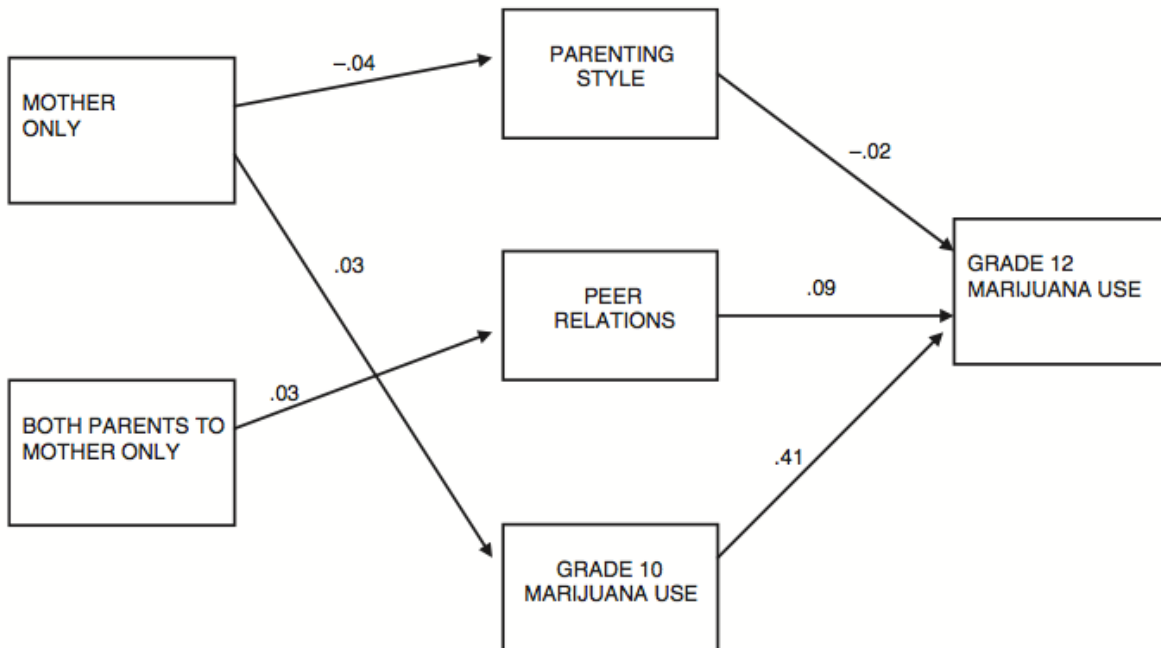


Figure 4. Effects of Standardized Family Structure and Parental and Peer Relations Variables on Grade 12 Marijuana Use ($n = 10,704$)



In an extension of previous analyses, we examined the degree to which opportunities for participation in delinquency, as well as parent-child relations, mediated the relationship between family structure and adolescent substance use. Based on a factor analysis of a number of process variables commonly used within the family structure-substance use literature, as well as a measure of participation in unstructured peer interaction, we derived two conceptually distinct measures of opportunity—nonrestrictive parenting style and peer relations—conducive to the use of alcohol and other drugs. Although frequency of parent-child interaction has served as the primary measure of opportunity used in prior analyses, as predicted, time spent with parents appeared to be more reflective of adolescents' levels of attachment to their parents than their opportunities for drug use.

In support of a mediation model, differences in levels of Grade 10 substance use between adolescents from single-parent or stepfamilies and individuals living with both parents were smaller, and in some cases absent altogether, when levels of parental attachment, parenting style, and peer relations were held constant. As hypothesized, much of the influence of residing with a father-only family on Grade 10 substance use was explained by the measures of opportunity (in this case peer relations, the most direct indicator of opportunities for delinquency, followed by parenting style). Similarly, parenting style accounted for some of the relationship between residing with a mother-only family and early levels of alcohol and marijuana consumption. Parental attachment, on the other hand, explained much of the stepfamily-substance use relationship.

Endogeneity may be a problem when one considers the implications of these findings. As mentioned earlier, peer relationships conducive to deviance, in particular, may be a consequence as well as a cause of adolescent substance use (Aseltine, 1995; Bauman & Ennett, 1996; Fisher & Bauman, 1988). Given this, the impact of the peer relations variable on measures of Grade 10 substance use must be interpreted with caution. The fact that these effects retained their significance in the longitudinal analyses, when controls for earlier alcohol and marijuana consumption were included in the statistical model, supports the notion that certain types of peer affiliations do in fact increase youths' risk for these behaviors.

Not surprisingly, the effects of family structure on both alcohol and marijuana use were somewhat smaller among the Grade 8 to 12 panel sample. Nonetheless, youth who resided in single-parent families when they were in Grades 8 through 10 were at a greater risk than individuals from intact families for both behaviors 2 years later when they were high school seniors. Respondents who lived with a mother and stepfather were also at heightened risk for later drinking. Once again, parenting style and peer relations mediated the single-parent substance use relationship, whereas parental attachment linked the mother-stepfather family form to subsequent alcohol use.

Taken together, the study results offer substantial evidence that single-parent and stepfamilies affect youth substance use through different causal mechanisms (opportunity vs. attachment, respectively). The effects of family structure on levels of alcohol and marijuana use did,

however, vary to some extent by the gender of the custodial parent. Adolescents who lived in father–stepmother, versus intact, families had higher levels of Grade 10 marijuana use but, unlike respondents from mother-stepfather households, they did not significantly differ in their Time 1 drinking from individuals who lived with both biological/adoptive parents. It is unclear as to why this family form would affect early marijuana use but not alcohol use. Consistent with Hoffmann’s (2002) previous findings, neither type of stepfamily (mother-stepfather or father-stepmother) influenced Time 2 marijuana consumption. Moreover, adolescents who lived with their father and stepmother were not at risk for later (Grade 12) alcohol use, suggesting that these individuals may be more similar in their substance use behaviors to youth from intact households.

Although living in a single-parent household was associated with high levels of both alcohol and marijuana use, as in previous studies (Cookston, 1999; Hoffmann, 2002; Hoffmann & Johnson, 1998), residing with a mother-only family emerged as somewhat less of a risk factor. Moreover, these two family forms appeared to operate through different mechanisms. Across analyses, peer relations conducive to deviance emerged as a key intervening variable in the father-only-substance use relationship, whereas parenting style (a less direct measure of opportunities for delinquency) was the only process variable that explained any of the impact of residing with a mother-only family between Grades 8 and 10 on these behaviors. These latter effects were relatively minimal. Thus, consistent with Hoffmann’s (2002) earlier analysis of determinants of drug use, the process variables investigated in this study were of little use in explaining the relatively high substance use reported by adolescents who resided in mother-only households.

Measures of attachment and opportunity accounted for substantially larger portions of the effects of the other stable family forms (father only, mother-stepfather, and father-stepmother) on levels of alcohol and marijuana consumption, suggesting that much of the impact of family structure on these behaviors may be alleviated by parents through changes in their interactional strategies. Thus, it is not family form itself that matters as much as family dynamics. Although this mirrors the conclusions of earlier researchers (e.g., Brody & Forehand, 1993; Demuth & Brown, 2004; Griffin, Botvin, Scheier, Diaz, & Miller, 2000; Hoffmann, 1995; Sokal-Katz et al., 1997), this study contributes to the existing literature by highlighting differences in the nature of parental and peer processes linking various nontraditional family forms to youth substance use.

Overall, the variables examined in this study had greater effects on adolescents’ drinking behaviors than on their use of marijuana. This is consistent with earlier research showing variations in the structural and interpersonal determinants of these forms of substance use (Paternoster, 1989) and with the notion that family structure exerts the greatest influence on less, rather than more, serious offenses (Free, 1991; Wells & Rankin, 1991).

The relatively strong effect of the transition from an intact to a mother- only family on Time 2 marijuana use was one exception to this pattern. The fact that this relationship was mediated by the measure of peer relations, but not Time 1 marijuana use, indicates that adolescents who experience this type of shift in family form between Grades 8 and 10 are at risk for later

marijuana consumption primarily because they are likely to become involved in peer relationships conducive to participation in deviant activities during or after their sophomore year in high school. It is to be expected that a change in family structure would have such a delayed effect on adolescents' behavior, influencing Time 2 but not Time 1 substance use. However, because this was the only transitional family type that affected levels of substance use, and its influence was specific to marijuana, this finding must be regarded as tentative.

The lack of relationship between the other family transitions examined and substance use may be due in part to the small number of respondents in each of these categories. Unfortunately, there are few studies with which to compare these findings. In Hoffmann's (1995) earlier analysis, youth (ages 11 to 17) whose parents recently divorced were at risk for subsequent marijuana use due to declines in parental attachment and affiliation with deviant peers. It is likely that the majority of these individuals transitioned into mother-only families. Nonetheless, it was only the peer variable that mediated the intact to mother-only-marijuana use relationship in our study. This difference may be due at least in part to the age of our sample at the time during which transitions in family structure occurred (Grades 8 to 10). Prior studies indicate that marital dissolution has different effects on adolescents than on younger children (Hoffmann, 1994; Needle et al., 1990; Wadsworth, 1979). Hoffmann (1994), in particular, found that declines in parental attachment following a marital breakup were most common among young adolescents (ages 11-13), whereas older children were more likely to respond to parental divorce with changes in family involvement and peer affiliations. Our findings are consistent with this pattern.

Regarding this, it is important to note that the measure of peer relations included in our analyses was rooted not only in friends' support for substance use but also in participation in what are typically considered to be conventional patterns of relatively inconspicuous and unstructured peer interaction. Although they did not focus on the context of adolescents' social interactions, previous studies (Hoffmann, 1994, 1995) indicate that the changes in parent-child relations associated with nontraditional family forms increase adolescents' likelihoods of having friends who use drugs. Data limitations, namely the lack of adequate early (Grade 8) measures of parental and peer relations in the NELS, precluded the estimation of a comparable model in this article. Future studies might focus on assessing the temporal ordering of parent-child relations, peer support for substance use, and adolescents' participation in conventional peer activities low in visibility. More precisely identifying the early source of peer interactions conducive to deviance, which placed individuals from a variety of nontraditional family types (including father-only households in particular) at risk for alcohol and marijuana use, might provide further insight into the nature of the determinants of adolescents' substance use behaviors, along with information of potential relevance to the development of effective interventions.

Additional research assessing other possible mediators of the family structure-substance use relationship is also warranted. Although some earlier reports show that variables such as parental attachment and peers' use of drugs explain virtually all of the relationship between family structure and substance use (Adlaf & Ivis, 1996; Brody & Forehand, 1993; Hoffmann, 1995; Kierkus & Baer, 2002; Sokol-Katz et al., 1997), others suggest the existence of other intervening

mechanisms (Hoffmann, 1993, 2002; Kung & Farrell, 2000). These discrepancies probably reflect methodological issues, including the use of different samples, measures of family structure, and types of statistical procedures (Adlaf & Ivis, 1996).

Using data from a national sample, a measure of family structure that reflects stability or change in living arrangements over the course of 2 years, and adjusting for the NELS's complex sampling design, our analyses suggest that parental attachment and opportunities for delinquency explain some, but not all, of the effects of family structure on levels of alcohol and marijuana consumption. This indicates that other factors (perhaps characteristics such as social integration and social support) must also serve as mediating variables, linking family form to adolescents' substance use behaviors.

Appendix

Parent-Child Relations

(Responses: 1 = *false*, 2 = *mostly false*, 3 = *more false than true*, 4 = *more true than false*, 5 = *mostly true*)

My parents treat me fairly.

I do not like my parents very much. (reverse coded)

I get along well with my parents.

My parents are usually unhappy or disappointed with what I do. (reverse coded)

My parents understand me.

Time With Parents

(Responses: 1 = *rarely or never*, 2 = *less than once a week*, 3 = *once or twice a week*, 4 = *every day or almost every day*)

How often do you spend time on the following activities outside of school?

Talking or doing things with your mother or father.

Parental Monitoring

(Responses: 1 = *not at all*, 2 = *just a little*, 3 = *some*, 4 = *a lot*)

How much do your parents try to find out about:

Who your friends are?

Where you go at night?

How you spend your money?

What you do with your free time?
Where you are most afternoons after school?

Parental Control

(Responses: 1 = *I decide by myself*, 2 = *I decide with a parent*, 3 = *we decide together*, 4 = *parents discuss with respondent*, 5 = *parents decide*)

In your family, who makes most of the decisions on each of the following topics?

How late I can stay out
Which friends I can spend time with
What classes I take in school
Whether I have a job
At what age I can leave school
How I spend my money
Whether I can date
Whether I should go out for a school sport
Whether I should be in other school activities
Whether I should go to college

Unstructured/Unsupervised Peer Interaction

(Responses: 1 = *rarely or never*, 2 = *less than once a week*, 3 = *once or twice a week*, 4 = *every day or almost every day*)

How often do you spend time on the following activities outside of school?

Driving or riding around (alone or with friends)
Visiting with friends at a local hangout

Peer Support for Substance Use

(Responses: 1 = *not very important*, 2 = *somewhat important*, 3 = *very important*)

Among the friends you hangout with, how important is it to be willing to party and get wild?

Alcohol Use (Measured at Grades 10 and 12)

(Responses: 0 = *none*, 1 = *1 to 2 times*, 2 = *3 to 19 times*, 3 = *20 times or more*)

On how many occasions (if any) have you had alcoholic beverages to drink?

In your lifetime?
During the last 12 months?
During the last 30 days?

(Responses: 0 = none, 1 = once, 2 = twice, 3 = 3 to 5 times, 4 = 6 to 9 times, 5 = 10 or more times)

Think back over the last 2 weeks. How many times have you had five or more drinks in a row?

Marijuana Use (Measured at Grades 10 and 12)

(Responses: 0 = none, 1 = 1 to 2 times, 2 = 3 to 19 times, 3 = 20 times or more)

On how many occasions (if any) have you used marijuana (grass, pot) or hashish (hash, hash oil)?

In your lifetime?
During the last 12 months?
During the last 30 days?

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