

*GENDER DIFFERENCES IN
ADOLESCENT DRUG USE
The Impact of Parental Monitoring
and Peer Deviance*

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This study investigates gender differences in adolescent drug use in terms of parental monitoring and peer deviance. Females are found to be more highly monitored than males, whereas males are more exposed to deviant peers than are females. There is a significant interaction between parental monitoring and peer deviance for the sample as a whole. The effect of this interaction is greater among females, indicating that exposure to deviant peers is more important for the drug use of females in families where parental monitoring is poor.

Keywords: *gender differences; adolescent drug use; parental monitoring; peer deviance*

Gender is well established as one of the most important correlates of delinquency. Males are more delinquent than females (e.g., Giordano & Cernkovich, 1997; Mears, Ploeger, & Warr, 1998; Rutter, Giller, & Hagell, 1998; Wilson & Herrnstein, 1985). We also know from the research that males use drugs more frequently than females (e.g., Elliott, Huizinga, & Menard, 1989; Hindelang, Hirschi, & Weis, 1981; Penning & Barnes, 1982).

Thus, we know that patterns of drug use and antisocial behavior vary by gender, and it is important for criminological theory to de-

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velop the means for understanding and explaining these differences. Bartuch and Matsueda (1996) have argued that "most traditional theories of delinquency have focused explicitly on explaining male delinquency" (p. 146), whereas Liu and Kaplan (1999) point out that empirical tests of traditional theories such as social bonding and differential association are rarely found in research that focuses on gender differences. However, a number of researchers have tried to test theories on gender differences in delinquency (e.g., Bartuch & Matsueda, 1996; Broidy & Agnew, 1997; Burton, Cullen, Evans, Alarid, & Dunaway, 1998; Hagan, 1989; LaGrange & Silverman, 1999; Smith & Paternoster, 1987), and theories have emerged, such as power-control theory, that pay particular attention to the need to explain these gender differences (Hagan, Gillis, & Simpson, 1985; Hagan, Simpson, & Gillis, 1979, 1987).

It is nonetheless well documented in the literature that more research is needed to investigate differences in the antisocial behavior and drug use of males and females (Dishion & Loeber, 1985; Giordano & Cernkovich, 1997). Rutter et al. (1998), for example, make the point that

there is limited evidence that some of the major known risk factors for antisocial behavior vary by sex, but there are simply too few data to allow firm conclusions on any of the possible explanations. This topic should remain high on the research agenda, as it could potentially elucidate much about how antisocial behavior develops. (p. 382)

One of the factors that is often discussed in explanations of gender differences in delinquency is the family and, in particular, the effect of parental monitoring or supervision (Bartuch & Matsueda, 1996; Canter, 1982; Hagan et al., 1979; Kruttschnitt, 1996). The importance of peer group influences has also been discussed (Rutter et al., 1998), but Liu and Kaplan (1999) contend that "empirical studies that examine peer influence on male and female delinquency have received relatively less attention than studies of the influence of the family" (p. 197). In this context, the aim of this study is to contribute to the literature by simultaneously investigating gender differences in adolescent drug use and in exposure to parental monitoring and peer deviance.

THEORETICAL FRAMEWORK

This research focuses on the theoretical constructs *parental monitoring* and *peer deviance* in an integrated theoretical framework. These components play an important role in some of the most influential theories of delinquency and deviant behavior (for a review of different theories and their discussion concerning these components, see the appendix).

In the social control theories, the major question posed is why so many individuals don't commit criminal acts. Control theories answer this question by pointing to different controlling factors that restrain people from committing such acts. The family is among the most important of these controlling factors (Hirschi, 1969; Nye, 1958). Parental monitoring plays an important but slightly mutable role across various forms of control theory. In his theory of social bonding, for example, Hirschi (1969) included a measure of "virtual supervision" in the attachment to parents element and specified this as a measure of indirect parental control. In more recent versions of control theory, on the other hand, a number of researchers have used parental monitoring as a direct parental control measure in addition to attachment to parents (Gottfredson & Hirschi, 1990; Hagan et al., 1985; Le Blanc, 1995; Sampson & Laub, 1993).¹

Specifying the causal order between deviant friends and delinquency remains one of the key questions in criminological theory. Social control theory contends that there is no causal association between delinquent friends and delinquency but that both are caused by weak bonds to society. Weak bonds cause the delinquent behavior that leads to association with delinquent friends (Hirschi, 1969). One crucial criticism of control theories, however, focuses on their lack of interest in what motivates individuals to commit criminal acts (Elliott, Huizinga, & Ageton, 1985; Johnson, 1979). As Elliott, Ageton, and Canter (1979) point out, "In addition to weak bonding and an absence of restraints, some positive motivation is necessary for sustained involvement in delinquent behavior" (p. 15).

By contrast, social learning theory contends that delinquency is learned in association with deviant peers and that relationships with

deviant peers lead to deviant behavior (Akers, 1998; Burgess & Akers, 1966; Sutherland & Cressey, 1955). The social learning perspective has also been subject to criticism, however. One limitation that has been discussed is that the perspective fails to explain why some adolescents spend their free time with deviant friends to begin with (e.g., Thornberry & Krohn, 1997).

To overcome these limitations, a number of theoretical perspectives choose to employ an integrated theoretical framework in relation to delinquent behavior. These perspectives combine components from different theories to achieve greater explanatory and predictive power in the explanation of delinquency. Proponents of an integrated theoretical perspective argue that although each traditional theory offers something of value in the explanation of delinquent behavior, none offers a complete explanation. Thus, elements of social control theory such as weak bonding and a lack of restraints must be combined with exposure to deviant peers and the consequent opportunities for delinquent learning needed to explain the motivation for criminal behavior (Elliott et al., 1979, 1985).

Integrated theories suggest that weak bonds to society have an indirect effect on drug use and delinquency. Such weak bonds increase the risk for the development of relations with delinquent friends and it is association with delinquent friends that has the strongest effect on drug use and delinquency (Elliott et al., 1985; Johnson, 1979). Agnew (1993) concluded that associations with "delinquent peers, in particular, provide the motivation for delinquency because they transmit delinquent values, reinforce delinquency, and function as delinquent role models" (p. 255). The theoretical framework for this study hypothesizes that poor parental monitoring will have an indirect effect on drug use. Adolescents exposed to poor parental monitoring will be more likely to associate with deviant peers, however, and this in turn is hypothesized as the major source of drug use behavior. Association with deviant peers is thus posited to act as an intervening (social learning) mechanism between the social control variable *parental monitoring* and the outcome variable *drug use*. It is within the context of this deviant group that the adolescent finds both the motivation for drug use and social reinforcement for this form of behavior.

REVIEW OF PREVIOUS RESEARCH

The family has played an important role in criminological research aimed at explaining delinquency and other problem behaviors among juveniles (Gove & Crutchfield, 1982; Hirschi, 1969; Rutter et al., 1998; Sampson & Laub, 1993). Within the family context, poor parental monitoring has shown itself to be one of the most important factors in the explanation of delinquency (Gottfredson & Hirschi, 1990; Loeber & Stouthamer-Loeber, 1986; Sampson & Laub, 1993). Poor parental monitoring generally increases the risk of drug use and delinquent behavior, a correlation that has been shown to be significant in both cross-sectional and longitudinal research (Dishion & Loeber, 1985; Martens, 1997; Paternoster & Triplett, 1988). A number of studies have found that poor parental monitoring has a similar effect for both males and females (Martens, 1997; Ring, 1999); others have found that the effect is stronger for males than for females (Cernkovich & Giordano, 1987; Smith & Paternoster, 1987; Weintraub & Gold, 1991). The overall conclusion from previous research is that females are more strongly bonded than males and that this could be an important factor in the explanation of their lower delinquency levels (e.g., Giordano & Cernkovich, 1997; Hagan et al., 1979; Heimer & De Coster, 1999; Jang & Krohn, 1995).

The existence of a correlation between associating with delinquent peers and drug use and delinquency is among the most well established findings in this field of research (e.g., Akers & Cochran, 1985; Paternoster & Triplett, 1988; Thornberry & Krohn, 1997). Once again, certain studies have concluded that associating with deviant peers effects a similar increase in the risk of delinquency for both males and females (Elliott et al., 1985); others have found that males are more affected by deviant friends than are females (Johnson, 1979; Mears et al., 1998; Smith & Paternoster, 1987).

There is also empirical support for integrated theories that combine the effects of parental control or social control and peer deviance on drug use and delinquency (e.g., Johnson, Marcos, & Bahr, 1987; Marcos, Bahr, & Johnson, 1986). For a review of selected studies examining the effects of both parental monitoring (social control) and deviant peers (learning perspective) on drug use and delinquency, see Table 1. Very few researchers have tested an integrated model for both

males and females. Exceptions include Elliott et al. (1985) and Johnson (1979), and both these studies found the same pattern for both males and females. The bonding variables have only an indirect effect on delinquency, and delinquent friends have the strongest direct effect on both drug use and delinquency. Agnew (1993) employed an interaction term made up of social control variables (family and school) and delinquent peers to examine more closely the intervening process between social controls and delinquency. He found a significant interaction between social control and delinquent peers. This indicates that a lack of social controls has a greater effect on delinquency when levels of association with delinquent peers are high and that the absence of control only leads to delinquency in the presence of delinquent peers.

Agnew's study is something of an exception here because most of the empirical research testing integrated models has employed path analyses (e.g., Elliott et al., 1985; Johnson, 1979; Patterson & Dishion, 1985), and only rarely have interaction terms been used to examine the joint effects of parental monitoring and deviant peers.

CURRENT STUDY

To sum up, current theory suggests that parental monitoring and peer deviance are important constructs in the explanation of delinquent behavior. According to the empirical evidence, poor parental monitoring is an important family mechanism in the explanation of delinquency. Researchers have pointed to the fact that females have been subjected to higher levels of parental monitoring than males and that this could be a factor in their low rates of deviant behavior. Peer deviance is one of the most consistently established correlates of delinquent behavior, often producing an effect for both males and females, but the effect tends to be stronger among males.

These two theoretical components have also been combined in an integrated theoretical framework to better explain delinquent behavior. This study focuses on this integrated theoretical framework. There is empirical support for integrated theories that combine the effects of parental control and peer deviance and that conclude that weak parental control leads to association with delinquent peers that in turn leads

TABLE 1
Selected Studies on the Effects of the Integration Between Parental Monitoring (social control) and Peer Deviance (learning perspective) on Drug Use and Delinquency

<i>Study</i>	<i>Participants^a</i>	<i>Longitudinal (L)/Cross-Sectional (CS), Year, Location</i>	<i>Gender Variable</i>	<i>Antisocial Behavior</i>	<i>Analysis Strategy</i>	<i>Main Results</i>
Agnew (1993)	Age 11-17, n = 1,365	L, USA	?	Self-reported delinquency	OLS regression models	Used interaction term between social control and delinquent friends in explanation of delinquent behavior. Results show significant interaction; this means that control variable leads to delinquency in presence of delinquent friends (i.e., poor social control leads to delinquent friends and delinquent friends are major cause of delinquent behavior).
Elliott, Huizinga, and Ageton (1985)	Age 11-17, n = 1,725	L, 1976, USA	Separately	Self-reported marijuana and delinquency	Path analysis and test for interaction (VARIANCE analysis)	Path analysis shows weak bonds affect levels of involvement with delinquent friends. Association with delinquent friends has strongest direct effect on use of drugs for both boys and girls. Results also show evidence of an interaction effect between conventional bonding and delinquent friends for both males and females.
Johnson (1979)	Age 15-16, n = 550	CS, 1975, Seattle	Separately	Self-reported delinquency	Path analysis	Weak family bonding has no direct effect on delinquency but leads to association with delinquent friends. Association with delinquent friends has strongest effect on delinquency for both sexes. Effect stronger for males.
Johnson, Marcos, and Bahr (1987)	Age 14-19, n = 768	CS, 1985, USA	?	Self-reported drug use	Path analysis	Drug-using friends are the most important mechanism in the explanation of drug use. The effects of social bonds on drug use are indirect and weak.

Marcos, Bahr, and Johnson (1986)	High school students, <i>n</i> = 2,626	CS, USA	?	Self-reported drug use	Path analysis	Parental attachment has indirect effect on drug use. Presence of drug-using friends has strongest direct effect on drug use.
Patterson and Dishion (1985)	7th and 10th grade, <i>n</i> = 136	L, 1984, USA	Male only	Self-reported delinquency	LISREL models	LISREL analysis shows parental monitoring to have both direct and indirect (via deviant peers) significant effect on delinquent behavior.
Ring (1995)	Age 14-15, <i>n</i> = 5,618 and <i>n</i> = 5,265	CS, 1995 and 1997, Sweden	Separately	Self-reported delinquency	LISREL models	LISREL model shows parental monitoring to have indirect effect on delinquency through delinquent friends. Delinquent friends has the strongest direct effect on delinquency. The pattern is the same for both males and females.

a. *n* = response rate.

to drug use and delinquent behavior. Moreover, there are good theoretical and empirical reasons for examining the interaction between parental monitoring and deviant peers in the explanation of delinquent behavior. The review of the literature indicates a lack of research addressing the interaction between parental monitoring and peer deviance separately for males and females in the explanation of adolescent drug use and delinquency.

Given the above, this study addresses three questions. First, is the effect of parental monitoring greater for males or females? Second, do males and females differ in their levels of exposure to deviant peers? Third, is there any interaction between the effects of poor parental monitoring, exposure to deviant peers, and gender on adolescent drug use, as we might expect there to be, given an integrated theoretical framework? Previous research has provided a number of insights into the first two questions, but more knowledge is still needed. The third question has cropped up only very rarely in the research to date and its examination here thus makes an important contribution to the literature.

METHOD

PARTICIPANTS

The data used in this study were collected in two surveys in Falkenberg, a coastal town in the south of Sweden with approximately 40,000 inhabitants. Approximately 10% of the population of Falkenberg is made up of immigrants (i.e., born outside Sweden). With regard to levels of educational achievement and income, Falkenberg can be considered as typical of small towns in Sweden. The first survey included all students in their final year of compulsory education (14-15 years of age) and the other included all youths in their final year of further education (aged 17-18 years). These two groups were chosen to provide a spectrum across the age groups of interest to the question of adolescent drug use. The study used a census of 859 students (417 males and 442 females). Of these, the 14- to 15-year-olds made up a total of 234 males and 233 females, whereas the 17- to 18-year-olds included 183 males and 209 females. The survey of ninth graders was

conducted in 20 classes in four schools and the survey of further education students covered 20 classes in one school. The nonresponse rate for the population was 11.2%.

Identical questionnaires were used in both studies and the participants were guaranteed complete anonymity. The questionnaire opens with a few questions concerning the students' social background before moving on to ask about their experience of drugs. The last part of the questionnaire includes questions about the students' leisure time activities, as well as their relations with peers, parents, and school.

The studies were conducted during October and November of 1995 and 1996. The headmaster at each school distributed the questionnaires with information about the study to the teachers in each class. The students filled out the questionnaires during lesson time in the presence of the teacher who saw to it that each student was given an envelope in which to put the completed questionnaire.²

The use of self-report data necessitates the discussion of a number of methodological problems. Recurrent issues include (a) the nonresponse rate, which is often selective (e.g., Dolmén & Lindström, 1991), as well as (b) underreporting and (c) overreporting of self-reported drug use. Several researchers have found that underreporting of drug use is a more serious problem than overreporting (e.g., Single, Kandel, & Johnson, 1975), although to complicate matters, Skog (1992) concludes that overreporting is the more serious problem. Even given these methodological difficulties, however, several researchers report that the method has given reliable and valid results when measuring drug use (e.g., Barnea, Rahav, & Teichman, 1987; Elliott et al., 1989; O'Malley, Bachman, & Johnston, 1983; Single et al., 1975; for a brief discussion of the validity of self-reported drug use, see e.g., Harrison & Hughes, 1997).

MEASUREMENT OF VARIABLES

DEPENDENT VARIABLES

Use of narcotics. The variable measuring use of *narcotics* is, Have you ever used narcotics? (*no/yes*) (the term *narcotics* explicitly covers inter alia hash, marijuana, amphetamines, and heroin). Of these sub-

stances, hash and marijuana are those most commonly used by the youths in this study.

Use of alcohol. The variable measuring use of *alcohol* is, Do you drink alcohol? (*no/yes, sometimes/yes, every weekend*). For the purposes of the following analyses, the alcohol variable is dichotomized and coded as follows (*no and yes, sometimes = 0; yes, every weekend = 1*). Dichotomizing the variable in this way focuses the analysis on those students who use alcohol every weekend.

The drug index. A drug index variable was also created. This index combines use of alcohol and narcotics and is coded as follows. Those students reporting any use of narcotics and/or alcohol every weekend were coded as 1 ($n = 182, 21.2\%$) and the rest zero ($n = 677, 78.8\%$). Those students who used narcotics and/or alcohol every weekend will hereafter be referred to as drug users and the remainder as non-drug users (this latter group includes those who occasionally used alcohol). Drug indexes have been employed in many different forms. Some combine alcohol, tobacco, and marijuana and others combine only alcohol and marijuana (e.g., Fletcher, Darling, & Steinberg, 1995; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998; Svensson, 2000).

INDEPENDENT VARIABLES

Parental monitoring. The measure of *parental monitoring* is based on two questions:

Do your parents know where you are if you go out in the evening? (*yes, always; quite often; sometimes; quite seldom; no, never*)

Do your parents know whom you meet if you go out in the evening? (*yes, always; quite often; sometimes; quite seldom; no, never*).

The correlation between these two variables is $r = .59$ ($p < .001$) for males and $r = .63$ ($p < .001$) for females. These two questions are combined into an index with a reliability coefficient (alpha) of .74 for males and .77 for females.

TABLE 2
Descriptive Statistics of Variables

<i>Variable</i>	<i>Range</i>	<i>High Scores on the Measure Implies</i>	<i>M</i>	<i>SD</i>	<i>Valid N</i>
Gender	0-1	Male	0.49	0.50	859
Age	0-1	17-18	0.46	0.50	859
Parental monitoring	1-9	Poor	2.95	1.63	858
Deviant peers	1-6	Many	3.65	1.84	854

These two questions are commonly used when measuring parental monitoring (cf. Hagan et al., 1979; Hirschi, 1969; Martens, 1997; Ring, 1999; Smith & Paternoster, 1987; Weintraub & Gold, 1991). On the basis of a factor analysis of different aspects of parental monitoring (11 items), Martens (1997) concluded that "if a simple indicator of the general parental monitoring dimension were to be chosen, the items defining the measure of parental knowledge would probably be an appropriate choice" (p. 238).

Peer deviance. The measure of *relations with deviant peers* is based on five questions: Do you have a friend who has (a) stolen something from a store, (b) vandalized something, (c) broken in somewhere, (d) assaulted someone, or (e) been contacted by the police. The five variables were positively correlated and are combined into an index with a reliability coefficient alpha of .83 for both males and females.

Control variables. Gender and age were entered as control variables. Age was coded 0 for the 14- to 15-year-olds and 1 for the 17- to 18-year-olds. Gender is also coded as a dummy: 0 for females and 1 for males.

Poor parental monitoring is correlated with peer deviance for both males and females. Among males the correlation between parental monitoring and peer deviance is $r = .32$ ($p < .001$), and among females the correlation is $r = .33$ ($p < .001$). For a description of the variables, see Table 2.

ANALYSIS

The analysis is carried out in three stages. The first stage compares the alcohol and narcotics use reported by males and females as well as their scores on the drug use index variable.

Stage two compares the levels of parental monitoring and peer deviance reported by males and females, then compares the effects of parental monitoring and peer deviance on the drug use index by gender. The differences are tested by means of a *t* test for independent samples.

The final stage of the analysis involves running a number of multivariate logistic regressions (Hosmer & Lemeshow, 1989; Menard, 1995). All the analyses were carried out for narcotics, alcohol, and the drug use index, but only those results relating to the index are presented here.³

A number of two-way interaction analyses were carried out in the logistic regression equations (Hosmer & Lemeshow, 1989; Jaccard, Turrisi, & Wan, 1990; Menard, 1995). To know how much the interaction effect adds to the model, we have to investigate if there is a statistically significant change in the model chi-square and in the magnitude of R^2_L (Menard, 1995).

In the first part of stage three, four multivariate logistic regression equations were estimated. In each of these analyses, gender is entered as a control variable. The purpose is to investigate the effects of parental monitoring and peer deviance on drug use and to check for any interaction between these two predictors. In the fourth and last equation, an interaction term was created by multiplying parental monitoring and peer deviance. Parental monitoring and peer deviance were mean centered for inclusion in this multiplicative term (Equation 4) to avoid multicollinearity. The four equations estimated are as follows:

$$\text{Self-reported drug use} = a + b_1 \text{ gender} + b_2 \text{ age} \quad (1)$$

$$\begin{aligned} \text{Self-reported drug use} = a + b_1 \text{ gender} + b_2 \text{ age} \\ + b_3 \text{ parental monitoring} \end{aligned} \quad (2)$$

$$\begin{aligned} \text{Self-reported drug use} = a + b_1 \text{ gender} + b_2 \text{ age} \\ + b_3 \text{ parental monitoring} + b_4 \text{ peer deviance} \end{aligned} \quad (3)$$

and

$$\begin{aligned} \text{Self-reported drug use} = & a + b_1 \text{ gender} + b_2 \text{ age} \\ & + b_3 \text{ parental monitoring} + b_4 \text{ peer deviance} \quad (4) \\ & + b_5 \text{ parental monitoring} \times \text{peer deviance} \end{aligned}$$

The second part of stage three involves the presentation of a multivariate cross-tabulation (trivariate frequency distribution table). The first step in this analysis entailed dichotomizing parental monitoring and peer deviance at the upper 25th percentile. The percent differences (*d*) are shown for each of the analyses. The proportion of those who have used drugs (index variable) is then reported for each of these groups. This analysis was carried out separately for males and females. The dichotomization of parental monitoring and peer deviance was carried out prior to splitting the sample by gender. This type of analysis makes it possible to illustrate the interaction between parental monitoring and peer deviance for males and females separately.

Finally, three logistic regression equations were estimated separately for males and females. The purpose of these analyses was to investigate the effect of parental monitoring and peer deviance for males and females, respectively. In addition, these analyses allow us to examine whether there is any interaction between poor parental monitoring and peer deviance for males and females. Once again, the third and final equation includes a two-way interaction term created by multiplying parental monitoring and peer deviance. As before, the parental monitoring and peer deviance variables were mean centered for inclusion in the multiplicative term (Equation 7) to avoid multicollinearity. The three equations estimated are as follows:

$$\text{Self-reported drug use} = a + b_1 \text{ age} + b_2 \text{ parental monitoring} \quad (5)$$

$$\begin{aligned} \text{Self-reported drug use} = & a + b_1 \text{ age} + b_2 \text{ parental monitoring} \quad (6) \\ & + b_3 \text{ peer deviance} \end{aligned}$$

and

$$\begin{aligned} \text{Self-reported drug use} = & a + b_1 \text{ age} + b_2 \text{ parental monitoring} \\ & + b_3 \text{ peer deviance} + b_4 \text{ parental monitoring} \quad (7) \\ & \times \text{peer deviance} \end{aligned}$$

RESULTS

Do a higher proportion of males than females report drug use?

The first stage of this presentation looks at differences between males and females with regard to drug use. The results indicate that more males than females are users both of alcohol (every weekend) and of narcotics (see Table 3). With regard to the drug use index variable, 26.6% of males and 16.1% of females have used drugs ($\chi^2 = 14.32, p < .001$). The pattern remains the same after controlling for age. Among males 14 to 15 years of age, 8.5% reported that they have used narcotics compared to 5.6% of females. In addition, a higher proportion of males than females in this age group report frequent alcohol use (every weekend) and having used one or other of these substances (index variable). The pattern is the same for the 17- to 18-year-old students. A higher proportion of males than females report substance use at all levels (narcotics, alcohol, and index).

Do males and females differ with regard to their exposure to parental monitoring and peer deviance?

This second stage compares the exposure of males and females to parental monitoring and peer deviance. The results indicate that males present significantly higher levels of exposure to peer deviance than females (see Table 4). Females tend to be significantly more strongly monitored by their parents than males. Moreover, females are more strongly monitored both among students aged 14 to 15 and among those aged 17 to 18, and males present higher levels of exposure to peer deviance in both age groups.

Table 5 presents gender differences in levels of exposure to parental monitoring and peer deviance for drug users (index variable) and non-drug users. The results indicate some differences between males and females. Among the males, poorer parental monitoring is reported by both drug users and non-drug users. The same pattern is also shown on the peer deviance variable (i.e., males more often have deviant peers than do females). Furthermore, both males and females who have used drugs tend to be less monitored by their parents and present higher levels of exposure to peer deviance than those who have not used drugs. These results are significant both for males and females.

TABLE 3
Male and Female Drug Use by Age (in percentages)

Drugs	14-15			17-18			Total			Total
	Male	Female	χ^2	Male	Female	χ^2	Male	Female	χ^2	
Narcotics	8.5	5.6	1.57	15.3	9.1	3.56	11.5	7.2	4.63*	9.3
Alcohol	10.3	5.6	3.50	38.3	13.9	30.71***	22.5	9.5	27.38***	15.8
Index	14.5	10.3	1.92	42.1	22.5	17.31***	26.6	16.1	14.32***	21.2

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

TABLE 4
Exposure to Parental Monitoring and Peer Deviance for Males and Females

Independent Variable	14-15			17-18			Total		
	Male	Female	t Test	Male	Female	t Test	Male	Female	t Test
Poor parental monitoring									
M (1-9)	3.13	2.64	3.26**	3.36	2.73	3.95***	3.23	2.68	5.00***
SD	1.68	1.60		1.74	1.41		1.71	1.51	
Peer deviance									
M (1-6)	4.27	3.41	5.61***	4.00	2.89	5.89***	4.15	3.16	8.19***
SD	1.62	1.71		1.89	1.83		1.75	1.79	

NOTE: Range in parentheses. High score on parental monitoring indicates poor parental monitoring.

TABLE 5
Comparison of Males' and Females' Exposure to Parental Monitoring and Peer Deviance for Drug Users (index variable) and Non-Drug Users

Independent Variable	No Use			Drug Use		
	Male	Female	t Test	Male	Female	t Test
Poor parental monitoring						
M (1-9)	2.91	2.58	2.98**	4.12	3.23	3.06**
SD	1.41	1.47		2.10	1.59	
Peer deviance						
M (1-6)	3.78	2.97	6.08***	5.19	4.14	4.27***
SD	1.72	1.70		1.39	1.91	

NOTE: Range in parentheses. High score on parental monitoring indicates poor parental monitoring.

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

TABLE 6
Logistic Regression Equations for Drug Use
(index variable), Entire Sample (*N* = 853)

<i>Predictors</i>	<i>Equation 1</i>	<i>Equation 2</i>	<i>Equation 3</i>	<i>Equation 4</i>
	<i>OR</i>	<i>OR</i>	<i>OR</i>	<i>OR</i>
Gender (1 = male)	2.036***	1.707**	1.233	1.237
Age (1 = 17-18)	3.416***	3.536***	4.715***	4.982***
Poor parental monitoring		1.430***	1.264***	1.132
Peer deviance			1.618***	1.628***
Poor Parental Monitoring × Peer Deviance				1.109**
Constant (<i>B</i>)	-2.348***	-3.419***	-4.972***	-4.777***
R^2_L	.072	.124	.205	.213
R^2_L change from previous equation		.052	.081	.008
Model chi-square	63.894***	110.081***	181.653***	188.752***
<i>df</i>	2	3	4	5
Change in model chi-square from previous equation		46.187, <i>p</i> = .000	71.572, <i>p</i> = .000	7.099, <i>p</i> = .008

NOTE: OR = odds ratio.

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

Does parental monitoring or peer deviance have the strongest effect on drug use? Is there any interaction between the two variables in the explanation of drug use?

The first task here is to investigate whether parental monitoring or peer deviance has the strongest effect on drug use and whether there is any interaction between these two variables after controlling for gender. Table 6 presents four multivariate logistic regression equations for the entire sample. In Equation 1, both gender (male) and age (17-18) are significantly related to drug use. Equation 2 includes parental monitoring as a predictor. In this equation, gender (male), age (17-18), and poor parental monitoring are all significantly related to drug use. In Equation 3, peer deviance is added as a predictor. The effect of gender is no longer significant after controlling for peer deviance in this way. Age (17-18), poor parental monitoring, and peer deviance are all significantly related to drug use, however. The effect of peer deviance appears to be stronger than that of poor parental monitoring.⁴ There is also a significant change in the model chi-square and an increase in R^2_L from Equation 2 to Equation 3 with the addition of the peer deviance variable.

Equation 4 includes the product of parental monitoring and peer deviance as an interaction term. Gender is not significantly related to drug use in this equation. The results indicate that poor parental monitoring is no longer significant after controlling for the interaction term. Age (17-18) and peer deviance are significantly related to drug use. The interaction term has a significant effect on drug use (OR = 1.109, $p < .01$), and there is a statistically significant change in the model chi-square from Equation 3 (7.099, $p = .008$) and a small increase in the R^2_L (.008) from the previous equation. This indicates that poor parental monitoring and exposure to peer deviance interact in their effect on drug use.

A number of differences were found between the use of narcotics and alcohol (tables not presented here). In the first equation, gender (male) is significantly related to the use of both narcotics and alcohol. Gender is not significantly related to narcotics use in Equations 2, 3, and 4 but is significantly related to alcohol use in each of these equations. In addition, the results show that the interaction between poor parental monitoring and peer deviance tends to have a stronger effect on narcotics than on alcohol. The change in model chi-square from the previous equation when the interaction term is added into the model for narcotics is 7.896 ($p = .005$) and the change in R^2_L is .015 compared to corresponding changes for alcohol of 3.716 ($p = .054$) and .005. For narcotics the effect of the interaction term was OR = 1.173 ($p < .01$) and for alcohol, OR = 1.088 ($p = .06$).

The next step is to illustrate the interaction between parental monitoring and peer deviance for males and females, respectively. Table 7 presents the proportion of males and females reporting drug use by high/low scores on parental monitoring and peer deviance. The results indicate that, for both males and females, the effect of peer deviance is strongest in families where parental monitoring is low and the effect of parental monitoring is strongest where peer deviance is high. In the next analysis, a more direct test is carried out of the interaction between parental monitoring and peer deviance for males and females, respectively.

Following on from the previous two analyses, the purpose of the following equations is to investigate whether parental monitoring or peer deviance has the strongest effect on drug use and whether there is any interaction between these two variables for males and females.

TABLE 7
Proportion of Males and Females Reporting Drug Use
(index variable) by High/Low Scores on Parental Monitoring
and Peer Deviance (percentage)

<i>Peer Deviance</i>	<i>Males</i>			<i>Peer Deviance</i>	<i>Females</i>		
	<i>Parental Monitoring</i>				<i>Parental Monitoring</i>		
	<i>High</i>	<i>Low</i>	<i>d</i>		<i>High</i>	<i>Low</i>	<i>d</i>
Low	11 (211)	25 (64)	-14	Low	11 (303)	19 (57)	-8
High	41 (76)	62 (65)	-21	High	26 (47)	53 (30)	-27
<i>d</i>	-30	-37	-7	<i>d</i>	-15	-34	-19

NOTE: *N*s are in parentheses.

Table 8 presents six multivariate logistic regressions for drug use, run separately for males and females. The results indicate a number of significant differences by gender. In Equation 5, both age (17-18 years of age) and poor parental monitoring are significantly related to drug use among both males and females. The effect of parental monitoring appears to be quite similar for both sexes (OR = 1.538 vs. 1.304). Equation 6 includes both parental monitoring and peer deviance in the regression. Here, age (17-18), poor parental monitoring, and peer deviance are significantly related to drug use for males. The effect of peer deviance appears to be stronger than that of parental monitoring.⁵ Among females, age (17-18) and peer deviance are significantly related to drug use, whereas the effect of parental monitoring is no longer significant when peer deviance is controlled for in this way.

Finally, Equation 7 includes the product of parental monitoring and peer deviance as an interaction term. The issue addressed is whether there is an interaction effect between parental monitoring and peer deviance on the drug use of males and females, respectively. The results indicate that peer deviance has a significant effect on drug use for both males (OR = 1.825) and females (OR = 1.492), whereas the effect of parental monitoring does not reach significance. The odds ratio for the interaction term in the females' equation is OR = 1.121 ($p = .054$), and the inclusion of this term in the equation for females produces a small increase in R^2_L (.01). The inclusion of the interaction term also produces a significant change in model chi-square (3.912, $p = .048$) for

TABLE 8
Logistic Regression Equations for Drug Use
(index variable) by Gender

Predictors	Equation 5 OR	Equation 6 OR	Equation 7 OR
Male (<i>N</i> = 416)			
Age (1 = 17-18)	4.596***	6.443***	6.546***
Poor parental monitoring	1.538***	1.344***	1.231
Peer deviance		1.844***	1.825***
Poor Parental Monitoring × Peer Deviance			1.059
Constant (<i>B</i>)	-3.296***	-5.783***	-5.501***
R^2_L	.162	.267	.269
R^2_L change from previous equation		.105	.002
Model chi-square	78.000***	128.824***	129.682***
<i>df</i>	2	3	4
Change in model chi-square from previous equation		50.824, <i>p</i> = .000	.858, <i>p</i> = .354
Female (<i>N</i> = 437)			
Age (1 = 17-18)	2.545***	3.292***	3.617***
Poor parental monitoring	1.304**	1.162	1.111
Peer deviance		1.465***	1.492***
Poor Parental Monitoring × Peer Deviance			1.121 <i>p</i> = .054
Constant (<i>B</i>)	-2.920***	-4.087***	-4.190***
R^2_L	.058	.119	.129
R^2_L change from previous equation		.061	.01
Model chi-square	22.406***	46.194***	50.106***
<i>df</i>	2	3	4
Change in model chi-square from previous equation		23.788, <i>p</i> = .000	3.912, <i>p</i> = .048

NOTE: OR = odds ratio.

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

the females. Among males, the inclusion of the interaction term produces no significant change in the model chi-square (.858, *p* = .354). This suggests that for females, parental monitoring has a larger negative effect on drug use when exposure to peer deviance is high and that, conversely, exposure to deviant peers has a larger positive effect on drug use when parental monitoring is poor. For males, there is no evidence of such an interaction between these two variables.

A number of differences were found between the models for narcotics and alcohol use, respectively (tables not presented here). For males, the results tended to be the same for the use of narcotics and alcohol. No significant changes in model chi-square were produced for

either narcotics or alcohol by the inclusion of the interaction term in Equation 7. For females, the patterns for alcohol and narcotics use were very similar when Equations 5 and 6 were estimated. When the interaction term was added and Equation 7 estimated, however, the interaction between poor parental monitoring and peer deviance approaches significance in relation to the use of narcotics but not of alcohol. The change in model chi-square from Equation 6 was 3.508 ($p = .061$) for narcotics with R^2_L showing an increase of .015. The odds ratio produced by the interaction term was $OR = 1.163$ ($p = .067$) for narcotics use.

CONCLUSION AND DISCUSSION

This article focuses on the explanation of gender differences in drug use. The explanation of gender differences in delinquent behavior is an issue that many researchers have suggested ought to be given a much higher priority on the research agenda. Most previous research in this area has focused on the family and only rarely on peer influences. In addition, a review of the literature found no tests for variations in the interaction between parental monitoring and peer deviance by gender. This article employs the theoretical constructs parental monitoring and peer deviance in combination, thus providing a much needed opportunity to examine gender differences in the relationships of interest to an integrated theoretical framework.

The results from the research presented above indicate that there are a number of differences in adolescent drug use by gender. For a start, more males than females have used drugs. The questions discussed in this article are whether females are exposed to higher levels of parental monitoring than males; whether males present higher levels of exposure to deviant peers than females; and finally, whether there is any interaction between the effects of parental monitoring and peer deviance on the behavior of males and females, respectively.

The results indicate that females tend to be more effectively supervised than males. This is true both for those who have used drugs and those who have not. Poor parental monitoring was found to be significantly related to drug use for both males and females, although the effect is stronger for males. A number of researchers have found that pa-

rental monitoring is significantly related to antisocial behavior for both males and females, and some found that the effect tends to be stronger for males. The results presented here support the findings of those suggesting that one reason why females are less often delinquent than males may be that they are exposed to higher levels of control and supervision by their parents.

The study also found that males tended to exhibit a higher level of exposure to deviant peers than females. Once again the results are significant both for those who have used drugs and those who have not. Peer deviance was found to be significantly related to drug use for both males and females, but the effect is stronger for males. Other researchers have also found that exposure to deviant peers has an effect on the behavior of both sexes but that the effect is stronger for males.

Perhaps the most interesting finding from the present research, however, is the evidence of an interaction between poor parental monitoring and exposure to deviant peers. The results indicate that adolescents exposed to poor parental monitoring are more likely to become involved with delinquent friends and that this in turn means that they are more likely to use drugs. When controls are run for gender, however, the results indicate that this interaction is significant for females but not for males. The results from this study thus indicate that, in general, females are more strongly monitored by their parents than are males but that when this monitoring is poor, adolescent females run a higher risk of becoming involved with deviant peers and, as a result of this involvement, of engaging in the use of drugs. For males, there is no evidence of an interaction.

In terms of the theoretical discussion presented at the beginning of this article, these results tend to support an integrated theoretical framework for the entire sample and for the explanation of female adolescent drug use. The integration of control and learning theories produces greater predictive and explanatory power than either control theory and/or learning theory alone. In line with the integrated theoretical perspective, the results indicate that weak parental control increases the risk for an adolescent to become involved with a deviant peer group, and this association in turn leads to an increased risk for drug use and delinquent behavior. Association with deviant friends is the principal source of motivation for delinquency and drug use.

This study thus provides further corroboration of earlier research whose findings have provided support for the use of integrated explanatory models. However, although earlier research has supported the use of such models to explain the behavior of both males and females, the findings in this study showed themselves to be significant only in relation to females. One reason for this may be that the current work focuses on parental monitoring, which has been shown to play an important role in the lower rates of delinquency exhibited by females (e.g., Giordano & Cernkovich, 1997), or that it employed an interaction term made up of both causal components. Other studies have either employed measures of family bonding, social control, or bonding to conventional society or have focused on the estimation of path analyses, or both.

This research shows the importance of taking gender differences into account when looking for explanations of antisocial behavior and drug use. In addition, although reinforcing findings from previous research that have shown the importance of family and peer factors for delinquency, it suggests that more research is needed into the role these factors might play in explaining gender differences. More research is needed to test the effects of theoretically relevant constructs and mechanisms such as parental monitoring and peer deviance for males and females, especially in the context of an integrated theoretical framework. This research also shows the importance of including interaction terms in statistical models to investigate the effects of interactions between independent variables (cf. Agnew, 1991). Specifically, the results indicate the existence of an interaction between poor parental monitoring and peer deviance for females, and attempts should be made to replicate this result in future research.

Appendix
Major Theories Employing the Parental Monitoring
and Peer Deviance Constructs

<i>Theory, Author</i>	<i>Concept</i>	<i>Definition</i>
Parental Monitoring		
Social Control Theory: Social Bonding Theory, Hirschi (1969)	Virtual supervision	Psychological presence of parents, indirect parental control, emotional bond to family all included in "attachment to parents" construct; adolescents sensitive to parents' opinion: "Child is less likely to commit delinquent acts not because his parents actually restrict his activities, but because he shares his activities with them; not because his parents actually know where he is, but because he perceives them as aware of his location." (pp. 89-90)
Age-Graded Informal Social Control Theory, Sampson and Laub (1993)	Parental supervision	Measure of informal family social control, direct parental control alongside attachment to parents; poor parental monitoring leads to increased risk for engaging in delinquent behavior; heavily reliant on coercion theory. ⁶
Self-Control Theory, Gottfredson and Hirschi (1990)	Parental supervision	Parental supervision important for adequate child-rearing; its absence is major cause of low self-control. "Supervision tends to be a major predictor of delinquency" (p. 99). Heavily reliant on the coercion theory.
Power-Control Theory, Hagan (1989), Hagan et al. (1985), Hagan et al. (1979, 1987), McCarthy, Hagan, and Woodward (1999)	Instrumental control	Direct parental control; gender-based theory; females less delinquent because they are more highly monitored than males. In more patriarchal families, daughters are subjected to higher levels of monitoring. In less patriarchal families, levels of parental monitoring are similar for sons and daughters.
Peer Deviance		
Social Control Theory, Hirschi (1969)	Peer deviance	No causal association between delinquent peers and delinquency. Weak bonds to society cause delinquent behavior, which leads to association with delinquent friends.

Appendix (continued)

<i>Theory, Author</i>	<i>Concept</i>	<i>Definition</i>
Social Learning Theories: Differential Association, Sutherland and Cressey (1955)	Peer deviance	Delinquent behavior learned through interaction and communication in intimate groups; delinquent peer groups of special importance.
Social Learning Theory, Akers (1998), Burgess and Akers (1966)	Peer deviance; integration of differential association theory with behavioral learning theory.	Association with delinquent friends is the major cause of delinquency. Delinquent behavior learned in association with delinquent friends.
Integration of Parental Monitoring and Peer Deviance		
Integrated Theories, Elliott et al. (1979), Elliott et al. (1985)	Integration of strain, social control, and social learning theories. No direct focus on parental monitoring construct; focus on social control theory.	Weak bonds to society increased the risk for relations with delinquent friends; delinquent friends provide motivation for delinquency.
Social Developmental Model, Catalano and Hawkins (1996), Hawkins and Weis (1985)	Integrate social control theory and social learning theory	Focus on prevention; weak social bonds increase risk for relations with delinquent friends and delinquent friends a major cause of delinquency.
Integrated Control Theory, Le Blanc (1995, 1997)	Integrate social control theory with self-control theory.	Focus here is on the integration between social control and self-control theory. Parental monitoring viewed as external constraint. Direct parental control, in addition to attachment to parents element; poor parental supervision related to delinquency. Poor bonding increases the risk for getting involved with criminal influences. Involvement with criminal influences has direct effect on delinquency.
Developmental Model of Antisocial Behavior, Patterson, DeBaryshe, and Ramsey (1989), Reid and Eddy (1997)	A developmental perspective on antisocial behavior	Poor family management practices (parental monitoring) explain involvement with deviant peers.

NOTES

1. Wells and Rankin (1988) defined direct parental controls (as compared with the indirect control construct employed by Hirschi) as "instrumental control of children's behaviors through the use of rewards and punishments" (p. 269). In a brief discussion of direct parental controls, they contend that parental monitoring is one of three mechanisms of direct parental control (cf. Seydlitz, 1991, 1993). Snyder and Patterson (1987) have defined parental monitoring as "parents' awareness of their child's peer associates, free time activities, and physical whereabouts when outside home" (pp. 225-226). In a revision of Hirschi's bonding theory, Le Blanc and Caplan (1993) have suggested that parental monitoring is a direct parental control measure alongside attachment to parents. Wilson and Herrnstein (1985) also concluded that it would be better to separate the effects of attachment to parents and those of parental monitoring (pp. 234-235).

2. In a study of young persons' experience of drugs, Bjarnason (1995) found that there was no significant difference in self-reported drug use between questionnaires administered by teachers and those administered by researchers.

3. The estimated odds ratio (OR) coefficients are presented for each analysis. In this study, an odds ratio of more than 1.0 indicates an increased risk for a specific result. In each of the analyses, R^2_L is also presented. This is the measure used to specify the explained variance in each model (see Hosmer & Lemeshow, 1989, pp. 148-149). Menard (1995) describes this measure as analogous to R^2 in linear regression models (pp. 22-23). It is calculated as follows: (chi-square for the model/initial $-2 \log$ likelihood). The value of chi-square is also presented for each regression model. This model chi-square is analogous to the multivariate F test in linear regression (Menard, 1995).

4. This equation was also analyzed using standardized (z score) values for parental monitoring and peer deviance. The pattern found was the same (i.e., peer deviance has the strongest effect on drug use).

5. This equation was also analyzed using standardized (z score) values for parental monitoring and peer deviance. The pattern found was the same (i.e., peer deviance has the strongest effect on drug use).

6. Coercion theory employs a social learning approach. Parental monitoring is a direct parental control and one of a number of parenting skills important for successful child rearing. According to this theory, improved parental monitoring practices reduce antisocial behavior (Larzelere & Patterson, 1990; Patterson, 1980, 1982).

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