Self-Control and Social Bonds: A Combined Control Perspective on Deviance

Douglas Longshore
Eunice Chang
Shih-chao Hsieh
Nena Messina

With longitudinal data from a sample of adult male drug offenders, this study tested 4 aspects of social bonding (attachment, involvement, religious commitment, and moral belief) and association with substance-using peers as outcomes of low self-control and as mediators of the relationship between low self-control and drug use. Low self-control was negatively related to social bonds and positively related to drug use and association with substance-using peers. The relationship between low self-control and drug use was fully mediated by moral belief and association with substance-using peers. These results support the utility of integrating self-control and social bonding perspectives on deviance.

Keywords: *general theory of crime; self-control; social bonds*

According to the general theory of crime (Gottfredson & Hirschi, 1990), variation in the propensity to engage in crime and other deviance is mainly a function of individual differences in self-control. The general theory of crime, featuring self-control as the central explanatory factor, contrasts with Hirschi's (1969) social bonding theory, in which deviance is a result of weak social bonds such as poor attachment to others and low involvement in conventional activities. It is not clear whether or how these two perspectives in control theory can be reconciled. One possibility,

DOUGLAS LONGSHORE: Integrated Substance Abuse Programs, University of California, Los Angeles. **EUNICE CHANG**: Integrated Substance Abuse Programs, University of California, Los Angeles. **SHIH-CHAO HSIEH**: Integrated Substance Abuse Programs, University of California, Los Angeles. **NENA MESSINA**: Integrated Substance Abuse Programs, University of California, Los Angeles.

Data collection and analysis were supported by National Institute on Drug Abuse contract N01DA-1-8408. Data analysis received additional support from the RAND Drug Policy Research Center, funded by the Ford Foundation.

CRIME & DELINQUENCY, Vol. 50 No. 4, October 2004 542-564
DOI: 10.1177/0011128703260684

explored in the current study, is that social bonds mediate the relationship between self-control and deviance. It has also been suggested that association with deviant peers may mediate the influence of social bonds on deviance (Krohn, Massey, Skinner, & Lauer, 1983; Marcos, Bahr, & Johnson, 1986); that is, people whose peers expose them to and reinforce deviance are more likely to engage in deviance themselves and to have weak bonds to conventional peers (Akers, 1994). In addition, association with deviant peers may be characteristic of people with low self-control and may mediate the effect of Low Self-Control on deviance. Prior research has not tested these possibilities.

Theory integration can help to resolve disparate conceptual approaches in the field of criminology (Bernard & Snipes, 1996; Messner, Krohn, & Liska, 1989). Through identification of dominant themes, premises, hypotheses, and findings common across different disciplines or causal propositions, theory integration may lead to an "intellectual account" (Tittle, 2000) that offers more conceptual richness and greater predictive power than any one theory individually. For reasons explained below, we believe that the self-control and social bonding perspectives might be combined into one explanatory model in which social bonds and deviant peer association are treated as processes through which Low Self-Control exerts some of its influence on deviance. Using longitudinal data from a sample of 1,036 adult male drug offenders, we examined relationships between self-control, social bonds, deviant peer association, and drug use. We also tested the degree to which social bonds and peer association mediate the relationship between self-control and drug use.

THEORETICAL BACKGROUND AND LITERATURE REVIEW

Gottfredson and Hirschi (1990) defined self-control as the degree to which a person is "vulnerable to the temptations of the moment" (p. 87). They viewed Low Self-Control as a behavior pattern arising from ineffective socialization early in life. This pattern was said to be quite stable, when established, and was cited as the primary individual-level factor explaining crime, drug use, and other forms of deviance. Many studies have found the expected relationship between low self-control and adult crime (Evans, Cullen, Burton, Dunaway, & Benson, 1997; Grasmick, Tittle, Bursik, & Arneklev, 1993; Longshore, 1998b; Longshore & Turner, 1998; Longshore, Turner, & Stein, 1996), juvenile delinquency (Polakowski, 1994; Wood, Pfefferbaum, & Arneklev, 1993), drunk driving (Keane, Maxim, & Teevan, 1993), and other

imprudent behavior by adults and youth (Arneklev, Grasmick, Tittle, & Bursik, 1993; Evans et al., 1997; Grasmick et al., 1993; Wood et al., 1993).

The general theory of crime, featuring self-control as the central explanatory factor for individual differences in deviant conduct, departs from Hirschi's (1969) social bonding theory, perhaps the pre-eminent control perspective in criminology (Akers, 1994). In social bonding theory, the primary explanatory factors for deviant conduct are weak social bonds—specifically, poor attachment to others, low involvement in conventional activities, lack of commitment to a conventional lifestyle, and low endorsement of conventional moral belief (Hirschi, 1969). Empirical research has confirmed the hypothesized relationships between social bonds and crime, delinquency, drug/alcohol use, and smoking (Agnew, 1993; Akers & Cochran, 1985; Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Cernkovich & Giordano, 1992; Krohn & Massey, 1980; Krohn et al., 1983; Newcomb & Bentler, 1988; Wiatrowski, Griswold, & Roberts, 1981). However, most of this research has focused on juveniles, not adults (Kempf, 1993). In addition, studies are inconsistent regarding the strength of the bonds/deviance link in relation to the seriousness of deviance. In some research, this link is stronger for minor deviant acts such as petty larceny and adolescent smoking than for serious misconduct such as theft, assault, and robbery (Agnew, 1985; Dunsmore & Kaplan, 1997). Other research has suggested the opposite (Evans et al., 1997; Krohn et al., 1983; Tittle, 1995) or found no such differences (Mak, 1990).

Hirschi's (1969) original formulation of social bonding theory did not fully explore possible complexities in attachment and peer influence. His hypothesis was that Attachment per se promotes conformity. As summarized by Akers (1994), "It is the fact of attachment to other people, not the character of the people to whom one is attached, that determines adherence to or violation of conventional rules" (p. 117). That hypothesis has been called into question by research indicating that attachment to peers is conducive to conformity only when peers are law abiding (Akers, 1994; Matsueda & Anderson, 1998). Additional research has distinguished between bonds to conventional others and bonds to deviant others. Findings indicate that deviance is less common among persons with close ties to law-abiding others and more common when close ties exist to deviant others (e.g., Conger, 1976; Elliott, Huizinga, & Ageton, 1985). Finally, some studies have tested peer influence as a variable mediating the relationship between social bonds and deviance. Marcos et al. (1986) and Krohn et al. (1983) found that deviant peer association partially explained the effects of social bonds on adolescent smoking and drug use (see also Burkett & Warren, 1987; Hirschi, 1969). In Agnew (1993), the relationship between social bonds and delinquency was

mediated by deviant peer association. In short, an adequate test of social bonds as correlates of deviance requires a careful definition of the attachment bond and recognition of the possibility that association with deviant others may be causally relevant as a mediator of the relationship between social bonds and deviance.

In their 1990 book introducing the general theory of crime, Gottfredson and Hirschi advanced the argument that the link between weak social bonding and deviance may be spurious inasmuch as both are products of the same causal factor, namely Low Self-Control. Their argument implies that nothing of theoretical importance is likely to be gained in research testing an integrated model of self-control and social bonding. However, Akers (1994) emphasized the need to explicate the conceptual links between self-control and social bonding. Other criminologists have made the same point (Andrews & Bonta, 1994; Cohen & Vila, 1996). In addition, bonding theory does not address "how people become bonded in the first place" (Tittle, 2000, p. 85). Given the general theory's proposition that social bonds are a product of low self-control, it seems germane to put that proposition to the test, and doing so requires an integrated perspective linking self-control and social bonding. Finally, the authors of the general theory stated that weak social bonds are "to some large degree products of low self-control" (Hirschi & Gottfredson, 1995, p. 140). Traits representing propensity to engage in deviance may "affect the settings in which the individuals possessing them are located, e.g., the amount of education they obtain, the kind of job or marriage they achieve, the area of the city in which they live" (Gottfredson & Hirschi, 1989, p. 59). These statements suggest relationships that are causal, not merely artifactual; that is, low self-control, as a propensity established early in life, may have negative effects on the development of social bonds later in life. The person with low self-control may be less likely to form and maintain stable friendships, more likely to associate with others who lack self-control and who are similarly deviant, less able to adjust to the demands of school and workplace, and less likely to place high value on conventional ties. Wright, Caspi, Moffitt, and Silva (2001) found that delinquent peer association promoted crime most strongly among those with low self-control (i.e., a social amplification effect). In addition, others may be reluctant to attach to a person with low self-control because that person may be less reliable as a friend, employee, or spouse and may neglect the reciprocity expected in conventional relationships (Evans et al., 1997; Gottfredson & Hirschi, 1990; Hirschi, 1996; Nagin & Paternoster, 1994). The importance of exploring the causal link between self-control and social bonds is underscored by the fact that self-control, as a trait established early in life, exerts any influence on serious deviance quite distally, that is, over a span of years. Some of that

influence may be direct, reflecting an enduring propensity for deviant conduct, however it remains important to see whether any part of its influence might be exerted through causal processes involving more proximal factors.

The foregoing implies an integration of self-control and social bonding perspectives in which the relationship between low self-control and deviance is mediated at least partially by one or more social bonds. Tests of that possibility may add depth to our conceptual understanding of deviance and would help to specify the causal chain linking self-control and deviance. There is little empirical work on this possibility, however. Wright, Caspi, Moffitt, and Silva (1999), using cohort data from the Dunedin Multidisciplinary Health and Development Study (see Silva & Stanton, 1996), found that low self-control in childhood predicted weak social bonds and greater criminal behavior later in life. The authors also found that social bonding and adolescent delinquency predicted adult crime, and the effect of self-control on crime was largely mediated by social bonds. Analyses of Kentucky Youth Survey data found that the effects of self-control (or "constraint") on drug use in adolescents were completely mediated by school attachment (Jones, Wilcox, & Clayton, 2002). Findings from Evans et al. (1997) also support an integrative view of self-control and social bonding. In a sample drawn from the general population of a midwestern city, self-control was lower among people with poor attachment to others, low involvement with others, weak "attachment to church" (interpretable as a measure of commitment), and strong endorsement of "internal criminal values" (interpretable as weak endorsement of conventional moral belief). When regressed on Low Self-Control plus these bonding factors and number of criminal friends, crime was independently associated with Low Self-Control, the Moral Belief factor, and criminal friends. This finding suggests, but does not directly demonstrate, that the relationship between low self-control and crime may have been mediated partially by at least one bonding factor (Moral Belief) and by Deviant Peer Association. However, the study was cross-sectional—as has usually been true in research on social bonding (Kempf, 1993); Low Self-Control and social bonds were not tested as predictors of crime occurring subsequently. Moreover, these findings were based on a general population sample in which criminal involvement was not extensive. Evans et al. (1997) argued that bonding factors might have emerged as stronger correlates of crime if the sample had been more deeply involved in crime.

The analysis reported here is based on longitudinal data from a sample of adult men with serious criminal histories, a population often overlooked in studies on self-control and social bonds. We examined low self-control, social bonds, and deviant peer association as predictors of drug use across a 6-month follow-up period. We also tested social bonds and deviant peer asso-

ciation as mediators of the relationship between low self-control and drug use. Deviant Peer Association was among our set of possible mediators because the effect of Low Self-Control and social bonds on deviance may be mediated partly by peer influences (Conger, 1976; Evans et al., 1997; Krohn et al., 1983; Marcos et al., 1986). Peer association may therefore play a role in a combined control perspective on deviance; it may help to explain the effect of low self-control, social bonds, or both.

METHOD

Sample

The article is based on data collected between 1991 and 1995 for an evaluation of Treatment Alternatives to Street Crime (TASC) programs in five U.S. cities. TASC programs assess the drug treatment needs of offenders in local criminal justice systems, refer drug-involved offenders to treatment and other services, and monitor their status. Treatment may be in lieu of, or an adjunct to, routine criminal justice processing. Evaluation results are reported in Anglin, Longshore, and Turner (1999) and Turner and Longshore (1998).

Data required for this analysis were complete for a sample of 1,036 adult male offenders. The ethnic breakdown of this sample was 59% African Americans; 35% non-Hispanic Whites; and 5% others, mostly Hispanics. Ages ranged from 18 to 64 years (M = 30.8) and offenders had completed 10.3 years of school on average. Of the sample, 25% said they were currently married or living with someone, and 66% were not employed at the time of the baseline interview. Most offenders had extensive criminal histories, two thirds (66%) had at least two prior felony convictions, and just more than one third (36%) had been younger than 15 years when first arrested. Most (77%) had been incarcerated at least once, and all offenders were on probation at the time of the baseline interview. Involvement in drug use was extensive, as would be expected in a sample of adult drug offenders referred to treatment by criminal justice. Lifetime use of marijuana was reported by 91% of the sample, crack cocaine by 47%, powder cocaine by 54%, and heroin by 28%.

The original sample included female as well as male offenders. However, psychometric properties of the self-control measure may not be adequate for women (Longshore, Stein, & Turner, 1998; Longshore et al., 1996; but see also Piquero & Rosay, 1998), perhaps because the etiology and consequences of low self-control differ by gender (Keenan & Shaw, 1995; Webster-Stratton, 1996). We therefore excluded female offenders from this analysis.

Measures

Items intended to capture the constructs of interest were factor analyzed in SAS by means of maximum likelihood estimation and direct quartimin rotation. Items that formed reliable and distinct factors corresponding to the intended constructs were retained in confirmatory factor analyses and employed as factor indicators in subsequent analyses. Where appropriate, items were scored in reverse. Factor loadings from the confirmatory factor analysis are shown in Table 1. Low self-control, social bonds, deviant peer association, and baseline drug use were measured in an initial interview. Subsequent drug use was measured in a follow-up interview 6 months later. More than 80% of the sample were located and completed the follow-up interview.

Low self-control. Low self-control was measured with three multi-item indicators: impulsivity, based on four self-report items (e.g., "you act on the spur of the moment without stopping to think"); self-centeredness, based on four self-report items (e.g., "you look out for yourself first, even if it makes things hard on other people"); and volatile temper, based on four self-report items (e.g., "you lose your temper pretty easily"). Response options were *never*, *rarely*, *sometimes*, *often*, and *almost always*. When necessary, item scores were reversed so that higher values represent lower self-control. The three indicators are among the constituent elements of low self-control defined by Gottfredson and Hirschi (1990); see also Grasmick et al. (1993). Psychometric properties of these indicators are acceptable (Longshore et al., 1996, 1998).

Distinctive relationships between deviant conduct and some of self-control's constituent elements have been found (Arneklev et al., 1993; Longshore et al., 1996). However, self-control can defensibly be analyzed as a unidimensional construct (Arneklev et al., 1993; Evans et al., 1997; Grasmick et al., 1993; Piquero & Rosay, 1998)—at least among men (Longshore et al., 1996; Longshore et al., 1998), and a unitary measure of self-control is appropriate in an analysis testing hypotheses derived from a theory in which self-control is viewed as a unitary construct (Nagin & Paternoster, 1993).

Attachment. Attachment was measured by three indicators of affective ties among family members "when you are around other members of your family." Questions asked how often there is (a) "a feeling of cooperation," (b) "enjoyment in being together," and (c) "an interest in listening and helping each other." The recall period for these questions was the past 6 months.

TABLE 1: Confirmatory Factor Analysis

Factor	*Standardized Factor Loadings*
Low self-control	
Impulsivity	0.55
Self-centeredness	0.61
Volatile temper	0.64
Attachment	
Cooperation	0.81
Enjoyment	0.83
Listening/helping	0.78
Involvement	
Currently married/living with	0.64
Ever married/lived with	0.70
Duration of current/last employment	0.37
Beliefs	
Children should obey	0.27
Things called crime don't hurt	0.42
Okay to sneak into game/movie	0.59
Okay to sell alcohol to minors	0.52
Religious commitment	
Religion important	0.70
Religious preference	0.66
Born again	0.52
Drug/alcohol peers	
Friends like to drink	0.62
Friends use drugs	0.97
Previous drug use	
Number of drugs used	0.71
Frequency of use (logged)	0.99
Days of use (logged)	0.98
Follow-up drug use	
Number of drugs used	0.72
Frequency of use (logged)	0.99
Days of use (logged)	0.98

Response options were *never*, *sometimes*, *about half the time*, *usually*, and *always*. Higher values indicate stronger attachment.

These questions, derived from Marcos et al. (1986) and Krohn et al. (1983), are typical of Attachment indicators employed in tests of social bonding theory (Akers, 1994). Because our focus was on bonds constraining adult behavior, questions pertained to the current family, not the family of origin. All men in the sample reported interaction with their families during the baseline recall period (past 6 months); thus, coding and interpretation of responses was not complicated by lack of recent interaction with family members.

Involvement. Involvement in a conventional lifestyle is the temporal aspect of social bonding. Involvement indicators in our data set pertained to the person's history and stability of intimate relationships; specifically, (a) whether the person is currently married or living with someone, (b) whether he has ever been married or lived with someone, and (c) duration of current or most recent employment. Higher values indicate greater involvement. These indicators are similar to those in Sampson and Laub (1990) and Burton, Cullen, Evans, and Dunaway (1994).

Moral belief. This bond represents adherence to a general belief that the rules of conventional society are binding. Our belief factor was based on endorsement of four items: (a) "many things called crime do not really hurt anyone"; (b) "when parents set down a rule, children should obey"; (c) "it is okay to sneak into a ballgame or movie without paying"; and (d) "even though it is against the law, it is okay to sell alcohol to minors." Response options were: *strongly disagree*, *disagree*, *undecided*, *agree*, and *strongly agree*. Scoring on items (1), (3), and (4) was reversed so that higher values represent stronger endorsement of conventional moral belief. These items were employed in Marcos et al. (1986) and Massey and Krohn (1986).

Religious commitment. The fourth bonding factor is stake in conformity, or devotion to conventional lines of action (Nagin & Paternoster, 1994). Commitment is typically measured as educational or job aspirations, time spent on homework or other conventional activities, and/or religiosity (Akers, 1994). However, a key problem in bonding studies is that Commitment, so measured, is difficult to distinguish from Involvement, especially when the commitment indicators implicitly or explicitly ask about time spent in conventional activities or time invested in conventional goals (Conger, 1976; Krohn et al., 1983; Massey & Krohn, 1986).

In accord with other research (e.g., Akers, 1994; Burkett & Warren, 1987; Krohn et al., 1983), we used indicators of religiosity to capture the constraining effect of Commitment. The three indicators were (a) "how important is religion in your life" (*not important*, *a little important*, *important*, or *very important*); (b) "how would you describe your current religious preference" (*none* versus *Catholic*, *Protestant*, *Jewish*, or *other*); and (c) "do you consider yourself a born-again Christian" (no or yes). Higher values indicate stronger religious commitment.

Association with substance-using peers. For a deviant peer association measure specific to the deviant conduct at issue (drug use), we used two indicators: (a) "how many of your friends like to drink" and (b) "how many of

your friends use illegal drugs." (A third possible indicator, how many of your friends are involved in crime, did not load on this factor.) Response options were *none*, *some*, *about half*, *most*, or *all*. Higher values indicate greater association with substance-using peers.

Notably, this measure is not based on a simple count of peers who used drugs or alcohol. By measuring substance-using peers as a (non-numerical) proportion of total peers, we accounted for the fact that social networks can include conventional as well as deviant others in varying proportions and that ties to deviant others may not contribute to misconduct if such ties are outweighed by conventional ones (Marcos et al., 1986).

Drug use. At baseline and follow-up, offenders were asked to report their drug-use patterns over the prior 6 months. Respondents reported drug use for the 6-month period on a month-by-month basis moving backward. This procedure followed previous interview techniques shown to produce good recall data on alcohol and drug use (Fals-Stewart, O'Farrell, Rutigliano, Freitas, & McFarlin, 2000; O'Farrell, Fals-Stewart, & Murphey, 2003). Indicators for this factor were number of drugs used, frequency of drug use (log transformed), and number of days of drug use (log transformed) in the prior 6 months.

Analysis of Data

As a first step in the analysis, we adjusted for possible effects of assignment to TASC and demographic variables (race and age). Following the procedure employed by Newcomb and Bentler (1988), we partialed all three variables out of each relationship in the correlation matrix, thus removing their influence from the entire system of theory-relevant factors. In subsequent causal modeling, we were therefore able to maintain focus on predictors drawn from the two control perspectives. This procedure reduced the possibility of misspecification of the relationships of theoretical interest and, at the same time, avoided adding unduly to the complexity of the analytic model. Race and age indicators were based on self-report. TASC assignment was measured as a dummy variable (TASC group = 1; comparison group = 0). We considered adjusting for additional background characteristics such as employment history, educational background, criminal history, and treatment experience. However, none of these was significantly correlated with the drug-use outcome. Accordingly, it was not necessary to include them in the partialing procedure.

Using the two-step approach recommended by Anderson and Gerbing (1988) and the Mplus statistical modeling program (Muthen & Muthen,

1998), we used confirmatory factor analysis to test the adequacy of the proposed measurement model and relationships among the latent factors. Each hypothesized factor predicted its proposed indicators, and factors were allowed to intercorrelate. Next we tested a structural equation model in which (a) low self-control predicted all four social bonds, (b) these five factors predicted substance-using peer association, and (c) all six factors predicted drug use at follow-up. Baseline drug use was employed as an additional predictor so that scores on the follow-up measure would reflect greater involvement in drug use after adjustment for baseline use. We did not allow correlated errors between latent factors because we had no theoretical basis for doing so (Bollen, 1989; Hayduk, 1987; MacCallum, 1995). Paths were dropped from the initial model if they were not significant. The significance of possible indirect effects of low self-control on drug use was also examined.

The closeness of our hypothetical model to the empirical data was evaluated through goodness-of-fit indexes, one of which is the chi-square/degrees of freedom ratio. A chi-square value no more than twice the degrees of freedom in the model generally indicates a plausible, well-fitting model inasmuch as large sample sizes make it difficult to obtain nonsignificant chi-squares. In addition, the Comparative Fit Index (CFI), which ranges from 0 to 1, indicates the improvement in fit of the hypothesized model compared to a model of complete independence among the measured variables (Bentler, 1995). Values of 0.9 and higher are desirable and indicate that at least 90% of the covariation in the data was reproduced by the hypothesized model (Bentler & Stein, 1992). Inasmuch as multivariate kurtosis was large (normalized Mardia's coefficient = 36.86), we relied on the Satorra-Bentler chi-square and robust CFI as the appropriate fit statistics, taking non-normality into account (Bentler & Dudgeon, 1996; Byrne, 1994).

Our measures of low self-control, social bonds, peer association, and baseline drug use were coterminous. The outcome measure was drug use during the 6-month follow-up period; after adjustment for baseline use, this measure reflected change in degree of drug-use involvement over that period. Thus, the temporal order is clear from predictors to outcome measure but not among the predictors themselves. We do not see the latter as a major problem. In the general theory of crime, self-control is said to be established early in life and to remain stable thereafter (Gottfredson & Hirschi, 1990). In his analysis of data from the Cambridge delinquent development study, Polakowski (1994) found that self-control had indeed remained "moderately stable" across a 4-year span (see also Arneklev, Cochran, & Gainey, 1996; Moffitt, Caspi, Silva, & Stouthamer-Loeber, 1995). Thus it is logical to use a coterminous self-control measure as an exogenous factor in an analysis in

which the endogenous factors, social bonds and deviant peer association, are based on data also collected at baseline.

RESULTS

We examined bivariate relationships between Low Self-Control and other factors to be included in the model. As shown in Table 2, Low Self-Control was strongly and inversely related to all four factors indicating strength of conventional social bonds. Offenders with low self-control also reported that a greater proportion of their peers were involved in substance use. Finally, measures of drug use were higher among persons with low self-control.

The four bonding factors were related consistently, though not always significantly, to drug use. The direction of these relationships was as hypothesized. Persons reporting more drug use at follow-up appeared to have weaker conventional bonds. Moral Belief was the bond most strongly linked to subsequent drug use. The other bonding factors were modestly related to subsequent drug use. The substance-using peer factor was associated positively with subsequent drug use.

The final structural equation model, with nonsignificant paths deleted, is shown in Figure 1 (parameter estimates changed only slightly with removal of nonsignificant paths). Fit statistics for the model were highly favorable. The robust CFI = .964; Satorra-Bentler chi-square (df = 235, n = 1,036) = 646.02; $p < .000$. Substance-using peer association and one bonding factor, Moral Belief, had significant direct paths to subsequent drug use. Neither Low Self-Control nor any of the three other bonding factors directly predicted drug use. Thus, the bivariate relationship between low self-control and drug use was fully mediated by substance-using peer association and moral belief. About 19% of the variance in drug use (R^2 = .185) was explained by the model.

DISCUSSION

In the general theory of crime (Gottfredson & Hirschi, 1990), the propensity to engage in crime and other deviance is determined mainly by individual differences in self-control. This proposition contrasts with Hirschi's (1969) own earlier view that deviance is mainly a result of weak social bonds. We tested the possibility that these two control perspectives might be integrated by positing social bonds, along with Deviant Peer Association, as outcomes of Low Self-Control and as mediators of the relationship between Low Self-

TABLE 2: Correlation Matrix

	M	SD	*1*	*2*	*3*	*4*	*5*	*6*	*7*
1. Low Self-Control	19.61	6.58							
2. Religious Commitment	2.95	1.64	–.30						
3. Attachment	7.5	3.7	–.38	.27					
4. Involvement	3.44	5.10	–.06^{ns}	.14	.06^{ns}				
5. Belief	15.62	2.33	–.42	.22	.15	.12			
6. Drug/Alcohol Peers	3.16	2.69	.26	–.13	–.09	–.03^{ns}	–.22		
7. Follow-Up Drug Use	3.71	3.49	.17	–.08	–.04^{ns}	–.01^{ns}	–.19	.27	

NOTE: All correlations except those marked ^{ns} are significant, $p < .05$.

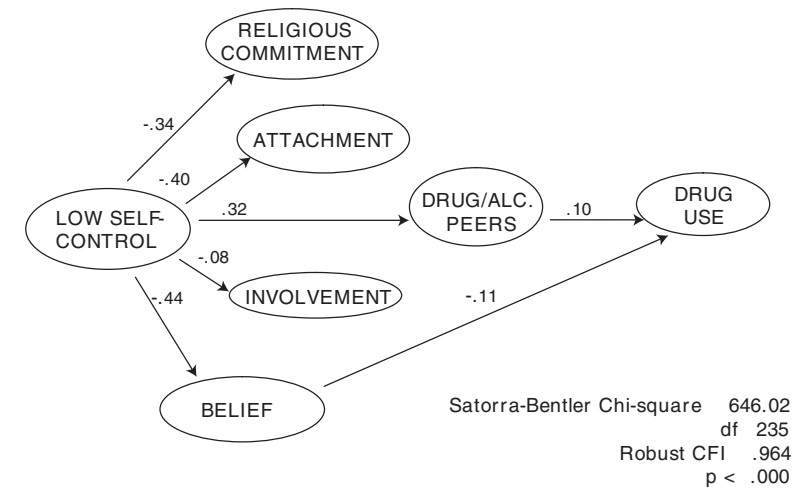

Figure 1: Final Path Model

Control and drug use. Moreover, this test was based on a data set that addressed important issues in prior research: data were longitudinal rather than cross-sectional; the sample was composed of adult men rather than juveniles; and deviant involvement, specifically illegal drug use, was substantial among these men.

All four bonding factors and the peer association factor were related strongly, in the expected direction, with low self-control. These results are consistent with the proposition that people with low self-control will also

lack close emotional ties to conventional others, spend less time in conventional activities, evince a weaker commitment to conventional lifestyles, reject the view that prevailing moral values are binding on the individual, and associate with others involved in deviant conduct (Evans et al., 1997; Gottfredson & Hirschi, 1990; Hirschi, 1996; Nagin & Paternoster, 1994; Short, 1997; Wright et al., 2001). Bonding factors were also related as expected to drug use, although the relationship for three of the factors was weak. These results are consistent with social-bonds research using samples drawn from nonoffender or juvenile populations. That research has confirmed hypotheses in social bonding theory but has typically found that bonding measures explain only a modest portion of the variance in deviant outcomes (Akers, 1994; Kempf, 1993).

Conventional moral belief was the only social bond that mediated the relationship between low self-control and drug use. This result too is consistent with research using nonoffender and juvenile samples—research in which Moral Belief has emerged as the social bond most consistently correlated with deviance (Kempf, 1993). For example, in Elliott and Menard (1996), Moral Belief was the sole bonding factor associated with juvenile delinquency in general and with drug use in particular. Burkett and Warren (1987) found an association between moral belief and adolescent marijuana use (see also Krohn et al., 1983; Marcos et al., 1986). In Williams (1985) and Williams and Hawkins (1989), crime and marijuana use by adults were associated with Moral Belief (see also Burton et al., 1994). Finally, in the study by Evans et al. (1997), reported above, moral belief ("internal criminal values") appeared to mediate partially the relationship between low self-control and adult crime.

Gottfredson and Hirschi (1990) argued that the apparent influence of weak social bonding and deviant peer association on deviance is spurious because all these characteristics can be traced to low self-control, a trait emerging early in life and remaining stable. Our findings argue against viewing social bonds and deviant peer association as causally trivial or irrelevant. Instead, an integrated explanatory model served to identify the more proximal processes through which low self-control may exert at least some of its influence on deviance. More specifically, and in accord with the implications of findings in Evans et al. (1997), we were able to identify Moral Belief and Deviant Peer Association as the mediating processes at work.

Although results support an integrated theoretical control perspective, only about 19% of the variance in drug use was explained by our model. The measures available to us may not have captured the underlying constructs adequately. However other longitudinal research on low self-control has explained, at best, about the same portion of the variance in crime and other

outcomes (e.g., Grasmick et al., 1993; Longshore, 1998b; Longshore et al., 1996). Similarly, longitudinal research on social bonds has explained only a limited portion of the variance in the outcomes tested (Akers, 1994). For example, bonding factors explained about 15% of the variance in adolescent smoking and about 2% of the variance in delinquency in longitudinal analyses reported by, respectively, Krohn et al. (1983) and Agnew (1985). One possible reason is that samples used in many prior studies were not involved in serious deviance; variability in the outcome measures may accordingly have been low. Unlike those samples, ours was composed of adult male offenders with extensive criminal histories, and the dependent variable in our analysis captured serious deviant involvement (frequent use of illegal drugs, chiefly marijuana and cocaine). Still, most of the variance in that outcome was left unexplained. Below we suggest alternatives by which explained variance might be improved.

Limitations and Conclusions

In this final section, we cite limitations of the analysis reported here, suggest strategies for increasing the explained variance in deviant conduct, offer interpretations of the mediating effects of social bonds and deviant peer association, and identify nonbonding factors that may help to explain the effects of low self-control on deviance.

At least three limitations of the analysis are notable. First, because our sample was composed of adult male offenders, findings may not represent causal processes among adult female offenders or juveniles, and variability in any of the predictors may have been more restricted than is likely in samples providing greater diversity. Range restrictions may explain why these predictors in combination were able to explain only a modest proportion of variance in subsequent drug use. However, despite the possible range restrictions, findings were in some important respects consistent with a combined control perspective. All four measures of social bonds were strongly related to low self-control; and one of the bonding factors, Moral Belief, mediated the path from low self-control to drug use.

A second limitation has to do with bonding measures available in the data set. The Attachment measure, for example, was based on emotional ties to family members; the Involvement measure, on stability of one's employment and intimate relationship if any. Measures using other indicators, such as quality of one's intimate relationship, job satisfaction, and participation in adult education or social/recreational activities, might have led to different results (see Sampson & Laub, 1990). In addition, our measure of Commit-

ment, or investment in conventional life, focused on religiosity. Other studies have operationalized commitment as educational or job aspirations, time spent on homework, or other conventional activities. Some of these operationalizations, notably aspirations and time spent on homework, may conflate commitment with other types of bonds (Bernard, 1987) and/or seem more applicable to adolescents than to adults. Thus they were not optimal for the current study. Moreover, research on religiosity and deviance can easily be read as support for the protective function served by commitment (Akers, 1994). Finally, Burkett and Warren (1987), Krohn et al. (1983), and LeBlanc and Caplan (1993) have used religiosity as an indicator of the commitment bond. A religion-based measure of this bond therefore seemed defensible. However, religious commitment may not be a strong deterrent of drug use among criminal offenders. There is a need for further work in which the bonding measures tested as mediators of self-control are based on diverse and conceptually distinguishable indicators. On the other hand, we do not think measurement problems are likely to have undermined the self-control factor. Psychometric evidence on the self-control indicators is quite favorable (see Arneklev et al., 1993; Grasmick et al., 1993; Longshore et al., 1996; Longshore et al., 1998; Piquero & Rosay, 1998; Wood et al., 1993).

Third, a unidirectional model does not account for the possibility of feedback effects; for example, deviant involvement may affect the strength of social bonds measured later (Thornberry, 1996). Bidirectional modeling may be essential in studies that postulate a dynamic relationship between variables in a long-term developmental course spanning childhood into adulthood. However, unidirectional modeling seemed defensible for a sample composed entirely of adults and a time frame as short as 6 months. In addition, Hirschi's formulation of control theory is unidirectional (bonding influences deviance), as is the general theory proposed by Gottfredson and Hirschi (low self-control influences deviance). Thus a unidirectional model seemed appropriate for an initial exploration of a combined control perspective.

The only bonding factor mediating the relationship between low self-control and drug use was conventional moral belief. This finding suggests that the mediating role of social bonding occurs mainly in the realm of internal constraint (Moral Belief) rather than the realm of affective ties (Attachment), investment in a conventional lifestyle (religious commitment), or time spent in conventional activity (Involvement); that is, if low self-control influences deviance via social bonding, its effect may operate through internalization of deviant values and/or neutralization of conventional values (Kempf, 1993). In addition, conventional moral belief has been found to predict help

seeking for drug problems and unfavorable attitudes toward drug use (Longshore, 1998a; Longshore, Grills, Annon, & Anglin, 1997; Longshore & Sanders-Phillips, 2000), and the desire to regain moral standing as a member of conventional society seems central to the recovery process (Biernacki, 1986; Waldorf, Reinarman, & Murphy, 1991). The mediating role of Moral Belief suggests that low self-control influences drug use partly by weakening the person's stake in conformity or, conversely, by elevating the person's feelings of social exclusion or stigma.

The predictive strength of substance-using peers may reflect differential association or social learning; that is, deviant conduct may be determined in part by normative and interpersonal influences, differential reinforcement of deviance, and modeling effects of substance-using peers (Akers, 1994). Such effects are not anticipated in theories of self-control or social bonding. However, the path from substance-using peers to deviant conduct can be read as consistent with control perspectives. It may, first, represent a sorting effect; persons with low self-control tend to flock together and share a taste for risk (Hirschi, 1969; Hirschi & Gottfredson, 1995). Substance-using peers may, second, represent exposure to greater opportunity for drug use (Evans et al., 1997; Kaplan, 1995).

We suggest three avenues for control-theory research attempting to increase the amount of variance explained in deviant conduct. First, the causal link from low self-control to bonds has been conceptualized in a simple one-way model in which low self-control is established early in life, remains stable, and later has adverse effects on social bonds. The causal processes may be more dynamic, however. Weak social ties early in life may undermine the development of adequate self-control and sensitivity to others, thus setting in motion a vicious cycle in which weak social bonds and low self-control reinforce each other (Short, 1997). Greater variance might be explained in data sets designed to model these more complex causal processes.

Second, control theorists may gain insight by examining the role of low self-control and social bonds within more comprehensive integrated models, such as modified strain (Agnew, 1985, 1992), problem behavior (Elliott, Huizinga, & Menard, 1989), or control balance (Tittle, 1995). Causal factors in the problem behavior model, for example, are deviant as well as conventional bonds, early socialization, strain, and social disorganization. Low self-control might be folded into that model as an outcome of early socialization with effects on subsequent strain and on both types of bonding. In control balance theory, self-control might be handled as a constituent element of constraint (Tittle, 1995) or as a factor influencing one's ability to balance control effectively and thus reducing the likelihood that the person will use deviance

to try to resolve a control imbalance (Tittle, 1997). Integrated theories can explain a healthy proportion of variance (50% or better) in crime and delinquency (e.g., Le Blanc, Ouimet, & Tremblay, 1988; Elliott et al., 1985; Matsueda & Heimer, 1987) and may be especially applicable to more serious and persistent deviance (Cohen & Vila, 1996). In short, research using an integrated theory approach might illuminate the conditions under which control factors exert strong effects on deviant behavior and might serve to locate these factors within an overall causal nexus.

A third approach to improving the variance explained by control factors is to identify moderators, that is, contingencies under which self-control and/or social bonds exert more influence on deviance. Among the set of potential moderating factors are aptitudes and skills for crime, motivations to commit crime, competing motivations that might divert people from crime despite low self-control or weak bonds, and rational choice variables (Tittle, 1995). Another possibility is that self-control is most closely linked to crime in early-onset than in late-onset offenders. Among early-onset offenders, behavioral problems indicative of low self-control manifest themselves early in childhood and result in weakened bonds to parents and others. Crime and other deviance are more serious and persistent among early-onset cases (Blackson, Tarter, & Mezzich, 1996; Jeglum-Bartusch, Lynam, Moffitt, & Silva, 1997; Lynam, 1996; Moffitt, 1993; Paternoster & Brame, 1997). Thus the causal processes in which control factors are pivotal in the production of later deviance may be stronger and easier to model among early-onset cases.

Finally, apart from social bonds, what other mediators might help to explain the effects of low self-control on deviance? As noted above, people with low self-control may experience greater strain, which may, in turn, lead to more deviant involvement (Elliott et al., 1989). Deterrence or rational-choice factors such as perceived pleasure of offending and perceived consequences of offending may play a mediating role as well (Nagin & Paternoster, 1993; Piquero & Tibbetts, 1996) if people with lower self-control derive more pleasure from offending, fail to foresee negative consequences, and discount such consequences more heavily.

In summary, the combination of self-control and social control perspectives shed some light on the causal processes by which low self-control may influence later deviance. However, more conceptual clarity may be gained by testing low self-control within broader integrated theories that account for factors outside the control tradition; identifying personal traits or social circumstances under which low self-control has more predictive value; and exploring the processes or mediating factors, including but not limited to social bonds, that explain the effects of low self-control on deviance.

REFERENCES

Agnew, R. (1985). Social control theory and delinquency: A longitudinal test. *Criminology*, *23*, 47-62.

Agnew, R. (1992). Foundation for a general strain theory of crime and delinquency. *Criminology*, *30*, 47-87.

Agnew, R. (1993). Why do they do it? An examination of the intervening mechanisms between "social control" variables and delinquency. *Journal of Research in Crime and Delinquency*, *30*(3), 245-266.

Akers, R. L. (1994). *Criminological theories: Introduction and evaluation*. Los Angeles: Roxbury.

Akers, R. L., & Cochra, J. K. (1985). Adolescent marijuana use: A test of three theories of deviant behavior. *Deviant Behavior*, *6*(4), 323-346.

Anderson, J. C., & Gerbing, D. M. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*, 411-423.

Andrews, D. A., & Bonta, J. (1994). *The psychology of criminal conduct*. Cincinnati, OH: Anderson.

Anglin, M. D., Longshore, D., & Turner, S. (1999). Treatment alternatives to street crime: An evaluation of five programs. *Criminal Justice and Behavior*, *26*, 168-195.

Arneklev, B. J., Cochran, J. K., & Gainey, R. R. (1996, November). *Assessing the stability of low self-control*. Paper presented at the Annual Meeting of the American Society of Criminology, Chicago.

Arneklev, B. J., Grasmick, H. G., Tittle, C. R., & Bursik, R. J. (1993). Low self-control and imprudent behavior. *Journal of Quantitative Criminology*, *9*, 225-247.

Bentler, P. M. (1995). *EQS structural equations program manual*. Encino, CA: Multivariate Software.

Bentler, P. M., & Dudgeon, P. (1996). Covariance structure analysis: Statistical practice, theory, and directions. *Annual Review of Psychology*, *47*, 563-592.

Bentler, P. M., & Stein, J. A. (1992). Structural equation modeling in medical research. *Statistical Methods in Medical Research*, *1*, 159-181.

Bernard, T. J. (1987). Structure and control: Reconsidering Hirschi's concept of commitment. *Justice Quarterly*, *4*(3), 409-424.

Bernard, T. J., & Snipes, J. N. (1996)). Theoretical integration in criminology. In M. Tonry (Ed.), *Crime and justice: A review of research* (Vol. 20, pp. 301-348). Chicago: University of Chicago Press.

Biernacki, P. (1986). *Pathways from heroin addiction: Recovery without treatment*. Philadelphia: Temple University Press.

Blackson, T. C., Tarter, R. E., & Mezzich, A. C. (1996). Interaction between childhood temperament and parental discipline practices on behavioral adjustment in preadolescent sons of substance abuse and normal fathers. *American Journal of Drug and Alcohol Abuse*, *22*(3), 335-348.

Bollen, K. (1989). *Structural equations with latent variables.* New York: Wiley.

Brook, J. S., Brook, D. W., Gordon, A. S., Whiteman, M., & Cohen, P. (1990). The psychosocial etiology of adolescent drug use: A family interactional approach. *Genetic, Social, and General Psychology Monographs*, *116*(Whole No. 2).

Burkett, S. R., & Warren, B. O. (1987). Religiosity, peer associations, and adolescent marijuana use: A panel study of underlying caused structures. *Criminology*, *25*(1), 109-131.

Burton, V. S., Jr., Cullen, F. T., Evans, T. D., & Dunaway, R. G. (1994). Reconsidering strain theory: Operationalization, rival theories, and adult criminality. *Journal of Quantitative Criminology*, *10*, 213-239.

Byrne, B. M. (1994). *Structural equation modeling with EQS and EQS/Windows*. Thousand Oaks, CA: Sage.

Cernkovich, S. A., & Giordano, P. C. (1992). School bonding, race and delinquency. *Criminology*, *30*(2), 261-291.

Cohen, L. E., & Vila, B. J. (1996). Self-control and social control: An exposition of the Gottfredson-Hirschi/Sampson-Laub debate. *Studies on Crime and Crime Prevention*, *5*, 125-150.

Conger, R. D. (1976). Social control and social learning models of delinquent behavior: A synthesis. *Criminology*, *14*, 17-39.

Dunsmore, M. W., & Kaplan, H. B. (1997, November). *Attachment, strain, and adolescent deviance: A longitudinal test of two perspectives*. Paper presented at the Annual Meeting of the American Sociological Association, San Diego, CA.

Elliott, D., & Menard, S. (1996). Delinquent friends and delinquent behavior: Temporal and developmental patterns. In J. D. Hawkins (Ed.), *Delinquency and crime: Current theories* (pp. 28-67). New York: Cambridge University Press.

Elliott, D., Huizinga, D., & Ageton, S. S. (1985). *Explaining delinquency and drug use*. Beverly Hills, CA: Sage.

Elliott, D., Huizinga, D., & Menard, S. (1989). *Multiple problem youth delinquency, substance use, and mental health problems*. New York: Springer-Verlag.

Evans, T. D., Cullen, F. T., Burton, V. S., Jr., Dunaway, R. G., & Benson, M. L. (1997). The social consequences of self-control: Testing the general theory of crime. *Criminology*, *35*(3), 475-504.

Fals-Stewart, W., O'Farrell, T. J., Rutigliano, P., Freitas, T., & McFarlin, S. K. (2000). The timeline followback reports of psychoactive substance use: Psychometric properties. *Journal of Consulting and Clinical Psychology*, *68*, 134-144.

Gottfredson, M. R., & Hirschi, T. (1989). A propensity-event theory of crime. In W. S. Laufer & F. Adler (Eds.), *Advances in criminological theory* (pp. 57-67). New Brunswick, NJ: Transaction Publishers.

Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.

Grasmick, H. G., Tittle, C. R., Bursik, R. J., & Arneklev, B. J. (1993). Testing the core empirical implications of Gottfredson and Hirschi's general theory of crime. *Journal of Research in Crime and Delinquency*, *30*, 5-29.

Hayduk, L. (1987). *Structural equation modeling with LISREL*. Baltimore: The Johns Hopkins University Press.

Hirschi, T. (1969). *Causes of delinquency*. Berkeley: University of California Press.

Hirschi, T. (1996, November). *Control theory and the stability assumption: Inherent or imposed?* Paper presented at the Annual Meeting of the American Society of Criminology, Chicago.

Hirschi, T., & Gottfredson, M. R. (1995). Control theory and the life-course perspective. *Studies on Crime and Crime Prevention*, *4*(2), 131-142.

Jeglum-Bartusch, D. R., Lynam, D. R., Moffitt, T. E., & Silva, P. A. (1997). Is age important? Testing a general versus a developmental theory of antisocial behavior. *Criminology*, *35*(1), 13-48.

Jones, S., Wilcox, P., & Clayton, R. (2002, November). *Personality and substance use: Exploring the psychosocial mediators of family, school, and peers*. Paper presented at the American Society of Criminology Conference, Chicago.

Kaplan, H. B. (1995). *Drugs, crime and other deviant adaptations: Longitudinal studies*. New York: Plenum.

Keane, C., Maxim, P. S., & Teevan, J. J. (1993). Drinking and driving, self-control, and gender: Testing a general theory of crime. *Journal of Research in Crime and Delinquency*, *30*, 30-46.

Keenan, K., & Shaw, D. S. (1995). The development of coercive family processes: The interaction between aversive toddler behavior and parenting factors. In J. McCord (Ed.), *Coercion and punishment in long-term perspectives* (pp. 165-180). New York: Cambridge University Press.

Kempf, K. L. (1993). The empirical status of Hirschi's control theory. In F. Adler & W. S. Laufer (Eds.), *New directions in criminological theory* (Vol. 4, pp. 143-185). New Brunswick, NJ: Transaction Publishers.

Krohn, M. D., & Massey, J. L. (1980). Social control and delinquent behavior: An examination of the elements of the social bond. *Sociological Quarterly*, *21*, 529-543.

Krohn, M. D., Massey, J. L., Skinner, W. F., & Lauer, R. M. (1983). Social bonding theory and adolescent cigarette smoking: A longitudinal analysis. *Journal of Health and Social Behavior*, *24*(4), 337-349.

Le Blanc, M., & Caplan, A. (1993). Theoretical formalization, a necessity: The example of Hirschi's bonding theory. In F. Adler & W. S. Laufer (Eds.), *New directions in criminological theory* (Vol. 4, pp. 237-336). New Brunswick, NJ: Transaction Publishers.

Le Blanc, M., Ouimet, M., & Tremblay, R. E. (1988). An integrative control theory of delinquent behavior: A validation, 1976-1985. *Psychiatry*, *51*, 164-176.

Longshore, D. (1998a). Drug problem recognition among Mexican American drug users. *Hispanic Journal of Behavioral Sciences*, *20*(2), 270-275.

Longshore, D. (1998b). Self-control and criminal opportunity: A prospective test of the general theory of crime. *Social Problems*, *45*(1), 103-114.

Longshore, D., Grills, C., Annon, K., & Anglin, M. D. (1997). Desire for help among African American drug users. *Journal of Drug Issues*, *27*(4), 755-770.

Longshore, D., & Sanders-Phillips, K. (2000). Moral belief and drug problem recognition in three ethnic groups. In J. A. Levy, R. C. Stephens, & D. C. McBride (Eds.), *Emergent issues in the field of drug abuse* (pp. 177-191). Stamford, CT: Jai.

Longshore, D., Stein, J., & Turner, S. (1998). Reliability and validity of a self-control measure: Rejoinder. *Criminology*, *36*(1), 175-182.

Longshore, D., & Turner, S. (1998). Self-control and criminal opportunity: Cross-sectional test of the general theory of crime. *Criminal Justice and Behavior*, *25*(1), 81-98.

Longshore, D., Turner, S., & Stein, J. A. (1996). Self-control in a criminal sample: An examination of construct validity. *Criminology*, *34*(2), 209-228.

Lynam, D. R. (1996). Early identification of chronic offenders: Who is the fledgling psychopath? *Psychological Bulletin*, *120*(2), 209-234.

MacCallum, R. C. (1995). Model specification: Procedures, strategies, and related strategies. In R. Hoyle (Ed.), *Structural equation modeling: Concepts, issues and application* (pp. 16-36). Thousand Oaks, CA: Sage.

Mak, A. S. (1990). Testing a psychosocial control theory of delinquency. *Criminal Justice and Behavior*, *17*(2), 215-230.

Marcos, A. C., Bahr, S. J., & Johnson, R. E. (1986). Test of a bonding/association theory of adolescent drug use. *Social Forces*, *65*(1), 135-161.

Massey, J. L., & Krohn, M. D. (1986). A longitudinal examination of an integrated social process model of deviant behavior. *Social Forces*, *65*(1), 106-134.

Matsueda, R. L., & Anderson, K. (1998). The dynamics of delinquent peers and delinquent behavior. *Criminology 36*(2), 269-307.

Matsueda, R. L., & Heimer, K. (1987). Race, family structure, and delinquency: A test of differential association and social control theories. *American Sociological Review*, *52*, 826-840.

Messner, S. F., Krohn, M. D., & Liska, A. E. (1989). *Theoretical integration in the study of deviance and crime.* Albany: State University of New York Press.

Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, *100*(4), 674-701.

Moffitt, T. E., Caspi, A., Silva, P. A., & Stouthamer-Loeber, M. (1995). Individual differences in personality and intelligence are linked to crime: Cross-context evidence from nations, neighborhoods, genders, races and age-cohorts. *Current Perspectives on Aging and the Life Cycle*, *4*, 1-34.

Muthen, L. K., & Muthen, B. O. (1998. *Mplus: Statistical analysis with latent variables user's guide*. Los Angeles: Muthen & Muthen.

Nagin, D. S., & Paternoster, R. (1993). Enduring individual differences and rational choice theories of crime. *Law and Society Review*, *27*, 467-496.

Nagin, D. S., & Paternoster, R. (1994). Personal capital and social control: The difference implications of a theory of individual differences in criminal offending. *Criminology*, *32*(4), 581-606.

Newcomb, M. D., & Bentler, P. M. (1988). Impact of adolescent drug use and social support on problems of young adults: A longitudinal study. *Journal of Abnormal Psychology*, *97*, 64-75.

O'Farrell, T. J., Fals-Stewart, W., & Murphey, M. (2003). Concurrent validity of a brief self-report drug use frequency measure. *Addictive Behaviors*, *28*, 327-337.

Paternoster, R., & Brame, R. (1997). Multiple routes to delinquency? A test of developmental and general theories of crime. *Criminology*, *35*(1), 49-84.

Piquero, A., & Rosay, A. B. (1998). The reliability and validity of Grasmick et al.'s self-control scale: A comment on Longshore et al. *Criminology*, *36*, 157-173.

Piquero, A., & Tibbetts, S. (1996). Specifying the direct and indirect effects of low self-control and situational factors in offenders' decision making: Toward a more complete model of rational offending. *Justice Quarterly*, *13*(3), 481-510.

Polakowski, M. (1994). Linking self- and social-control deviance: Illuminating the structure underlying a general theory of crime and its relation to deviant activity. *Journal of Quantitative Criminology*, *10*, 41-78.

Sampson, R. J., & Laub, J. H. (1990). Crime and deviance over the life course: The salience of adult social bonds. *American Sociological Review*, *55*, 609-627.

Short, J. F., Jr. (1997). *Poverty, ethnicity, and violent crime.* Boulder, CO: Westview.

Silva, P., & Stanton, W. (1996). *From child to adult: The Dunedin Multidisciplinary Health and Development Study.* Auckland, New Zealand: Oxford University Press.

Thornberry, T. P. (1996). Empirical support for interactional theory: A review of the literature. In J. D. Hawkins (Ed.), *Delinquency and crime: Current theories* (pp. 198-235). New York: Cambridge University Press.

Tittle, C. (1995). *Control balance: Toward a general theory of deviance*. Boulder, CO: Westview.

Tittle, C. (1997, November). *The limits of theoretical integration*. Paper presented at the Annual Meeting of the American Society of Criminology, San Diego, CA.

Tittle, C. (2000). Theoretical developments in criminology. In *The nature of crime: Continuity and change* (Vol. 1, pp. 51-101). Washington, DC: U.S. Department of Justice, Office of Justice Programs.

Turner, S., & Longshore, D. (1998). Evaluating the Treatment Alternatives to Street Crime (TASC) program. In J. Petersilia (Ed.), *Community corrections: Probation, parole, and intermediate sanctions* (pp. 134-141). New York: Oxford University Press.

Waldorf, D., Reinarman, C., & Murphy, S. (1991). *Cocaine changes: The experience of using and quitting*. Philadelphia: Temple University Press.

Webster-Stratton, C. (1996). Early onset conduct problems: Does gender make a difference?" *Journal of Consulting and Clinical Psychology*, *64*(3), 540-551.

Wiatrowski, M. D., Griswold, D. B., & Roberts, M. K. (1981). Social control theory and delinquency. *American Sociological Review*, *46*, 525-541.

Williams, F. P., III. (1985). Deterrence and social control: Rethinking the relationship. *Journal of Criminal Justice*, *13*, 141-151.

Williams, K. R., & Hawkins, R. (1989). Controlling male aggression in intimate relationships. *Law and Society Review*, *23*(4), 591-612.

Wood, P. B., Pfefferbaum, B., & Arneklev, B. J. (1993). Risk-taking and self-control: Social psychological correlates of delinquency. *Journal of Crime and Justice*, *16*, 111-130.

Wright, B. R., Caspi, A., Moffitt, T. E., & Silva, P. A. (1999). Low self-control, social bonds, and crime: Social causation, social selection, or both? *Criminology*, *27*, 479-514.

Wright, B. R., Caspi, A., Moffitt, T. E., & Silva, P. A. (2001). The effects of social ties on crime vary by criminal propensity: A life-course model of interdependence. *Criminology*, *39*(2), 321-351.