

# A LONGITUDINAL TEST OF SOCIAL CONTROL THEORY AND DELINQUENCY

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*Recent longitudinal research suggests that cross-sectional studies have exaggerated the importance of Hirschi's social control theory. This longitudinal research, however, suffers from one or more of the following problems: (a) measures of questionable validity and/or reliability; (b) misspecified causal models, including models that omit important variables and fail to examine the reciprocal and contemporaneous effects between variables; and (c) the failure to consider certain methodological problems peculiar to panel analysis, such as autocorrelation. Most of these problems reduce the likelihood of finding a causal effect from social control to delinquency, and so make the findings of the longitudinal studies suspect. This article uses data from the first two waves of the National Youth Survey to overcome these problems, and provide a more accurate estimate of the effect of social control on delinquency.*

Hirschi's (1969) social control theory has amassed much empirical support since its development and, largely as a consequence, has become one of the dominant explanations of delinquency (see Empey 1982; LaGrange and White 1985; and Shoemaker 1984 for reviews of empirical research on the theory). According to the theory, individuals are prevented from engaging in delinquency by their bond to society. There are four elements of this social bond: (a) attachment to conventional others, such as parents and teachers; (b) commitment to conventional goals and activities, such as school; (c) involvement in conventional activities; and (d) belief in conventional norms. When these elements of the bond are weak, the individual becomes "free" to engage in delinquency. Empirical support for this theory, however, derives primarily from cross-sectional studies. A recent series of longitudinal studies have begun to raise serious questions about the importance attributed to the theory. These studies, in particular, suggest that the cross-sectional association between social control and delinquency is not necessarily due to the causal impact of control on delinquency.

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First, most of the longitudinal studies find that parental attachment or similar variables have a weak or insignificant effect on subsequent delinquency (Agnew 1985; Paternoster and Iovanni 1986; Elliott, Huizinga, and Ageton 1985; Elliott, Huizinga, and Morse 1985; Kandel, Kessler, and Margulies 1978 [for hard liquor]; Paternoster, Saltzman, and Waldo 1983; Paternoster 1988; Wells and Rankin 1983; Massey and Krohn 1986 [who examine smoking]—for exceptions see Liska and Reed 1985; McCord 1979; Kandel et al., 1979 [for marijuana and other illicit drugs]).<sup>1</sup> An effect is defined as “weak” if the standardized beta for that effect is .10 or less or the amount of explained variance is 1% or less.<sup>2</sup> Attachment to teachers has not been as extensively examined as parental attachment, although data from Paternoster and Triplett (1988) and Paternoster and Iovanni (1986) suggest that it too is largely unrelated to future delinquency.

Second, most longitudinal studies find that commitment is unrelated or weakly related to future delinquency, with commitment being measured in terms of such things as grades, educational and occupational expectations, the value placed on school and education, and the respondent’s perception of how much getting arrested would hurt their chances of getting a good education or good job (Agnew 1985; Bynner, O’Malley, and Johnston 1981; Kandel et al. 1978 [for hard liquor and other illicit drugs]; Paternoster and Iovanni 1986; Paternoster et al. 1983 [for “stakes in conformity”]; Elliott, Huizinga, and Ageton 1985; Elliott, Huizinga, and Morse 1985; Paternoster and Triplett 1988; Liska and Reed 1985; Wells and Rankin 1983; McCarthy and Hoge 1984; for exceptions see Massey and Krohn 1986; Kandel et al. 1978 [for marijuana]; and Paternoster et al. 1983 [for grades]).

Third, limited longitudinal data also suggest that measures of involvement are largely unrelated to future delinquency. Such measures have not received much attention in the longitudinal literature, in part because they tend to be unrelated to delinquency even in cross-sectional studies. As Jensen (1986) points out, however, many of the social control measures in Elliott, Huizinga, and Ageton (1985) reflect the bond of involvement, specifically the amount of time spent in family and school activities. These measures have a small impact on subsequent delinquency.

Fourth, there is evidence that belief may have a moderate effect on subsequent delinquency, although even here the data are mixed (Kandel et al. 1978; Massey and Krohn 1986; Paternoster and Iovanni 1986; Burkett and Warren 1987; Paternoster and Triplett 1988; Bishop 1984; Liska, Felson, Chamlin, and Baccaglini 1984; for studies showing that belief has no effect or a weak effect see Agnew 1985; Elliott, Huizinga, and Ageton 1985; Elliott, Huizinga, and Morse 1985; Paternoster 1988; Paternoster et al. 1983). Beliefs

are usually measured in terms of the respondent's attitude toward one or several delinquent acts, although more general measures are occasionally used (e.g., scales are used with items like "to intentionally break any law is wrong" and "we all have a moral duty to abide by the law"). The data on beliefs, however, can be interpreted in terms of differential association as well as social control theory, because both theories predict that beliefs may cause delinquency. This is not to say that the treatment of beliefs is the same in each theory. Social control theory claims that inadequate socialization leads to amoral beliefs, while differential association theory claims that socialization by intimate others such as peers may lead to beliefs "favorable to violation of law" (Sutherland and Cressey 1978, p. 81). Unfortunately, the longitudinal research does not allow us to distinguish between these two explanations with any precision, although scattered data suggest that delinquent or amoral beliefs are a function of both inadequate socialization and association with delinquent peers/peer attitudes—with delinquent peers/peer attitudes generally being more important (Massey and Krohn 1986; Paternoster 1988; Elliott, Huizinga, and Morse 1985).

The longitudinal data, then, suggest that the cross-sectional studies have exaggerated the importance attributed to Hirschi's social control theory. With the possible exception of belief, the elements of the bond appear to have a small effect on subsequent delinquency. However, although the longitudinal studies raise questions about the adequacy of Hirschi's theory, they do not as yet provide a sufficient basis for rejecting the theory. The longitudinal studies suffer from one or more of several problems, most of which reduce the likelihood of finding a causal effect from social control to delinquency. These problems can be grouped into the following categories: validity and reliability of measures, model specification, and methodological problems peculiar to panel analysis (see Kercher 1988; and Thornberry 1987 for related discussions). This article attempts to build on the previous longitudinal research by overcoming these problems.

### *PROBLEMS OF PREVIOUS LONGITUDINAL RESEARCH*

#### *Validity and Reliability of Measures*

Many of the researchers cited above did not explicitly set out to test Hirschi's theory, and in certain cases one might question whether the measures they employ accurately reflect the elements of the social bond. Most notably, Jensen (1986) has critiqued Elliott, Huizinga, and Ageton's (1985)

test of control theory. According to Jensen, Elliott et al.'s measures of social control are biased toward the bond of involvement, the least important of Hirschi's bonds. In particular, Jensen argues that many of Elliott et al.'s control measures focus on time spent in conventional contexts, rather than the adolescent's emotional attachment to conventional individuals and commitment to conventional groups. Measures of attachment and commitment are incorporated into the strain measures and are not examined separately. Elliott et al., therefore, do not provide a good test of Hirschi's theory or control theory more generally. The same criticism can be leveled against Britt's (1988) more recent analysis of the National Youth Survey. This is a serious criticism since the National Youth Survey is only one of two nationally representative surveys that allow us to conduct a longitudinal test of control theory. Further, the National Youth Survey has a number of advantages over the other such survey (the Youth in Transition survey), including better measures of delinquency (see Elliott and Ageton 1980), data on females, and a broader age representation. (It should be noted that the criticisms of Jensen have been partially rectified in a later, unpublished analysis of the National Youth Survey [Elliott, Huizinga, and Morse 1985]—although the measures of social control in this analysis still differ somewhat from those described by Hirschi).

Other studies employ measures of the social bond with more face validity, although the reliability of these measures is often low or questionable. It is rarely the case that corrections for unreliability are made, and this can seriously attenuate parameter estimates (Kercher 1988; Kessler and Greenberg 1981). In certain cases, one or two item measures are employed and, although reliability estimates are not reported, it is unlikely that the reliabilities for these measures are high (e.g., Paternoster 1988; Paternoster and Triplett 1988). In other cases, multi-item measures—often created through factor analysis—are used (e.g., Liska et al. 1984; Wells and Rankin 1983; Elliott, Huizinga, and Ageton 1985; Elliott, Huizinga, and Morse 1985; Paternoster and Iovanni 1986). The reliabilities of such measures, if reported, are usually in the .7 to .8 range. Such reliabilities are typically viewed as acceptable, although even reliabilities in this range can result in a substantial attenuation of parameter estimates unless corrections are made (see Kessler and Greenberg 1981). It should be noted that the few studies which correct for measurement error due to unreliability or employ highly reliable measures are the ones most likely to find social control effects on subsequent delinquency (McCord 1979; Liska and Reed 1985; Massey and Krohn 1986; see also the discussion in Kercher 1988; for an exception see Agnew 1985).

*Model Specification*

Most longitudinal studies not only suffer from problems in measuring variables, but also from problems in specifying the relationship between variables. In particular, causal models tend to suffer from one or more of the following problems: (a) the omission of important variables, (b) the failure to examine indirect as well as direct effects, (c) the failure to examine reciprocal effects, and (d) the failure to examine contemporaneous effects.

The first problem, the omission of important variables, differs from most of the other problems discussed in this article. Whereas most of the other problems may lead to a reduction in the effect of social control on delinquency, this problem may be responsible for an exaggeration of social control effects. Longitudinal data tend to suggest that two variables have a large causal impact on delinquency: prior delinquency and association with delinquent peers (Elliott, Huizinga, and Ageton 1985; Elliott, Huizinga, and Morse 1985; Massey and Krohn 1986; Burkett and Warren 1987; Paternoster and Triplett 1988; see Kercher 1988). These variables, however, are not included in many of the longitudinal studies cited above. This is true for most of the studies which find social control effects. Liska et al. (1984), Liska and Reed (1985), Bishop (1984), McCord (1979), and Kandel et al. (1978), for example, do not control for delinquent peers when examining the impact of their control variables. Bishop (1984) has no control for prior delinquency, and McCord (1979) has only a rough control. This is a problem because data suggest that delinquency and delinquent peers not only affect subsequent delinquency, but may affect certain social control variables as well (Liska et al. 1984; Liska and Reed 1985; Paternoster 1988; Massey and Krohn 1986). It is therefore possible that the social control effects found in such studies are spurious.<sup>3</sup> It should also be noted that most of the longitudinal studies fail to examine all of the elements of the social bond (e.g., Paternoster 1988; Bishop 1984; Liska et al. 1984; Liska and Reed 1985; McCarthy and Hoge 1984; McCord 1979; Wells and Rankin 1983). In many cases, only a single element of the bond, such as attachment or belief, is examined. This too may lead to the exaggeration of social control effects.

Second, several of the above cited studies simply examine the direct effect of social control variables on subsequent delinquency — usually regressing Time 2 delinquency on Time 1 social control. This may be a problem because certain theorists have argued that the impact of social control on delinquency may be largely indirect. It is commonly argued, for example, that parental attachment has indirect effects on delinquency through its influences on commitment, beliefs, and delinquent associates. Commitment is said to exert

indirect effects through beliefs and delinquent associates, and belief is sometimes said to exert an indirect effect through delinquent associates (e.g., Johnson 1979; Wiatrowski, Griswold, and Roberts 1981; Elliott, Huizinga, and Ageton 1985; Marcos, Bahr, and Johnson 1986; LaGrange and White 1985; Massey and Krohn 1986). To the extent that such arguments are true, it may be the case that social control variables have small direct effects on delinquency but relatively large indirect effects. Studies that only examine direct effects, such as Agnew (1985) and Paternoster and Iovanni (1986), would not reveal this.

Third, as Thornberry (1987) has argued, most research has failed to consider the existence of reciprocal effects between delinquency and social control and between social control variables themselves (also see Thornberry and Christenson 1984; Liska and Reed 1985). In particular, the causal models in most research are recursive in nature and fail to determine whether delinquency has a causal effect on social control and whether the social control variables themselves have a reciprocal effect on one another. There are good theoretical reasons to expect such reciprocal effects and limited empirical data for their existence (e.g., Liska and Reed 1985; Liska et al. 1984; Paternoster 1988; Thornberry 1987). The failure to consider such effects means that ones model is misspecified and that parameter estimates may be biased. Only the Liska and Reed (1985), Paternoster (1988), and Elliott, Huizinga, and Morse (1985) studies described above take full account or come close to taking full account of reciprocal effects. The failure of the other studies to consider such effects may mean that the impact of certain control variables on delinquency has been attenuated or exaggerated depending on the specific case. For example, suppose belief is modeled as a function of commitment when in fact the relationship between belief and commitment is reciprocal (see Massey and Krohn 1986, p. 113). To the extent that commitment has an effect on delinquency, this misspecification will reduce the total effect of belief on delinquency.

Fourth, most studies examine the *lagged* rather than *contemporaneous* effect of social control on delinquency. There is, however, good reason to believe that the effect of social control on delinquency is primarily contemporaneous in nature (see Liska and Reed 1985). As Liska et al. (1984) point out, the effect of beliefs on delinquency is obviously contemporaneous. Adolescents, in particular, are likely to base their actions (such as delinquency) on current beliefs rather than beliefs held in the past. A similar argument can be made for attachment and commitment. Attachment and commitment essentially refer to the adolescent's "stake in conformity," to those things the adolescent has to lose by engaging in delinquency. In the one

case, the adolescent risks losing the affection and respect of valued others, in the other case the adolescent jeopardizes his or her actual or anticipated investment in conventional institutions like school. This clearly implies a contemporaneous effect. Current delinquency is likely to be a function of what you currently have to lose, not what you had to lose in the past. (This is not to say that prior levels of social control are unimportant. Rather, they exert their importance primarily through their effect on current levels of social control.) If the effect of social control on delinquency is contemporaneous, models that employ lagged variables are likely to underestimate that effect (Liska et al. 1984; Kercher 1988). These arguments receive limited support from the work of Burkett and Warren (1987), Liska et al. (1984), and Liska and Reed (1985), who examined both the lagged and contemporaneous effect of select social control variables on deviance. The data clearly indicate that contemporaneous effects are larger than lagged effects, with the lagged effects generally being insignificant (also see Kercher 1988; Thornberry and Christenson 1984; Meier, Burkett, and Hickman 1984; Skinner, Massey, Krohn, and Lauer 1985, p. 368). These studies, however, suffer from other problems—such as the omission of important variables—that make their conclusions tentative.

#### *Methodological Problems in Panel Analysis*

As Kessler and Greenberg (1981) point out, panel analysis is particularly subject to certain methodological problems—most notably autocorrelation among error terms (also see Bohrnstedt 1983). When the same variable is measured over time there is a strong probability that the error terms across different measurements will be correlated. There is a good chance, for example, that the error terms for the Time 1 and Time 2 delinquency measures will be positively correlated. This autocorrelation may stem from several sources, including omitted variables in the model which have a similar effect on Time 1 and Time 2 delinquency, and shared biases in the measurement of Time 1 and Time 2 delinquency. Unless corrected, such autocorrelation may cause us to overestimate the effect of Time 1 delinquency on Time 2 delinquency and underestimate the effect of other variables. Almost none of the above studies, however, attempt to determine if autocorrelation is present and, if present, to correct for it (for exceptions, see Liska and Reed 1985; Burkett and Warren 1987).

All of the longitudinal examinations of social control theory, then, suffer from problems in one or more of the following areas: the measurement of social control, the specification of causal models depicting the relationship

between social control and delinquency, and the estimation of these causal models.

### *THE CURRENT STUDY*

This article attempts to overcome these problems and thereby provide a more accurate estimate of the effect of social control on delinquency. Data are from the first two waves of the National Youth Survey; 1 of only 2 nationally representative data sets that allow for a longitudinal test of Hirschi's control theory. Most of the other longitudinal tests of social control theory have employed local samples, and the representativeness of even these samples is sometimes questionable due to problems such as high panel attrition.

Previous tests of social control theory using the National Youth Survey, however, have been suspect because of the questionable validity of the control measures (see Jensen 1986) and for certain of the other reasons discussed above—such as the failure to correct for measurement error, examine contemporaneous effects, and test and correct for autocorrelation. This study will begin by extracting measures of attachment, commitment and belief from the National Youth Survey. The bond of involvement is ignored because cross-sectional data, as well as previous longitudinal analyses by Elliott, Huizinga, and Ageton (1985), suggest it is unimportant. A causal model depicting the relationship between these variables and delinquency will then be presented and estimated. In particular, there will be corrections for measurement error. The causal model will (a) include measures of prior delinquency and delinquent associates, (b) examine indirect as well as direct effects, (c) examine reciprocal effects, and (d) examine the contemporaneous rather than the lagged effect of social control on delinquency. Finally, there will be a test and, if necessary, correction for autocorrelation.

### *Data*

Data are from the first two waves of the National Youth Survey, a longitudinal survey of delinquency and drug use conducted by the Behavioral Research Institute in Boulder, Colorado (see Elliott, Huizinga, and Ageton 1985, for survey details). The survey is based on a national probability sample of youths aged 11 to 17 and contains 1,725 respondents. The first wave was conducted from January to March of 1977 and focuses on delinquency during the 1976 calendar year. The second wave, conducted a year later,



focuses on delinquency during the 1977 calendar year and contains 1,655 respondents or 96% of the Time 1 respondents. Elliott, Huizinga, and Ageton (1985, p. 93) found that the representativeness of the survey, with respect to certain key variables, was not seriously affected by the loss over the two waves.

### *Measures: Social Control*

As indicated, Jensen (1986) has argued that Elliott, Huizinga, and Ageton's measures of social control are biased toward the bond of involvement. To overcome this problem, a new set of measures indexing the elements of the social bond were developed. First, 32 items related to the social bond were selected from the survey. Twelve of these items dealt with parental attachment, 14 with school performance and attachment, and 6 with beliefs. These items were then factor analyzed, along with seven measures of delinquent peers and seven measures of delinquency. Maximum likelihood analysis and an oblique method of rotation were employed. Maximum likelihood analysis often produces a lot of minor factors when applied to large samples with many variables (Kim and Mueller 1978). This was the case in the present analysis, and a Scree-Test (see Kim and Mueller 1978, pp. 44-45) was used to limit the number of factors. All items were then refactored, and the data suggest that there are four factors related to the social bond, one related to delinquent associates, and one measuring delinquency. The three or four best indicators for each factor were then selected, with the focus on selecting items that (a) loaded highly on the given factor (at least .40 as a general rule), (b) did not load highly on any other factor (less than .20), and (c) appeared representative of the domain of content. The three or four best indicators were selected because they should be sufficient to adequately represent the factor, and because the use of all relevant indicators would have overwhelmed the computational program.

Table 1 shows the items used to index each factor. The Time 1 items were factored separately from the Time 2 items, although substantially the same results were obtained. The variable numbers for the items in the table were taken from the Wave 1 (1976) and Wave 2 (1977) Codebooks for the National Youth Survey, and they are used in Figures 1 and 2. The items selected from these exploratory factor analyses were used to construct the measurement model in the covariance structure analysis described shortly.

High scorers on the 3-item parental attachment scale report that (a) they often do things with parents, (b) they are able to talk with their parents about

**TABLE 1: The Social Control, Delinquent Peer, and Delinquency Measures**

<i>Scale</i>		<i>Item</i>
A. Parental attachment (Paratt)	Y52, Y2-51.	Family that does lots of things together.
	Y58, Y2-57.	Have parents that you can talk to about almost everything.
	Y78, Y2-77.	Get along well with your parents.
B. School attachment (Schatt)	Y87, Y2-85.	Teachers don't call on me in class, even when I raise my hand. (reversed).
	Y89, Y2-87.	I often feel like nobody at school cares about me. (reversed).
	Y94, Y2-92.	I don't feel as if I really belong in school. (reversed).
	Y96, Y2-94.	Even though there are lots of kids around, I often feel lonely at school. (reversed).
C. Commitment (Comm)	Y5, Y2-5.	What is your grade point average?
	Y60, Y2-59.	[Are you] doing well even in hard subjects?
	Y76, Y2-75.	[Do you] have a high grade point average?
D. Deviant beliefs (Devbel)	Y192, Y2-188.	How wrong is it for someone your age to purposely damage or destroy property that does not belong to him or her? (reversed).
	Y194, Y2-190.	... steal something worth less than \$5? (reversed).
	Y195, Y2-191.	... hit or threaten to hit someone without any reason. (reversed).
	Y199, Y2-195.	... steal something worth more than \$50. (reversed).
E. Delinquent peers (Delpeer)	Y201, Y2-200.	During the past year how many of your close friends have purposely damaged or destroyed property that did not belong to them.
	Y203, Y2-202.	... stolen something worth less than \$5.
	Y204, Y2-203.	... hit or threaten to hit someone without any reason.
	Y208, Y2-207.	... stolen something worth more than \$50.

(continued)

TABLE 1 Continued

<i>Scale</i>	<i>Offenses</i>
Delinquency scales	
A. Felony assault (Felass)	1. Aggravated assault. 2. Sexual assault. 3. Gang fights.
B. Minor assault (Minass)	1. Hit teacher 2. Hit parent 3. Hit students
C. Robbery (Rob)	1. Strongarmed students. 2. Strongarmed teachers. 3. Strongarmed others.
D. Felony theft (Felthf)	1. Stole motor vehicle. 2. Stole something greater than \$50. 3. Broke into building/vehicle. 4. Bought stolen goods.
E. Minor theft (Minthf)	1. Stole something less than \$5. 2. Stole something \$5-\$50. 3. Joyriding.
F. Illegal services (Illser)	1. Prostitution. 2. Sold marijuana. 3. Sold hard drugs.
G. Status offenses	1. Been loud, rowdy. 2. Run away from home. 3. Sexual intercourse.

“almost everything,” and (c) they get along well with their parents. High scorers on the 4-item school attachment scale report that (a) people at school care about them, (b) teachers call on them, (c) they feel like they belong in school, and (d) they never feel lonely at school. High scorers on the 3-item commitment scale state that they (a) have high grade point averages, (b) do well even in hard subjects, and (c) get mostly “A”s or “Excellents” in their courses. High scorers on the 4-item deviant beliefs scale that the following offenses are “not wrong at all”: (a) destroying property, (b) stealing something worth less than \$5, (c) stealing something worth more than \$50, and (d) hitting someone. Whereas the deviant beliefs scale directly measures the level of approval for specific delinquent offenses, it should be noted that alternative measures of belief have sometimes been used in the literature — most notably scales measuring the techniques of neutralization.

These scales index the major elements of the social bond and are comparable to the control measures in other major studies of Hirschi’s theory (e.g.,

Agnew 1985; Wiatrowski et al. 1981; Wiatrowski and Anderson 1987; Massey and Krohn 1986).

*Measures: Association with Delinquent Peers*

As indicated, it is necessary to control for association with delinquent peers because this variable may have a causal effect on both delinquency and social control. The factor analytic procedures described above were used to produce a 4-item measure of delinquent peers. High scorers on this scale report that during the past year all of their close friends have (a) destroyed property, (b) stolen something worth less than \$5, (c) stolen something worth more than \$50, and (d) hit someone. The items in this scale are also shown in Table 1.

*Measure: Delinquency*

One of the strongest features of the National Youth Survey is its self-reported delinquency measures. As discussed in Elliott, Huizinga, and Ageton (1985), these measures overcome such problems in prior self-report scales as vague response categories and the failure to distinguish minor from serious delinquency. Seven delinquency scales derived from the research of Elliott and associates (see Elliott and Huizinga 1983) were included in the factor analyses described above. Five of the measures are "offense-specific" scales in Elliott and Huizinga (1983): felony assault, minor assault, robbery, felony theft, and minor theft. Each scale contains three or four individual offenses and represents "a very tight, homogeneous grouping of offense items, both with respect to the nature of the acts involved and their degree of seriousness." The remaining two scales are from the list of "offense-category" scales in Elliott and Huizinga: illegal services and a slightly modified status offense scale. Offense-category scales "involve more general classes of behaviors and more internal variability with respect to seriousness." These scales were chosen so as to ensure that a broad range of delinquent acts of varying levels of seriousness were represented. All scales loaded on the same factor. Three different measures of delinquency, however, were employed in the data analyses. The first was a measure of general delinquency that included the seven individual scales. The second was a measure of minor delinquency, that included the minor theft, minor assault, and status offense scales. The third was a measure of serious delinquency, that included the felony theft, felony assault, and robbery scales. Minor delinquency was analyzed separately from serious delinquency because certain data suggest that social

control may have a greater effect on minor delinquency (Agnew 1985; Krohn and Massey 1980). The items in each of the seven individual scales are shown in Table 1, and detailed information on these scales can be obtained from Elliott and Huizinga (1983).

### *The Causal Model*

Figure 1 shows the causal model that will be estimated (for minor delinquency, in this case). Figure 1, in particular, depicts both a measurement model and a structural equations model. The measurement model is based on the exploratory factor analyses described above, and it shows the relationship between the latent factors (in ovals) and the observed indicators of these factors. Each latent factor has at least three indicators, and the use of these multiple indicators will allow us to correct for measurement error (see Kessler and Greenberg 1981). The structural equations model shows the causal relationships between the latent factors. In particular, the structural model contains measures of social control, delinquent peers, and delinquency at the two time points; and indicates that all measures have a contemporaneous effect on one another. There are no lagged effects in the model, except for the effects of prior values of a variable on current values of the same variable (e.g., the effect of Time 1 delinquency on Time 2 delinquency). The model also indicates that the disturbance terms for the Time 2 latent factors are correlated with one another: a standard assumption when estimating nonrecursive models (see Hargens 1988).

This model is rather different from those tested in previous research. First, it includes a broader range of variables. Second, it corrects for measurement error in these variables. Third, it recognizes that the social control variables may have both direct and indirect effects on delinquency. Fourth, it recognizes that all variables in the model may have a reciprocal effect on one another. This particular modification represents a major departure from most previous path models. Although a wide range of path models have been presented in the literature, they all essentially argue that (a) family variables affect the adolescent's attachment to and performance in school; (b) both family and school variables affect the adolescent's beliefs and associates; and (c) delinquency is affected by all of the above variables (e.g., Johnson 1979; Wiatrowski et al. 1981; Elliott, Huizinga, and Ageton 1985; Marcos et al. 1986; LaGrange and White 1985; Massey and Krohn 1986; see the discussion in Thornberry 1987, pp. 867-69). The causal model in Figure 1, however, draws heavily from the recent theoretical work of Thornberry (1987) and argues that there is good reason to believe that most variables are involved



examination of reciprocal effects can be found in Thornberry (1987), as well as the empirical sources cited earlier.

Fifth, the model argues that the causal effects between social control, delinquent peers, and delinquency are primarily contemporaneous in nature. The justification for the contemporaneous effect of the social control variables on delinquency has already been presented. It can also be argued that the effect of delinquency on the social control variables is primarily contemporaneous. Liska et al. (1984) make a good argument for the contemporaneous effect of delinquency on beliefs. As they indicate, the dominant theories in social psychology suggest that one's evaluation of delinquency is more likely to be influenced by current behavior than past behavior, especially behavior committed over a year ago. Likewise, relations with parents and teachers are more likely to be a function of current rather than past delinquency. These arguments seem especially true during the adolescent period. Adolescence is often marked by rapid change, and past behavior is likely to be overshadowed by current behavior. Also, the view of the adolescent as "immature" makes parents and others more likely to forgive past behavior and base relations on current behavior. Finally, many of the same points can be used to argue that social control variables have a largely contemporaneous effect on one another. It seems reasonable to argue that relations with parents are largely a function of the adolescent's current beliefs and school performance (as well as previous relations with parents). Likewise, it seems reasonable to argue that school performance is a function of currently available resources (as well as previous levels of school performance). Previous levels of social control seem unlikely to affect current school performance, except through their effect on previous levels of school performance.

#### *A Note on Temporal Order*

There are compelling reasons to believe that the effect of social control on delinquency is contemporaneous, but the data do not readily lend themselves to an examination of contemporaneous effects. The social control measures, for the most part, measure the level of social control at the time of the interview. The delinquency scales, however, measure the extent of delinquency during the *prior* 12 months. Therefore, if we examine the effect of Time 2 social control on Time 2 delinquency we are, in effect, examining the impact of social control during the spring of 1978 on delinquency committed during the course of the prior year. So we are essentially using the present to explain the past. Certain researchers have nevertheless chosen to follow this strategy, there being no viable alternative if one wants to

examine contemporaneous effects with currently available data sets (Liska et al. 1984; Liska and Reed 1985; Meier et al. 1984). Other researchers, however, have been critical of this strategy (Paternoster 1988; Bynner et al. 1981; also see the discussion in Kercher 1988).

It was decided to employ this strategy in the present article for two reasons. First, if one examines the social control measures it becomes clear that most of them at least *implicitly* refer to past behavior. This is most obvious with respect to the commitment measure, where adolescents are asked about their prior grades and academic performance. But, it is also true of the other measures. The teacher and parental attachment measures essentially ask adolescents to summarize their past relations with these individuals. Adolescents, for example, are asked whether they often do things with their family or whether their teachers ignore them. So most of the social control measures do, in fact, make reference to the adolescent's past. Second, as Kercher (1988, p. 296) implies, this strategy carries little chance of inflating the impact of the contemporaneous social control measures because current delinquency will be controlled when examining the impact of these measures. For these reasons, then, we feel the data are appropriate for the examination of contemporaneous effects. The ultimate test of social control theory, however, awaits a data set that employs the strategy advocated by Kercher (1988) — the employment of delinquency and control variables that have similar measurement periods (e.g., that ask adolescents about their level of delinquency and social control over the last year).

### *Model Estimation*

The causal model will be estimated using the maximum likelihood procedure in EQS, a structural equations program developed by Bentler (1985) and distributed by BMDP (Biomedical Program) Statistical Software.

### *RESULTS*

Three models were estimated: one for general delinquency, one for minor delinquency, and one for serious delinquency. The results for each model were essentially the same and, for that reason, only the results for the minor delinquency model will be reported. The focus is on minor delinquency because most previous empirical tests of control theory employed scales biased toward minor offenses and because data suggest that control theory is best able to explain minor delinquency (Agnew 1985; Krohn and Massey 1980).

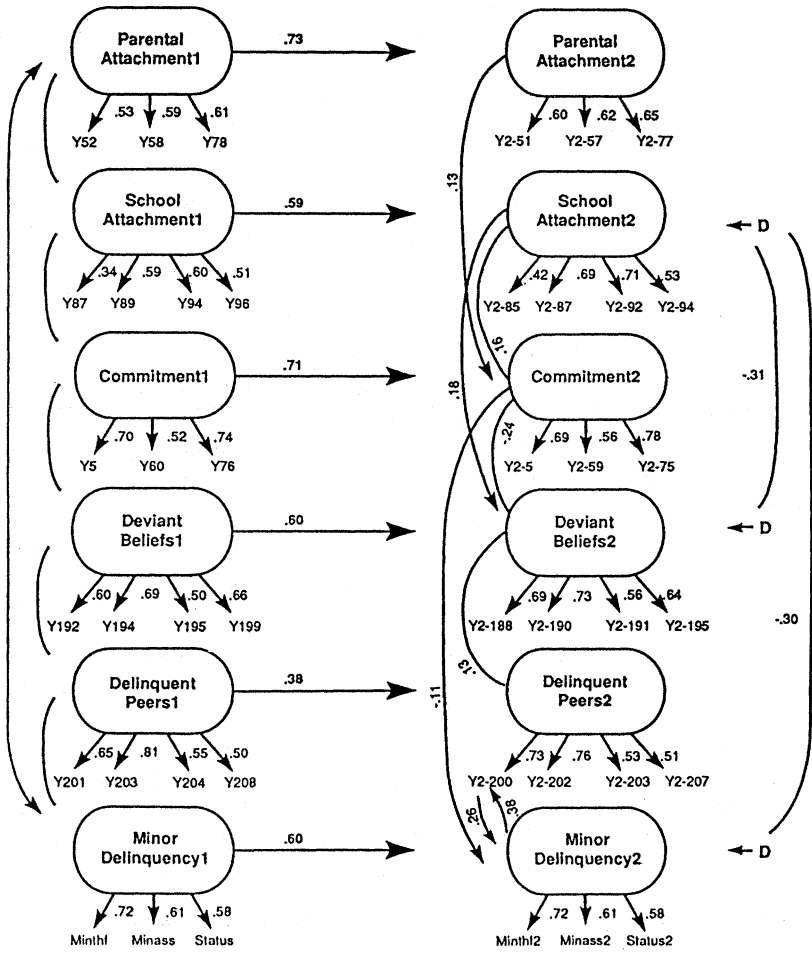


The chi-square statistic for the minor delinquency model in Figure 1 is 2,827.51 with 753 *df* ( $p < .01$ ).<sup>4</sup> The chi-square statistic almost always leads to model rejection in large samples, and alternative indexes less dependent on sample size have been developed (see Hayduk 1987; Wheaton 1987). One of the most popular is the Bentler-Bonnett normed fit index (Bentler and Bonnett 1980). This index shows the proportionate improvement in fit relative to a null model that assumes no relationship among the observed variables. Bentler and Bonnett suggest that this index exceed .90 before a model is accepted. The Bentler-Bonnett index for the model, modified using the formula suggested by Bollen (1989), is .84. This model, then, does not provide an acceptable fit to the data.

As indicated earlier, it is likely that the error terms for certain of the Time 1 and Time 2 variables are autocorrelated. Further, an examination of the residuals matrix suggests that certain other of the error terms may also be correlated. The model was reestimated with these considerations in mind and the final model is described in Table 2 and shown in Figure 2. This model includes 19 correlated errors and has a chi-square of 1,713.14 with 734 *df* ( $p < .01$ ). The Bentler-Bonnett index for this model, modified using the formula suggested by Bollen (1989), is .92.

Figure 2 shows the estimates for the measurement model. Figure 2, in particular, shows the standardized effect of each latent construct on its indicators. The estimates for the measurement model confirm the results of the exploratory factor analysis, and suggest that the items are acceptable indicators of the latent constructs. The one possible exception is that school attachment item: "Teacher's don't call on me." Although most of the standardized effects are in the .5 to .7 range, the effect of Time 1 school attachment on this item is .34 and the effect of Time 2 school attachment on the Time 2 item is .42. It is possible that this item is a function of additional constructs, like classroom size, as well as school attachment.

The measurement model contains one finding of some potential significance. Gottfredson and Hirschi (1987) have recently critiqued certain of the research based on the National Youth Survey. Among other things, they claim that there is extreme overlap between the measure of peer delinquency and the measure of the respondent's own delinquency. They offer several possible reasons why the respondent's estimate of his/her delinquency might overlap with their estimate of their friends' delinquency, including "1) the respondent may have been at the scene, himself engaging in the activity, 2) the respondent may impute his own qualities to his friends, [and] 3) the respondent may impute friendship to people like himself" (1987, p. 598). Based on such arguments, they suggest that the variables measuring the respondent's delin-



**Figure 2: The Final Causal Model for Minor Delinquency**  
 NOTE: All effects are standardized and significant at the .05 level or better. Correlated errors are not shown (see Table 2A).

quency and peer delinquency may really be measuring the same thing. If true, this would call into question a large portion of the recent research and theorizing on the causes of delinquency. However, neither the exploratory factor analysis nor the confirmatory factor analysis underlying the measurement model support this argument. (Note that when the delinquent peer items

were constrained to load on the delinquency construct, the model did not converge to a meaningful solution.) Further, the structural equations model — to be described shortly — suggests that delinquency and delinquent peers are differentially related to certain of the other variables in the model. So there is some empirical justification for treating these variables as distinct. At the same time, it should be noted that these variables are highly correlated (.70 at Time 1 and .76 at Time 2) and it may still be argued that at least part of this correlation is due to overlap between the variables. The overlap, however, is not so great that one can argue that the two variables are equivalent to one another.

Table 2A shows the 19 correlated errors that were included in the model. An examination of these correlations reveals two patterns. First, the errors for the Time 1 and Time 2 values of the same variable are positively correlated in several cases. Such autocorrelation was expected and, as indicated earlier, may be due to shared sources of bias in the measurement of the Time 1 and Time 2 variables or to omitted variables that have a similar effect on the Time 1 and Time 2 variables. Second, certain of the errors between the deviant belief, delinquent peer, and delinquency items are correlated with one another. This is especially true for the items which refer to “hitting someone.” There are several possible explanations for this, one of which is that the links between these errors reflect a “subculture of violence” in the larger society.

Tables 2B, 2C, and 2D and Figure 2 show the estimates for the structural equations model. Table 2B shows the coefficient estimates, both standardized and unstandardized, as well as the standard errors for each estimate. Table 2C shows the correlations between disturbance terms or errors-in-equations. Table 2D shows the correlations between the exogenous variables. And Figure 2 shows the significant ( $p > .05$ ) standardized effects and correlated disturbances.

Other than prior delinquency, only two variables have a significant effect on Time 2 minor delinquency. As association with delinquent peers increases, minor delinquency increases by a moderate amount (standardized beta = .26). And as commitment to school increases, minor delinquency decreases by a small amount (standardized beta = -.11). None of the other variables have significant direct effects on minor delinquency. Parental attachment and deviant beliefs have indirect effects on minor delinquency, although these effects are trivial in size: parental attachment having an indirect effect of -.01 through commitment and deviant beliefs an indirect effect of .03 through delinquent peers.<sup>5</sup> With two exceptions, discussed below, none of the disturbance terms in the model are significantly correlated. Similar results were obtained for the serious and general delinquency scales, except that commit-

TABLE 2: Estimates for the Minor Delinquency Model

A. Correlated errors significant at the .05 level or better														
Y5, Y2-5	=	.54	Y204, Y2-203	=	.25	Y2-203, Minass2	=	.11						
Status1, Status2	=	.40	Y204, Y2-191	=	.24	Y2-191, Y2-207	=	-.11						
Minass1, Minass2	=	.36	Y87, Y2-85	=	.22	Y204, Minass1	=	.09						
Y195, Y2-204	=	.29	Y2-195, Y2-207	=	.21	Y5, Y2-85	=	.06						
Y208, Y2-207	=	.28	Y96, Y2-94	=	.19	Y204, Y2-85	=	-.06						
Y105, Y2-191	=	.28	Y2-207, Minthfl	=	.14									
Y2-191, Y2-203	=	.27	Y199, Y2-207	=	-.14									
B. Structural effects (standardized effects on top, with unstandardized effects and standard errors below)														
Paratt2	=	.07	Schatt2	+ .00	Comm2	+ .00	Devbel2	-.11	Delpeer2	-.08	Del2	+ .73**	Paratt1	+ .59D
		.06		.00		.01		.09		.07		.82		
		.07		.06		.09		.17		.16		.09		
Schatt2	=	.08	Paratt2	+ .16**	Comm2	-.03	Devbel2	-.28	Delpeer2	+ .29	Del2	+ .59**	Schatt1	+ .71D
		.09		.16		.03		.26		.27		.69		
		.08		.07		.10		.19		.17		.07		
Comm2	=	.13*	paratt2	-.06	Schatt2	+ .07	Devbel2	-.24	Delpeer2	+ .20	Del2	+ .71**	Comm1	+ .70D
		.15		-.06		.07		-.22		.19		.71		
		.08		.07		.09		.18		.16		.05		
Devbel2	=	-.02	Paratt2	+ .18*	Schatt2	-.22**	Comm2	-.03	Delpeer2	+ .16	Del2	+ .60**	Devbell	+ .73D
		-.03		.18		-.22		-.03		.15		.69		
		.08		.08		.07		.18		.17		.08		
Delpeer2	=	.02	Delpeer2	-.05	Schatt2	-.03	Comm2	+ .13*	Devbel22	+ .38**	Del2	+ .38**	Delpeer1	+ .58D
		.03		-.05		-.03		.13		.39		.43		
		.07		.07		.06		.08		.10		.07		

(continued)

TABLE 2 Continued

Del2	=	.06	Paratt2	+.08	Schatt	-.11*	Comm2	+.04	Devbel2	+.26*	Delpeer2	+.60**	Del1	+.55D
		.07		.08		-.12		.04		.25		.60		
		.08		.07		.06		.09		.14		.10		
C. Correlations between the disturbance terms or errors in equations														
Paratt2		—	Paratt2	Schatt2	Comm2	Devbel2	Delpeer2	Del2						
Schatt2		-.05		—										
Comm2		.20		.15										
Devbel2		-.04		-.31*										
Delpeer2		-.05		.12		.24								
Del2		-.03		-.30*		.13		-.10						
D. Correlations between the exogenous variables ( $p < .01$ in all cases)														
Paratt1		—	Paratt1	Schatt1	Comm1	Devbel1	Delpeer1	Del1						
Schatt1		.26		—										
Comm1		.28		.30										
Devbel1		-.34		-.22										
Delpeer1		-.23		-.21		.53								
Del1		-.31		-.21		.55		.70						

\* $p < .05$ ; \*\* $p < .01$ .

ment did not have a significant direct effect on these scales and parental attachment did not have an indirect effect. These results largely confirm the results of past research. The social control variables have, at best, only a minimal effect on delinquency.

As a precaution, several alternative versions of the causal model were estimated. In one alternative, the measure of delinquent peers was eliminated from the model. Because this measure is empirically distinct from delinquency, one might argue that the resultant model is misspecified. Nevertheless, delinquent peers is highly correlated with minor delinquency and it might be argued that this correlation is artificially inflated for reasons indicated by Gottfredson and Hirschi (1987). Removing this measure from the model, therefore, might provide a more accurate indication of the true effect of social control on delinquency. Estimates for this model, however, confirm previous findings and indicate that commitment is the only social control variable to have a significant effect on Time 2 minor delinquency (standardized beta =  $-.12$ ,  $p < .05$ ). (Even though delinquent peers is not in the model, the disturbance term for minor delinquency is not significantly correlated with any of the other disturbance terms [a full set of estimates is available from the author.])

In another alternative, the lagged, rather than contemporaneous, effects of the social control variables were examined. In particular, each Time 2 variable was modeled as a function of all Time 1 variables. There were no contemporaneous effects in the model. The results once again indicate that commitment is the only control variable to have a significant effect on Time 2 minor delinquency (standardized effect of Time 1 commitment =  $-.10$ ,  $p < .05$ ). It should be noted, however, that the disturbance term for minor delinquency was significantly correlated with all other disturbance terms in the model—raising some questions about whether the lagged model is properly specified (complete estimates available from the author on request).

The ideal test of control theory would estimate a model that included both lagged and contemporaneous effects. Unfortunately, it is not possible to identify such a model with only two waves of data (Kessler and Greenberg 1981). In theory, it is possible to identify such a model with three waves of data, assuming constraints are placed on certain of the coefficients (see Kessler and Greenberg 1981). In practice, however, the data have to meet a very restrictive set of conditions for the successful application of this approach (see Greenberg and Kessler 1982). The first three waves of the National Youth Survey data apparently do not meet these conditions, as an effort to estimate a 3-wave model containing both lagged and contemporaneous effects was not successful. Identification with four waves is possible,

but the number of variables becomes so large as to overwhelm the computational program. Although we cannot estimate both lagged and contemporaneous effects in the same model, it is possible to perform a "sensitivity analysis" on the contemporaneous model in Figure 2 (see Kessler and Greenberg 1981). In this model, all lagged effects are fixed at zero. We can reestimate this model, fixing the lagged effects at several additional levels believed to be reasonable. If the contemporaneous effects of the control variables remain weak, that increases our confidence in the conclusions we have drawn.

In one analysis, the lagged effects of the Time 1 variables on delinquency were fixed at .1 or  $-.1$ . The effects of parental attachment, school attachment, and commitment were fixed at  $-.1$ , while the effects of deviant beliefs and delinquent peers were fixed at .1. If lagged effects were set at this level, the Time 2 control variables either did not have a significant effect on Time 2 delinquency or had an effect opposite to that predicted by the theory (e.g., Time 2 parental attachment had a standardized effect of .22 on Time 2 minor delinquency,  $p < .01$ ). Similar results were obtained when the Time 1 variables were allowed to have lagged effects of .1 or  $-.1$  on all Time 2 variables. Raising the lagged effects to .2 or  $-.2$  only served to increase the positive effect of certain social control variables on Time 2 delinquency. (It should be noted that the correlations between the disturbance term for Time 2 delinquency and all other disturbance terms were usually significant and negative in the above analyses. This suggests that the lagged specification is not appropriate). The only situation in which the Time 2 control variables had a significant negative effect on delinquency was when the Time 1 social control effects were fixed at positive values of at least .2 ( $-.2$  in the case of deviant beliefs). However, it seems unlikely that social control has a positive lagged effect and a contemporaneous negative effect on delinquency in real life. In another set of analyses, the lagged effects were freed and the contemporaneous effects were set at various levels believed to be reasonable. In these analyses, the Time 1 control variables either did not have a significant effect on Time 2 delinquency or had an effect which was opposite to that predicted by the theory. These analyses are not definitive: It is possible to set the lagged and/or contemporaneous effects at varying combinations of levels that were not considered. Nevertheless, taken as a whole, the longitudinal data provide only weak support for social control theory.

Somewhat more support is provided for differential association theory. Next to prior delinquency, association with delinquent peers is the best predictor of delinquency. It is interesting to note that this effect is direct, and is not mediated by deviant beliefs (see the discussion in Gibbons and Krohn

1986, p. 161). It is also interesting to note that delinquent peers is itself affected by delinquency. Both these variables, in fact, are involved in an amplifying loop with one another. Delinquency leads one to associate with delinquent peers, and delinquent peers lead one to engage in delinquency. This loop provides some support for the interactional theory of delinquency developed by Thornberry (1987).

Although the focus of this article is on the explanation of delinquency, it is useful to take a brief look at certain of the other effects in the model. First, certain of the social control variables have direct effects on one another, although these effects are only small to moderate in size. Commitment to school has a positive effect on school attachment and a negative effect on deviant beliefs. Parental attachment has a small positive effect on commitment. And school attachment has a small positive effect on deviant beliefs. This last effect is in a direction opposite to that which we would predict. It should be noted, however, that the correlation between the disturbance terms for deviant beliefs and school attachment is significant and negative (see Table 2C). Negatively correlated disturbances can be due to a number of factors, but in the present case they are most likely caused by "upward bias in the calculation of the (positively signed) reciprocal effects" (see the discussion in Gillespie and Fox 1980). This upward bias may result from several types of specification error (Gillespie and Fox 1980), and so the positive effect of school attachment on deviant beliefs should be viewed with suspicion. Only a few other longitudinal studies have examined the effects of social control variables on one another. Liska and Reed (1985) and Paternoster (1988) also found weak effects along the lines reported in this study, while Massey and Krohn (1986) found somewhat stronger effects for many of the control variables in their model. The results of Massey and Krohn (1986), however, may stem from the fact that they did not control for the prior values of their social control variables (e.g., they did not control for Time 1 belief when examining the effect of Time 1 parental attachment on Time 2 belief). Such issues need to be investigated further, particularly given the arguments of Hirschi (1969) and others regarding the close connections between the bonds.

Second, the social control variables are largely unaffected by delinquency and delinquent peers. In certain cases, however, the standardized effects of delinquency and delinquent peers exceed .10 and verge on significance. It may be that they do not achieve significance because the high correlation between Time 2 minor delinquency and Time 2 delinquent peers ( $r = .76$ ) created a mild problem with multicollinearity and so raised the standard errors for these estimates. It should also be noted that there is a significant negative



correlation between the disturbance terms for school attachment and minor delinquency. Although the effect of minor delinquency on school attachment is not significant, it is positive in sign and close to significance. As indicated earlier, this negatively correlated disturbance is likely due to upwardly biased reciprocal paths which, in turn, may result from one of several types of specification error (Gillespie and Fox 1980). The positive effect of minor delinquency on school attachment, then, should also be viewed with suspicion.

Overall, however, the data suggest that delinquency and delinquent peers do not have a major impact on social control. This corresponds to certain of the empirical studies on labeling theory, which suggest that even officially detected delinquency has a minimal effect on the adolescent (Mahoney 1974). Agnew (1985) also found that delinquency has a small impact on social control, although certain other studies suggest that delinquency and delinquent peers may have a more substantial effect on social control. These later studies, however, fail to control for prior social control (Massey and Krohn 1986; Paternoster et al. 1983) or test models that omit certain important variables (Liska and Reed 1985; Liska et al. 1984). The impact of delinquency and delinquent peers on social control is, of course, an important issue. Not only does it bear on labeling theory, but it is also central to Thornberry's interactional theory of delinquency. The above data, however, suggest that this impact might not be as substantial as imagined.

### *CONCLUSION*

In sum, the social control variables have a weak effect on the three forms of delinquency examined in this article. Current delinquency is largely a function of prior delinquency and, to a lesser extent, association with delinquent peers. The data analyses in this article correct for many of the problems in previous research, and for that reason they raise further doubt about the importance attributed to Hirschi's theory as an explanation of general delinquency among adolescents. It is, however, still necessary to exercise caution in interpreting these findings. Replications with additional data are needed, and it is possible that Hirschi's theory is of more limited relevance. Researchers have recently made several arguments in this area.

First, a distinction has recently been made between the initiation, intensity, and cessation of delinquency. It is sometimes argued that different theories are relevant at each of these strategies. That is, there may be differences in the factors that determine (a) whether one starts offending, (b) the rate at which one offends, and (c) whether one stops offending. In this area,

Paternoster and Triplett (1988) argue that social control theory is better able to explain the initiation (or prevalence) of offending than the intensity (or incidence) of offending. Data on this point have been mixed (Agnew 1987; Paternoster and Triplett 1988; Skinner et al. 1985; Krohn, Skinner, Massey, and Akers 1985), but suggestive enough that it is a topic worth pursuing.

Second, this study employed general measures of delinquency — making a distinction only between serious and minor offenses. This strategy, of course, has ample precedent in previous research. Further, certain data suggest that most delinquent behaviors are related and they reflect the same underlying disposition to engage in a wide range of antisocial conduct (see Jessor and Jessor 1977; Hirschi and Gottfredson 1988; Osgood, Johnston, O'Malley, and Bachman 1988). Limited data, however, also suggest that there may be some utility in conducting offense-specific analyses — with a few studies finding that social control variables are related to certain offenses but not to others (Paternoster 1988; Kandel et al. 1978; Friedman and Rosenbaum 1986; see Loeber and Stouthamer-Loeber 1987, pp. 357-60).

Third, this analysis tested control theory with a relatively broad sample of adolescents. It is possible that social control theory is relevant to certain subgroups. In particular, several recent researchers have argued that the impact of the social bond may vary by age (e.g., Agnew 1985, Liska and Reed 1985). The existence of such developmental differences is, in fact, a centerpiece of the interactional theory of delinquency developed by Thornberry (1987). Thornberry suggests that the importance of parental attachment peaks in early adolescence, commitment to school peaks in early to midadolescence, and beliefs in mid- to late adolescence. Several cross-sectional studies provide suggestive evidence for age differences in the effect of the social bonds, although there are some contradictions between these studies and they do not fully conform to the pattern described by Thornberry (LaGrange and White 1985; Shoemaker and Gardner 1988; Friedman and Rosenbaum 1986; Rankin 1980). Further, the extent of such age differences has sometimes been exaggerated in the cross-sectional research. In the best known of these studies, La Grange and White examine the effect of social control on delinquency among 12, 15, and 18 year olds, and find that social control is most important among the 15 year olds. However, given their small sample size, they employ a rather liberal test for determining whether variables differ in their effect across age groups (see LaGrange and White 1985, p. 34). If we use the test for differences in regression coefficients described by Cohen (1983), only 2 of the 10 differences described by LaGrange and White are significant at the .05 level, and 5 are not even significant at the .20 level. Only one longitudinal study has attempted to

examine age differences in the causes of delinquency, and this study found that the social bond had a weak effect on delinquency among all adolescent age groups (Agnew 1987). Nevertheless, the evidence is suggestive enough to warrant the examination of age differences in future research.

In addition, future studies should examine the impact of the social bonds among preadolescents. The data in this and other longitudinal studies suggest that delinquency is highly stable among adolescents—with prior delinquency being far and away the best predictor of current delinquency. This suggests that the predisposition for delinquency is largely formed by the time most individuals have reached adolescence. It may be that variations in parental attachment and school commitment during the adolescent period come too late and perhaps are too small in magnitude to affect delinquency. In addition, limited data suggest that the influence of parents declines during adolescence (Jessor and Jessor 1977; Elliott, Huizinga, and Morse 1985). Apparently, the only institution close enough to the adolescent and powerful enough to affect delinquency during this period is the peer group (Jessor and Jessor, as well as Elliott, Huizinga and Morse, present data suggesting that the peer group increases in importance during adolescence). The family and school, however, may have had a large impact on the formation of delinquent predispositions during the preadolescent period. There is limited support for this position (see Farrington 1986; Loeber and Stouthamer-Loeber 1987, pp. 362-64). Unfortunately, current data sets do not allow us to test this argument.

Finally, this article focused on those variables most closely associated with Hirschi's social control theory. Recent research has begun to build on Hirschi's theory and examine a broader range of family, school and other variables (e.g., Cernkovich and Giordano 1987). Certain of these additional variables may well have an effect on subsequent delinquency (see, for example, Loeber and Stoutamer-Loeber 1986). At present, however, the data suggest that the elements of the bond as described by Hirschi are unimportant in predicting general delinquency among adolescents.

### NOTES

1. It should be noted that certain of the longitudinal studies cited are based on the same data set. In particular, several studies are based on the Youth in Transition survey (Agnew 1985; Liska et al. 1984; Liska and Reed 1985; Wells and Rankin 1983; Bynner et al. 1981). Three of the cited studies are based on a sample of high school students in a midsized Southeastern city (Paternoster 1988; Paternoster and Triplett 1988; Paternoster and Iovanni 1986). Three of the studies are based on the National Youth Survey (Elliott, Huizinga, and Ageton 1985; Elliott, Huizinga, and

Morse 1985; Britt 1988), and three of the studies are based on a study of smoking in a small midwestern city (Skinner et al. 1985; Krohn et al. 1985; Massey and Krohn 1986). It was decided to cite different studies based on the same data set because these studies usually employ different methods and/or causal models—a fact that sometimes leads to differences in results (e.g., compare Agnew 1985 to Liska and Reed 1985).

2. There have been numerous longitudinal studies related to social control theory, although not all of these studies allow one to determine if the social control variables have effects which surpass the criteria employed in this article. Farrington (1986), for example, reports that certain family and school variables related to control theory have a significant effect on subsequent delinquency among young adolescents, but not among older adolescents. Data on the size of these family and school effects, however, are not reported. Although earlier publications suggest that certain of these effects may be large (West and Farrington 1973), the more sophisticated analyses in Farrington (1986) suggest this is not necessarily the case (e.g., certain of the family variables are only significant at the .05 level). The data in Jessor and Jessor (1977), another major longitudinal study, indicate that many social control variables do not have a significant impact on subsequent delinquency. Several control variables, however, are significantly related to subsequent delinquency. The size of these effects, however, is unclear. White, Pandina, and LaGrange (1987) also find that certain social control variables are not significantly related to subsequent delinquency and drug use (especially family variables), and other control variables are significantly related. Like Jessor and Jessor, however, the size of the social control effects is unclear. Finally, Lefkowitz, Eron, Walder, and Huesmann (1977) find that most of the family variables related to control theory in their study do not have an effect on subsequent aggression. The cut-off point for excluding variables from their step-wise regression, however, is 2% of explained variance.

3. It should be noted that measures of delinquent peers and prior delinquency are not available in certain data sets. The Youth in Transition survey employed by Liska et al. (1984) and Liska and Reed (1985), for example, does not contain an adequate measure of delinquent peers. In other cases, these measures were available but were not controlled in the data analysis. Jessor and Jessor (1977), for example, only conducted univariate analyses with their longitudinal data, even though measures of delinquent peers, prior delinquency, and many other variables were available.

4. Thirty-eight percent or 671 of the 1,725 cases at Time 1 are missing. Seventy of these missing cases are due to panel attrition. The remaining missing cases are distributed over several Time 1 and Time 2 variables, most notably the Time 1 and Time 2 delinquent peer items and two of the Time 2 commitment items. A comparison of the missing and nonmissing cases reveals that the missing cases are more likely to be Black (21.2% versus 11.2%) and slightly more likely to be male (58.9% versus 49.6%), 15 years of age or older (45.5% versus 36.5%), and lower in socioeconomic status (SES) (31.9% in the bottom quartile of the Hollingshead Index versus 22.9%). Differences between the two groups in minor delinquency are negligible, and the missing cases are somewhat higher in serious delinquency (12.4% score in the top decile of Time 1 serious delinquency versus 5.8% of the nonmissing). The slight to moderate bias created by the exclusion of these cases should not adversely affect our test of control theory, particularly given the fact that the theory was developed to explain less serious forms of delinquency among the general population of adolescents (as opposed, for example, to certain versions of strain theory, which focus on serious delinquency among the urban poor).

5. Elliott, Huizinga, and Ageton (1985) find that the social control variables in their study have a larger effect on association with delinquent peers than the control variables in this study.

Elliott et al., however, do not control for the prior value of their delinquent peers variable when examining the impact of social control.

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