

## TESTING CONTROL THEORY AND DIFFERENTIAL ASSOCIATION: A REANALYSIS OF THE RICHMOND YOUTH PROJECT DATA\*

BARBARA J. COSTELLO  
University of Rhode Island

PAUL R. VOWELL  
Texas A&M University, Kingsville

*In what has become a classic work in the field, Matsueda (1982) tested control theory against differential association theory using Hirschi's (1969) Richmond Youth Project data. Matsueda found that measures of "definitions favorable to law violation" entirely mediated the effect of his social control measures and friends' delinquency, and concluded that differential association theory was supported over control theory. We note several problems with Matsueda's specification of control theory, and we reanalyze the Richmond data including measures of commitment to conventional goals and several attachment to parents variables that Matsueda excluded. We also propose and test a new method of measuring the social bond, conceptualizing the social bond as a second-order latent construct. In contrast with Matsueda's findings, we find that the social bond and friends' delinquency retain important direct effects on delinquency, and that these effects are greater than those of definitions. Thus, our results are more supportive of control theory than differential association theory.*

In what has been described as a "classic contribution to theory testing in criminology" (Hagan, 1992:4), Ross Matsueda (1982) tested Sutherland's (1947) differential association theory against Hirschi's (1969) social control theory using Hirschi's Richmond Youth Project data. His major finding was that indicators of "definitions favorable to law violation" mediated all of the social control and background variables' effects on delinquency. Thus, Matsueda concluded that differential association theory was supported over control theory, in contrast to the conclusions of previous research (Hirschi, 1969; Jensen, 1972).

\* Address all correspondence to the first author at the Department of Sociology and Anthropology, University of Rhode Island, Kingston, RI 02881. The authors thank Travis Hirschi for providing the data and Travis Hirschi, Chester L. Britt III, and Xiaohu Xu for helpful comments on an earlier draft of this manuscript. This study is a revised version of a paper presented at the annual meetings of the American Society of Criminology, San Diego, California, November 1997.

A critical evaluation of Matsueda's findings is necessary, in part, because this work has been so influential in subsequent criminological research. It has been credited with "help[ing] to rescue differential association theory from potential empirical oblivion" (McCarthy, 1996:145), and with "... providing impressive evidence for the explanatory power of Sutherland's central variables. . ." (Orcutt, 1987:341). It has been cited in scholarly journals 98 times since its publication<sup>1</sup> (Institute for Scientific Information, 1982-1998), and it continues to be cited in recent works (e.g., Greenberg, 1999; Heimer, 1997; Sampson and Laub, 1993).

Existing critiques of the study tend to be quite limited in scope, addressing issues such as Matsueda's use of a dichotomous measure of broken homes (Wells and Rankin, 1986), his exclusion of females from the sample (Smith and Paternoster, 1987), and his use of cross-sectional data (Menard and Huizinga, 1994). Some of the criticisms we discuss below have been noted previously, such as problems with Matsueda's operationalization of the concept "definitions" (Gibbs, 1987; Johnson et al., 1987). However, there has been no serious challenge to Matsueda's specification of the theoretical models, and thus his findings have been largely accepted as valid.

There are several problems with Matsueda's study that lead us to question his results. Most importantly, his social control model does not provide a complete test of the theory because of the omission of several of the theory's crucial constructs from the analyses. The control theory model is also misspecified by misplacement of several concepts in the causal chain.

In this work, we address and attempt to rectify these problems. Using Hirschi's (1969) Richmond Youth Survey data, we respecify Matsueda's models derived from control theory, differential association theory, and multiple factor theory. We also propose an innovative measurement model of Hirschi's concept of the social bond, which we include in our tests of each theory. In order to provide context for our analyses, we first briefly review control and differential association theory, and the research pertaining to these theories.

## SOCIAL CONTROL AND DIFFERENTIAL ASSOCIATION THEORY

### SOCIAL CONTROL THEORY

Hirschi's (1969) statement of social control theory holds that crime often allows us to satisfy wants more quickly and easily than conventional behavior does. Thus, explaining crime is nonproblematic, and we must

1. Ninety-seven citations were listed in the Social Science Citation Index. We discovered an additional citation that was omitted from the index (Wiatrowski and Anderson, 1987).

instead explain conformity. Hirschi collectively refers to the forces controlling criminal behavior as the social bond, which comprises four elements: emotional *attachment* to parents, peers, and conventional institutions, such as the school; *commitment* to long-term educational, occupational, or other conventional goals; *involvement* in conventional activities, such as work, homework, and hobbies; and *belief* in the moral validity of the law. The four elements of the social bond can independently influence delinquency, but Hirschi also argued "the more closely a person is tied to conventional society in any of these ways, the more closely he is likely to be tied in the other ways" (Hirschi, 1969:27).

Empirical tests of social control theory are generally supportive of the theory, particularly with regard to the relationship between attachment and commitment and delinquency (Cernkovich and Giordano, 1987; Hindelang, 1973; Hirschi, 1969; Jensen, 1972; Junger and Marshall, 1997; Krohn and Massey, 1980; Marcos et al., 1986; Rankin and Kern, 1994; Rankin and Wells, 1990; Sampson and Laub, 1993; Wiatrowski et al., 1981). Research on the relationship between involvement in conventional activities and delinquency is less supportive (Agnew, 1993; Hirschi, 1969; Kempf, 1993), although Hirschi (1969) found a negative relationship between time spent on homework and delinquency. Hirschi (1969) also found belief in the validity of the law was negatively related to delinquency, and positively associated with attachment and commitment. Contrary to his predictions, Hirschi found that variables measuring four of Sykes and Matza's (1957) techniques of neutralization were also associated with delinquency. Further analysis of the neutralization items showed that they were positively associated with the belief items (Hirschi, 1969), which suggests that the difference between these measures of these concepts is minimal. The difficulty in distinguishing between these related concepts is also apparent in distinguishing between measures of belief and Sutherland's (1947) concept of definitions favorable to law violation, a point that is addressed in more detail below.

### DIFFERENTIAL ASSOCIATION THEORY

Sutherland (1947) argued that crime results from learning positive "definitions" of criminal behavior through interaction with others. Only those who learn "an excess" of these definitions over definitions unfavorable to crime will engage in criminal behavior, because "the person who has not been trained in crime does not invent criminal behavior" (Sutherland et al., 1992:88-89). Sutherland acknowledged that not all associations have an equal impact, and the influence of associations varies by "frequency, duration, priority, and intensity" (Sutherland et al., 1992:89).

Early studies of differential association theory focused on the connection between delinquent peers and the individual's delinquency (Matsueda, 1988). Research consistently demonstrates that friends' delinquency is a very strong predictor of the individual's delinquency, and this relationship may account for the continued appeal of differential association and other learning theories of delinquency (Agnew, 1995). However, the correlation between friends' and the individual's delinquency can be explained in a variety of ways, some of which are inconsistent with differential association theory (Gottfredson and Hirschi, 1990). Thus, recent tests of differential association theory (e.g., Heimer, 1997) have focused more on Sutherland's most proximate causal variable, the individual's definitions of deviant behavior.

There is substantial evidence that those who are less disapproving of crime are more likely to engage in it (Hirschi, 1969; Krohn et al., 1984; Matsueda, 1989; Menard and Huizinga, 1994; Minor, 1984; Thornberry et al., 1994). However, it is often difficult to determine whether such tests provide support for the control theory concept of belief or Sutherland's concept of definitions, in part because Sutherland was often inconsistent in his explanations of what definitions favorable to law violation entail. For example, Sutherland referred to delinquent definitions as "expectations and obligations" as well as "rationalizations and reassurances" (Sutherland et al., 1992:194). This ambiguity presents particular difficulty in testing control theory against differential association theory, as definitions that merely allow deviant behavior are not easily distinguished from a lack of belief in the law (Hirschi, 1969). For the purposes of this research, we assume that Hirschi's measures of belief and neutralization can serve as measures of either belief or definitions favorable to law violation.

#### MATSUEDA'S SPECIFICATION OF SOCIAL CONTROL AND DIFFERENTIAL ASSOCIATION THEORIES

The basic point of contrast between control theory and differential association theory is the role of definitions or beliefs in delinquency causation (Matsueda, 1982). Matsueda argues that for differential association theory, definitions mediate any effects of background variables, such as age and neighborhood crime rates, social control variables, and the effects of delinquent companions. Thus, differential association theory predicts no direct effect of these variables on delinquency (see Matsueda, 1982, Figure 1). In contrast, Matsueda specified his social control and multiple factor models with the antecedent variables having direct effects on delinquency as well as indirect effects through definitions.

Matsueda estimated three models derived from control theory and multiple factor theories and contrasted these with his differential association model (see Matsueda, 1982, Tables 1-3). He concluded that his Model 3,

specifying eight direct effects on delinquency, correlated error terms within the definitions construct, and correlated error terms between constructs, fit the data better than either of the first two control/multiple factor theory models. Model 4, representing his test of differential association theory, allowed the same correlated error terms as Model 3, but specified only definitions as having a direct effect on delinquency. The goodness-of-fit tests of Models 3 and 4 were not significantly different, but because Model 3 was less restricted than Model 4, Model 3 was rejected, and Matsueda concluded that differential association theory was confirmed.

There are several problems with Matsueda's specification of the control theory model. The most important of these is that he omits from his models several constructs that are central to social control theory, namely, commitment, attachment to school, and involvement. He also utilizes only a partial measure of the concept attachment to parents, that of "virtual supervision."<sup>2</sup>

We do not believe that the omission of involvement is an important problem with his specification, largely because most of the measures of involvement in the Richmond Youth Survey are not significantly related to delinquency (Hirschi, 1969). The one measure of involvement Hirschi found to be negatively and significantly related to delinquency was time spent on homework, which can be conceptualized as one aspect of commitment to long-term goals. This reconceptualization is fairly common in tests of social control theory (Kempf, 1993).

Matsueda's omission of commitment is a more serious problem. The notion that commitment to long-term goals acts as a deterrent to delinquency has been fairly well supported in the literature, although results vary depending on how the concept is operationalized and on the placement of this variable in causal models. Because Hirschi's analysis of the same data showed commitment to be a fairly robust correlate of delinquency, a complete test of the theory requires inclusion of commitment indicators.

Similarly, it is potentially problematic that Matsueda operationalized attachment to parents solely with Hirschi's "virtual supervision" variables (see Appendix). To test the relationship between attachment to parents and delinquency, Hirschi utilized measures of virtual supervision, intimacy of communication between children and parents, and the children's affectional identification with the parents. He found that these measures were negatively related to delinquency, as expected. Further, Hirschi found attachment to school, measured with variables such as how much the

2. These items do not measure direct supervision, such as how much time the child spends with the parents, but rather whether the parents know where and with whom the child is when s/he is away from the parents' direct supervision.

respondent liked school, to be a good predictor of delinquency. Thus, Matsueda's failure to include these indicators reduces the power of his test of control theory.

Another problem with Matsueda's analyses is his conceptualization and placement of Hirschi's measures of belief and neutralization. Matsueda states that "the items were designed to measure attitudes toward the law and Sykes and Matza's (1957) techniques of neutralization, both direct operationalizations of Sutherland's delinquent definitions . . ." (1982: 495). We maintain that the appropriateness of these items as measures of definitions is not as clear-cut as Matsueda indicates (see Costello, 1997, 1998; Matsueda, 1997, for a recent exchange on this issue). Nevertheless, we assume for the purposes of our analyses that these items serve as adequate indicators of either belief or definitions.

Under this assumption, the issue becomes the placement of the belief/definitions items in the causal model. Matsueda's specification of all three theoretical models includes definitions immediately prior to delinquency, with the crucial difference between the models lying solely in whether variables antecedent to definitions have a direct effect on delinquency in addition to an indirect effect through definitions. This specification of control theory is questionable. As noted earlier, Hirschi argued that belief is dependent to some extent on attachment to parents because it is unlikely that one would come to believe in the norms or laws of a social group into which he or she is not integrated. However, Hirschi argued that each element of the social bond should have a direct effect on delinquency, and there is no clear reason to hypothesize an indirect effect of attachment through belief.

Similarly, because Hirschi viewed attachment to friends as one dimension of the social bond, it should be related to belief, but there is no reason to expect that it should affect delinquency indirectly through belief. With regard to the relationship between friends' delinquency and belief, the causal ordering specified by Matsueda should be reversed in a test of control theory—that is, level of belief should influence choice of friends, just as the other elements of the social bond should. This causal ordering would better reflect a selection effect, which control theorists argue can help explain the relationship between friends' and individuals' delinquency (Gottfredson and Hirschi, 1990; Hirschi, 1969).

The placement of the two peer constructs in Matsueda's models is also debatable (see Matsueda, 1982: Figures 1 and 2). He specifies friends' delinquency as causally prior to attachment to friends, but we maintain this causal order should be reversed in a test of control theory. Hirschi argued that those with delinquent friends should be less attached to their friends, which could lead one to conclude that Matsueda's specification is appropriate. However, Hirschi argued:

The lack of attachment to others and the absence of commitment to individualistic success values lead to association with delinquents (that is, with others similarly lacking in attachment and commitment). Since delinquents are less strongly attached to conventional adults than nondelinquents, they are less likely to be attached to each other (1969:140-141).

This suggests that attachment to friends should be specified as causally prior to friends' delinquency in a test of control theory.

Matsueda's inclusion of the four background variables is also not entirely consistent with control theory. Hirschi devoted relatively little attention to these variables, and held that the effect of variables such as parents' social class and the structure of the family should be minimal. The results of his analyses support this prediction (1969:107-108, 242), and Hirschi concludes that "none of the traditional 'background variables' not controlled by exclusion was sufficiently strongly related to delinquency to require that it be controlled in examining the relations between other variables and delinquency" (1969:236). Although it is not totally inconsistent with control theory to include background variables in a causal model, it is unnecessary, especially because these variables are not important predictors of delinquency in the Richmond data.<sup>3</sup>

However, it is problematic that Matsueda posits both direct and indirect effects of the background variables on delinquency in his test of control theory. Matsueda states that the first three models he specified are "derived from control theory and multiple factor theory" (1982:496; see also Table 1, p. 497), but he does not test his differential association model against a model derived solely from social control theory. As the model is specified, it is more appropriately viewed as a test of multiple factor theory than a test of control theory because the background variables are specified as directly affecting delinquency.

In sum, there are several problems with Matsueda's specification of control theory that we address with our analyses. First, Matsueda did not include measures of commitment or attachment to school, and he utilized only one of Hirschi's measures of attachment to parents. Second, Matsueda's placement of the constructs belief and attachment to friends in the model are not consistent with control theory. Third, Matsueda specified direct effects of four background variables on delinquency without justifying this specification from a control theory perspective. These issues are the focus of our analysis.

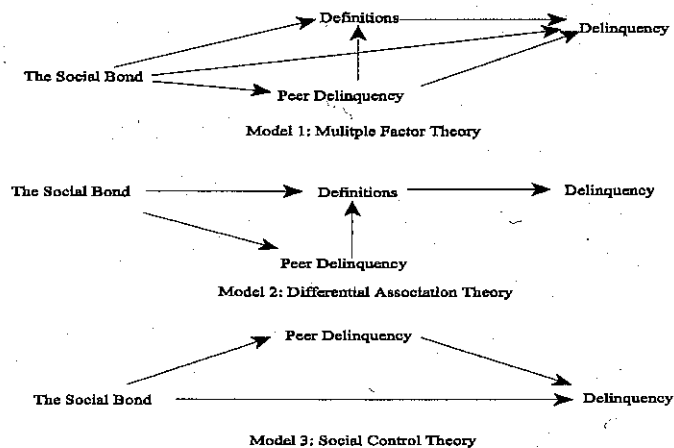
3. Although Matsueda found that the respondent's perception of trouble in the neighborhood had significant effects on some variables, our preliminary analyses showed that including this variable did not substantively change the results of our analysis.

## DATA AND METHODS

The Richmond Youth Project is a self-report survey of 4,075 high school students in the Richmond, California area, conducted in 1965. To increase comparability between Matsueda's results and our own, we limit our sample to nonblack males. After listwise deletion of missing data, the final sample consisted of 1,090 nonblack males.<sup>4</sup> A complete description of the data can be found in Hirschi's (1969) study.

In our analysis, we specify and test models analogous to Matsueda's Model 3, derived from social control and multiple factor theories (our Model 1), and his Model 4, derived from differential association theory (our Model 2). Our alternative model, Model 3, provides what we consider to be the best test of social control theory as distinct from multiple factor theory. A simplified causal diagram of each model is presented in Figure 1.

Figure 1. Simplified Structural Models



Because Hirschi conceptualized the elements of the social bond as separate but interrelated, we specify a second-order social bond construct in each model. This assumes that the social bond is a latent construct accounting for the covariance among the specified dimensions of the bond,

4. We used listwise deletion of missing cases, except when specified otherwise. Matsueda's sample size was 1,140. Our smaller sample size is because of our larger number of variables.

each of which is also conceptualized as a latent construct with multiple observed indicators (see Figure 2). Although Hirschi held that each element of the social bond could affect delinquency independently, we believe our conceptualization to be consistent with the theory. In short, the social bond is the abstract concept linking the more concrete elements of the social bond. Although each element of the bond may have an independent effect on delinquency, a model that specifies their joint effects on delinquency provides a better test of the theory as a *theory* rather than as a collection of variables related to delinquency. Put differently, if the second-order model does not adequately fit the data, we would question Hirschi's conceptualization of the elements of the social bond as logically interrelated.

Because the variables in each model are identical, the major difference between our tests of social control theory and differential association theory is in model specification. In our test of social control theory, we also assume that Matsueda's definitions measures are measures of Hirschi's concept belief. Thus, in Model 3, we include these indicators as one element of the social bond, rather than endogenous to the other social control measures. In addition, we include attachment to friends as a component of the social bond construct, which is consistent with Hirschi's conceptualization.

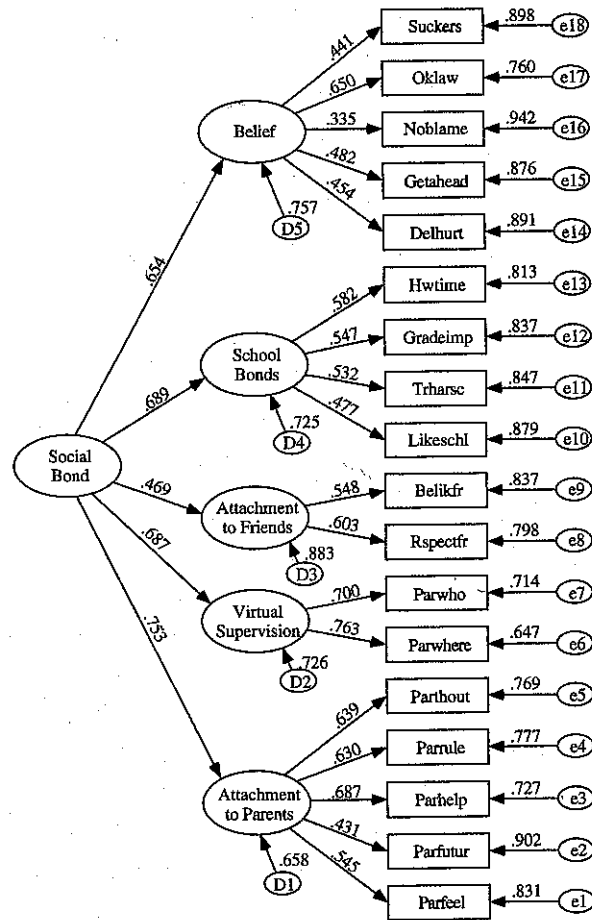
LATENT FACTORS AND OBSERVED INDICATORS<sup>5</sup>

We analyzed 18 items from the Richmond questionnaire that Hirschi used to measure attachment to parents; nine questions were asked separately about the respondents' mother and father. Exploratory factor analysis on these items uncovered three factors, two of which corresponded with Hirschi's concepts of intimacy of communication and virtual supervision. The third factor was composed of four items asking whether the respondent wanted to be the kind of person his mother and father are, and whether the respondent thought his parents would stick by him if he got into trouble. This third factor did not correlate with the other two factors, and it was thus omitted from subsequent analysis. Four of the remaining 14 items, indicating virtual supervision, were included in Matsueda's models as a measure of attachment to parents. The other 10 items were not included in Matsueda's models.

There were substantial numbers of missing cases on the items pertaining to fathers. Following Matsueda, we replaced missing values on the father items with scores from the mother items for the virtual supervision and intimacy of communication measures of attachment to parents. We then

5. Simple statistics for all variables and correlation matrices for the three structural models are available on request.

Figure 2. Social Bond Measurement Model



parceled these items, combining the corresponding mother/father items. This left five parceled indicators representing intimacy of communication (Chronbach's  $\alpha = .72$ ), and two parceled indicators of virtual supervision. A confirmatory factor analysis on the five intimacy of communication

items produced acceptable fit indices (Satorra-Bentler scaled  $\chi^2 = 34.721$ , 5 *df*,  $p < .001$ ; CFI = .966; Robust CFI = .965).

Two questions asking whether respondents wanted to be the kind of person their friends are and if they respected their friends' opinions were used as indicators of attachment to friends. Factor analysis showed that both items loaded on one factor, and thus they were retained for subsequent analysis. These items are the same as those Matsueda included as measures of attachment to friends.

As noted previously, the only measure of involvement in conventional activities in the Richmond data that Hirschi found to be significantly related to delinquency was time spent on homework (1969). On these grounds, and based on previous conceptualizations of time spent on homework in the literature (Hindelang, 1973; Kempf, 1993), we treated time spent on homework as an indicator of commitment rather than involvement. Thus, this item as well as a number of other items Hirschi used to measure commitment and attachment to school were factor analyzed. Four indicators had acceptable factor loadings on one factor, and these were retained as measures of school bonds. These items included time spent on homework, liking school, trying hard in school, and the perceived importance of grades (Chronbach's  $\alpha = .58$ ). Confirmatory factor analysis on these school items showed a good fit to the data (Satorra-Bentler scaled  $\chi^2 = 5.079$ , 2 *df*,  $p < .079$ ; CFI = .990; Robust CFI = .992).

Six of the seven items initially chosen to measure belief and definitions favorable to law violation are the same as those used by Matsueda in his analysis of these data. We did not use the indicator TROUBLE, which measured agreement with the statement "I can't seem to stay out of trouble no matter how hard I try." Although Hirschi and Matsueda analyzed this item, we felt it was lacking in face validity as an indicator of definitions or belief. We did utilize the item NOBLAME, which Hirschi analyzed but Matsueda did not.

Two factors emerged from a factor analysis of the selected items. Five items (DELHURT, SUCKERS, NOBLAME, OKLAW, GETAHEAD) loaded on the first factor. Two items, measuring respect for the Richmond police and whether respondents felt police try to give youths an "even break" (RESPECTPO and EVNBREAK in Matsueda's analysis), loaded on the second factor. We conducted a confirmatory factor analysis on these items, and the goodness-of-fit statistics showed the measurement model of seven items did not fit the data (Satorra-Bentler scaled  $\chi^2 = 98.309$ , 14 *df*,  $p < .001$ ; CFI = .857; Robust CFI = .856). The LaGrange Multiplier (LM) test statistics showed freeing the error terms between RESPECTPO and EVNBREAK would have substantially improved the goodness of fit because these were moderately correlated. Both of these items relate to the respondent's perceptions of law enforcement, and the

error correlation may represent more than measurement error. We opted to drop these two items and rerun the model. Dropping these two items substantially improved the goodness of fit (Satorra-Bentler scaled  $\chi^2 = 6.834$ , 5 *df*,  $p < .233$ ; CFI = .991; Robust CFI = .994). Considering the outcome of the CFA, we decided to retain only the five items from the latter measurement model.

Because we use these items as indicators of both definitions and belief, they are coded differently depending on which construct is included in each model. When these items indicate belief, a high score indicates a greater level of belief in the law. They are reverse coded when they are used to indicate definitions, so that a high score reflects definitions more favorable to law violation.

Friends' delinquency is measured with a single item, the number of the respondent's friends who had been picked up by police. This is the same measure Matsueda used in his analysis.

Delinquency was operationalized with the six items Matsueda used. Following Matsueda, we dichotomized responses to the individual items, with those having engaged in the activity in the past year coded 1 and all others coded 0.<sup>6</sup> Although this measure of delinquency is essentially a measure of the range of delinquent behaviors engaged in rather than a measure of incidence, analysis of the respondents' degree of versatility in offending suggests that this delinquency measure is adequate for our purposes.<sup>7</sup>

6. In an earlier version of this manuscript, we used a lifetime prevalence measure of delinquency so those reporting ever committing the act were coded as delinquent, and all others coded nondelinquent on that item. At the suggestion of an anonymous reviewer, we reestimated our models using the same coding as Matsueda. There were some differences in the results of these two sets of analyses, but none affected our substantive conclusions (all three models fit better using the lifetime measure). At the suggestion of the editor, we also reestimated our models using a measure of delinquency that incorporated the incidence of each type of offense, albeit to a limited degree. This variable was coded 0 if the respondent had never engaged in the behavior, 1 if the respondent committed the offense either in the past year or before the past year, and 2 if the respondent committed the offense both during the past year and before the past year. Again, although there were some differences in our results using this coding scheme, none was substantively important. Results from these analyses are available on request.

7. In a review of an earlier version of this manuscript, the editor noted that our coding scheme would result in a "specialist" in one form of serious crime being classified as less delinquent than a more versatile, but less serious, offender. Our analysis of this issue showed 32.4% of all of those committing any delinquent offenses in the past year had committed at least one serious offense (theft over \$50, auto theft, or battery), but no nonserious offenses. Further analysis using the incidence coding described in Note 6 showed that only 17 respondents in the sample had committed the same serious offense twice and had never committed any of the three less serious offenses. This represents 3.5% of those in the sample who had ever committed a serious offense.

## MODEL ESTIMATION

According to Jöreskog, "it is a widespread misuse of structural equation modeling to include correlated error terms in the model for the sole purpose of obtaining a better fit to the data. Every correlation between error terms must be justified and interpreted substantively" (1993:297). Thus, we attempt to fit the models without specifying covariance among error terms. However, we do examine the standardized residual correlation matrix and the LaGrange test statistics to determine which error terms are correlated, the magnitude of any correlations, and the extent to which the fit of the models would be improved if correlated errors were specified.

We assess model fit with the CFI and the Robust CFI in addition to the Satorra-Bentler scaled  $\chi^2$  in relation to the degrees of freedom. We set the cutoff point for specifying an acceptable model at .90 for the CFI and Robust CFI (Byrne, 1994).

All of our models were estimated with the EQS program, using the maximum likelihood robust method of estimation. As is typical in delinquency research, our measures of delinquency were somewhat skewed. The robust method of estimation compensates for data non-normality using a scaling method (Byrne, 1995).

## RESULTS

### SPECIFYING THE SOCIAL BOND AS A MULTIDIMENSIONAL SECOND-ORDER CONSTRUCT

In order to specify the social bond as a second-order latent construct, we first factor analyzed all of the items conceptualized as indicators of dimensions of the social bond. Five dimensions were extracted. We then specified a model including the latent factor of the social bond, conceptualized as accounting for the covariance among the latent dimensions of the bond (see Figure 2).<sup>8</sup> Using our previously specified measures of fit, this measurement model showed a reasonably good fit to the data (see Table 1 for goodness-of-fit statistics for all models).<sup>9</sup>

8. The coefficients in each of the full models including the social bond and its indicators vary slightly because of differences in model specification.

9. We also estimated a measurement model omitting the indicators of belief, because this more limited model is used in our tests of multiple factor and differential association theories. This model showed a similar fit to the data, with the exception of the  $\chi^2/df$ , which was slightly higher than in the model including beliefs.

Table 1. Goodness-of-fit Statistics for Estimated Structural Models ( $N = 1090$ )

	CFI	Robust CFI	Satorra-Bentler		
			Scaled $\chi^2$	df	$\chi^2/df$
Social Bond Construct	.948	.95	266.080	130	2.05
Model 1	.917	.916	548.907	266	2.06
Model 2	.905	.904	593.274	268	2.21
Model 3	.915	.914	557.909	268	2.08

Post-hoc model modification could have improved the fit of the social bond construct, but our interests lie more in confirming the model than in exploratory procedures. We reached a conclusion similar to previous studies (e.g., Wiatrowski and Anderson, 1987); the four dimensions of the social bond Hirschi specified do not factor out cleanly. Instead, with the exception of belief, these dimensions appear to reflect the social arenas of family, friends, and school rather than distinct dimensions of attachment, involvement, and commitment. This pattern was exhibited in separate factors for attachment to parents and attachment to friends, and in a single factor representing attachment to school, involvement in homework, and commitment to educational pursuits.

Attachment to parents, indicated by Hirschi's intimacy of communication items, had the highest loading on the social bond construct. This finding is significant in light of Matsueda's omission of these indicators in his analyses. The social bond also explained a considerable amount of variation in belief, which suggests that the items Matsueda used to indicate definitions are better interpreted as measures of belief. If these items were true measures of definitions rather than belief, they would most likely not load so heavily on the second-order social bond construct.

Of course, our findings cannot be taken as definitive evidence that these are true measures of belief. If these were measures of definitions, and if definitions were a direct result of the social bond, they might still load on the social bond construct. However, this finding would be difficult to explain from a differential association perspective. Sutherland argued that delinquent peers were the major source of definitions favorable to law violation, and he and other differential association theorists assume that the family and school generally provide conventional definitions of behavior.<sup>10</sup> In addition, Matsueda (1982) found that those with higher levels of

10. Although Sutherland argued that definitions can be learned from conforming individuals, and although some parents may be criminal, most of Sutherland's statements about the influence of the family support this claim. Further, tests of differential

attachment to friends scored lower on definitions favorable to law violation. Thus, if definitions were so strongly (and negatively) related to attachment to parents, school bonds, and attachment to friends that they loaded on the same construct, a major reconceptualization of differential association theory would be necessary. If definitions favorable to law violation are a direct result of a low level of social integration, it is difficult to argue that they are *learned* in communication with others who hold those definitions.

## SPECIFICATION OF THE FULL STRUCTURAL EQUATION MODELS

### MODEL 1

Model 1 (Figure 1) is analogous to Matsueda's multiple factor model. This model fit the data according to the criteria we specified (Table 1). The LM test statistics showed that allowing correlated error terms among THEFT2, THEFT250, and THEFT50 would have improved the model fit.<sup>11</sup>

The effects of all constructs in Model 1 (as in the other models estimated) were statistically significant and in the expected direction (see Table 2). The social bond was related to friends' delinquency (-.434),<sup>12</sup> lending support to the control theory argument that self-selection processes can help explain the correlation between the individual's and friends' delinquency. The social bond also had a strong effect on definitions (-.635). Given our prior finding on the relationship between "belief" and the other dimensions of the social bond, the strength of this effect is not surprising. Friends' delinquency was positively related to definitions as differential association theory predicts, although its effect was relatively weak (.120). This finding again leads us to question the differential association theory assumption that delinquent definitions are learned in the context of interaction with delinquent others, and suggests instead that those who are not well integrated into social groups are less likely to believe in the norms of conventional society.

The final equation in this model approximates Matsueda's test of social control/multiple factor theory against differential association theory, but includes relevant indicators of the social bond omitted by Matsueda's test. Our findings indicate that the social bond retains its effect on delinquency controlling for both definitions and friends' delinquency. Although

association theory that include family-related variables typically hypothesize, as Matsueda (1982) does, that the family influences youths' behavior in a conventional direction.

11. This was also the case in Models 2 and 3.

12. We report the standardized results.



Table 2. Standardized Coefficients for Structural Parameters in Models 1, 2, and 3 (N = 1090)

Dependent Variables	Independent Variables									Explained Variance (R <sup>2</sup> )		
	Social Bond			Friends' Delinquency			Definitions			Disturbance		
	1	2	3	1	2	3	1	2	3	1	2	3
Attachment to Parents	.681	.686	.644				.733	.728	.765	.462	.470	.415
Virtual Supervision	.636	.641	.609				.771	.767	.793	.406	.412	.372
Attachment to Friends	.484	.486	.482				.875	.874	.876	.234	.236	.233
School Bonds	.780	.773	.786				.626	.635	.618	.608	.597	.618
Belief			.740						.672		.548	.548
Friends' Delinquency	-.434	-.432	-.471				.901	.902	.882	.188	.186	.222
Definitions	-.635	-.691		.120	.170		.719	.627		.483	.606	
Delinquency	-.393		-.558	.178		.154	.771	.772	.764	.396	.404	.416

NOTE: All coefficients are significant at  $p < .001$ , except for .120, which is significant at  $p < .01$ .

friends' delinquency and definitions had significant effects on delinquency, the social bond emerged as the strongest predictor in this equation (-.393), independent of mediated effects. The total effect of this latent construct was -.590, accounting for the majority of the variance in delinquency (see Table 3 for effect decomposition for all models). The model as a whole accounted for 39.6% of the variance in delinquency. Importantly, both the social bond and friends' delinquency showed nontrivial effects on delinquency independent of effects mediated by definitions.

These results contrast markedly with Matsueda's findings in his analogous model (see Matsueda, 1982; Table 3). With direct paths specified from the social control variables to delinquency and indirect paths specified from these variables through definitions to delinquency, the direct effect of parental supervision was reduced to .053, and the direct effect of attachment to friends was .094. Neither of these effects was statistically significant. Similarly, Matsueda found a statistically nonsignificant direct effect of friends' delinquency on delinquency. These findings were the basis for Matsueda's conclusion that the effects of these variables are entirely mediated by definitions. Our findings, in contrast, show that definitions mediate only a small portion of the effects of the social bond and friends' delinquency, and that definitions have a weaker effect on delinquency than either of the other two constructs.

#### MODEL 2

Model 2 is analogous to Matsueda's differential association model. In this model, all antecedent variables are specified to affect delinquency only indirectly, through their effect on definitions favorable to law violation. This model marginally met the criteria specified for an acceptable fit to the observed data (see Table 1).

The effect of the social bond on friends' delinquency was roughly the same as in Model 1. However, the effect of the social bond on definitions was stronger than in Model 1 (-.691). The effect of friends' delinquency on definitions was again significant, but smaller than the effect of the social bond (.170). Again, these findings cast doubt on the differential association prediction that friends' delinquency is the most important determinant of definitions favorable to law violation, as the effect of the social bond on definitions is substantially stronger than the effect of friends' delinquency on definitions.

For the final equation predicting delinquency, only one path was specified from definitions favorable to law violation to delinquency. As would be expected, with this specification, the effect of definitions is substantially stronger than in Model 1 (.636), and this effect is stronger than the total

Table 3. Decomposition of Structural Effects in Standardized Form

Predetermined Variables	Endogenous Constructs								
	Friends' Delinquency			Definitions			Delinquency		
	Indirect	Direct	Total	Indirect	Direct	Total	Indirect	Direct	Total
<b>Model 1</b>									
Social Bond		-.434	-.434	-.051	-.635	-.686	-.197	-.393	-.590
Friends' Delinquency					.120	.120	.021	.178	.199
Definitions								.175	.175
R <sup>2</sup>		.188			.483			.396	
<b>Model 2</b>									
Social Bond		-.432	-.432	-.073	-.691	-.764	-.486		-.486
Friends' Delinquency					.170	.170	.108		.108
Definitions								.636	.636
R <sup>2</sup>		.186			.607			.404	
<b>Model 3</b>									
Social Bond		-.471	-.471				-.073	-.558	-.631
Friends' Delinquency								.154	.154
R <sup>2</sup>		.222						.416	

effect of the social bond on delinquency (-.486). This model accounts for 40.4% of the variance in delinquency.

#### MODEL 3

In our alternative social control model, definitions favorable to law violation were conceptualized as belief and included as a dimension of the social bond construct. This model showed a similar fit to the data as Model 1.

There was a slightly stronger effect of the social bond on friends' delinquency, compared with Models 1 and 2 (-.471), which would be expected

remains when friends' delinquency is controlled, and the social bond has a substantially stronger effect on delinquency than does friends' delinquency. The model accounted for 41.6% of the variance in delinquent behavior.

#### MODEL COMPARISON

The multiple factor (Model 1) and social control (Model 3) models fit the data slightly better than Model 2, the differential association model.<sup>13</sup> However, because the difference in model fit was minimal, we must turn to other means of comparing the models.

In both models allowing a direct effect of the social bond on delinquency, the social bond was the strongest predictor of delinquency. Its effect held, controlling for both definitions and peer delinquency (Model 1) and it held in Model 3, which controlled for peer delinquency while conceptualizing the relevant indicators as belief rather than definitions. In addition, the social bond had strong effects on both friends' delinquency and definitions, and its effect on definitions was stronger than that of friends' delinquency in both the multiple factor and differential association models. Further, the results of Model 1 indicate that when definitions and friends' delinquency are allowed to affect delinquency independently, friends' delinquency has about the same direct effect on delinquency as definitions.

Thus, although Model 2 fit the data adequately, our results do not support the claim that the effects of the social control variables and friends' delinquency are entirely mediated by definitions. In fact, the results of Model 1 cast doubt on the specification of the differential association model. Although theoretical justification exists for Matsueda's specification of differential association theory with definitions mediating all of the effects of the social bond, this specification is not justified empirically with these data. The fact that the second-order social bond model fit the data well, in combination with the results of Model 3, cast further doubt on the specification of definitions as mediating the effect of the social bond.

13. A reviewer of a previous version of this manuscript expressed some reservations about our specification of the social bond as a second-order latent construct. We conducted additional analyses to determine if our conclusions would differ when the social control constructs were included separately in each model. The robust CFIs for each model were slightly higher with this specification, which would be expected given the fewer degrees of freedom in these models. The relative fit of each model did not differ with this specification, and thus our substantive conclusions remain unchanged.

## DISCUSSION AND CONCLUSIONS

### BELIEF, DEFINITIONS, AND THE SOCIAL BOND

The second-order social bond construct fit the data very well with the inclusion of the "belief" items, which supports our conceptualization of them as indicators of belief. Although we cannot conclude definitively these items are measures of belief, their strong relationship with the other social bond indicators is very difficult to interpret from a differential association perspective. In combination with the finding that the social bond is a stronger determinant of definitions than is the delinquency of friends, this finding implies that definitions favorable to law violation are caused primarily by weak social bonds, a conclusion that conflicts with Sutherland's claim that definitions are learned in interaction with others. In short, these results support the social control theory claim that tolerant attitudes toward law violation are more likely reflective of a lack of social integration than the result of learning definitions through integration into deviant groups.

The general implications of the results of the second order factor model are also noteworthy. Our findings are somewhat similar to those of previous research analyzing the structure of the social bond. Wiatrowski and Anderson (1987) uncovered an eight-factor model of the social bond and concluded that attachment to parents, attachment to school, and belief were significant predictors of delinquency. They also concluded that peers do not serve as significant socializing influences.

Our work builds on that of Wiatrowski and Anderson (1987) through the measurement of the social bond as a second-order construct, and we believe this approach merits further attention. Although a wealth of research on social control theory exists, differences in model specification between studies make the interpretation of this body of literature difficult. Specifying the social bond as a second-order construct is fully consistent with Hirschi's original explication of the theory, and can potentially resolve some of the disagreement in the literature on the correct interrelationships between the elements of the social bond. Further, because most studies of delinquency are conducted with respondents old enough to have already established attachments, commitments, involvements, and beliefs, it is unlikely that even longitudinal studies can untangle the true temporal priority of each dimension of the bond. Thus, it makes sense to conceptualize these dimensions as contemporaneous rather than try to specify one element as a cause of another.

### THE MEDIATING EFFECT OF DEFINITIONS

Our results indicate that the effect of the social bond on delinquency is not entirely mediated by definitions, as Matsueda concluded. Our Models

1 and 3, both of which allowed a direct effect from the social bond to delinquency, fit the data adequately. Further, in Model 1, we found that the direct effect of the social bond is greater than the mediated effect, casting doubt on the empirical justification for specifying definitions as mediating all of the effect of the social bond. We attribute the difference between our results and Matsueda's largely to our more complete measurement of the social bond.

Our results also show a significant effect of friends' delinquency on the individual's delinquency independent of definitions. Contrary to differential association theory's prediction that delinquent friends influence delinquency only indirectly through their influence on the individual's definitions of delinquency, we found that the direct effect of friends' delinquency was greater than the indirect effect. Others (Jensen, 1972; Warr and Stafford, 1991) have reached similar conclusions. Matsueda concluded that his results disconfirmed Jensen's (1972) findings, and thus differential association theory was supported over alternative explanations for the relationship between friends' delinquency and delinquency. Our results, however, suggest that more attention should be paid to these alternatives. For example, delinquent peers may simply provide the individual with opportunities to engage in delinquent behavior, and some evidence suggests that unstructured socializing with friends is in itself conducive to deviance (Osgood et al., 1996). These and other explanations of a direct influence of peer delinquency on delinquency are more consistent with our results.

### THE STRENGTH OF THE SOCIAL BOND

We also conclude from our analyses that the social bond is a more important predictor of delinquency than are definitions or friends' delinquency. In Model 1, which included the definitions construct as endogenous to the other measures of the social bond, the social bond had a greater direct effect than either of the other variables. The social bond continues to affect delinquency controlling for the effect of friends' delinquency, and when belief is reconceptualized as definitions, the effect of the social bond is still stronger than that of definitions. This finding is not surprising if these indicators are measures of belief rather than definitions. We would expect that belief, as one dimension of the social bond, would be less strongly related to delinquency than would the combined effects of the other four dimensions.

If, on the other hand, we do not accept these indicators as true measures of belief, one might argue that the relative strength of the social bond is merely a result of the greater number of indicators of that construct compared with the number of indicators of definitions. However, this measurement strategy is consistent with both social control and differential

association theories. Differential association theory places most explanatory power on a single construct, definitions favorable to law violation. Social control theory, in contrast, specifies a more complex explanatory construct composed of a number of dimensions. Thus, the greater number of indicators of social control processes in our analysis may lead to the greater explanatory power of the social bond, but this is not "artificial" inflation of its power. Rather, the number of indicators is a direct result of the complexity of the theory.

Taken together, our results provide more support for social control than for differential association theory. The strength of the individual's bond to parents and peers, in combination with the individual's commitment to conventional goals, had the strongest influence on delinquency in our test of multiple factor theory. Further, all of our analyses showed that the social bond has an important influence on whether youths associate with delinquent friends, supporting the notion that self selection can explain some of the relationship between friends' delinquency and delinquency. Finally, although definitions mediate some of the effect of the social bond and friends' delinquency, both constructs retain significant direct effects on delinquency when these paths are specified in a causal model. This finding is in direct contrast to Matsueda's conclusion that definitions mediate all but a trivial effect of friends' delinquency and social control measures.

#### LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Although we believe our results to be very supportive of social control theory, there are limitations to our analysis. First, like Matsueda, our analysis is based on cross-sectional data, which limits our ability to determine causal order. Structural equation modeling allows assessing whether a theoretically derived model fits observed data, but it cannot rule out the possibility that other specifications would also fit the data (Mueller, 1997). This is evident in the acceptable fit of all three of our models. However, we are able to conclude that the specification derived from control theory fit the observed data at least as well as those derived from differential association and multiple factor theories. Because Matsueda reached a different conclusion, our research contributes to our understanding of these theories. Moreover, we believe that Matsueda's specification of control theory did not allow a test of some of the theory's propositions, such as whether belief influences the individual's choice of delinquent versus non-delinquent friends. Thus, we provide a better specification of control theory, and despite the limitations of cross-sectional data, we conclude that the control theory specification of this relationship is at least as plausible as that of differential association theory.

Second, our tests of differential association and multiple factor theories

are weakened by the questionable nature of the indicators of definitions included in these models. As Matsueda noted, "if in fact these indicators do not tap the theoretical domain specified by Sutherland, any use of them for examining differential association theory is unwarranted" (1982:501). Thus, if we accept the finding that these indicators are true measures of belief as distinct from definitions, we cannot accept our Model 2 as a true test of differential association theory.

This leads us to perhaps our most important conclusion. What is needed to help resolve the continued debate between control and cultural deviance theories is additional theoretical development, and careful model specification that closely corresponds with existing theoretical statements. For example, the variety of existing specifications of social control theory in the literature complicate meaningful accumulation of the research findings in this area. Similarly, until some agreement is reached with regard to the meaning of Sutherland's concept definitions favorable to law violation as distinct from a low level of belief in the moral validity of the law, empirical tests of these theories will be inconclusive. In short, inconsistencies between theoretical statements, operational definitions, and model specification must be addressed if we are to advance the existing state of knowledge on crime causation.

#### REFERENCES

- Agnew, Robert  
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* 30:245-266.
- 1995 Testing the leading crime theories: An alternative strategy focusing on motivational processes. *Journal of Research in Crime and Delinquency* 32:363-398.
- Byrne, Barbara M.  
1994 Structural-Equations Modeling with EQS and EQS/Windows: Basic Concepts, Applications, and Programming. Thousand Oaks, Calif.: Sage.
- 1995 One application of structural equation modeling from two perspectives: Exploring the EQS and LISREL strategies. In Rick H. Hoyle (ed.), *Structural Equation Modeling: Concepts, Issues and Applications*. Thousand Oaks, Calif.: Sage.
- Cernkovich, Stephen A. and Peggy C. Giordano  
1987 Family relationships and delinquency. *Criminology* 25:295-321.
- Costello, Barbara J.  
1997 On the logical adequacy of cultural deviance theories. *Theoretical Criminology* 1:403-428.
- 1998 The remarkable persistence of a flawed theory: A rejoinder to Matsueda. *Theoretical Criminology* 2:85-92.
- Gottfredson, Michael R. and Travis Hirschi  
1990 *A General Theory of Crime*. Stanford, Calif.: Stanford University Press.

- Gibbs, Jack P.  
1987 The state of criminological theory. *Criminology* 25:821-840.
- Greenberg, David F.  
1999 The weak strength of social control theory. *Crime and Delinquency* 45:66-81.
- Hagan, John  
1992 The poverty of a classless criminology—The American Society of Criminology 1991 presidential address. *Criminology* 30:1-19.
- Heimer, Karen  
1997 Socioeconomic status, subcultural definitions, and violent delinquency. *Social Forces* 75:799-833.
- Hindelang, Michael J.  
1973 Causes of delinquency: A partial replication and extension. *Social Problems* 20:471-487.
- Hirschi, Travis  
1969 *Causes of Delinquency*. Berkeley, Calif.: University of California Press.
- Institute for Scientific Information  
1982-1998 *Social Science Citation Index*. Philadelphia.
- Jensen, Gary F.  
1972 Parents, peers, and delinquent action: A test of the differential association perspective. *American Journal of Sociology* 78:562-575.
- Johanson, Richard E., Anastasios C. Marcos, and Stephen J. Bahr  
1987 The role of peers in the complex etiology of adolescent drug use. *Criminology* 25:323-339.
- Jöreskog, Karl G.  
1993 Testing structural equation models. In Kenneth A. Bollen and J. Scott Long (eds.), *Testing Structural Equation Models*. Newbury Park, Calif.: Sage.
- Junger, Marianne and Ineke Haen Marshall  
1997 The interethnic generalizability of social control theory: An empirical test. *Journal of Research in Crime and Delinquency* 34:79-112.
- Kempf, Kimberly L.  
1993 The empirical status of Hirschi's control theory. In Freda Adler and William S. Laufer (eds.), *Advances in Criminological Theory*. Vol. 4. New Directions in Criminological Theory. New Brunswick, N.J.: Transaction.
- Krohn, Marvin D., Lonn Lanza-Kaduce, and Ronald L. Akers  
1984 Community context and theories of deviant behavior: An examination of social learning and social bonding theories. *The Sociological Quarterly* 25:353-371.
- Krohn, Marvin D. and James L. Massey  
1980 Social control and delinquent behavior: An examination of the elements of the social bond. *The Sociological Quarterly* 21:529-543.
- Marcos, Anastasios C., Stephen J. Bahr, and Richard E. Johnson  
1986 Test of a bonding/association theory of adolescent drug use. *Social Forces* 65:135-161.

- Matsueda, Ross L.  
1982 Testing control theory and differential association: A causal modeling approach. *American Sociological Review* 47:489-504.  
1988 The current state of differential association theory. *Crime and Delinquency* 34:277-306.  
1989 The dynamics of moral beliefs and minor deviance. *Social Forces* 68:428-457.  
1997 "Cultural Deviance theory:" The remarkable persistence of a flawed term. *Theoretical Criminology* 1:429-452.
- McCarthy, Bill  
1996 The attitudes and actions of others: Tutelage and Sutherland's theory of differential association. *British Journal of Criminology* 36:135-147.
- Menard, Scott and David Huizinga  
1994 Changes in conventional attitudes and delinquent behavior in adolescence. *Youth and Society* 26:23-53.
- Minor, W. William  
1984 Neutralization as a hardening process: Considerations in the modeling of change. *Social Forces* 62:995-1019.
- Mueller, Ralph O.  
1997 Structural equation modeling: Back to basics. *Structural Equation Modeling* 4:353-369.
- Orcutt, James D.  
1987 Differential association and marijuana use: A closer look at Sutherland (with a little help from Becker). *Criminology* 25:341-358.
- Osgood, D. Wayne, Janet K. Wilson, Patrick M. O'Malley, Jerald G. Bachman, and Lloyd D. Johnston  
1996 Routine activities and individual deviant behavior. *American Sociological Review* 61:635-655.
- Rankin, Joseph H. and Roger Kern  
1994 Parental attachments and delinquency. *Criminology* 32:495-515.
- Rankin, Joseph H. and L. Edward Wells  
1990 The effect of parental attachments and direct controls on delinquency. *Journal of Research in Crime and Delinquency* 27:140-165.
- Sampson, Robert J. and John H. Laub  
1993 *Crime in the Making: Pathways and Turning Points Through Life*. Cambridge, Mass.: Harvard University Press.
- Smith, Douglas A. and Raymond Paternoster  
1987 The gender gap in theories of deviance: Issues and evidence. *Journal of Research in Crime and Delinquency* 24:140-172.
- Sutherland, Edwin H.  
1947 *Principles of Criminology*. 4th ed. Philadelphia: Lippincott.
- Sutherland, Edwin H., Donald R. Cressey, and David F. Luckenbill  
1992 *Principles of Criminology*. 11th ed. Dix Hills, N.Y.: General Hall.
- Sykes, Gresham M. and David Matza  
1957 Techniques of neutralization: A theory of delinquency. *American Sociological Review* 22:664-670.

- Thornberry, Terence P., Alan J. Lizotte, Marvin D. Krohn, Margaret Farnworth, and Sung Joon Jang  
1994 Delinquent peers, beliefs, and delinquent behavior: A longitudinal test of interactional theory. *Criminology* 32:47-83.
- Warr, Mark and Mark Stafford  
1991 The Influence of delinquent peers: What they think or what they do? *Criminology* 29:851-865.
- Wells, L. Edward and Joseph H. Rankin  
1986 The broken homes model of delinquency: Analytic issues. *Journal of Research in Crime and Delinquency* 23:68-93.
- Wiatrowski, Michael and Kristine L. Anderson  
1987 The dimensionality of the social bond. *Journal of Quantitative Criminology* 3:65-81.
- Wiatrowski, Michael D., David B. Griswold, and Mary K. Roberts  
1981 Social control theory and delinquency. *American Sociological Review* 46:525-541.

Barbara J. Costello is Assistant Professor of Sociology at the University of Rhode Island. Her research interests include the family and delinquency, criminological theory, and social psychological explanations of crime.

Paul R. Vowell is Assistant Professor of Sociology at Texas A&M-Kingsville. His research interests include theoretical integration, quantitative methods, and the spatial distribution of crime.

### Appendix. Variable Labels and Coding Schemes

#### Attachment to Parents

- PARFEEL Does your (father, mother) ever explain why (they) feel the way (they) do? 1 = never, 2 = sometimes, 3 = often
- PARFUTUR How often have you talked over your future plans with your (father, mother)? 1 = never, 2 = sometimes, 3 = often
- PARHELP When you come across things you don't understand, does your (father, mother) help you with them? 1 = never, 2 = sometimes, 3 = usually
- PARRULE When you don't know why your (father, mother) makes a rule, will s/he explain the reason? 1 = never, 2 = sometimes, 3 = usually
- PARTHOUT Do you share your thoughts and feelings with your (father, mother)? 1 = never, 2 = sometimes, 3 = often

Virtual Parental Supervision 1 = never, 2 = sometimes, 3 = usually

- PARWHERE Does your (father, mother) know where you are when you are away from home?
- PARWHO Does your (father, mother) know who you are with when you are away from?

Attachment to Friends 1 = not at all, 2 = in a few ways, 3 = in most ways

- RSPECTFR Do you respect your best friend's opinions about the important things in life?
- BELIKFR Would you like to be the kind of person your best friends are?

#### School Bonds

- LIKESCHL In general, do you like or dislike school? 1 = dislike (school), 2 = like and dislike (school) equally, 3 = like it (school)
- TRHARSCH I try hard in school. 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree
- GRADEIMP How important is getting good grades to you personally? 1 = completely unimportant, 2 = fairly important, 3 = somewhat important, 4 = very important.
- HWTIME On average, how much time do you spend doing homework outside school? 1 = no homework, 2 = less than a 1/2 hour a day, 3 = 1/2 hour a day, 4 = 1 hour a day, 5 = 1 1/2 hours a day, 6 = 2 or more hours a day

- Belief/Definitions 1 = strongly disagree, 2 = disagree,  
3 = undecided, 4 = agree, 5 = strongly agree  
(All items coded so that high scores reflect belief,  
reverse coded when items indicate "definitions.")
- DELHURT Most things that people call "delinquency" don't really hurt anyone.
- GETAHEAD To get ahead, you have to do some things which are not right.
- NOBLAME The man who leaves the keys in his car is about as much to blame for its theft as the man who steals it.
- OKLAW It is alright to get around the law if you can get away with it.
- SUCKERS Suckers deserve to be taken advantage of.
- Friends' Delinquency 1 = no or don't know, 2 = one friend has,  
3 = two friends have, 4 = three friends have,  
5 = four or more friends have
- FRPICKUP Have any of your close friends been picked up by the police?
- Delinquency 1 = yes, 0 = no
- BATTERY Not counting fights you may have had with a brother or sister, have you ever beaten up on anyone or hurt anyone on purpose?
- CARTHEFT Have you ever taken a car for a ride without the owner's permission?
- THEFT2 Have you ever taken little things (worth less than \$2) that did not belong to you?
- THEFT250 Have you ever taken things of some value (between \$2 and \$50) that did not belong to you?
- THEFT50 Have you ever taken things of large value (worth over \$50) that did not belong to you?
- VANDALSM Have you ever banged up something that did not belong to you on purpose?

## THE INFLUENCE OF GENDER, LOW BIRTH WEIGHT, AND DISADVANTAGED ENVIRONMENT IN PREDICTING EARLY ONSET OF OFFENDING: A TEST OF MOFFITT'S INTERACTIONAL HYPOTHESIS

STEPHEN G. TIBBETTS

East Tennessee State University

ALEX R. PIQUERO

Temple University

National Consortium on Violence Research

*Little is known about the causes of an early onset of offending. In an attempt to shed light on this issue, some theoretical models have been advanced purporting to explain the reasons for an individual's early initiation into offending. In one of these models, Moffitt (1993) predicts that early onset of offending is caused by an interaction between (1) increased risk for neuropsychological disorders and (2) disadvantaged childhood environments. This study tests Moffitt's hypothesis concerning the development of early offending. In the present analysis, low birth weight was used as a proxy for increased likelihood of neuropsychological deficits, and socioeconomic status and family structure served as indicators for disadvantaged environment. Using the Philadelphia portion of the Collaborative Perinatal Project, we find support for Moffitt's hypothesis that neuropsychological risk and disadvantaged environment interact to produce an early, but not late, onset of offending. In subsequent analysis, the interaction was observed for males but not females. The latter result, however, may be a function of the small number of cases in the female sample. Finally, we address the theoretical and policy implications arising from our analyses and provide some suggestions for future research.*

Similar to the observed strong and positive relationship between past and future offending (Gottfredson and Hirschi, 1990; Nagin and Paternoster, 1991; Paternoster et al., 1997; Robins, 1966, 1978; Wilson and Herrnstein, 1985), the age at which a first offense occurs (i.e., onset) is an important factor in predicting the future offending of individuals. Studies have consistently found that early onset is one of the best predictors of serious, high-rate offending in adolescence and adulthood (Blumstein et al., 1986; Dunford and Elliott, 1984; Elliott et al., 1984; Farrington, 1986; Farrington et al., 1990; LeBlanc and Fréchette, 1989; Loeber and LeBlanc,