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PRINCIPAL STUDIES

TESTING INTERACTIONAL THEORY: AN EXAMINATION OF RECIPROCAL CAUSAL RELATIONSHIPS AMONG FAMILY, SCHOOL, AND DELINQUENCY*

ROCHESTER YOUTH DEVELOPMENT STUDY**

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ABSTRACT

Attachment to parents and commitment to school are important buffers against delinquency. Adolescents who are emotionally bonded to their parents and who succeed at school are unlikely candidates for serious delinquency. These relationships have strong empirical support. In addition, however, it is possible that frequent involvement in delinquency can cause a substantial deterioration in the emotional bond between parent and child and in the adolescent's commitment to school. Indeed, an interactional perspective argues that bidirectional or reciprocal causal influences such as these are more accurate representations of how delinquency develops over the life-course. The present paper tests an interactional model for these variables using the first three waves of data from the Rochester Youth Development Study. Results strongly suggest that the causes of delinquency are more complex than originally thought. While weakened bonds to family and school do cause delinquency, delinquent behavior further attenuates the strength of the bonds to family and school, thereby establishing a behavioral trajectory towards increasing delinquency.

I. INTRODUCTION

Criminologists have long hypothesized that attachment to parents and commitment to school play a major role in reducing adolescent involvement in delinquent behavior; as such, they are prime candidates for manipulation in delinquency prevention programs. While many theoretical perspectives include these variables, attachment to parents and commitment to school are perhaps most central to social control theory, because they represent two of the major ways by which adolescents are "bonded" to society. According to this perspective, these variables exert a causal influence on delinquency, but are not influenced by delinquency.

Recent theories of delinquency—especially interactional theory¹—have challenged this unidirectional causal order. Arguing that human behavior develops dynamically over time as people interact with one another and as the consequences of prior behavior are felt, interactional theory posits that delinquent behavior may also have reciprocal causal influences on such variables as attachment to parents and commitment to school. This article examines this hypothesis both theoretically and empirically. The article first reviews the basic premises of social control theory and various spec-

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¹ Thornberry, *Toward an Interactional Theory of Delinquency*, 25 *CRIMINOLOGY* 863 (1987).

ifications of the relationships among these bonding variables. It then examines empirically interactional theory's hypothesis that these variables are involved in reciprocal causal relationships that have the potential of propelling a person along an increasingly delinquent behavioral trajectory. Finally, it discusses the theoretical and policy implications of the empirical results.

II. SOCIAL CONTROL THEORY

The central thesis of social control theory is that people tightly bonded to conventional society are behaviorally constrained and therefore unlikely to violate society's rules and regulations. As an individual becomes more and more tightly ensnared in society's web, behavioral freedom diminishes and the chances of deviance dwindle. On the other hand, as society's grasp over the person weakens—as the web slackens and begins to tear—behavioral constraints also weaken and deviance becomes more likely. Thus, delinquency is a direct function of how tightly the person is bonded to conventional society.

As with most theoretical perspectives, proponents generally agree about social control theory's basic premises and claims, but exhibit lesser agreement about the structure of propositions used to explain a particular phenomenon. As a result, one can identify a number of versions of control theory. Among the more traditional versions there appear to be two major types, which we call classical control theory and integrated control theory.

A. CLASSICAL CONTROL THEORY

The classical version of control theory is represented in the writings of such theorists as Toby² and Nye³ but is epitomized in Hirschi's *Causes of Delinquency*.⁴ Hirschi argues that human nature contains a strong natural tendency towards deviance and, therefore, the motivation for delinquency is constant, or at least non-problematic. The theory does not have to account for why people deviate; deviance is part of our humanity. It does have to explain why people do *not* deviate; that is, it has to account for the forces that stem this natural tendency to be deviant.

Hirschi's explanation is that these natural tendencies are controlled to the extent that the person is bonded to society. The social

² Toby, *Social Disorganization and Stake in Conformity: Complementary Factors in the Predatory Behavior of Hoodlums*, 48 J. CRIM. L. & CRIMINOLOGY 12 (1957).

³ F. NYE, *FAMILY RELATIONSHIPS AND DELINQUENT BEHAVIOR* (1958).

⁴ T. HIRSCHI, *CAUSES OF DELINQUENCY* (1969).

order is the only force capable of preventing the enactment of self-interested, natural proclivities to deviate—this is the central, defining premise of all social control theories.

In Hirschi's version of the theory, four elements bond individuals to society, thereby reducing delinquency. The four elements are: *attachment* to others; *commitment* to conformity; *involvement* in conventional activities; and *belief* in the moral validity of conventional values. Attachment is the emotional or affective element of the bond. Adolescents attached to conventional others (*e.g.*, parents and teachers) are sensitive to their wishes and values and are, therefore, unlikely to engage in delinquency. Commitment is often referred to as the rational element of the bond. For people who have built up a stake in conformity, delinquent conduct places that investment in jeopardy and is, therefore, likely to be rejected. Involvement simply argues that adolescents heavily engrossed in conventional activities—family, school, sports and so forth—are too busy to be involved simultaneously in substantial amounts of delinquent conduct. Finally, belief is the moral element of the bond. People who believe strongly in the moral validity of society's norms are unlikely to violate those norms by engaging in delinquency. Thus, the behavior of people with high attachment, commitment, involvement, and belief is severely constrained and delinquency is unlikely. On the other hand, people with low attachment, commitment, involvement, and belief are not tightly ensnared in society's web and are much more likely to be delinquent.

The theoretical structure of Hirschi's control theory, as of most of the classical statements of control theory, is remarkably simple. The four elements of the bond appear as separate but equal factors, independently related to delinquency. Hirschi includes a brief but unsystematic discussion of how they might be interrelated,⁵ but that is not pursued either theoretically or empirically.

In many ways, the great strength of classical control theory lies in its simplicity and resulting clarity. It identifies four of the core concepts that are causally related to delinquency and explicates how each operates to reduce delinquent behavior. That is a substantial contribution indeed.

Over the years, however, two major criticisms of the classical representation of control theory have emerged. First, it cannot easily account for the empirical importance of associations with delinquent peers in predicting delinquency; this limitation, in turn, has raised questions about classical control theory's amotivational as-

⁵ *Id.* at 27-30.

sumption. Second, both empirical observation and the logic of control theory suggest that the elements of the bond are interrelated and that their interrelationships might be helpful in explaining delinquency. These criticisms have given rise to integrated versions of control theory.

B. INTEGRATED CONTROL THEORIES

Integrated theories attempt to combine propositions from compatible theories to form a broader explanation of the phenomenon of interest.⁶ Examples of efforts to expand the theoretical scope of classical control theory are those by Johnson,⁷ Elliott *et al.*,⁸ and Weis and Sederstrom.⁹

These theories share two general characteristics. First, they incorporate some elements of a social learning perspective into the explanation of delinquency, typically by including differential associations and deviant beliefs as important causal variables. As a result, classical control theory's assumption about the amotivational nature of deviance is weakened. Although some variation exists, integrated models assume that weakened bonds set the stage for delinquent behavior, but such behavior needs to be learned and reinforced before it is enacted. Thus, a weakened social bond is not, by itself, a sufficient explanation for delinquent behavior.

Second, these theories attempt to explicate the causal interrelationships among the elements of the bond. In general, the temporal and causal ordering starts with attachment to parents, is followed by commitment to and involvement in school, and is followed in turn by acceptance of conventional values. Also, all of the bonding variables precede the social learning variables. This approach provides a richer theoretical understanding of the causes of delinquency than is offered by classical versions. It begins to model the causal network that generates delinquent conduct; it assesses the impact of each element of the bond after the impact of the others is held constant; and, it estimates indirect as well as direct causal influences.

While the theoretical and empirical contributions of integrated

⁶ See THEORETICAL INTEGRATION IN THE STUDY OF DEVIANCE AND CRIME: PROBLEMS AND PROSPECTS (S. Messner, M. Krohn & A. Liska eds. 1989) [hereinafter THEORETICAL INTEGRATION].

⁷ R. JOHNSON, *JUVENILE DELINQUENCY AND ITS ORIGINS* (1979).

⁸ Elliott, Ageton & Canter, *An Integrated Theoretical Perspective on Delinquent Behavior*, 16 J. RES. CRIME & DELINQ. 3 (1979); D. ELLIOTT, D. HUIZINGA & S. AGETON, *EXPLAINING DELINQUENCY AND DRUG USE* (1985).

⁹ Weis & Sederstrom, *The Prevention of Serious Delinquency: What to Do?* (Reports of the National Juvenile Justice Assessment Centers, Department of Justice, OJJDP, Dec. 1981).

control theories are quite substantial, they too share a number of shortcomings. From the perspective of this paper, the most important shortcomings concern their static theoretical structure.

First, these models tend to ignore developmental issues. Despite the fact that criminal careers develop over time, a single and presumably invariant causal structure is offered. The same causal effects are presented for adolescents and young adults, for neophytes and experienced offenders. Such a view of human behavior does not accord very well with general observations, let alone with developmental psychology.

Second, these models generally do not allow for bidirectional causal influences either among the elements of the bond or between the elements and delinquency. Thus, if attachment to parents has a causal impact on commitment to school, commitment cannot influence attachment. Similarly, if commitment to school reduces delinquency, delinquency—no matter how serious or how prolonged—cannot influence commitment. Such a static view of the way in which social factors impinge upon human behavior is often quite implausible. For example, youngsters who join delinquent gangs and routinely use crack cocaine often find their commitment to school deteriorating as a result.

Thus, integrated control theories, like the more classical versions, offer implausibly static representations of the development of delinquency. Recognizing this limitation, recent theoretical models have attempted to incorporate a more developmental perspective¹⁰ and a more dynamic causal structure¹¹ into the explanation of delinquency. In addition, longitudinal studies have begun to examine developmental and reciprocal issues empirically.¹² The present study examines one of these theoretical models—interactional the-

¹⁰ 3 G. PATTERSON, *A SOCIAL LEARNING APPROACH* (1982); Loeber & Le Blanc, *Toward a Developmental Criminology*, in 12 *CRIME & JUST.: A REVIEW OF RES.* 375 (M. Tonry & N. Morris eds. 1990).

¹¹ Thornberry, *supra* note 1.

¹² See, e.g., Agnew, *A Longitudinal Test of Social Control Theory and Delinquency*, 28 *J. RES. CRIME & DELINQ.* (1991) (forthcoming) [hereinafter Agnew, *A Longitudinal Test*]; Burkett & Warren, *Religiosity, Peer Influence, and Adolescent Marijuana Use: A Panel Study of Underlying Causal Structures*, 25 *CRIMINOLOGY* 109 (1987); Elliott, Huizinga & Morse, *The Dynamics of Deviant Behavior: A National Survey* (progress report submitted to the National Institute of Mental Health, Department of Health and Human Services 1985) [hereinafter Elliott, *Dynamics of Deviant Behavior*]; Liska & Reed, *Ties to Conventional Institutions and Delinquency: Estimating Reciprocal Effects*, 50 *AM. SOC. REV.* 547 (1985); Matsueda, *The Dynamics of Moral Beliefs and Minor Deviance*, 68 *SOC. FORCES* 428 (1989); Paternoster, *Examining Three-Wave Deterrence Models: A Question of Temporal Order and Specification*, 79 *J. CRIM. L. & CRIMINOLOGY* 135 (1988). For a review of these and related empirical studies, see Thornberry, *Empirical Support for Interactional Theory: A Review of the Literature*, in *SOME CURRENT THEORIES OF CRIME AND DEVIANCE* (D. Hawkins ed. 1991) (forthcoming).

ory—in more detail and tests empirically some of its core propositions.

III. INTERACTIONAL THEORY

Interactional theory proposes that the fundamental or primary cause of delinquent behavior is a weakening of bonds to conventional society. In this sense, it is a variant of social control theory that employs the basic argument that individuals who are attached to others, committed to conformity, and believe in conventional values are unlikely to engage in delinquent behavior.

When bonds to conventional society are weakened, however, a person acquires greater behavioral freedom. No longer bound to the straight and narrow, a number of alternatives become available to the individual, including the opportunity to engage in delinquent behavior. For that to occur, however, some mechanism that channels the behavioral freedom towards specifically delinquent conduct is required. This is especially so if one is concerned with explaining persistent and serious delinquency rather than isolated, nonpatterned acts of delinquency. Associations with delinquent peers and the learning environment they provide are the primary mechanisms for cultivating both delinquent beliefs and delinquent behavior. As delinquency is learned and reinforced, it is apt to become a stable part of the person's repertoire.

To this point, interactional theory is quite similar to the integrated control theories described earlier. It differs from those models in three fundamental respects, however.¹³ First, it does not assume, as many control-based theories do, that variation in the strength of the bond just happens. This variation is systematically related to structural variables such as social class position and residential area. Second, it does not assume that causal models are stable over the life-course. Causal influences vary at different developmental stages and at different stages of criminal careers (*i.e.*, at initiation, maintenance, and termination). Third, it does not assume that causal influences are overwhelmingly unidirectional and that delinquency is merely an outcome variable. Many effects are bidirectional, and delinquency may contribute to the weakening of social bonds as well as being a consequence of weakened social bonds. Although interactional theory differs from other social control theories in these three respects, the present analysis is con-

¹³ It also differs in that it is an elaborated, as opposed to an integrated, theory. See Thornberry, *Reflections on the Advantages and Disadvantages of Theoretical Integration*, in THEORETICAL INTEGRATION, *supra* note 6, at 51.

cerned almost exclusively with the third issue—whether social bonding variables and delinquency are better thought of as recursively or reciprocally related.

A. RECIPROCAL RELATIONSHIPS

This article's empirical analysis focuses on two of the variables which bond a person to society; namely, attachment to parents and commitment to school. Interactional theory incorporates the element of involvement into a broadened concept of commitment, a view that has considerable theoretical and empirical support.¹⁴ Also, interactional theory hypothesizes that at early adolescence, beliefs in conventional values should be relatively invariant and, therefore, add little to the explanation of delinquency.¹⁵ The hypothesized invariance is observed in this data set, and conventional beliefs is dropped from the present analysis. The analysis thus focuses on the two elements of the bond generally thought to be most central to the explanation of delinquency during early adolescence—attachment to parents and commitment to school.

Classical versions of control theory view these variables as having independent, direct effects on delinquency (Figure 1a). For example, the most that Hirschi says about the interrelationships between these variables is that it is "safe to assume that attachment to conventional others and commitment to achievement tend to vary together."¹⁶ In integrated versions of control theory (Figure 1b), the typical specification holds that attachment to parents directly affects commitment to school and delinquent behavior and that commitment to school also has a direct effect on delinquency.¹⁷

It is important to note in these models the effects that are presumed to play no causal role in the genesis of delinquency. First, attachment to parents is not influenced by either commitment to school or delinquent behavior. Thus, even if youngsters are doing very poorly in school and are heavily involved in delinquent behavior, these factors presumably have no negative impact on the affective bond between parent and child. Second, commitment to school is not influenced by delinquency. Delinquent behavior, no matter how persistent or serious, does not lead to a reduction in academic performance and commitment.

Interactional theory views both of these assertions as theoretic-

¹⁴ Krohn & Massey, *Social Control and Delinquent Behavior: An Examination of the Elements of the Social Bond*, 21 *SOCIOLOGICAL Q.* 529 (1980).

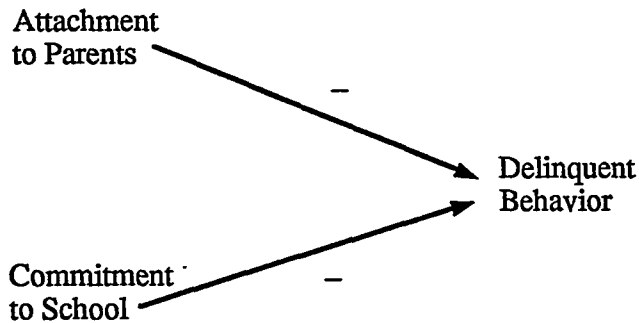
¹⁵ Thornberry, *supra* note 1, at 874.

¹⁶ T. HIRSCHI, *supra* note 4, at 28.

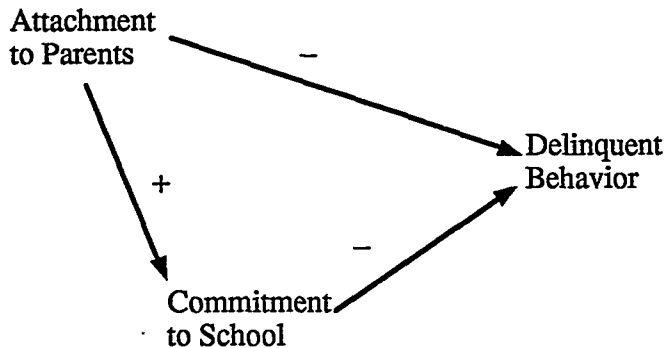
¹⁷ See, e.g., R. JOHNSON, *supra* note 7, at 96.

FIGURE 1
TYPICAL SPECIFICATIONS OF THEORETICAL RELATIONSHIPS AMONG
ATTACHMENT TO PARENTS, COMMITMENT TO SCHOOL, AND
DELINQUENT BEHAVIOR

a. Classical Control Theory



b. Integrated Control Theory



cally and empirically implausible. A mother's love may be undying, but it is not necessarily unbending. Precisely because of control theory's assumption that parents are monolithically conventional, extremely poor school performance and high involvement in delinquency on the part of the child should drive a wedge between parent and child, resulting in a weakening of attachment. Similarly, youngsters who become increasingly involved in delinquency are likely to experience a declining commitment to school. Having already jeopardized their stake in conformity by delinquent conduct,

their commitment is likely to dwindle even further as delinquent conduct continues. Thus, interactional theory predicts more complex interrelationships among these variables than is found in either classical or integrated control theories. While weakened bonds to conventional society do tend to increase the chances of delinquency, delinquent behavior also reduces attachment to parents and commitment to school, further weakening the person's bond to society.

B. EMPIRICAL SUPPORT

Few empirical studies have examined reciprocal relationships for these three variables—attachment to parents, commitment to school, and delinquent behavior. The empirical studies that have done so suggest that reciprocal influences are indeed important, but the precise pattern of these relationships is not very consistent across studies. For example, Liska and Reed¹⁸ reported a bidirectional relationship for school and delinquency while Agnew,¹⁹ using the same data set, reported only an effect from delinquency to school attachment. On the other hand, Liska and Reed found a unidirectional effect from parental attachment to delinquency, while Agnew did not.²⁰ When social learning variables are added to the analysis, results also vary across studies. Using National Youth Survey data, both Elliott *et al.*²¹ and Agnew²² reported no significant relationships, either unidirectional or bidirectional, involving attachment, commitment, and delinquency. However, Paternoster,²³ using data from South Carolina, reported a consistent lagged reciprocal relationship for parental supervision and two separate forms of delinquency—marijuana use and petty theft.

These results suggest that additional research is needed to clarify the causal relationships among these variables. Findings of prior research demonstrate that some of the relationships involving attachment to parents, commitment to school, and delinquency are reciprocal, implying that the more traditional unidirectional specifications (see Figure 1) are erroneous. Nevertheless, research findings have yet to converge on a consistent pattern of bidirectional effects. Because of this divergence, priority is therefore given to establishing the nature of the reciprocal relationships between the

¹⁸ Liska & Reed, *supra* note 12.

¹⁹ Agnew, *Social Control Theory and Delinquency: A Longitudinal Test*, 23 *CRIMINOLOGY* 47 (1985).

²⁰ Agnew, *A Longitudinal Test*, *supra* note 12.

²¹ Elliott, *Dynamics of Deviant Behavior*, *supra* note 12.

²² Agnew, *A Longitudinal Test*, *supra* note 12.

²³ Paternoster, *supra* note 12.

bonding variables and delinquency before determining if those relationships vary in a broader theoretical context.

C. MODEL SPECIFICATION

Interactional theory's specification of the causal relationships for these variables during early adolescence is presented in Figure 2.²⁴ For reasons discussed earlier, strong reciprocal relationships among these variables are anticipated. That is, weakened bonds to conventional society should increase the chances of delinquency, and delinquent behavior should feed back upon and further attenuate the person's bond to society. A number of more specific points about the model in Figure 2 can also be made.

First, at Wave 1 the variables are treated as lagged endogenous variables and are allowed to be correlated with each other. Causal relationships among them are not modeled to improve the identification of the overall model.

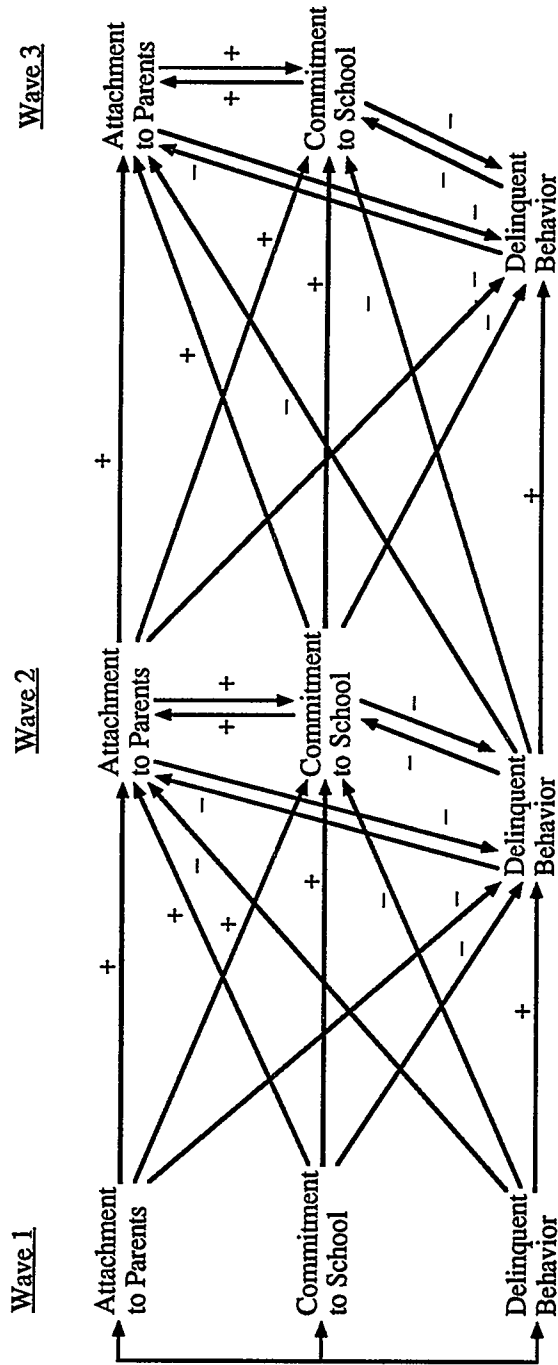
Second, one-wave stability effects are predicted for each variable. More concretely, the person's current level on any variable is expected to be produced, to some sizeable extent, by the person's immediately prior level on the same variable. Including stability effects in all equations also allows lagged and instantaneous effects to be thought of as predicting change in the dependent variable.

Third, we include two types of reciprocal or bidirectional relationships in the model. The first are referred to either as instantaneous or contemporaneous relationships. These refer to a causal loop between two variables when both variables are measured at the same wave or time period. For example, a causal loop between two variables (X and Y) means that X_t has a direct effect on Y_t , and Y_t also has a direct effect on X_t . The second type are referred to as either lagged or cross-lagged relationships. These refer to mutual causal relationships between two variables that develop over time. For X and Y , this means that X_{t-1} has an effect on Y_t , and Y_{t-1} has an effect on X_t .

The theoretical model anticipates both lagged and instantaneous reciprocal effects for each of the dyadic relationships. One can illustrate these effects with commitment to school and delinquent behavior. Change in delinquency from one wave to the next is thought to be produced by both prior commitment (the lagged effect) and by current commitment (the instantaneous effect). Simi-

²⁴ The theoretical model is presented for early adolescence, since the data used in this study cover that developmental stage. Also, a three-wave panel model is presented to conform to the available data.

FIGURE 2
THEORETICAL MODEL OF CAUSAL RELATIONSHIPS AMONG ATTACHMENT TO PARENTS, COMMITMENT TO SCHOOL, AND DELINQUENT BEHAVIOR



larly, change in commitment is thought to be produced by both prior delinquency (the lagged effect) and current delinquency (the instantaneous effect). The same pattern of relationships holds for the other variables in the model. Since the effects of these variables are expected to diminish over time, we include only lagged effects from the immediately prior wave.

Fourth, this model is derived from interactional theory's more general model and only refers to early adolescence.²⁵ As a result, major developmental hypotheses are not offered. One should note, however, that interactional theory posits that by middle adolescence, the causal impact of attachment to parents diminishes considerably, and no direct path from it to delinquency is predicted. Causal relationships among the other variables remain largely unchanged from early to mid-adolescence.

Theoretically, this model is more complex and less parsimonious than the versions presented in either classical or integrated control theories. Empirically, it requires more complicated statistical procedures for assessing its validity. Are these additional demands reasonable to place upon the theory? The remainder of this paper attempts to answer this question by analyzing data collected as part of the Rochester Youth Development Study.

IV. METHODS

The Rochester Youth Development Study (RYDS) is designed to examine the development of delinquent behavior and drug use in a predominantly high-risk, urban sample using a seven-wave panel design. Each adolescent respondent and his or her caretaker (in 95% of the cases this is the mother or stepmother) are interviewed at six-month intervals. Data are also collected from the Rochester schools, police, and other agencies that service youth.

A. SAMPLE

The total panel consists of 987 students who attended the seventh and eighth grades of the Rochester City public schools during the 1987-1988 academic year.²⁶ The present analysis is based on the first three waves of student interviews, which began in the spring

²⁵ Thornberry, *supra* note 1, at 870-76.

²⁶ A thorough description of the sampling strategy is provided in M. Farnworth, T. Thornberry, A. Lizotte & M. Krohn, *Sampling Design and Implementation: Technical Report No. 1* (Aug. 1990) (available through Rochester Youth Development Study, School of Criminal Justice, The University at Albany).

semester of the adolescents' seventh or eighth grade and continued through the spring semester of their eighth or ninth grade.

To ensure that serious, chronic offenders are included in the study, the sample overrepresents high-risk youth in the following manner. Males are oversampled (75% versus 25%), because they are more likely to be chronic offenders and to engage in serious delinquent behavior than are females. In addition, students are selected proportionately to the resident arrest rates of the census tracts in which they live. These rates estimate the proportion of each tract's total population arrested in 1986. Students from tracts with the highest rates are proportionately overrepresented since they are at highest risk for serious delinquency; students from the lower rate tracts are proportionately underrepresented. Because the true probability of a youth living in a particular census tract is known, the sampling strategy provides the means to weight cases to represent the total seventh and eighth grade population. The sample is weighted in the analyses to follow.²⁷

Current analysis is based on the 867 adolescents for whom Wave 1 through Wave 3 interviews are completed. The retention rate from Wave 1 to Wave 2 is 91%, while from Wave 1 to Wave 3 it is 88%.²⁸ Characteristics of students who remain in the study during all three waves compare favorably to those at the initial wave (see Table 1). There are only slight differences in terms of age, sex, ethnicity, and resident arrest rates of census tracts. At Wave 1, the unweighted sample was 69% Afro-American, 17% Hispanic, and 14% white; 74% male and 26% female; and ranged in age from eleven to fourteen, although 75% were thirteen or fourteen. These proportions are quite close to what was expected given the population characteristics of the Rochester Schools and the decision to oversample high-risk youth.

RYDS interviewers conducted interviews with students in private rooms at the schools. If the student could not be contacted in school, he or she was interviewed at home. Interviews lasted between forty-five minutes and one hour.

B. MEASUREMENT OF VARIABLES

The model tested in this paper contains three variables: attachment to parents, commitment to school, and self-reported delin-

²⁷ For example, weighting the sample has the effect of equalizing the number of boys and girls in the sample.

²⁸ The total retention rate at Wave 3 is somewhat higher (92%). The 88% figure represents the percentage of subjects who completed all three interviews.

TABLE 1
CHARACTERISTICS OF THE UNWEIGHTED SAMPLE
AT WAVES 1, 2, AND 3

		Wave 1	Wave 2	Wave 3
<u>Age at Wave 1</u>				
	< 13	13.9	14.3	14.6
	13	37.5	38.1	39.0
	14	37.0	37.5	36.9
	> 14	11.6	10.1	9.5
<u>Sex</u>				
	Male	74.1	73.7	73.8
	Female	25.9	26.3	26.2
<u>Ethnicity</u>				
	Afro-American	68.7	69.2	69.6
	Hispanic	17.1	16.5	16.1
	White	14.2	14.3	14.3
<u>Census Tracts</u> <u>Grouped By</u> <u>Resident Arrest Rates</u>				
	1 = highest	33.1	32.8	33.7
	2	32.1	32.4	32.0
	3	18.1	18.2	17.9
	4	9.8	9.8	9.6
	5	5.2	5.1	5.0
	6 = lowest	1.7	1.7	1.8

quent behavior. Each variable is measured with identical items at all three waves.

1. Attachment to Parents

An eleven-item scale adapted from Hudson's Child's Attitude Toward Mother Scale²⁹ is used to measure attachment to parents.³⁰ The scale measures adolescents' perceptions of warmth, liking, and the absence of hostility between themselves and their parent or primary caretaker.³¹ Since the Hudson scale has been used previously and found to be reliable, we computed a confirmatory factor analysis for each wave of data collection to confirm that the items loaded on a single factor.³² At all three waves, the items loaded on a single factor and the factor loadings are quite stable across waves. Coeffi-

²⁹ W. HUDSON, *THE CLINICAL MEASUREMENT PACKAGE: A FIELD MANUAL* (1982).

³⁰ Missing values never exceeded 10 respondents on individual items used to constitute the scales used in this study. Therefore, the mean on those items is substituted for missing values.

³¹ In approximately 85% of the cases, the referent is the mother; in another 10% it is the stepmother; and the remaining cases refer to a variety of other caretakers (*e.g.*, a father, grandparent, *etc.*).

³² The individual items and their factor loadings appear in Appendix A.

cients of reliability (Chronbach's alpha) are quite high for all three waves (0.82, 0.87, and 0.87), and higher scale values indicate a closer relationship between child and parent.

2. *Commitment to School*

An exploratory factor analysis including the sixteen school-related items contained in the interview schedule generated two factors.³³ One factor includes items that asked respondents about their relationships to their teachers (eigenvalue = 1.24), while the other factor includes items that dealt with more general attitudes toward school (eigenvalue = 2.44). Because the teacher factor could be considered another measure of attachment to a conventional adult, only the ten-item scale measuring whether students like school, how well they do in school, and how hard they work on their schoolwork is retained. These items more clearly tap the concept of commitment. Scale reliabilities are high for all three waves (0.76, 0.80 and 0.83), and higher scores indicate that the student is more committed to school.

3. *Self-Reported Delinquency*

A total of forty-four types of delinquent behavior and drug use are included on the student interview schedule. These items are derived in large part from the National Youth Survey.³⁴ In the first interview, questions concerning delinquency were framed in terms of offenses that took place over the previous six months. In subsequent interviews the questions covered the period of time since respondents were last interviewed (which was also approximately six months).³⁵

By excluding items that potentially double-count delinquencies,³⁶ a general delinquency scale comprised of 29 items ranging from running away from home to using a weapon to try to hurt someone is generated. In constructing this measure, responses are first screened to determine that they (a) fit the category of delin-

³³ We computed the factor analysis using a principle component analysis and a maximum likelihood estimation procedure.

³⁴ D. ELLIOTT, D. HUIZINGA & S. AGETON, *EXPLAINING DELINQUENCY AND DRUG USE* (1985).

³⁵ In order to assist respondents in focusing on the appropriate time period, interviewers show them a calendar, pointing out the date of their last interview and significant events (*e.g.*, holidays, the beginning and end of the school year, *etc.*) that occurred since then.

³⁶ For example, items about shoplifting and thefts of a certain value can potentially count the same event twice. In those instances, only one item is used to calculate the general delinquency score. The final items are listed in Appendix B.

quency being measured and (b) are "actionable" offenses. The latter criterion is intended to screen out trivial offenses (*e.g.*, pranks, sibling squabbles, and the like) that law enforcement officials would probably ignore.³⁷ If the subject's response meets these two criteria, it is included in the summated prevalence score. Since the scores on the delinquency scale are skewed toward the lower end, they are logged in subsequent analyses.

4. *Other Variables*

In addition to the variables included in the theoretical model, sex, ethnicity, and age are included as control variables. Ethnicity is measured with two dummy variables representing Afro-Americans and Hispanics, with whites being the reference category. Sex is also a dummy variable with females as the reference category.

V. ANALYSIS

Equations for this analysis are estimated using EQS, a program which employs a Full Information Maximum Likelihood (FIML) covariance structure model.³⁸ Our initial intent was to estimate the full theoretical model presented in Figure 2. This three-wave panel model anticipates lagged reciprocal relationships from parental attachment, commitment to school, and delinquent behavior at one wave to each of those same variables at the next wave. In addition, contemporaneous reciprocal relationships are anticipated among these variables. The model also includes stability effects for variables from one wave to the next. This aspect of the model allows one to predict changes in delinquent behavior, parental attachment, and commitment to school from other lagged and instantaneous variables. Furthermore, when both lagged and contemporaneous effects of exogenous variables are called for, the model allows one to predict *changes* in the endogenous variables from both level of and changes in exogenous variables. In estimating all of these coefficients, the effects of age, sex, and ethnicity are controlled.

Numerous heartbreaking attempts, employing various minor changes in specification, were made to estimate this model. After properly identifying the model, estimation proved unsuccessful if one includes both cross-lagged and instantaneous effects in the sys-

³⁷ To determine that the offenses reported are "actionable," respondents are asked to describe the most serious (or only) act committed in a category. Coders rate the act as being actionable or not. The interrater reliability for the three waves ranged from 90% to 95%. If the most serious delinquency described is not rated as delinquent, the item is coded as a zero.

³⁸ P. BENTLER, EQS: STRUCTURAL EQUATIONS PROGRAM MANUAL (1989).

tem of equations. This is true for both the second and third panels of the model. These findings, as well as those of previous research using this data set,³⁹ suggest that collinearity may be a serious problem when both lagged and instantaneous reciprocal effects are included in the same model. Because of this collinearity concern, a model that includes only lagged reciprocal effects is estimated in this study. This causal order (see Figure 3) is employed, because a model retaining *only* the instantaneous reciprocal effects implies that current levels of attachment and commitment can predict changes in delinquency over the prior six months. The same logical problem holds for the other endogenous variables. Thus, if only one class of relationships can be retained because of collinearity, the cross-lagged model is the only one consistent with proper temporal and causal ordering.

In addition to the lagged reciprocal relationships, the estimated model includes stability effects, error terms, appropriate correlations among the errors, and three unidirectional contemporaneous effects at each wave. We predict that delinquency has a contemporaneous effect on both attachment and commitment since, at each wave, delinquency measures behavior over the prior six months, and attachment and commitment are contemporaneous measures. In essence, these relationships are also lagged even though the measurement occurs at the same time.⁴⁰ The choice of including an effect from attachment to commitment is discussed below.

Results for this model are presented in Figure 4 and Tables 2 and 3. The traditional chi-square goodness of fit test for the model is insignificant ($X^2 = 11.48$; $p = 0.12$), indicating that the model is a very good representation of the data.⁴¹ This is somewhat surprising, given the sensitivity of chi-square to large sample sizes like the one here.

A. STABILITY EFFECTS

The stability effects in the model are generally larger between

³⁹ T. Thornberry, A. Lizotte, M. Krohn & M. Farnworth, *The Role of Delinquent Peers in the Initiation of Delinquent Behavior* (RYDS Working Paper No. 6) (presented at the annual meetings of the American Sociological Ass'n, Washington, D.C., Aug. 1990) (available through authors).

⁴⁰ For a discussion of this point, see Paternoster, *supra* note 12.

⁴¹ Standardized effects are reported, and all effects are significant at the 0.05 level of a one-tailed test. With one exception, which is discussed below, results of the multiple LaGrange test (explained in Bentler & Dijkstra, *Efficient Estimation Via Linearization in Structural Models*, in VI MULTIVARIATE ANALYSIS (P. Krishnaiah ed. 1985)) suggest that we have not made unreasonable assumptions about excluding other relationships among these variables.

FIGURE 3
ESTIMATED LAGGED RECIPROCAL MODEL

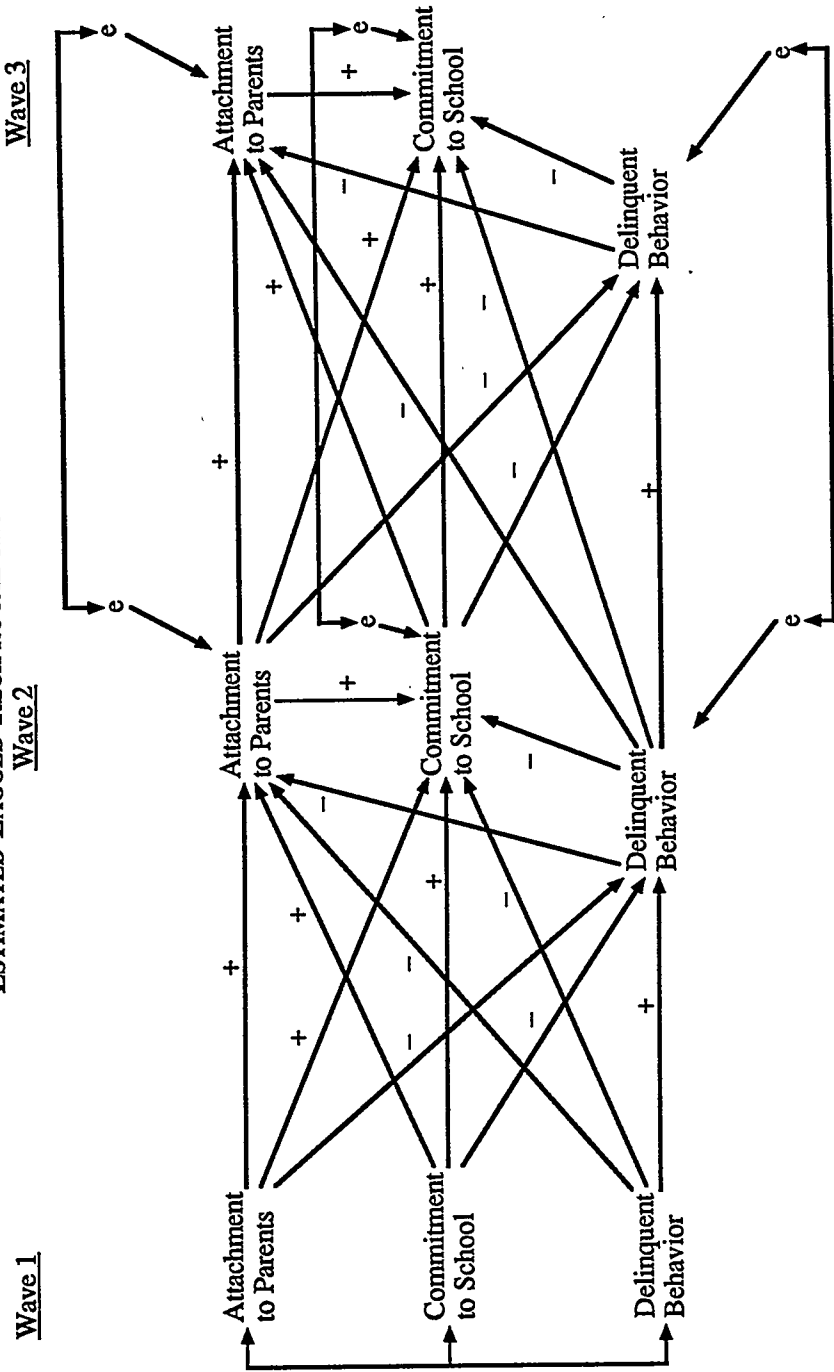
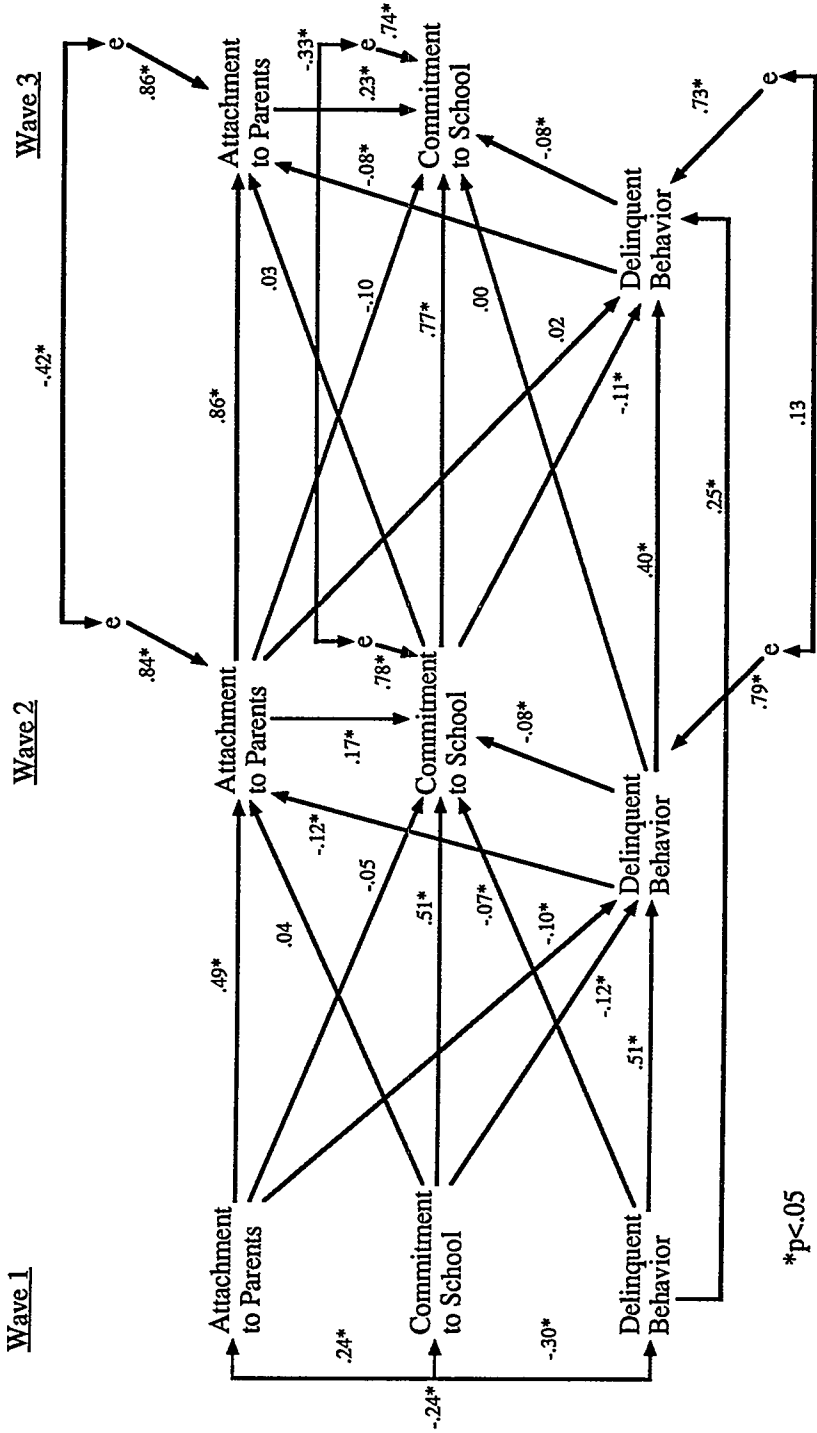


FIGURE 4
EMPIRICALLY SUPPORTED LAGGED RECIPROCAL MODEL



Waves 2 and 3 than they are between Waves 1 and 2. For example, for attachment to parents, the Wave 1 to 2 effect is 0.49 while the Wave 2 to 3 effect is 0.86; for commitment to school, the first stability effect is 0.51 and the second is 0.77. For delinquent behavior, the LaGrange test indicated the importance of adding the stability effect of delinquent behavior at Wave 1 to delinquent behavior at Wave 3. At Wave 3 both one-wave and two-wave lagged stability effects are significant, with the one-year lag being about half the size of the six-month lag. If one adds the two direct stability effects for Wave 3 together, the combined direct effect (0.65) is again somewhat larger than the stability effect from Wave 1 to Wave 2 (0.51).

Overall, one might think of the stability effects for these variables as a sort of momentum of past behaviors encouraging future behaviors. This implies that, for this age group, adolescents are moving toward a sort of equilibrium on these variables. As time passes, the probability increases that the level of a variable at one point will be positively related to the level of that same variable at a subsequent point.⁴² These findings also suggest that one-year time intervals between interviews are too long, because they would tend to homogenize the more rapidly changing and divergent six-month effects and the yearly effect.

There are moderate negative correlations of the residuals for the attachment to parents and commitment to school equations between Waves 2 and 3. This implies that large errors in predicting commitment to school at Wave 2 are associated with small errors in prediction at Wave 3.⁴³ The negative correlation might be removed by including the Wave 1 to Wave 3 stability effect. When this effect was added for delinquent behavior (see above), the correlation between the error terms changed from negative and significant to positive and nonsignificant. In fact, the multiple LaGrange test⁴⁴ suggests adding the two-wave lagged stability effect to the Wave 3 equation predicting attachment to parents. When this effect is added to the model, the maximum likelihood function does not converge, making model estimation impossible. The LaGrange test did

⁴² Of course, at later ages, teens decline and even desist from delinquency. Hence, at some point in the analysis involving later waves of data, it will become increasingly important to locate the factors associated with declining stability over time. These factors would separate the career delinquents from those who desist. At even later ages, stability would again increase because of more uniform desistance in the population.

⁴³ For a discussion of how omitted causal factors could account for these correlations, see Luskin, *Estimating and Interpreting Correlations Between Disturbances and Residual Path Coefficients in Nonrecursive (and Recursive) Causal Models*, 22 AM. J. POL. SCI. 444 (1978).

⁴⁴ Bentler & Dijkstra, *Efficient Estimation*, *supra* note 41.

not call for the inclusion of the Wave 1 to Wave 3 effect for commitment to school.

B. CROSS-LAGGED EFFECTS

The theoretically expected lagged reciprocal relationship between the two bonding variables is not evident in this model. Attachment to parents has significant instantaneous effects on commitment to school, such that high attachment increases commitment. However, the anticipated reciprocal effects from commitment to attachment, either lagged or instantaneous,⁴⁵ are absent. Therefore, it would appear that these variables are involved in a unidirectional relationship with attachment to parents increasing commitment to school.

In addition, for both Waves 2 and 3, the lagged effect of attachment to parents on commitment to school is negative but insignificant if evaluated using a one-tailed test. One expects the level of attachment in Wave 1 to produce decreasing commitment to school in Wave 2, having also controlled for changes in attachment to parents in Wave 2. After having accounted for change, those with high initial levels of parental attachment will experience decreasing commitment, and those with very low levels of attachment will experience increasing commitment. One could think of this result as an example of regression toward the mean of attachment to parents over time.

For the substantive predictions concerning the cross-lagged effects involving delinquency, considerable correspondence exists between the hypothesized and estimated models. Attachment to parents and commitment to school in Wave 1 are significant and negative predictors of delinquent behavior at Wave 2. The standardized coefficients are -0.10 and -0.12 , respectively. In other words, high levels of both attachment to parents and commitment to school in Wave 1 lead to decreases in delinquency from Wave 1 to Wave 2. In addition, however, there is a significant cross-lagged reciprocal effect from delinquent behavior at Wave 1 to commitment to school at Wave 2 (-0.07); high levels of initial delinquency are associated with reductions in commitment to school.⁴⁶ At Wave 2,

⁴⁵ The model including instantaneous effects from commitment to attachment is not shown in this article. The model is the same as that presented in Figure 4 with the addition of an instrumental variable—family involvement—that has a direct effect on attachment to parents at each of the waves.

⁴⁶ Lagged effects from delinquent behavior to attachment to parents are not shown in Figure 4. Initial estimates indicated that they are essentially zero, and they were eliminated from final estimations to improve the fit of the model.

there are also instantaneous negative effects of delinquent behavior on both attachment to parents (-0.12) and commitment to school (-0.08). High delinquency during the last six months produces decreases in attachment to parents and commitment to school.

In combination, these results suggest that low levels of attachment to parents and commitment to school at one time, lead to more delinquency in the next time interval; and high delinquency, in turn, further attenuates attachment to parents and commitment to school. The model shows that even in a relatively short interval, relationships between attachment and commitment on the one hand, and delinquency on the other, can propel one towards or away from delinquency.

Commitment to school and attachment to parents play central roles in the model. At Wave 2, delinquent behavior and attachment to parents both drive commitment to school. Furthermore, increases in attachment to parents cause increases in commitment to school.

The model also shows how these variables interact over time to propel individuals into or out of a delinquent career in the long run. The level of commitment to school at Wave 2, and the stability of delinquency from Waves 1 and 2, lead to increases in delinquency at Wave 3. This starts the cycle again, with higher delinquency at Wave 3 leading to lower attachment to parents. Again, at Wave 3, both delinquent behavior and attachment to parents determine commitment to school.

C. INDIRECT EFFECTS

To this point, analysis has focused on direct effects—the effect of one variable on another—without taking into consideration indirect pathways via intervening or mediating variables. Yet the structure of interactional theory suggests that substantial indirect effects among these variables should occur as well. Since the variables are all interrelated in a relatively dense causal web (see Figure 2), change in any single variable should not only have a direct impact on another variable, but should also have indirect effects as the consequences of that change ripple throughout the causal system. To examine this possibility, Table 2 presents the sum of all indirect effects from each predictor variable to each of the endogenous variables. One can calculate the specific pathways that contribute to these sums from the coefficients presented earlier in Figure 4.⁴⁷

⁴⁷ In the parlance of path analysis, these are the causal indirect effects. They are calculated by simply multiplying adjacent indirect effects. They include neither non-

TABLE 2
INDIRECT EFFECTS FOR ENDOGENOUS VARIABLES†

Predictor Variables	Endogenous Variables						
	Attachment to Parents W2	Commitment to School W2	Delinquent Behavior W2	Attachment to Parents W3	Commitment to School W3	Delinquent Behavior W3	
Attachment to Parents W1	.01	.09*	—	.44*	.08*	-.04	
Commitment to School W1	.01	.02	—	.07*	.42*	-.10	
Delinquent Behavior W1	-.06*	-.05*	—	-.09*	-.14*	.22*	

Attachment to Parents W2	—	—	—	.01	.33*	-.02*	
Commitment to School W2	—	—	—	.01*	.02*	—	
Delinquent Behavior W2	—	-.02*	—	-.14*	-.12*	.01	

Attachment to Parents W3	—	—	—	—	—	—	
Commitment to School W3	—	—	—	—	—	—	
Delinquent Behavior W3	—	—	—	—	-.02*	—	

† Dashes indicate that no indirect paths were estimated.
* Significant at the level of .05 (one-tailed test)

The top panel of Table 2 displays the indirect effects of Wave 1 variables on Wave 2 and 3 endogenous variables. The most informative results concern the Wave 3 endogenous variables (the upper right panel of Table 2), since these variables have the greatest number of indirect paths leading to them.

The main diagonal of the upper right panel presents "indirect stability effects," or, more specifically, the indirect effects of a variable measured at Wave 1 on that same variable measured at Wave 3. These indirect effects are significant and quite high, but almost all of the effect is due to the multiplication of the first and second stability effects, as revealed by an examination of Figure 4.

The off-diagonal entries in that panel are more interesting theoretically since they represent indirect effects across variables. Attachment to parents at Wave 1 has an indirect effect on commitment to school at Wave 3 (0.08), and commitment at Wave 1 has an indirect effect on attachment at Wave 3 (0.07). Interestingly though, neither bonding variable has a significant indirect effect on delinquency. On the other hand, delinquent behavior at Wave 1 has significant effects on both of the Wave 3 bonding variables—attachment to parents (-0.09) and commitment to school (-0.14). Thus, delinquent conduct attenuates a person's bond to conventional society both directly and via a number of indirect pathways.

The one-wave indirect effects, seen in the upper left and the middle right panels of Table 2, are substantially smaller than the two-wave effects just discussed.⁴⁸ Nevertheless, the pattern of results is similar. Indirect effects of the bonding variables on delinquency and on each other tend to be smaller than the indirect effects of delinquency on the bonding variables.

In sum, results for both the direct and indirect effects estimated in this model are quite similar. While attachment to parents and commitment to school tend to reduce delinquent behavior, it appears that delinquent behavior has somewhat stronger and more consistent effects on reducing attachment to parents and commitment to school.

D. BACKGROUND VARIABLES

Table 3 shows the effects of sex, age, and ethnicity on the endogenous variables in the model. The most notable findings are

causal indirect effects (traversing backwards on an arrow) nor spurious effects (effects traversing correlations among exogenous variables).

⁴⁸ There is one exception to this statement. The indirect effect of Wave 2 attachment on Wave 3 commitment is large (0.33), primarily because this effect includes two pathways that involve stability effects.

TABLE 3
EFFECTS OF BACKGROUND VARIABLES AND GOODNESS-OF-FIT STATISTICS FOR LAGGED RECIPROCAL MODEL

Variable Names	Wave 2		Wave 3	
	Attachment to Parents	Commitment to School	Attachment to Parents	Commitment to School
Sex (Male)	.03	.04	-.01	-.04
Age	.02	-.10*	.05	-.03
Ethnicity (Afro-American)	.04	.08*	.01	.06
Ethnicity (Hispanic)	.01	-.03	.02	-.00
			Delinquent Behavior	Delinquent Behavior
			.02	.08*
			.05*	.01
			.07*	.06
			-.01	.02

* $p < .05$ (one-tailed test)

Note: Goodness-of-fit indices for the total model

Chi-square: 11.48 with 7 degrees of freedom ($p = .12$)

Bentler-Bonett Normed Fit Index: .997

that age decreases commitment to school at Wave 2; males are more likely to experience increases in delinquent behavior at Wave 3; and Afro-Americans report more increases in commitment to school and increases in delinquency than others. None of these effects are particularly strong, however, suggesting that this model applies reasonably well to each of these major demographic subgroups.

VI. DISCUSSION

The classical version of control theory, epitomized by Hirschi's presentation, has generated much research over the past two decades. Although some of that research has supported hypotheses derived from that perspective, other examinations have pointed to deficiencies in the theory. Integrated theories, which combine propositions from control theory and social learning theory, address one of these deficiencies—the failure to include the impact of differential associations in predicting delinquent behavior. Integrated control theories, however, share with classical control theories a static theoretical structure, failing to attend to developmental issues and not allowing for reciprocal causal influences.

In contrast to these models, interactional theory explicitly recognizes that causal influences vary at different developmental stages and that many causal relationships are reciprocal. To account for these issues, interactional theory is necessarily more complex and less parsimonious. The current analysis has addressed the question of whether such complexity is warranted by focusing on the part of the overall model that includes the interrelationships among attachment to parents, commitment to school, and delinquent behavior for early adolescence.

Results warrant such theoretical complexity. In terms of the hypotheses of reciprocal relationships offered by interactional theory in the present analysis, only the relationship concerning the two bonding variables is unsupported. While attachment to parents has an instantaneous effect on commitment to school, commitment to school does not exert a significant lagged or instantaneous effect on attachment to parents.

Commitment to school and delinquent behavior are involved in a mutually reinforcing causal relationship over time. Low commitment increases delinquency, and delinquency in turn reduces commitment to school. Reciprocal effects for these variables are quite stable over the three waves of this panel model.

The relationship between attachment to parents and delinquent behavior is somewhat more complex. From Wave 1 to 2 these vari-

ables are reciprocally related: low attachment leads to increases in delinquency and delinquency further attenuates the adolescent's attachment to parents. From Wave 2 to 3, however, the relationship between these variables appears to be unidirectional; delinquency has a negative impact on attachment, but attachment to parents does not have a significant effect on delinquency. The latter finding, while not anticipated by either classical or integrated control theory, is suggested by the model for middle adolescence presented in interactional theory.⁴⁹ That model posits that parental influences in accounting for delinquency diminish considerably over time as adolescents gain independence. Indeed, by middle adolescence, attachment to parents is viewed as an effect of delinquency rather than a cause of it. The findings reported here are quite consistent with this developmental perspective.

These reciprocal effects and the significant indirect effects observed here are also consistent with interactional theory's concept of behavioral trajectories. This concept suggests that for adolescents who are weakly bonded to society,

the initially weak bonds lead to high delinquency involvement, the high delinquency involvement further weakens the conventional bonds, and in combination both of these effects make it extremely difficult to reestablish bonds to conventional society at later ages. As a result, all of the factors tend to reinforce one another over time to produce an extremely high probability of continued deviance.⁵⁰

On the other hand, of course, there are adolescents who are highly attached to parents and committed to school, and they are unlikely to engage in delinquency. In turn, their generally conforming behavior patterns further cement their bond to conventional society. In this case, a behavioral trajectory is established that leads to increasing conformity.

While these results support interactional theory, it must be emphasized that they address only a part of the overall theoretical argument. Whether the reciprocal relationships found in this study remain once variables like association with deviant peers are entered into the model has yet to be determined. The estimation of such a model is the ultimate objective of the Rochester Youth Development Study, and the present findings offer encouragement to pursue that objective.

Perhaps more importantly than what the results suggest about interactional theory is what they suggest about research strategies in the study of delinquency causation. By collecting and analyzing

⁴⁹ Thornberry, *supra* note 1, at 877-79.

⁵⁰ *Id.* at 893.

panel data and allowing for reciprocal effects, this study calls into question the interpretation of results from studies that examine only unidirectional relationships. It has been argued that unidirectional hypotheses that ignore causal effects from delinquency to commitment and from delinquency to attachment are theoretically implausible. The results of this study join with the relatively few previous investigations of reciprocal relationships to suggest that such hypotheses are also empirically implausible. However, if researchers confine their investigations to cross-sectional studies or do not examine bidirectional hypotheses when they have access to panel data, they will continue to make important errors in interpretation. Although this study did not directly investigate the developmental aspects of interactional theory, some of its results also suggest that future studies should examine developmental changes more thoroughly as well.

VII. POLICY IMPLICATIONS

The results of this study have a number of implications for programs designed to prevent and treat delinquency. The remainder of this article discusses some of these implications. Our intent is to identify issues that should be addressed by intervention programs; we do not attempt to recommend how one should design those programs or what specific modalities one should offer. The design of programs goes beyond the inferences that one can draw from these data and requires the special expertise of treatment agents. Nevertheless, the findings of this research have a number of implications for policy.

First, this study highlights, once again, the importance of bonding adolescents to conventional society as an important step in reducing delinquency. In doing so, however, programs should begin to treat delinquent behavior as an active rather than a passive element in the causal system. Because of its reciprocal relationships with the bonding variables, delinquent behavior contributes, in a very real sense, to its own causation. Once exhibited, delinquency causes a deterioration in attachment and commitment, which, in turn, leads to further increases in delinquency. Treatment agents need to be aware of this causal pattern and should design intervention strategies that reduce or mitigate the negative consequences of delinquency on family and school. If this is not done, then the adolescent's continuing delinquency may simply "undo" the success of intervention programs in improving attachment to family and commitment to school.

Second, the interlocking nature of the causal relationships suggests the need for comprehensive, holistic treatment strategies. Since delinquency appears to be embedded in a rather complex causal network, there is no single, direct pathway to delinquency. For this reason, programs need to address all of these causal influences as a coherent package. Precisely because of the reciprocal nature of delinquency causation, single focus interventions are less likely to be successful than programs that deal with multiple factors and their interrelationships simultaneously.

The emphasis on holistic programs that flows from an interactional perspective has both positive and negative features. On the negative side, it suggests that interventions need to be comprehensive and interdisciplinary and therefore are likely to be both expensive and difficult to manage. On the positive side, however, it suggests that successful intervention in any one part of the system will tend to ripple throughout the system, helping intervention efforts targeted at another factor. For example, family interventions that improve attachment to parents should also indirectly improve commitment to school, thereby making the efforts of teachers and counselors to improve academic performance in school a little easier.

Third, these findings suggest that family interventions should start relatively early in the life-course, since the causal impact of attachment to parents on delinquency appears to weaken as these subjects begin to enter middle adolescence. If this pattern continues, it would highlight the importance of intervening in other aspects of the adolescents' lives as they mature.

Fourth, results of this study suggest the importance of the educational arena as one of the other aspects of the adolescents' lives. Commitment to school and delinquent behavior have strong reciprocal effects on one another. Programs that attempt to break the cycle of alienation from school increasing delinquency, and delinquency increasing alienation from school, appear to be particularly important at these ages. At still later ages, other intervention targets are likely to become more salient. For example, by late adolescence, providing for a smooth transition from school to work is likely to be a central issue for reducing criminal involvement. The more general point is that intervention strategies need to be both holistic in scope and flexible enough to be developmentally appropriate.

Finally, results reported here suggest that if problems in the family or school, or initial delinquency itself, are left unattended, a behavioral trajectory is established that increases considerably the

likelihood of a delinquent career. After some initial impetus is provided, the reciprocal nature of the causal system tends to be self-perpetuating, and delinquency becomes more and more likely. On the other hand, however, if early problems are successfully treated, then the same reciprocal quality of the system works to decrease the chances of delinquency and increase the chances of conformity. For example, successful family intervention should both reduce delinquency and increase commitment to school, which should begin a set of mutually reinforcing relationships that make delinquency less and less likely. The most important point from an interactional perspective is that all of the causes of delinquency need to be identified and dealt with in a coordinated fashion to take advantage of the reciprocal quality of the system, thereby establishing a behavioral trajectory that makes delinquency increasingly less likely.

APPENDIX A
FACTOR ANALYSIS AND RELIABILITY ANALYSIS FOR BONDING VARIABLES

Items	Wave 1		Wave 2		Wave 3	
	Factor Loading	Alpha	Factor Loading	Alpha	Factor Loading	Alpha
Attachment to Parents						
<i>How often would you say that . . .</i>						
<i>(1. Never 2. Seldom 3. Sometimes 4. Often)</i>						
1. You get along well with your _____?	.662	.82	.716	.87	.698	.87
2. You feel that you can really trust your _____?	.644		.736		.700	
3. Your _____ does not understand you?	.304		.406		.407	
4. Your _____ is too demanding?	.401		.408		.447	
5. You really enjoy your _____?	.782		.814		.795	
6. Your _____ interferes with your activities?	.358		.382		.382	
7. You think your _____ is terrific?	.772		.774		.769	
8. You feel very angry toward your _____?	.482		.517		.547	
9. You feel violent toward your _____?	.458		.531		.548	
10. You feel proud of your _____?	.667		.739		.722	
11. You have a lot of respect for your _____?	N.A.		.565		.566	
<hr/>						
Commitment to School						
<i>How much do you agree or disagree with these statements?</i>						
<i>(1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree)</i>						
1. Since school began this year, you like school a lot.	.465	.76	.478	.80	.553	.83
2. School is boring to you.	.391		.533		.605	
3. You do poorly at school.	.487		.591		.613	
4. You don't really belong at school.	.491		.551		.560	
5. Homework is a waste of time.	.593		.641		.632	
6. You try hard at school.	.600		.587		.679	
7. You usually finish your homework.	.494		.567		.617	
8. Getting good grades is very important to you.	.600		.622		.606	
9. Sometimes you do extra work to improve your grades.	.428		.452		.450	
10. If you could choose on your own between studying to get a good grade on a test or going out with your friends, would you304		.357		.435	
<i>(1. Definitely go out with friends 2. Probably go out with friends 3. Probably study 4. Definitely study)?</i>						

APPENDIX B
SELF-REPORTED DELINQUENCY ITEMS

Have you ever . . .

1. Run away from home?
2. Skipped classes without an excuse?
3. Lied about your age to get into some place or to buy something?
(for example, lying about your age to get into a movie or to buy alcohol)
4. Hitchhiked a ride with a stranger?
5. Carried a hidden knife, gun, or other weapon?
6. Been loud or rowdy in a public place where somebody complained and you got in trouble?
7. Been drunk in a public place?
8. Damaged, destroyed or marked up somebody else's property on purpose?
9. Set fire on purpose or tried to set fire on purpose to a house, building, or car?
10. Avoided paying for things, like a movie, taking bus rides, using a computer, or anything else?
11. Gone into or broken into a building to steal or damage something?
12. Tried to steal or actually stolen money or things worth \$5 or less?
13. Tried to steal or actually stolen money or things worth between \$5 and \$50?
14. How about between \$50 and \$100?
15. How about more than \$100?
16. Snatched someone's purse or wallet or picked someone's pocket?
17. Tried to buy or sell things that were stolen?
18. Taken a car or motorcycle for a ride without the owner's permission?
19. Stolen or tried to steal a car or other motor vehicle?
20. Forged a check or used fake money to pay for something?
21. Used or tried to use a credit card, bank card, or automatic teller card without permission?
22. Tried to cheat someone by selling them something that was worthless or not what you said it was?
23. Used a weapon with the idea of seriously hurting or killing someone?
24. Hit someone with the idea of hurting them? (other than what you just told me about)
25. Been involved in gang fights?
26. Thrown objects such as rocks or bottles at people? (other than events you have already mentioned)
27. Used a weapon or force to make someone give you money or things?
28. Sold marijuana, reefer or pot?
29. Sold other drugs such as heroin, cocaine, crack, or LSD?