

# **STUDENT ANGER AND AGGRESSIVE BEHAVIOR IN SCHOOL: AN INITIAL TEST OF AGNEW'S MACRO-LEVEL STRAIN THEORY**

**TIMOTHY BREZINA  
ALEX R. PIQUERO  
PAUL MAZEROLLE**

*Variation in criminal/delinquent behavior across communities, schools, and other social units is usually explained in terms of social disorganization and subcultural values. Agnew's macro-level strain theory (MST), however, provides an additional explanation. MST contends that macro-level differences in crime and deviance can also be explained in terms of aggregate levels of anger and frustration. Following Agnew's recommendations, the authors conduct an initial school-level test of MST using data on aggressive student behavior from a national sample of public high schools. The results of the assessment lend partial support to the theory, showing that student-to-student conflict is partly a function of the level of anger in the student population. Other forms of aggressive student behavior, however, are not likewise affected. Nonetheless, the authors believe the findings are sufficiently promising to warrant further examination of MST, and they offer some suggestions in this regard.*

In recent years, the criminological community has witnessed a resurgence of interest in strain theory. This development is largely attributable to Agnew's (1992) formulation of general strain theory (GST). According to GST, individuals may encounter aversive social relations in which they experience goal blockage, are presented with noxious stimuli, and/or are deprived of positively valued stimuli. These relations tend to generate negative affect,

---

An earlier version of this article was presented at the 1999 meetings of the Academy of Criminal Justice Sciences, Orlando. We wish to thank the editor and several anonymous reviewers for their helpful comments and suggestions. Address correspondence to Dr. Timothy Brezina, Department of Sociology, Tulane University, 220 Newcomb Hall, New Orleans, LA 70118; e-mail: tbrezin@tulane.edu.

JOURNAL OF RESEARCH IN CRIME AND DELINQUENCY, Vol. 38 No. 4, November 2001 362-386  
© 2001 Sage Publications

create pressures for corrective action, and increase the likelihood of criminal/delinquent behavior. Anger plays a central role in GST and is said to have a particularly strong connection to delinquency because it “energizes” strained individuals to action, lowers inhibitions, increases felt injury, and “creates a desire for retaliation and revenge” (Agnew 1992:60).

Agnew’s (1992) version of strain theory highlighted various independent variables and provided rather clear guidelines for empirical testing. For this reason, GST has attracted much attention from researchers (e.g., Brezina 1996; Hoffmann and Miller 1998; Mazerolle and Piquero 1997; Paternoster and Mazerolle 1994). In particular, Agnew highlighted the assumptions and intervening processes that most clearly distinguish strain theory from competing theoretical frameworks. Whereas social control theory assumes that individuals are “freed” into delinquency, and social-learning theory assumes that individuals come to view delinquency as a form of desirable or justifiable behavior, strain theory assumes that individuals are *pressured* into delinquency by their circumstances. Moreover, strain theory is the only major crime theory to emphasize the importance of anger and other negative emotions (Agnew 1995a).

Initial tests of GST have been promising. Strain in parental and school relations (e.g., parental punitiveness, negative comments from teachers, and frustration with school) has been linked to delinquency in several studies, controlling for social control and social-learning factors (Agnew 1985; Agnew and White 1992; Brezina 1998; Broidy 2001; Hoffmann and Miller 1998; Mazerolle 1998; Mazerolle and Piquero 1997, 1998; Paternoster and Mazerolle 1994; Piquero and Sealock 2000). In addition, certain data indicate that anger is an important intervening mechanism linking strain to delinquent outcomes, especially interpersonal violence or aggression (Agnew 1985; Brezina 1998; Broidy 2001; Mazerolle and Piquero 1997, 1998; but see Mazerolle et al. 2000). Although more testing will be required to fully evaluate the theory, these initial results suggest that GST may have an important place to occupy in contemporary criminological theory.

It is important to note, however, that Agnew (1992:75) presented his formulation of strain theory as a foundation for further theoretical development rather than a “fully developed alternative” to earlier strain theories. GST, for example, was pitched at the individual level of analysis. This fact represents a potential limitation of the theory because, as Agnew recognized, the macro implications of GST had not been fully developed.

In a recent article, Agnew (1999) addressed this issue by presenting an extended and elaborated version of GST that is designed to explain community-level (or macro-level) differences in criminal and delinquent

behavior. In addition to social disorganization and subcultural values, this version of GST contends that aggregate-level variation in crime/delinquency can also be explained in terms of frustrating social conditions and aggregate levels of anger and frustration. The characteristics of certain communities are said to be particularly aversive. As a result, these communities are inhabited by a high percentage of angry/frustrated individuals and thus exhibit relatively high rates of criminal/delinquent behavior.

The purpose of this study is to conduct an initial test of Agnew's macro-level version of strain theory (henceforth, MST). As Agnew (1999) observed, currently available data sets do not allow for an adequate test of the theory at the community level of analysis. However, Agnew (1999:140) suggested that available school-level data can be used to conduct an initial evaluation of MST. If the core propositions of MST are correct, variation in problem behavior across schools should be associated with aggregate-level student anger, controlling for other relevant variables.

Following Agnew's (1999:140) recommendations, we conducted an initial school-level assessment of MST using data on aggressive student behavior from a national sample of public high schools. Like Agnew, we believe that school-level data can shed useful light on the possible merits of MST, and, at least for a preliminary test of the theory, school-level data appear to have certain advantages. As Agnew stated, MST "is best tested with data from smaller areas" (p. 124). Unlike metropolitan areas and other large social units, schools can be expected to be more homogeneous in terms of the major independent and dependent variables. Schools are also more likely to have definite boundaries, with more extensive interaction between members (Felson et al. 1994).

Although the main purpose of this study is to examine the merits of MST, our focus on aggressive student behavior should also be of interest to criminologists. There is growing concern with student conflict, aggression, and violence in our schools, and many psychologists believe that anger is an important contributing factor (Furlong and Smith 1994). Yet, despite some evidence of a correlation between anger and student aggression, "anger, particularly among children and adolescents, has received only limited research attention" (Smith et al. 1998:2). Our analyses will help to elucidate the processes through which anger affects student behavior. This study, then, will add to the literature on problem behaviors in school as well as the literature on strain theory. Before turning to the results of the data analyses, we provide a brief summary of MST and describe how it applies to aggressive/disruptive behavior in the school setting.

*A BRIEF SUMMARY OF AGNEW'S MST**The Dominant Theories of Macro-Level  
Variation in Crime and Delinquency*

Variation in criminal and delinquent behavior across macro-level social units (e.g., schools, neighborhoods, and metropolitan areas) is usually explained in terms of social disorganization/social control theories and, to a lesser extent, subcultural deviance theories. The dominance of these two theoretical perspectives is readily apparent in the community crime literature.

According to social disorganization theorists, some communities exhibit relatively high rates of crime and delinquency because they have lost the ability to control their members (Bursik 1988; Bursik and Grasmik 1993). Due to high rates of residential mobility, family disruption, economic deprivation, or other manifestations of social disorganization, high-crime communities tend to suffer from low participation in community life, weak commitment to community institutions, and inadequate supervision of youths (Sampson, Raudenbush, and Earls 1997). As a result, members of disorganized communities have more freedom to engage in crime and delinquency. The results of numerous empirical studies are, in fact, consistent with a social control explanation (e.g., Bellair 1997; Elliott et al. 1996; Sampson 1987; Sampson and Groves 1989; Veysey and Messner 1999).

Subcultural deviance explanations are also prominent in the community crime literature, although there is less direct support for these explanations (Cao, Adams, and Jensen 1997; but see Anderson 1994; Heimer 1997; Markowitz and Felson 1998; Matsueda et al. 1992). According to subcultural accounts, the characteristics of disadvantaged communities foster the development of subcultures that hold values conducive to crime and deviance. Anderson (1994), for example, observed that much social interaction in high-crime neighborhoods is governed by the "code of the streets." Residents who live by the code actively campaign for respect in the streets by abusing others and view violence as a necessary or acceptable response to slights and provocations (see also Luckenbill and Doyle 1989).

The dominance of social disorganization and subcultural deviance explanations is also apparent in the literature on school disorder. In the attempt to explain variation in delinquent or disruptive behavior across schools, researchers typically examine the effects of social disorganization and student values. Studies in this area have focused on the contribution of internal or institutional factors (e.g., overall levels of student commitment, approval of delinquent conduct, and other aspects of "school climate"), the contribution of external factors related to the status of the surrounding community

(e.g., local rates of poverty, crime, and residential stability), or some combination of internal and external factors (Ennett et al. 1997; Felson et al. 1994; Gottfredson and Gottfredson, 1985; Hellman and Beaton 1986; Tygart 1988; Welsh, Greene, and Jenkins 1999; Welsh, Stokes, and Greene 2000). In general, the results of these studies indicate that variables derived from social disorganization and subcultural deviance theories can help to explain why some schools are plagued by relatively high levels of crime, delinquency, and problem behavior.

#### *Agnew's MST*

MST provides an additional explanation of aggregate-level variation in criminal and delinquent behavior. In terms of community-level differences in crime and deviance, MST contends that these differences are a function not only of differences in social control and values "but also of differences in the *motivation* for crime" (Agnew 1999:126, emphasis added). In addition to low social control and subcultural orientations, Agnew argued that the characteristics of disadvantaged communities (e.g., inequality, blocked opportunity, and various life stressors) contribute to strain and high levels of anger/frustration (for a complete description of the possible sources of community strain and anger, see Agnew 1999). Disadvantaged communities, then, suffer from a relatively high proportion of strained and angry individuals in the resident population. This is another reason for the high levels of crime and delinquency observed in these communities, based on the assumption that strain/anger is a major source of deviant motivation.

A further and particularly intriguing argument of MST is that a high concentration of angry residents, in itself, can escalate crime. When communities suffer from a high density of angry persons, this increases the likelihood that residents will make contact with angry, upset, and potentially hostile individuals. It also increases the likelihood that angry individuals will interact with one another. This situation has the potential to generate much "interpersonal friction" and, ultimately, higher levels of conflict and aggression (see also Bernard 1990).

Agnew (1999) also considered the community-level factors that are likely to condition the effects of strain and anger on crime. Individuals may cope with strain and anger in a variety of ways (e.g., attack the source of adversity or use cognitive techniques to minimize subjective strain), and not all involve crime or delinquency. The likelihood of criminal versus conventional coping is likely to be shaped by such factors as the availability of conventional coping resources in a community, the presence of subcultures that encourage deviant adaptations to strain, level of community social control, and extent of criminal opportunity.

Several of these conditioning variables are borrowed from social disorganization and subcultural deviance theories. This is a noteworthy observation because it highlights the fact that, although MST provides an additional explanation for community crime rates, it is not meant to replace social disorganization and subcultural deviance theories (Agnew 1999). Rather, MST is proposed as a supplement to these theories. As Agnew (1999) argued, “a full explanation of community differences in crime rates must draw on a range of theories, including those which examine the ways in which communities *motivate* as well as *control* crime” (p. 147).

Although Agnew (1999) focused on the application of MST to community differences in crime rates, he suggested that key aspects of the theory can be used to explain variation in crime and deviance across other social units, including schools. (As described below, he stated that school-level data can be used to conduct a preliminary test of the theory.) In particular, school-level variation in crime, delinquency, and problem behavior is likely to be a function not only of social disorganization and subcultural values but also the level of anger in the student population. Moreover, when a school harbors a relatively angry student population, this increases the likelihood that students will interact with angry/upset peers and, hence, “get into conflicts” (Agnew 1999:141).

### ASSESSING THE EMPIRICAL VALIDITY OF AGNEW'S MST

#### *Testing Core Propositions with School-Level Data*

MST asserts that a full explanation of macro-level variation in crime and deviance requires attention to aggregate levels of anger/frustration in addition to variables derived from social disorganization and subcultural deviance theories. To determine the validity of this assertion, it will be necessary to estimate the effects of MST, social disorganization, and subcultural deviance variables simultaneously, in multivariate analyses (Agnew 1995c, 1999; Agnew et al. 1996).

As Agnew (1999) observed, attempts have not yet been made to measure all of the necessary variables at the community level of analysis. However, he noted that appropriate school-level data are available, namely, data contained in the Youth in Transition Survey (YIT) (Bachman 1975). This data set contains an adequate range of theoretically relevant variables and can be used to conduct an initial test of key MST propositions. As Agnew (1999) stated:

The Youth in Transition (YIT) data set contains a measure of anger/frustration that can be aggregated to the school level. We can, therefore, estimate the per-

centage of angry/frustrated individuals in each school. The YIT data also allow us to construct rough measures of school disorganization and school values conducive to crime/violence. . . . [If MST is correct,] we would expect the aggregate measure of anger/frustration to be related to school crime rates even after school disorganization and values are controlled. (P. 140)

The ability to construct an aggregate measure of student anger also permits a test of the interpersonal-friction argument of MST. If a high density of angry students promotes interpersonal conflict and aggression, “we would also expect the aggregate measure of anger/frustration to be related to individual crime, even after individual anger/frustration and other individual-level variables [are] controlled” (Agnew 1999:140).

As stated earlier, school-level data may be particularly suitable for a preliminary test of MST because the theory is best tested with data from smaller units of analyses. We can also note that school-level data may be especially suitable for testing the interpersonal-friction argument. Students rarely have the opportunity to choose which schools they attend, and they generally have little control over their interactions with other students. For example, it is not always possible for students to avoid interactions with other students; they may be assigned to the same classes or be forced to navigate the same passageways. Thus, students may be forced to interact with others, even if they find these interactions to be hostile or unpleasant. This feature of the school environment should maximize the likelihood of finding support for the interpersonal-friction argument of MST—if, in fact, this argument is valid.

#### *A Focus on Aggressive Behavior*

In the next section of the article, we describe the details of an initial test of MST. Our test of MST conforms to Agnew’s (1999) recommendations with, perhaps, one exception. Although Agnew (1999) did not outline hypotheses that are specific to particular types of criminal, delinquent, or deviant outcomes, our analyses focus strictly on aggressive/disruptive student behaviors, such as fighting and arguing with teachers and peers. This focus is mainly a function of limitations inherent in the YIT data (see below).

For several reasons, our focus on aggressive behavior should not be a major problem for an initial school-level test of MST. First, the interpersonal-friction argument appears to be mainly relevant to aggressive behavior, particularly conflict between students. Second, researchers have noted that, due to the theory’s focus on anger, GST arguments are especially relevant to aggressive behavior (Mazerolle and Piquero 1997). Data indicate that anger has a more substantial effect on aggression than other forms of deviant conduct<sup>1</sup> (Agnew 1985:160; see also Mazerolle et al. 2000; Mazerolle and

Piquero 1998; Piquero and Sealock 2000). This finding is consistent with a sizable psychological literature documenting the aggression-provoking qualities of anger. Anger typically occurs when individuals have attributed blameworthiness to others. Moreover, angry arousal increases the likelihood that further conflict will lead to an aggressive response because it tends to lower the individual's threshold for perceived wrong or injury. Thus, if a person is already in a state of arousal, "even a casual remark" may be interpreted as an affront and "any further obstruction as an unwarranted infringement" on the individual's rights (Averill 1982:142; see also Berkowitz 1993; Bernard 1990; Zillman 1979).

We should also note that, although the focus of our analyses includes attention to relatively minor aggressive acts, such acts can lead to more serious forms of aggression in the school context. Research conducted by Lockwood (1997:2) indicated that violent incidents at school typically originate from seemingly trivial "opening moves," such as a push or shove, an insult, an accusation of wrongdoing, verbal teasing, or other "minor affronts." (In fact, Lockwood suggested that reducing the frequency of minor affronts may be the most promising approach to the problem of school violence.)

In the analyses presented below, our main goal is to test the core propositions of MST as they apply to aggressive behavior at school. Due to data limitations and other restrictions, we do not attempt to examine factors that may condition the effects of anger on student aggression.<sup>2</sup> Although this fact limits the breadth of our assessment, at this point it seems most useful to determine whether the central arguments of MST are at all valid. Similar preliminary investigations of core theoretical propositions have been undertaken and have been useful in the assessment of self-control (Grasmick et al. 1993), general strain (Agnew and White 1992), and control balance (Piquero and Hickman 1999) theories.

#### *DATA AND METHODS*

To conduct an initial test of MST, we draw on individual and school-level data from the first and second waves of the YIT survey (Bachman 1975). The YIT data set has been used in previous research on schools and problem behavior, mainly to test arguments derived from social control and subcultural deviance theories (Felson et al. 1994). Prior research, then, provides a useful starting point for this study. We can now add an aggregate measure of anger to the list of independent variables.<sup>3</sup>

The initial wave of the survey (time 1) is based on a national sample of 2,213 male public high school students in the 10th grade, drawn from 87 randomly selected schools.<sup>4</sup> According to the principal author of the study, the



YIT sample constitutes “an essentially bias-free representation of tenth-grade boys in public high schools throughout the United States” (Bachman 1975:1). The second wave of the survey (time 2) is based on data collected from 1,886 (85 percent) of the original respondents the following school year, when they were in the 11th grade. Data presented by Bachman, O’Malley, and Johnston (1978:257-61) indicate that the survey results were not seriously biased by either panel attrition or repeated measurement effects.<sup>5</sup>

The YIT data were obtained from personal interviews and questionnaires administered to the respondents. A school identification code is provided for each respondent, and thus it is possible to aggregate individual-level data (e.g., anger, commitment to school, deviant beliefs, and aggressive behavior) to the school level.

Most of the study variables described below are measured at both the individual and school level. For continuous variables, the school-level measures represent the means of the individual-level variables. For dichotomous variables (such as race), the school-level variables are equivalent to the proportion of students in each school who share a particular characteristic or attribute (see the appendix for descriptive statistics and correlations among the school-level measures).

#### *Measurement of Dependent Variables*

Although the YIT survey contains several delinquency scales, most of these scales are not well suited for the purposes of this study. First, the items in most of the delinquency scales ask respondents to report the number of times they engaged various acts during the past three years. These scales, then, index behaviors that may have occurred before students were actually enrolled in the various schools included in the sample. This is a problem if we wish to estimate the level of problem behavior at each school.

Second, most of the scales fail to measure delinquent/disruptive behavior that is specific to the school context. This is a potential problem if we are interested in estimating the effect of school-context variables on student behavior because it is reasonable to assume that such variables would mainly affect behavior occurring in or around schools.

Fortunately, the YIT data set contains several items that allow us to avoid these problems. During each wave of data collection, respondents were asked to report the general frequency in which they engaged in various aggressive and disruptive behaviors at their school. Responses to these items were used to construct the dependent variables.<sup>6</sup>

Respondents who score high on a three-item scale of Aggressive Behavior say they often (1) “fight or argue with other students,” (2) argue “with their

teachers,” and (3) do things they “know will make the teacher angry” (factor loadings range from .77 to .86). Responses to each item in the scale range from 1 (*never* engage in the behavior) to 5 (*almost always* engage in the behavior). The mean of the items constitutes the scale score. To test the interpersonal-friction argument of MST, we conduct separate analyses using the single-item measure of fighting/arguing with other students (item 1 in the above scale), which we label Conflict with Peers.

In the analyses reported below, we control for the effects of prior aggression/conflict to increase confidence in proper temporal ordering. In particular, we estimate the effects of time 2 school-context variables on time 2 Aggressive Behavior and Conflict with Peers while controlling for time 1 aggression/conflict.

#### *Measurement of Independent Variables*

A number of independent variables were constructed with the aid of factor analysis. For example, a number of items relating to anger/frustration were factor analyzed using principal components extraction and an orthogonal method of rotation. Items that loaded high onto a single factor (at least .50) were then selected to form an anger scale. The scale items are equally weighted, and the average of these items constitutes the scale score. (All of the following independent variables are measured at time 2.)

*Anger.* High scorers on a six-item Anger scale say they often (1) feel like a “powder keg ready to explode,” (2) feel like “losing their temper,” (3) feel like swearing, (4) feel like being rude, (5) lose their temper easily, and (6) are irritated by small things (factor loadings range from .59 to .75). In short, these are angry and frustrated individuals (see also Agnew 1985; Brezina 1996).

*Commitment to School.* High scorers on a four-item measure of Commitment to School state that it is “very good” to (1) study constantly “in order to become a well-educated person,” (2) work hard “to achieve academic honors,” (3) strive to get “the top grade-point average in the group,” and (4) study hard “to get good grades” (factor loadings range from .70 to .83). In short, these individuals are highly committed to conventional academic goals. This measure has been used in past research to index social control (e.g., Agnew 1985; Brezina 1996; Felson et al. 1994).

*Approval of Aggression.* High scorers on this three-item scale express beliefs or values that are conducive to aggressive behavior in response to various types of provocation (see Felson et al. 1994). In particular, these individuals devalue nonaggressive responses to personal attacks and wrongdoing,

stating that it is *not good* to (1) turn the other cheek and forgive others when they harm you, (2) reply to anger with gentleness, and (3) be kind to people “even when they do things against one’s beliefs” (factor loadings range from .66 to .80). This measure has been used in past research to index adherence to a subculture of aggression or violence (Felson et al. 1994).

#### *Measurement of Control Variables*

A number of control variables are entered into the analyses including the following dummy variables: race (1 = Black), family stability (scored 1 if the respondent lives with both his mother and father), and residential stability (scored 1 if the respondent [a] had lived in his present locality for six or more years at time 1, and [b] had not experienced a change of residence by time 2). The analyses also control for socioeconomic status and school size, each measured at time 1. Socioeconomic status is measured by a six-item index constructed by the original investigators (Bachman 1975), which combines information on father’s occupational status, father’s education, mother’s education, number of rooms per person in the home, number of books in the home, and a checklist of other possessions (e.g., a map or globe, a set of encyclopedias, a camera). The mean of the six items constitutes the scale score. The measure of school size is based on total student enrollment.

#### *Analyses*

The data analyses proceed in three steps. First, we conduct analyses of variance (ANOVA) to determine the amount of variation in aggression/conflict occurring within and between schools. It is important to demonstrate that a sufficient amount of between-school variation in aggression/conflict exists to warrant further consideration, especially in light of MST predictions. If levels of student conflict and aggression do not vary across schools, then there will be nothing for school-level variables to explain (Felson et al. 1994).

Second, we conduct aggregate school-level multivariate analyses based on ordinary least squares regression (OLS). The OLS analyses focus on the ability of school characteristics (such as the aggregate measure of student anger) to explain *school-level differences* in overall aggression/conflict. In these analyses, both explanatory and outcome measures are aggregated to the school level.

Third, we conduct contextual analyses based on hierarchical linear modeling (HLM), version 4.04 (Bryk and Raudenbush 1992). The contextual analyses focus on the ability of school-level characteristics to explain *individual differences* in aggression/conflict, net of the influence of individual-level

characteristics. Contextual analyses, then, will allow us to estimate the effects of aggregate-level anger on student aggression/conflict while controlling for individual anger and other variables. By controlling for individual-level characteristics, we gain confidence that the observed effects of school climate variables are not simply a reflection of individual characteristics, which may also vary across schools. Such analyses are required to test the interpersonal-friction proposition of MST.

## RESULTS

### ANOVA

The results of one-way ANOVA (not shown) indicate that, although most of the variation in the dependent variables occurs within schools (93 to 94 percent), a significant proportion of the total variance occurs between schools. Approximately 7 percent of the variation in Aggressive Behavior ( $F$  value = 1.43,  $p < .05$ ) and 6 percent of the variation in Conflict with Peers ( $F$  value = 1.28,  $p < .05$ ) occurs between schools. Although the amount of between-school variation in student aggression/conflict is not large, contextual variables at any level of analysis “rarely explain more than 5 percent to 10 percent of the total variance in any dependent variable” (Felson et al. 1994:163; see also Welsh et al. 1999). Thus, the ANOVA results are typical for this line of research and suggest that schools are meaningful contexts for the study of aggressive behavior.

### *Aggregate-Level Analyses*

Table 1 presents the results of the aggregate-level analyses.<sup>7</sup> The first equation in Table 1 shows the effects of the aggregate-level variables on Aggressive Behavior, whereas the second equation shows the effects of these variables on Conflict with Peers. The results provide mixed support for MST. Anger fails to exhibit a significant effect on Aggressive Behavior, indicating that schools with relatively angry student populations do not necessarily witness high levels of fighting and arguing directed at both teachers and peers. However, anger exhibits a significant effect on the more specific measure of Conflict with Peers ( $p > .05$ ), controlling for prior conflict and other variables.

Thus, although the aggregate-level measure of student anger does not affect aggressive behaviors of a relatively general nature, it does predict student-to-student conflict.<sup>8</sup> This pattern of results is not entirely consistent

TABLE 1: Aggregate Analyses of the Determinants of Aggressive Student Behaviors

	Time 2 Dependent Variables							
	Aggressive Behavior				Conflict with Peers			
	b	(B)	SE	t Value	b	(B)	SE	t Value
Time 2 independent variables								
Anger	.154	(.155)	.098	1.574	.283	(.255)	.099	2.864*
Approval of aggression	.272	(.440)	.080	3.418*	.235	(.340)	.080	2.952*
Commitment to school	.063	(.071)	.109	0.575	.146	(.148)	.111	1.307
Control variables								
Family stability	-.108	(-.089)	.139	-0.777	-.089	(-.066)	.141	-0.632
Residential stability	.099	(.076)	.127	0.781	.146	(.101)	.127	1.145
Percent Black	-.017	(-.027)	.081	-0.209	.129	(.182)	.081	1.598
Socioeconomic status	.053	(.132)	.045	1.180	.071	(.159)	.046	1.544
School size	-.000	(-.305)	.000	-3.124*	-.000	(-.257)	.000	-2.936*
Time 1 Aggressive Behavior	.223	(.231)	.093	2.386*	—	—	—	—
Time 1 Conflict with Peers	—	—	—	—	.418	(.405)	.089	4.670*
R <sup>2</sup>	.409				.520			

NOTE:  $N = 87$ . Unstandardized effects shown, with standardized effects in parentheses. \* $p < .05$  (two-tailed test).

with the expectations of MST, although it is line with the interpersonal-friction argument of the theory (the contextual analyses reported below allow for a more direct test of the interpersonal-friction argument).

According to the results in Table 1, interschool variation in Aggressive Behavior is a function of subcultural values (approval of aggression), prior history of aggressive behavior at the school, and school size ( $p < .05$ ). Interschool variation in Conflict with Peers is also a function of subcultural values, prior conflict with peers, and school size—along with anger.

Interestingly, the effect of school size is negative in both equations, indicating that schools with relatively large student enrollments tend to experience lower levels of aggression/conflict. Overall, the effect of school size has been inconsistent in past research. Some researchers have observed a positive association between school size and disorder (Gottfredson and Gottfredson 1985), suggesting that large schools have difficulty exerting social control. However, like the present study, Welsh and his colleagues (1999) observe a *negative* association between school size and disorder (or problem behavior). Although the association was not statistically significant in their analyses, the authors note that large student populations may reduce certain types of problem behavior, particularly interpersonal conflict: “Perhaps students more

easily blend into the crowd in a large school—they welcome anonymity and/or successfully practice avoidance so as to reduce conflicts” (Welsh et al. 1999:104). Clearly, additional research on school size is needed, particularly the effects of school size on different types of delinquent/disruptive behavior.

### *Contextual Analyses*

Our HLM analyses involved the specification of multilevel models (for both Aggressive Behavior and Conflict with Peers) that incorporate the influence of individual-level and school-level characteristics (note, however, that school size has no counterpart at the individual level). An individual-level model is designed to assess the contribution of individual characteristics (within-schools factors) to student aggression/conflict. A school-level model is designed to assess the added contribution of school climate variables (between-schools factors). In the school-level model, the means (or intercepts) of aggression/conflict for each school (derived from the individual-level model) serve as outcome measures. The school-level model, then, estimates the effects of school climate variables on student aggression/conflict after adjusting for the influence of individual-level characteristics.<sup>9</sup>

Table 2 presents the results of the contextual analyses. As seen in Table 2, the results of the contextual analyses parallel the outcomes of our earlier aggregate-level analyses. School-level anger fails to exhibit a significant effect on Aggressive Behavior. However, school-level anger has a significant effect on Conflict with Peers ( $p < .05$ ), controlling for individual anger and other variables. Consistent with the interpersonal-friction argument of MST, the latter finding suggests that a student is more likely to engage in fights and arguments with schoolmates if he attends a school that harbors a relatively angry student population, controlling for his own level of anger. In such schools, students may have frequent contact with angry and potentially hostile peers and, consequently, high levels of exposure to the type of interactions that promote conflict and aggression.<sup>10</sup>

A few other school-level effects in Table 2 are noteworthy. Approval of aggression exhibits a significant school-level effect on Aggressive Behavior ( $p < .05$ ), controlling for approval of aggression at the individual level. As Felson and his colleagues (1994) discuss, this finding suggests the operation of a social control process. In addition to any internal pressure caused by personal adherence to aggression-oriented values, students may feel external pressure to engage in aggressive behaviors when such acts are valued by schoolmates (e.g., pressure to argue with, and to show contempt for, teachers for the purpose of impression management).

Unexpectedly, approval of aggression at the school level fails to exhibit a significant effect on the more specific measure of Conflict with Peers,

TABLE 2: Contextual Analyses of the Determinants of Aggressive Student Behaviors

	<i>Time 2 Dependent Variables</i>					
	<i>Aggressive Behavior</i>			<i>Conflict with Peers</i>		
	<i>b</i>	<i>SE</i>	<i>t Value</i>	<i>b</i>	<i>SE</i>	<i>t Value</i>
Time 2 independent variables						
School level						
Anger	.130	.101	1.286	.274	.113	2.426*
Approval of aggression	.226	.081	2.779*	.128	.089	1.434
Commitment to school	-.018	.112	-0.164	.043	.126	0.342
Family stability	-.229	.146	-1.566	-.227	.164	-1.379
Residential stability	.046	.129	0.358	.077	.143	0.539
Percent Black	-.053	.086	-0.616	.124	.097	1.286
Socioeconomic status	.065	.046	1.408	.069	.052	1.326
School size	-.000	.000	-2.903*	-.000	.000	-2.544*
Time 1 Aggressive Behavior	.243	.094	2.573*	—	—	—
Time 1 Conflict with Peers	—	—	—	.449	.099	4.514*
Individual level						
Anger	.275	.021	12.686*	.306	.027	10.985*
Approval of aggression	.101	.015	6.489*	.097	.020	4.822*
Commitment to school	-.067	.019	-3.400*	-.067	.025	-2.626*
Family stability	-.051	.035	-1.462	-.004	.045	-0.110
Residential stability	.030	.031	0.971	.006	.040	0.170
Race (1 = Black)	-.025	.086	-0.289	.074	.111	0.662
Socioeconomic status	.014	.019	0.744	.008	.025	0.326
Time 1 Aggressive Behavior	.322	.021	15.167*	—	—	—
Time 1 Conflict with Peers	—	—	—	.236	.023	10.173*

NOTE: Unstandardized effects shown.

\* $p < .05$  (two-tailed test).

suggesting that fights and arguments with schoolmates are not encouraged by the same process. The effect in this case would be marginally insignificant ( $p = .07$ ) in a one-tailed test, so we are reluctant to draw definitive conclusions about the relationship between aggression-oriented values and various types of aggressive behavior. However, one possible explanation for the

inconsistent effects of school-level values involves the type of audience that is likely to witness student-to-teacher versus student-to-student aggression. Student-to-teacher interaction typically occurs in the classroom, in front of a captive audience of one's peers. This fact may increase the likelihood that a student will feel external pressure to display aggressive/disruptive behavior. Although conflicts that erupt between students often have an audience, this is not always the case<sup>11</sup> (Lockwood 1997). Thus, in hostile encounters with other students, external pressure to respond with verbal or physical aggression may not be felt with the same degree of consistency.

Returning to the results in Table 2, we see that prior aggression/conflict and school size exhibit significant effects on both Aggressive Behavior and Conflict with Peers ( $p < .05$ ). The effect of prior aggression/conflict at the school level suggests that a student is more likely to engage in aggressive behavior if he attends a school that has had problems with student aggression/conflict in the past, controlling for his own recent history of aggressive behavior. It is possible that, at the school level, our measures of prior aggression/conflict help to capture the effects of relevant school characteristics that have been omitted from the analyses, such as poor disciplinary practices or other factors that increase the likelihood of problem behavior among students.

At the individual level, four variables exhibit significant and consistent effects on both Aggressive Behavior and Conflict with Peers: anger, approval of aggression, commitment to school, and prior behavior. Students who are angry, personally adhere to aggression-oriented values, are weakly committed to school, and have a recent history of aggressive behavior tend to exhibit relatively high levels of aggression/conflict in the school setting.

#### *SUMMARY AND CONCLUSION*

Following Agnew's (1999) recommendations, we conducted a preliminary test of core MST propositions using school-level data. Drawing on data from a national sample of public high schools, we were able to construct an aggregate measure of student anger and estimate its relationship to school-level variation in aggressive/disruptive behavior. We were also able to estimate the relationship between aggregate-level student anger and individual differences in aggressive behavior, controlling for individual anger and other individual-level variables.

The results of our analyses provide mixed support for MST. According to MST, school-level differences in problem behavior should be a function, in part, of anger in the student population. In OLS analyses, an aggregate measure of student anger was significantly associated with school-level differ-



ences in student-to-student aggression (i.e., the frequency with which students report fights and arguments with other students), controlling for social disorganization and subcultural deviance variables. However, student anger failed to have a significant effect on a more general measure of aggressive/disruptive behavior that also included aggression directed toward teachers (arguing with teachers and doing things to make teachers angry). In short, the aggregate measure of student anger exhibited a behavior-specific effect.

Although Agnew (1999) did not explicitly outline behavior-specific hypotheses in his statement of MST, the pattern of effects we observe in our analyses is not particularly surprising in light of the interpersonal-friction argument contained in the theory. One reason why a high level of anger in the student population is said to foster problem behavior is because it contributes to interpersonal friction within this population. A high density of angry/upset students increases the likelihood that a student will interact with angry/upset peers and thus “get into conflicts” (Agnew 1999:141). This line of argument, in turn, implies an escalation of behaviors that seem more closely related to student-to-student aggression than student-to-teacher aggression.

Moreover, Agnew (1999:141) hinted at the idea that the interpersonal-friction argument may best apply to those segments of the population that are involved in extensive interpersonal interaction, such as “young males” who “spend much idle time in public settings” and are subject to frequent contact with each other (see also Bernard 1990). This fact may help to explain the behavior-specific effect we have observed. Students far outnumber teachers, and, for this reason alone, two-way interactions between students are likely to be more extensive than two-way interactions between students and teachers. Interactions between students are also likely to be less structured than student-teacher exchanges, perhaps creating more opportunity for the development of interpersonal friction and conflict.

With the aid of contextual (HLM) analyses, we were able to conduct a direct test of the interpersonal-friction argument. The results of this test indicate that a student is more likely to engage in fights and arguments with fellow schoolmates when levels of anger in the overall student population are high, controlling for individual anger, recent history of aggressive behavior, and other individual-level characteristics. This finding lends further support to the interpersonal-friction argument of MST, as applied to the school context.

Although the results of our analyses are mixed overall, with the effect of aggregate student anger limited to student-to-student conflict, we believe they are sufficiently encouraging to inspire further testing of MST—both at the level of schools and other macro-level social units. Depending on the outcome of such research, it may be necessary to further specify the theory, perhaps noting a special relevance of the theory to aggression and conflict

between equal-status individuals engaged in extensive interpersonal interaction. In any event, we believe the attention that the theory brings to the relationship between aggregate-level anger and interpersonal friction is itself a significant contribution. Based on the findings of our preliminary examination, the interpersonal-friction argument of MST appears to identify an additional macro-level source of aggressive behavior that is worthy of attention.

We recognize that, due to several limitations, our test of MST sheds only a limited amount of light on the merits of the theory. These limitations should be addressed in future research. First, future tests of MST would benefit from the examination of a broad range of dependent outcomes, including serious acts of crime and violence, as well as different types of negative emotions because it is possible that the emotion-behavior relationship varies by crime type (Piquero and Sealock 2000).

Second, although the theory is best tested with data from smaller areas (e.g., "face blocks" and "nominal communities"), it will be desirable to test MST with data from social units of various size, including neighborhoods, metropolitan areas, and beyond (Agnew 1999:124; see also Linsky, Bachman, and Straus 1995; Messner and Rosenfeld 1994). Because MST appears to shed light on certain aspects of problem behavior in schools, additional school-level tests of MST should also be pursued with the goal of incorporating a wider range of possibly relevant variables, such as local community, school administration, and personality factors. We recognize the possibility that our own models may be limited due to the exclusion of such variables, although our study is not unique in this regard (see also Felson et al. 1994; Welsh et al. 1999).

Third, in the course of testing the core propositions of MST with school-level data, we focused solely on main effects. We were not able to determine whether certain processes condition the effect of student anger on behavior (see note 2), nor did we explore the possible sources of student anger. If MST is correct, a number of factors are likely to shape the effect of aggregate-level anger on behavioral outcomes, such as the availability of legitimate coping resources and the presence of subcultures that encourage/reward deviant adaptations. We would also expect high levels of aggregate-level anger to result, in part from frustrating environmental conditions. In the case of schools, such conditions may include exposure to authoritarian teachers, unpleasant school surroundings (e.g., dilapidated buildings), and difficult/boring instructional materials<sup>12</sup> (Brezina 1996; Mayer et al. 1983). Thus, two additional issues to address in future tests of MST include the possibility of interaction effects and the sources of anger.

Further testing of MST along these lines and across different social units will require the collection of novel data, namely, data on a full range of theoretically relevant processes, including anger/frustration as well as social

disorganization and subcultural values.<sup>13</sup> However, the results of our initial examination lend tentative support to certain aspects of the theory, suggesting that such efforts will be worthwhile. We believe that further evaluation of MST is also warranted because the theory appears to have implications for the control of crime, delinquency, and problem behavior. For instance, the theory draws attention to the social density of angry/upset individuals and the fact that it may vary from one context to the other. If further testing of MST generates additional empirical support, this should provide policymakers with a strong incentive to pursue anger-reduction and anger-management interventions on a wide scale, especially in schools and other settings plagued by high levels of anger and frustration (see also Agnew 1995b; Furlong and Smith 1994; Mayer et al. 1983).

**APPENDIX**  
**Pearson Correlation Matrix, Means, and Standard Deviations for the School-Level Variables (N = 87)**

	X <sup>1</sup>	X <sup>2</sup>	X <sup>3</sup>	X <sup>4</sup>	X <sup>5</sup>	X <sup>6</sup>	X <sup>7</sup>	X <sup>8</sup>	X <sup>9</sup>	X <sup>10</sup>	X <sup>11</sup>	X <sup>12</sup>	
T2 Anger	X <sup>1</sup>	1.00											
T2 Approval of Aggression	X <sup>2</sup>	.10	1.00										
T2 Commitment to School	X <sup>3</sup>	-.28	-.35	1.00									
T2 Family Stability	X <sup>4</sup>	.21	-.29	-.31	1.00								
T2 Residential Stability	X <sup>5</sup>	-.05	.03	.01	.21	1.00							
T2 Percent Black	X <sup>6</sup>	-.31	.36	.38	-.49	.05	1.00						
T1 Socioeconomic Status	X <sup>7</sup>	.28	-.29	-.25	.29	-.10	-.41	1.00					
T1 School Size	X <sup>8</sup>	-.03	.01	.04	-.13	.19	.05	.21	1.00				
T1 Aggressive Behavior	X <sup>9</sup>	.20	.21	-.30	.04	-.11	-.19	-.03	-.20	1.00			
T2 Aggressive Behavior	X <sup>10</sup>	.27	.45	-.23	-.09	-.05	.05	-.05	-.29	.38	1.00		
T1 Conflict w/ Peers	X <sup>11</sup>	.11	.24	-.24	-.11	-.05	-.03	-.21	-.13	.75	.34	1.00	
T2 Conflict w/ Peers	X <sup>12</sup>	.28	.46	-.11	-.20	-.00	.25	-.14	-.23	.33	.78	.45	1.00
Mean		2.45	2.20	5.02	0.78	0.73	0.13	4.99	1230.14	2.18	2.10	2.33	2.11
Standard deviation		0.18	0.27	0.20	0.15	0.13	0.29	0.42	902.53	0.18	0.17	0.19	0.19

NOTE: T1 = time 1; T2 = time 2.

## NOTES

1. The criminogenic effects of anger are not limited to aggression, however. As Felson (1992:4) observes, anger also affects theft and other behaviors “not usually thought to have an aggressive motive”—perhaps because these behaviors can also represent the expression of a grievance (see also Agnew 1985).

2. Problems with multicollinearity interfered with our attempts to examine conditioning influences. For example, we constructed several school-level multiplicative interaction terms to test for interactions between anger and subcultural values and between anger and social disorganization. The variance inflation factors for these terms exceed 4.0, the cutoff point generally accepted as an indication of multicollinearity problems (Fox 1991). Moreover, the use of strategies specifically designed to reduce multicollinearity did not resolve the problem (see Aiken and West 1991). (When the interaction terms are excluded from the analyses, none of the variance inflation factors for the study variables exceeds 2.14.)

3. We include in our analyses all of the independent variables that exhibited a consistent and statistically significant effect in the study by Felson et al. (1994). However, we also include a measure of anger, and, whereas Felson and his colleagues tended to rely on general measures of delinquency/violence, our dependent measures focus specifically on aggressive behaviors in the school setting. As discussed later in the Data and Method section, we believe that school-specific outcome measures are particularly appropriate for the purposes of this study.

4. Unfortunately, the data are limited to male students. However, we do not view the exclusion of female students as a serious problem because males are more likely to engage in aggressive behavior. Also, although research suggests that females tend to experience anger as often as males, it is believed that males are more likely to respond to anger with aggression (for a review of relevant research, see Brody and Agnew 1997; see also Mirowsky and Ross 1995).

5. Data indicate that the respondents lost to attrition were slightly more likely than regular participants to live in urban areas, come from broken homes, be Black, and be of lower socioeconomic status. In most cases, the difference was small, “usually less than five percent of a standard deviation” (Bachman, O’Malley, and Johnston 1978:259).

6. Because low-frequency offenders are likely to make fewer self-report errors than high-frequency offenders, the use of ordinal response categories—rather than raw frequencies—is preferable and should contribute to the general reliability of the delinquency scale (see Huizinga and Elliott 1986).

7. The number of students sampled in each school is not equal. The number ranges from 10 to 41, with a mean 25.4 and a standard deviation of 6.7. As Felson et al. (1994) noted, this is a potential problem because an unequal sample size across schools may cause the error terms to be heteroskedastic. To address this issue, we estimated the equations using weighted least squares, with the square root of the school sample size as the weight. Weighted and unweighted analyses produced an identical pattern of results (see also Felson et al. 1994).

8. We also examined the effects of the school-context variables on several items involving nonaggressive student misconduct, such as truancy, coming to class late, and copying someone else’s assignments. The effect of anger was insignificant on these measures, reinforcing our conclusion that the effect of school-level anger is specific to student-to-student aggression (conflict with peers).

9. A detailed summary of the contextual (HLM) analysis is available from the authors on request.

10. Although we followed Agnew’s (1999:140) recommendations, it should be noted that our contextual analyses provide a rather conservative test of the interpersonal-friction argument because we control for individual anger and other individual-level characteristics. According to

the results, aggregate-level anger increases the likelihood of fighting/conflict among students in general, net of individual anger. Perhaps a high density of angry students in the school population increases the chances that *any* student will experience aversive interactions with angry/upset peers and will engage in fights/arguments (perhaps in a defensive, if not offensive, role). It is still possible that the effect of aggregate-level anger is stronger among students who are themselves particularly angry (as MST might predict), although this possibility would involve a complicated interaction effect between aggregate-level and individual-level characteristics. Future tests of MST should explore such an interaction effect.

11. In Lockwood's (1997) study of school-based violent incidents, third parties (e.g., friends or relatives) were absent in approximately 40 percent of the cases.

12. Anger may also reflect an individual trait or disposition. However, this possibility is not necessarily at odds with strain theory. As Agnew (1997) described, an angry or aggressive temperament is believed to be a product of both biological factors and early socialization experiences of an aversive nature, such as harsh discipline. The ultimate sources of student anger, then, may be related to strain-related processes that are both internal and external to the school environment.

13. Longitudinal data would be desirable, especially data that allow for the examination of short-term, lagged effects—to permit the estimation of causal ordering between variables. Although individual-level data indicate that anger increases the likelihood of subsequent aggression, the issue of causal order remains a concern because data also show that the relationship between anger and aggression can flow in the opposite direction (Felson 1992; see also Averill 1982). In the present study, we did not examine lagged effects because the time lag separating the waves of data is excessive (we would not expect the density of angry students in the 10th grade to have much of an effect on behavior reported in the 11th grade). Instead, we controlled for prior behavior. This strategy increases confidence in our interpretation of effects, although it does not completely eliminate the potential problem of causal order.

## REFERENCES

- Agnew, Robert. 1985. "A Revised Strain Theory of Delinquency." *Social Forces* 64:151-67.
- . 1992. "Foundation for a General Strain Theory of Crime and Delinquency." *Criminology* 30:47-87.
- . 1995a. "The Contribution of Social-Psychological Strain Theory to the Explanation of Crime and Delinquency." Pp. 113-37 in *The Legacy of Anomie Theory: Advances in Criminological Theory, Volume 6*, edited by Freda Adler and William S. Laufer. New Brunswick, NJ: Transaction.
- . 1995b. "Controlling Delinquency: Recommendations from General Strain Theory." Pp. 43-70 in *Crime and Public Policy*, edited by Hugh D. Barlow. Boulder, CO: Westview.
- . 1995c. "Testing the Leading Crime Theories: An Alternative Strategy Focusing on Motivational Processes." *Journal of Research in Crime and Delinquency* 32:363-98.
- . 1997. "Stability and Change in Crime over the Life Course: A Strain Theory Explanation." Pp. 101-32 in *Developmental Theories of Crime and Delinquency: Advances in Criminological Theory, Volume 7*, edited by Terence P. Thornberry. New Brunswick, NJ: Transaction.
- . 1999. "A General Strain Theory of Community Differences in Crime Rates." *Journal of Research in Crime and Delinquency* 36:123-55.
- Agnew, Robert, Francis T. Cullen, Velmer S. Burton, Jr., T. David Evans, and R. Gregory Dunaway. 1996. "A New Test of Classic Strain Theory." *Justice Quarterly* 13:681-704.

- Agnew, Robert and Helene R. White. 1992. "An Empirical Test of General Strain Theory." *Criminology* 30:475-99.
- Aiken, Leona S. and Stephen G. West. 1991. *Multiple Regression: Testing and Interpreting Interactions*. Newbury Park, CA: Sage.
- Anderson, Elijah. 1994. "The Code of the Streets." *Atlantic Monthly* 273 (May): 81-94.
- Averill, James R. 1982. *Anger and Aggression*. New York: Springer-Verlag.
- Bachman, Jerald G. 1975. *Youth in Transition: Documentation Manual*. Ann Arbor, MI: Institute for Social Research.
- Bachman, Jerald G., Patrick M. O'Malley, and Jerome Johnston. 1978. *Youth in Transition, Volume 6: Adolescence to Adulthood*. Ann Arbor, MI: Institute for Social Research.
- Bellair, Paul E. 1997. "Social Interaction and Community Crime: Examining the Importance of Neighborhood Networks." *Criminology* 35:677-703.
- Berkowitz, Leonard. 1993. *Aggression: Its Causes, Consequences, and Control*. Philadelphia: Temple University Press.
- Bernard, Thomas J. 1990. "Angry Aggression among the Truly Disadvantaged." *Criminology* 28:73-96.
- Brezina, Timothy. 1996. "Adapting to Strain: An Examination of Delinquent Coping Responses." *Criminology* 34:39-60.
- . 1998. "Adolescent Maltreatment and Delinquency: The Question of Intervening Processes." *Journal of Research in Crime and Delinquency* 35:71-99.
- Broidy, Lisa M. 2001. "A Test of General Strain Theory." *Criminology* 39:9-35.
- Broidy, Lisa and Robert Agnew. 1997. "Gender and Crime: A General Strain Theory Perspective." *Journal of Research in Crime and Delinquency* 34:275-306.
- Bryk, Anthony and Stephen Raudenbush. 1992. *Hierarchical Linear Modeling*. Newbury Park, CA: Sage.
- Bursik, Robert J., Jr. 1988. "Social Disorganization and Theories of Crime and Delinquency: Problems and Prospects." *Criminology* 26:519-51.
- Bursik, Robert J., Jr. and Harold G. Grasmick. 1993. *Neighborhoods and Crime*. New York: Lexington.
- Cao, Liqun, Anthony Adams, and Vickie J. Jensen. 1997. "A Test of the Black Subculture of Violence Thesis: A Research Note." *Criminology* 35:367-79.
- Elliott, Delbert S., William J. Wilson, David Huizinga, Robert J. Sampson, Amanda Elliott, and Bruce Rankin. 1996. "The Effects of Neighborhood Disadvantage on Adolescent Development." *Journal of Research in Crime and Delinquency* 33:389-426.
- Ennett, Susan T., Robert L. Flewelling, Richard C. Lindrooth, and Edward C. Norton. 1997. "School and Neighborhood Characteristics Associated with School Rates of Alcohol, Cigarette, and Marijuana Use." *Journal of Health and Social Behavior* 38:55-71.
- Felson, Richard B. 1992. "'Kick 'Em When They're Down': Explanations of the Relationship between Stress and Interpersonal Aggression and Violence." *Sociological Quarterly* 33:1-16.
- Felson, Richard B., Allen E. Liska, Scott J. South, and Thomas L. McNulty. 1994. "The Subculture of Violence and Delinquency: Individual vs. School Context Effects." *Social Forces* 73:155-73.
- Fox, John. 1991. *Regression Diagnostics*. Newbury Park, CA: Sage.
- Furlong, Michael and Douglas Smith. 1994. *Anger, Hostility, and Aggression: Assessment, Prevention, and Intervention Strategies for Youth*. Brandon, VT: Clinical Psychology.
- Gottfredson, Gary D. and Denise C. Gottfredson. 1985. *Victimization in Schools*. New York: Plenum.

- Grasmick, Harold G., Charles R. Tittle, Robert J. Bursik, Jr., and Bruce J. Arneklev. 1993. "Testing the Core Empirical Implications of Gottfredson and Hirschi's General Theory of Crime." *Journal of Research in Crime and Delinquency* 30:5-29.
- Heimer, Karen. 1997. "Socioeconomic Status, Subcultural Definitions, and Violent Delinquency." *Social Forces* 75:799-833.
- Hellman, Daryl A. and Susan Beaton. 1986. "The Pattern of Violence in Urban Public Schools: The Influence of School and Community." *Journal of Research in Crime and Delinquency* 23:102-27.
- Hoffmann, John P. and Alan S. Miller. 1998. "A Latent Variable Analysis of General Strain Theory." *Journal of Quantitative Criminology* 14:83-110.
- Huizinga, David and Delbert S. Elliott. 1986. "Reassessing the Reliability and Validity of Self Report Delinquency Measures." *Journal of Quantitative Criminology* 2:293-327.
- Linsky, Arnold S., Ronet Bachman, and Murray A. Straus. 1995. *Stress, Culture, and Aggression*. New Haven, CT: Yale University Press.
- Lockwood, Daniel. 1997. "Violence among Middle School and High School Students: Analysis and Implications for Prevention." Washington, DC: U.S. Department of Justice.
- Luckenbill, David F. and Daniel P. Doyle. 1989. "Structural Position and Violence: Developing a Cultural Explanation." *Criminology* 27:419-53.
- Markowitz, Fred E. and Richard B. Felson. 1998. "Socio-Demographic Differences in Attitudes and Violence." *Criminology* 36:117-38.
- Matsueda, Ross L., Rosemary Gartner, Irving Pilavin, and Michael Polakowski. 1992. "The Prestige of Criminal and Conventional Occupations: A Subcultural Model of Criminal Activity." *American Sociological Review* 57:752-70.
- Mayer, G. Roy, Tom Butterworth, Mary Nafpaktitis, and Beth Sulzer-Azaroff. 1983. "Preventing School Vandalism and Improving Discipline: A Three-Year Study." *Journal of Applied Behavior Analysis* 16:355-69.
- Mazerolle, Paul. 1998. "Gender, General Strain, and Delinquency: An Empirical Examination." *Justice Quarterly* 15:65-91.
- Mazerolle, Paul, Velmer S. Burton, Jr., Francis T. Cullen, T. David Evans, and Gary L. Payne. 2000. "Strain, Anger, and Delinquent Adaptations: Specifying General Strain Theory." *Journal of Criminal Justice* 28:89-101.
- Mazerolle, Paul and Alex Piquero. 1997. "Violent Responses to Strain: An Examination of Conditioning Influences." *Violence and Victims* 12:323-43.
- . 1998. "Linking Exposure to Strain with Anger: An Investigation of Deviant Adaptations." *Journal of Criminal Justice* 26:195-211.
- Messner, Steven F. and Richard Rosenfeld. 1994. *Crime and the American Dream*. Belmont, CA: Wadsworth.
- Mirowsky, John and Catherine E. Ross. 1995. "Sex Differences in Distress: Real or Artifact?" *American Sociological Review* 60:449-68.
- Paternoster, Raymond and Paul Mazerolle. 1994. "General Strain Theory and Delinquency: A Replication and Extension." *Journal of Research in Crime and Delinquency* 31:235-63.
- Piquero, Alex R. and Matthew Hickman. 1999. "An Empirical Test of Tittle's Control Balance Theory." *Criminology* 37:319-41.
- Piquero, Nicole Leeper and Miriam D. Sealock. 2000. "Generalizing General Strain Theory: An Examination of an Offending Population." *Justice Quarterly* 17:449-84.
- Sampson, Robert J. 1987. "Urban Black Violence: The Effect of Male Joblessness and Family Disruption." *American Journal of Sociology* 93:348-82.
- Sampson, Robert J. and W. Byron Groves. 1989. "Community Structure and Crime: Testing Social-Disorganization Theory." *American Journal of Sociology* 94:774-802.



- Sampson, Robert J., Stephen W. Raudenbush, and Felton Earls. 1997. "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy." *Science* 277:918-24.
- Smith, Douglas C., Michael Furlong, Michael Bates, and John D. Laughlin. 1998. "Development of the Multidimensional School Anger Inventory for Males." *Psychology in the Schools* 35:1-15.
- Tygart, Clarence E. 1988. "Strain Theory and Public School Vandalism: Academic Tracking, School Social Status, and Students' Academic Achievement." *Youth and Society* 20:106-18.
- Veysey, Bonita M. and Steven F. Messner. 1999. "Further Testing of Social Disorganization Theory: An Elaboration of Sampson and Groves's 'Community Structure and Crime.'" *Journal of Research in Crime and Delinquency* 36:156-74.
- Welsh, Wayne N., Jack R. Greene, and Patricia H. Jenkins. 1999. "School Disorder: The Influence of Individual, Institutional, and Community Factors." *Criminology* 37:73-115.
- Welsh, Wayne N., Robert Stokes, and Jack R. Greene. 2000. "A Macro-Level Model of School Disorder." *Journal of Research in Crime and Delinquency* 37:243-83.
- Zillmann, Dolf. 1979. *Hostility and Aggression*. Hillsdale, NJ: Lawrence Erlbaum.