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General Strain Theory and Delinquency: Extending a Popular Explanation to American Indian Youth*

David Eitle and

Montana State University

Tamela McNulty Eitle

Montana State University

Abstract

Despite evidence that American Indian adolescents are disproportionately involved in crime and delinquent behavior, there exists scant research exploring the correlates of crime among this group. We posit that Agnew's (1992) General Strain Theory (GST) is well suited to explain American Indian delinquent activity. Using the National Longitudinal Study of Adolescent Health, we examined a subsample of American Indian students—a study that represents, to the best of our knowledge, the initial published test of GST principles used to explain AI delinquent behavior. Overall, we find mixed support for the core principles of GST applying to AI delinquent behavior. We also found evidence that some of the personal and social resources identified by Agnew condition the strain-delinquent behavior relationship, albeit, sometimes in ways that are not entirely consistent with GST.

According to several indicators, American Indians (AIs) have among the highest rates of crime and delinquency of any racial/ethnic group in America (Pridemore, 2004; Greenfield & Smith, 1999). AIs have a violent crime rate that is 2.5 times greater than the national average (Greenfield & Smith, 1999) and their rate of violent crime victimization is more than twice the national average (Perry, 2004). AI women are at greater risk of rape and sexual assault than the average American (Perry, 2004) and studies have found that AIs are at a heightened risk of physical and sexual assault victimization (Tjaden & Thoennes, 2000; Malcoe, Duran, & Montgomery, 2004; Yuan, Koss, Polacca, & Goldman, 2006; Beals, Klein, & Croy, 2005). Self-report studies suggest that AI teens are also disproportionately involved in delinquency (e.g., McNulty & Bellair, 2003). Indeed, AIs comprise approximately sixty percent of the young prisoners in the federal system (U.S. Department of Justice, 2006).

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Despite this evidence, there has been a dearth of studies that have attempted to explain AI delinquency (Morris & Wood, 2010), with most examining only substance use (e.g., Plunkett & Mitchell, 2000; Beauvais, 1996; Oetting et al., 1988; Oetting et al., 1989). Among the studies that have attempted to explain AI substance use, many have focused on the loss of Native traditionalism (Morris & Wood 2010; Herring, 1994), despite mixed evidence that traditionalism plays a meaningful role in explaining AI substance use. As noted by Morris and Wood, “Criminology has long neglected indigenous minorities” (2010, p. 248).

This study serves to further attend to this neglected topic. Using a sub-sample of AIs from a nationally representative sample of American high school students, we explore whether Agnew’s (1992) General Strain Theory (GST) can adequately explain AI self-reported delinquent acts. Our study represents the first systematic examination of GST extended to an AI sample.

Background

Despite the paucity of research that has extended general explanations of crime and delinquency to AI samples, there do exist some important exceptions. Morris, Wood, and Dunaway (2006) found that self-control was a stronger predictor of AI substance use compared to whites. Morris and Wood (2010) also found that self-control predicts self-reported delinquency in their examination of crime among a sample of 382 AI teens. Heavyrunner-Rioux and Hollist (2010) tested measures representing social bond, social learning, and social disorganization theory to explain substance use among a sample of AI children, finding the strongest support for social learning theory.

While there are few studies that have tested criminological theories with AI samples, research has explored various risk and protective factors associated with AI delinquency. In a focus group research with elders, parents, youth workers and teens, Mmari, Blum, and Teufel-Shone (2010) identified such risk factors as the loss of traditional language and culture, racism, the availability of guns, drugs, and alcohol, the increasing presence of gangs in AI communities, peer pressure and protective factors such as AI traditionalism, mentors, religion/spirituality and a sense of responsibility. Family was identified as both a potential risk (family disintegration and lack of parental discipline) and as a protective factor (parental support). In his comprehensive review of the predictors of AI crime and delinquent behaviors, Pridemore (2004) identified risk factors including isolation, segregation, and powerlessness, alcohol and drug abuse, violent victimizations (often associated with alcohol and drug abuse), the emergence of gangs, and the lack of effective social services and protective factors including a strong family, close social networks, and native traditionalism. But overall, there have been few evaluations of the applicability of criminological theories to AI delinquent behavior. As Morris, Wood, and Dunaway (2006, p. 573) note, “though Native Americans are said to be one of the most disproportionate offending groups in the United States, they remain among the least studied.”

One theory that may be particularly useful in understanding AI delinquency is Agnew’s GST. At the core of GST (Agnew, 1992) is the notion that negative relationships with others and negative experiences produce strain that he/she must manage. Agnew identified three

major sources of strain: 1) the failure to achieve positively valued goals, including the disjunction between expectations and actual outcomes and the perception of what would be a fair or just outcome and actual outcomes; 2) the removal (or threat of removal) of positively valued stimuli that the actor already possesses; and 3) presentation with noxious or negatively valued stimuli, such as abuse. Such strains produce a range of negative emotions (e.g., anger, frustration, depression, anxiety) that the actor must somehow take corrective action to reduce; corrective actions can include delinquent behavior, with the behavioral solution potentially being instrumental, retaliatory, or escapist in nature. However, one can manage such strains legitimately if the actor has effective coping mechanisms. Personal and social resources including one's self-concept, one's level of social support, mastery and problem-solving skills may moderate the strain-delinquency link (Agnew, 1992). Agnew argues that adolescents who are self-efficacious, who have extensive social support networks, and who have a positive self-concept are less likely to resort to delinquent acts in response to exposure to strains. Additionally, the inclination of one's peers toward (or against) deviance can influence whether a teen is likely to turn to delinquency as a response to the negative affect generated by strain.

There have been a number of tests of the validity of GST for explaining crime and delinquency, with many tests supporting the core principle that greater exposure to strains is associated with greater involvement in illicit behaviors (Agnew & White, 1992; Agnew, Brezina, Wright, & Cullen, 2002; Brezina, 1998, 1999; Broidy, 2001; Cernkovich et al., 2000; Mazerolle & Maahs, 2000; Moon et al., 2009). But despite the popularity of GST for explaining delinquency and crime, we are aware of no published studies that have examined the model's applicability to AI teens. However, there are compelling reasons to expect that GST should prove a valid explanation of AI delinquent behaviors.

First, there is ample evidence that AI teens experience significant stress in their lives. For example, Morris and his colleagues, in writing about AI ethnic dislocation, noted, "cultural differences between native traditions and the norms of White society generate strain, conflict, cultural dissonance, and anomie" (Morris, Wood, & Dunaway, 2006, p. 577). Likewise, Plunkett and Mitchell (2000) noted that stresses associated with the living conditions of the AI today (e.g., poverty, unemployment, social isolation, prejudice) help to produce high substance use rates. Studies have documented the high levels of stress exposure in AI lives. Evans-Campbell and colleagues (2006) found that among 112 AI women living in New York City, 65% reported experiencing some form of interpersonal violence and most experienced emotional trauma related to such experiences (see also Dugan & Apel, 2003). Additionally, Manson and colleagues (1996) found that between 51–62% of AI students reported having experienced at least one traumatic event during childhood and Manson and colleagues (2005) found that lifetime exposure to at least one traumatic event ranged from 62.4% to 69.8% in another study (see also Cheadle & Whitbeck, 2011). However, no published study has yet to link stress exposure to AI teen delinquency, nor has there been any systematic examination of whether or not the personal and social resources proffered by Agnew serve to mediate or moderate the strain-deviance relationship for AI youth. We are motivated by the warning of Giordano and Cernkovich (1992), who wrote that researchers need be wary of generalizations about the processes that

lead to deviant behavior across racial groups without directly examining the possible role that race plays in such processes.

While no studies have directly examined the suitability of GST for explaining AI delinquency, extant research has explored the applicability of GST with other racial/ethnic groups. Kaufman and colleagues (2008) argued that African-Americans are more likely to experience more and unique types of strains compared to Whites, including economic strains, negative educational experiences, criminal victimization, discrimination strain, and suffer from community-level strain, and that low social support and inadequate problem solving skills increased the likelihood of engaging in crime as a coping mechanism (see also Sung & Johnson, 2003). Likewise, Perez, Jenkins, and Gover (2008) examined the role of strain exposure, including unique strains such as acculturation stress, nativity, intergenerational conflict, and perceived discrimination in their test of GST in explaining violent behavior among Hispanics. They concluded that both ethnic-specific and more general strains were associated with violence (especially under conditions of a high concentration of Hispanics in the community). Overall, prior scholarship suggests that GST has significant potential for explaining AI delinquency. The present study represents a preliminary test of the applicability of GST principles to explaining AI adolescent delinquency.

Data and Methods

This study analyzes data from Waves I and II of the National Longitudinal Study of Adolescent Health (Add Health). Add Health is a nationally representative study of adolescents (7th–12th grade in 1994 when the study began; Wave II data was collected in 1995). The Add Health sample is representative of US schools with respect to region, urbanicity, school size, school sector, and racial composition (Harris et al., 2009). However, wave II intentionally excluded respondents who were in the 12th grade at wave I. This and other attrition resulted in approximately 75 percent of the original wave I respondents remaining in the wave II sample. For our AI sample (N=670), we selected adolescents from the wave I in-home sample based on the following criteria: a) we selected adolescents who indicated that their racial/ethnic identity was American Indian; b) we selected respondents who participated in both of the first two waves of the in-home interview and for whom a valid wave II sampling weight was available; and c) we selected respondents who answered questions about delinquent behaviors at wave II.

Measures

We examined three measures of *delinquent acts*: general, property, and violence. The general measure was a self-reported count of the number of different acts (out of seventeen items). The measures of property (eight items) and violent (six items) delinquency were created from subgroups of items from the general measure of delinquency and were considered in order to further evaluate GST's potency to explain particular domains of delinquent acts (see table one). The delinquency measures were collected at wave II whereas the independent variables were measured at wave I, in order to reduce concerns about temporal ordering. Table One provides descriptive statistics for the variables included in the analyses.

We considered four measures of *strain*: Criminal victimization, recent negative life events, educational strain, and school-based strain. Most prior tests of GST have employed recent life events checklists (e.g., Aselstine, Gore, & Gordon, 2000; Daigel et al., 2007; Kaufman, 2009; Paternoster and Mazerolle, 1994; Ostrowsky and Messner, 2005; Piquero and Sealock, 2004). Since such events have been considered to be independent (Thoits 1983; Hoffman and Miller, 1998), they were measured as count variables instead of scales (Hoffmann and Miller, 1998; pg. 90). As with other tests of GST, we assumed that exposure to such negative life events was capturing two sources of strain—the presentation of noxious stimuli and the removal of positive stimuli. However, Agnew (2001) has argued that some types of strain are more likely than other types to inspire crime/delinquency. Agnew (2001) posited that strains that are high in magnitude, perceived as unjust in nature, create some incentive to respond by engaging in crime (e.g., retaliation) and are associated with low self-control were most likely to be associated with crime/delinquency. Although our data limits our opportunity to test this argument fully, one source of strain that was included in our measures is criminal victimization. Agnew noted that such victimization satisfies each of these four aforementioned conditions. Furthermore, prior studies have found support for the notion that criminal victimization is strongly associated with crime/delinquency (Kaufman, 2005; 2009; Hay and Evans, 2006; Agnew et al., 2002) and Agnew (2006) has argued that racial and ethnic minorities are more likely to experience the strains most conducive to generating crime and delinquency. *Criminal victimization* is comprised of five items asking the respondent whether they had someone a) pull a knife or gun on them; b) shot them; c) cut or stabbed them; d) jumped them; and/or e) witnessed someone else being shot or stabbed in past year with the response set including never, once, or more than once. Prior studies using the Ad-Health data to capture criminal victimization have employed these same items (Kaufman, 2005; 2009).

Our count measure of *negative life events*, comprised of 12 items such as whether the respondent, friends, or family members attempted suicide in the past year (3 items); whether the respondent was unable to seek medical care when needed (1 item), was suspended or expelled from school (2 items), had a parent die (2 items), moved (1 item), was tested or received treatment for a sexually transmitted disease (1 item), was pregnant (1 item) or experienced a significant injury (1 item). Our measure of *educational strain* indicates whether the respondent had higher aspiration for attending college than his/her expectations of attending (Stogner & Gibson, 2010). Our additive measure of *school-based strain* is composed of two items asking the respondent whether he/she felt students at the school are prejudiced and whether the respondent felt safe at school.

Consistent with prior studies testing GST theory using Add Health data, we used two measures to capture negative affect—depressive symptoms and bad temper (Kaufman 2009; Stogner & Gibson 2010; Daigle et al., 2007). The measure of *depressive symptoms* was comprised of nineteen items from the Center for Epidemiological Studies Depression Scale (CES-D) twenty-item scale. Each item utilizes a 4-point ordinal response measuring negative affect. The items were summed and divided by the number of items present. *Bad temper* was measured by using a single item asking the parent whether their child has a bad temper or not.

Agnew has posited that personal and social resources serve to moderate the strain-deviance relationship, with those who have fewer social and personal resources or more delinquent peers displaying a stronger strain-deviance relationship than those with more resources or fewer delinquent peers. *Religiosity* has been identified as a type of legitimate coping mechanism (Stogner & Gibson, 2010). We constructed a religiosity scale from three items (questions assessing the importance of religion in their lives, participation in religious services and youth groups). *Social support* is a seven-item scale capturing support from such resources as parents, friends, and teachers. It has been used in prior GST studies utilizing Add Health data (e.g., Kaufman, 2009; Stogner & Gibson, 2010). *Self esteem* was measured by a seven-item additive scale (e.g., Stogner & Gibson, 2010) comprised of five-point ordinal scale responses (ranging from strongly disagree to strongly agree) that asked such questions as whether the respondent has a lot of good qualities, is physically fit, or has a lot to be proud of. Our three-item measure of *self-control* has been used in prior tests of GST theory using Add-Health data (Stogner & Gibson, 2010). Items include such questions as “when you have a problem to solve, one of the first things you do is get as many facts about the problem as possible” and “when you are attempting to find a solution to a problem, you usually try to think of as many different ways to approach the problem as possible.” Higher scores indicated greater self-control. *Parental autonomy* is a seven-item scale measuring the extent to which adolescents reported that their parents control or let the respondents make decisions about various aspects of their lives (Haynie, 2003; Daigle, Cullen, & Wright, 2007). Items were summed and divided by the number of items present. Higher scores indicate greater autonomy. *Peer substance use* was a scale derived from the average score from three items asking the respondent how many of his/her three best friends smoke at least one cigarette a day, smoke marijuana at least once a month, and drink alcohol at least once a month.

A scale derived from the average score from three items captured *school attachment*: “do you feel close to people at school,” “do you feel like you are a part of the school,” and “are you happy to be at your school?” Responses ranged from ‘strongly disagree’ to ‘strongly agree’. And a common measure of *school commitment*, grade point average (GPA), was captured by averaging the responses to four items asking the student to report her/his grades (1=D to 4=A) in the subject areas of math, English, history/social studies, and the sciences. Finally, these controls were included: *gender* (1=female), *parental alcohol use* (based on respondent’s resident parent’s reported alcohol use), *age*, *family structure* (whether or not the child resides in a two-parent family) and *parental education* (whether at least one parent graduated from high school, college, or neither graduated from high school).

Analysis Strategy

Due to the unequal probability of sample selection in Add Health (Chantala 2006), all analyses were weighted to account for the Add Health design effects. Missing values on independent variables were substituted using a regression estimation procedure in STATA (StataCorp, 2009).

We utilized negative binomial regression analyses because the dependent variables were count measures. The decision to use negative binomial regression models was supported by

the results of an analysis comparing the fit of poisson, negative binominal regression, zero-inflated poisson, and zero-inflated negative binomial regression models using a procedure in STATA called countfit (see Long & Freese, 2006: pp. 409–414). In the tables we reported the Incident Rate Ratios (IRR) which indicate the factor change in the number of delinquent behaviors associated with a one-unit increase in an independent variable. Finally, to probe the findings of significant interaction terms, we split our data into categories of one of the variables in the interaction term (e.g., low, moderate, and high strain exposure), ran separate models and examined whether the effect of the other independent variable in the interaction term varied across the models (using the postestimation command in STATA 11 for seemingly unrelated estimation [SUEST] and a Wald test to determine whether the coefficient varies significantly across the models). Although such a strategy results in a loss of efficiency (due to smaller sample sizes), it is a reasonable method to examine conditional associations (Hoffman, 2010; Brambor, Clark, & Golder, 2006: pg. 78).

Results

The results of the negative binomial regression models predicting the count of past year delinquent acts (general, violent, and property) were reported in Table 2. In the baseline model for general delinquency (model 1), three predictors were found to be associated with the dependent variable: age (younger respondents report greater involvement in delinquent acts), criminal victimization, and recent life events. Consistent with GST, standard deviation increases in criminal victimization and recent life events were associated with 34 and 24 percent increases in the number of delinquent acts reported, holding all other variables constant. The inclusion of the two measures of negative affect (model 2) reveals that while bad temper was not associated, depressive symptoms were found to be positively associated with delinquent acts. However, including these measures of negative affect appear to only minimally mediate the relationship between strain and delinquent acts, with the criminal victimization and recent life events IRRs reduced by only 5 and 10 percent (respectively).

The inclusion of the personal and social resources served to attenuate the association between recent life events and delinquent acts, but criminal victimization still remained a statistically significant predictor of delinquent acts. Three of the personal and social resources included were found to be statistically significant predictors of delinquent behavior: social support, religiosity, and exposure to substance using peers. While two of these resources display the anticipated associations with the dependent variable (with social support serving to reduce delinquent acts while exposure to substance using peers serves to increase such behavior), religiosity has an unexpected *positive* association with the number of delinquent acts reported. While speculative, some research suggests that adherence to Native traditionalism, which may be partially captured in our measure of religiosity (because of the importance of religion and spirituality to many AI tribes and cultures), is associated with an increased involvement in delinquent behaviors (Morris, Wood, & Dunaway, 2006). Hence, adherence to Native traditionalism may actually be a stressor for AI adolescents, particularly when exposed to environments wherein the dominant culture pervades (i.e., non-Reservation communities). Nonetheless, this is a provocative finding that warrants further exploration with other data that include measures of Native traditionalism.

The results of the analyses of violent and property delinquent acts largely reinforced the findings reported for general delinquent acts—gender, age, criminal victimization, recent life events, depressive symptoms, social support, and exposure to substance using peers are statistically significant predictors of the dependent variable across the three measures of delinquent acts. However, the models predicting involvement in property acts revealed an additional predictor—parental autonomy. As suggested by GST, adolescents reporting less autonomy report lower involvement in property delinquent acts.

The more provocative role of the personal and social resources, according to GST, is their potential role as moderators of the strain-delinquency relationship. Table 3 presents the results of the tests of interaction terms included with the full models reported in Table 2 (model 3). Only statistically significant interaction terms were included in the table and only the variables included in the interaction terms were reported in the table. In our consideration of the potential moderating role of such resources, five were found to have statistically significant influences—social support, self-esteem, school attachment, school commitment, and substance using peers. Contrary to expectations (inspired by GST), increased social support appears to strengthen the association between negative recent events and involvement in delinquent acts. Decomposing these effects reveals that social support only attenuates the strain-delinquent activity association under conditions of high social support—under conditions of moderate social support, the strain-delinquent behavior association is strengthened. While speculative, it appears that for this group, in order for social support to reduce the criminogenic influences of strain exposure, the support must be (relatively) strong—otherwise, such support may exacerbate rather than serve a protective function. However (and consistent with the expectations of GST) social support displays a protective influence against engaging in general and property delinquency under conditions of greater educational strain. Further, the moderating effect of self-esteem on the educational strain-general delinquency association is also consistent with GST, with stronger self-esteem serving to attenuate the strain-delinquency link.

We also found evidence that school commitment and school attachment moderate the relationship between strains and involvement in delinquent acts, but (again) not in the expected way. Under conditions of greater school attachment, the association between school-based strain and general delinquent behavior is *strengthened*. Decomposing this effect revealed that under conditions of relatively moderate levels of school attachment, the relationship between school-based strain and delinquency does indeed strengthen. However, under conditions of relatively high school attachment, school-strain has no association with delinquent activity. In short, it appears that school attachment does attenuate the strain-delinquency relationship, but only for those who are (relatively) strongly attached to school. For those experiencing moderate levels of attachment to school, such attachment appears to exacerbate the school strain-delinquent activity association (more on this below). Similarly, under conditions of increased school commitment, increased criminal victimization and negative recent events were positively associated with violent delinquent acts. Decomposing the moderating role of school commitment reveals that the strength of the association between such strain exposure and delinquent activity does indeed strength, although the differences are modest. Nonetheless, these two measures of school connectedness are operating in a fashion contrary to what one would derive from GST.

While speculative, one possible interpretation is that American Indian adolescents may experience a cultural mismatch when pursuing academic excellence, particularly in urban and suburban school settings (AI respondents in our sample attend largely urban and suburban schools). Given the history of the use of residential schools for the cultural assimilation of American Indian children, such cultural conflict may be particularly likely for AIs attending predominately non-AI schools. Although hotly debated (see Warikoo & Carter, 2009 for an overview), such cultural conflict may create strain for racial/ethnic minority students who perceive that academic achievement, particularly in white-majority schools, entails a rejection of their own cultural identity in order for them to achieve in white-dominated status hierarchies (Fordham & Ogbu, 1986). Scott (1986: 384) refers to this orientation among Indian students as trying to be “less Indian.” In his study, Scott found that AIs who were “less devoted to Indian ways” performed better in college than their counterparts (see also James, 1995; Vadas, 1995). Further, Denham (2008) argued that American Indian adolescents’ experiences in schools are interpreted through a shared narrative passed down from prior generations and used to give meaning to current experiences (p. 406). Such a narrative (that often features stories of resistance to acculturation) may serve to create stress in the contemporary student who strives to be successful academically. It may be that our interaction is capturing (unmeasured) *acculturation stress*, which may be translated into increased delinquent activity in the actor. For example, Zamboanga and colleagues (2006) found that acculturation stress was a risk factor in heavy alcohol use among a sample of Mexican-American college males and Nagasawa and colleagues (2001) found that such stress was a risk factor for drug use and delinquency among a sample of Asian adolescents. Unfortunately, data limitations prohibit a sound test of the acculturation stress thesis (as an explanation of the unexpected moderated relationship). Clearly, further research exploring the possible association between AI academic achievement, attachment, and delinquent behavior, particularly in urban and suburban contexts wherein the AI student is a racial minority, is warranted.

Likewise, we found an unexpected interaction between strain and substance using peers. The strength of the association between negative recent events and delinquent acts was strongest under conditions of relatively *low* exposure to peer delinquency, a finding, while inconsistent with GST, has been found in past tests (Aseltine, Gore, and Gordon, 2000; Hoffman and Miller, 1998; Hoffman, 2010). However, the results of additional analyses decomposing the effects indicates that the positive association between strain and delinquent activity was only significant for those with little exposure to delinquent peers—the relationship between strain and delinquent activity was not significant under conditions of moderate or high exposure to delinquent peers. We discuss this surprising finding further below.

Overall, we detected 14 statistically significant interactions (out of a total of 96 tested interactions) between strain and personal and social resources and only three of these conditional relationships (all with educational strain) behaved in the manner predicted by GST. While finding 14 significant interactions out of 96 tests is greater than chance, nonetheless we must conclude that we find limited support for the role of moderators in the strain-delinquency relationship, especially considering that some of the findings are novel.

Supplemental Analyses of Gender Differences

Broidy and Agnew (1997), in their seminal article on GST and gender, made a compelling case for both the theory's applicability to both males and females and to help explain the gender gap in crime/delinquency. This later issue is particularly salient to strain theories, because earlier versions, including Merton's anomie theory, have been criticized both for their neglect and the poor applicability of theory in explaining the gender gap. Broidy and Agnew posited that although males and females experience similar levels of strain and anger, gender differences in the types of strain experienced, the emotional responses to strain and differences in coping, social and personal resources can explain the gender gap.

We conducted some preliminary analyses to assess whether GST has utility for both AI males and females. The results (reported in Table 4) suggest no significant gender differences in the strain-delinquency relationship, although model 1 (table 4) indicated that depressive symptoms has a stronger relationship with delinquency among AI males compared to females (based on cross-model tests of differences between coefficients in non-linear models, see Hoetker, 2007). In model 2 we found that exposure to substance using peers was a risk factor for general delinquency for both males and females and that religiosity was a risk factor but only for males. Compared to the models reported in table 2, social support neared but did not reach statistical significance for males and females, likely due to the smaller sample sizes. In model 2 we found no evidence that the strength of the coefficients were significantly different by gender. However, we did find three significant gender differences in the moderating effects of social and personal resources on the relationship between strains and delinquent acts. Consistent with GST, but only among adolescent females, we found that under conditions of high educational strain, school attachment is protective for general delinquency. Similarly, among females, we found that school commitment was protective for general delinquency, but only when on has few criminal victimization experiences. We also found evidence that the moderating effect of substance using peers on the relationship between school strain and general delinquency was only significant for males. Overall, we found limited evidence of gender differences in the role of the GST variables to predict delinquent behavior.

Discussion

The present study represents the initial published test of GST principles used to explain AI delinquent behavior. Overall, we found mixed support for GST. Supporting hypothesis one, we found that both criminal victimization and recent negative life events were associated with all three-delinquency measures. Also consistent with GST, we found that negative affect (depressive symptoms) was associated with all three dependent variables. However, we found little support for the hypothesis that negative affect mediates the strain-delinquency relationship. Perhaps more provocatively, we found mixed support for the GST notion that personal and social resources condition the strain-delinquency relationship. However, many of the significant interactions found revealed associations inconsistent with GST. While these inconsistent conditioning relationships have been found in prior tests of GST (Aseltine, Gore, and Gordon, 2000; Hoffman and Miller, 1998; Paternoster and Mazerolle, 1994; Hoffman, 2010), they further illuminate the need to reconsider the role of

personal and social resources in influencing the strain-delinquency association. For instance, if our interpretation of the moderating roles of school attachment and commitment is valid (i.e., acculturation stress), our findings point to a need for increased cultural competence training to be incorporated into the professional development programs of teachers in school settings where AIs are part of the student population. Such training has been found to be beneficial as it both leads to more effective teaching and better equips teachers to reach out to culturally diverse families (Gay, 2000; Henderson et al., 2007). Likewise, our finding that exposure to delinquent peers attenuates the strain-delinquent behavior association also challenges GST's logic regarding the role of deviant peers in amplifying delinquency. As Hoffman (2010: 115) notes, GST does not provide any clear explanation as to why we would find such a novel moderating effect. His explanation for an identical finding to ours seems sound:

“...perhaps even delinquent peers provide some measure of social support for adolescents who experience adverse events...perhaps youths who experience these [strains] find some modicum of support from even their delinquent friends” (117).

It is also possible that peers who use substances have more experience with managing strain than peers who don't use substances, such that substance using peers have begun to develop coping strategies that can be passed on to friends. Unfortunately, evaluating the extent of strain exposure by respondent's peers is beyond the scope of the present study, but our results (and others like ours) suggest that additional research is necessary to further explore the role of peers in adolescent stress management. Indeed, further research and thought into the role of personal and social resources in understanding the strain-delinquency association is warranted, both for white and non-white (including AI) populations.

Like any study, our findings must be considered in light of some important limitations. First, the measures of strain in the Add Health study are limited. There were no measures of personal discrimination strain and few measures of chronic stressors (i.e., the daily hassles that a person experiences). Additionally, our measure of bad temper is a weak measure of anger: instead of capturing situational anger, this measure likely taps into trait anger, which may be a characteristic that existed prior to the experience of the strains examined in these analyses. And the inventory of events captured in the measure of recent life events was less than comprehensive. As Thoits (2010) noted, the more comprehensively that stress is measured, the more likely the research is to reveal significant and substantial health implications.

Finally, it should be noted that although the Add-Health study was a nationally representative sample of high school students, no reservation schools were selected in the sample. Thus, the reported results may have limited application to AI adolescents who attend schools wherein AIs are a racial majority (such as reservation schools). Indeed, readers should remember that the notion that AIs are a monolithic racial category is an oversimplification that was mandatory in this data analysis because tribal affiliation was not reported. Given that there are 565 federally recognized tribes and many more tribes that are not so acknowledged by the United States, readers should be cautious in interpreting these results.

Implications for Future Research

Our examination, as mentioned earlier, is best viewed as a preliminary study of the applicability of GST principles to a sample of AI adolescents. The purpose of this study was, consistent with the aforementioned concern by Giordano and Cernkovich (1992), to assess whether generic measures of GST can adequately explain delinquent activity among an understudied group (AIs). We found that GST is a valid explanation of such behavior among our sample of AIs. In this regard, our findings reinforce the finding of other studies that have examined the general applicability of GST for explaining delinquency among non-white samples (Kaufman 2005; Perez, Jennings, and Gover, 2008). The next logical step in this research is to move beyond the generic measures of strain and GST generally and take into consideration some of the unique aspects of AI culture, environment, and experiences that likely would produce a more comprehensive understanding of how strains are associated with delinquent behavior among AIs. As noted by Perez, Jennings, and Gover (2008) in their work applying GST principles to Hispanics,

“it is important to note that this theoretical integration is not arguing that there should be a different theory to explain the criminal and delinquent behavior of different ethnic groups...Instead, it suggests that Agnew’s General Strain Theory-related processes operate similarly for all groups (consistent with the intention of a general theory); however, there are strains specific to ethnic-minority groups that are unique and for which theory should account” (p. 566).

Unfortunately, such unique strains were not captured by the data utilized in these analyses. Likewise, there was no consideration for what is referred to in the literature as historical trauma (e.g., Brave Heart, 1998; Whitbeck et al., 2004). Historical trauma, which is the intergenerational transmission of trauma associated with the ethnic cleansing of AIs and persisted with practices of forced segregation, isolation, and acculturation, has been identified as an important stressor that has adverse health consequences for many AIs (Whitbeck et al., 2009). Additional research that incorporates measures of historical trauma and other culturally unique strains would greatly enhance our understanding of GST applied to the AI experience (see Simoni & Evans-Campbell, 2002 for one such culturally-sensitive strain-focused framework).

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Table 1

Descriptive Characteristics (n=670).

	Cronbach's alpha (# of items)	Means (Standard Deviations)	Min	Max
Dependent Variables				
Delinquent acts	.83 (17)	2.87 (3.18)	0	16
All violent delinquent acts below				
All property delinquent acts below				
Lie to parents or guardians about where you had been or whom you were with				
Run away from home				
Act loud, rowdy, or unruly in a public place				
Violent delinquent acts	.68 (6)	0.87 (1.27)	0	6
Use or threaten to use a weapon to get something from someone				
Take part in a fight where a group of friends was against another group				
Pulled a knife or gun on someone				
Shot or stabbed someone				
Carried a weapon at school				
Got into a serious physical fight				
Property delinquent acts	.77 (8)	1.07 (1.71)	0	8
Paint graffiti or signs on someone else's property or in a public place				
Deliberately damage property that did not belong to you				
Take something from a store without paying for it				
Drive a care without the owner's permission				
Steal something worth more than \$50				
Go into a house or building to steal something				
Sell marijuana or other drugs				
Steal something worth less than \$50				
Independent Variables				
Strains				
Criminal victimization		0.72 (1.62)	0	10
Negative recent life events		1.47 (1.38)	0	7
Educational strain		0.41 (.49)	0	1
School-based strain		2.72 (.96)	0	5
Negative Affect				
Bad temper (yes=1)		0.39 (.46)	0	1

	Cronbach's alpha (# of items)	Means (Standard Deviations)	Min	Max
Depressive symptoms	.91 (19)	1.69 (.43)	1	3.37
Personal & Social Resources				
Social support	.79 (7)	3.99 (.63)	1	5
Self-esteem	.85 (7)	4.00 (.62)	1.71	5
Religiosity	.81 (3)	4.43 (3.02)	0	9
Peer substance use	.76 (3)	0.93 (.97)	0	3
School attachment	.82 (3)	3.56 (.98)	0	5
School commitment (GPA)		2.61 (.77)	1	4
Self-control	.70 (3)	3.81 (.68)	1.33	5
Autonomy	.64 (7)	0.71 (.24)	0	1
Control Variables				
Gender (female=1)		0.48(.50)	0	1
Parental education (high school=1)		0.57 (.50)	0	1
Parental education (college=1)		0.21 (.43)	0	1
Two parent household		0.50 (.50)	0	1
Age		15.51 (1.62)	12	20
Parental alcohol use		1.93 (1.07)	1	6

Table 2

Negative Binomial Regression predicting count of delinquent acts (n=670)

	General			Violent			Property		
	Model 1 IRR	Model 2 IRR	Model 3 IRR	Model 1 IRR	Model 2 IRR	Model 3 IRR	Model 1 IRR	Model 2 IRR	Model 3 IRR
<i>Controls</i>									
Gender	0.852 (.110)	0.799 (.098)	0.788* (.078)	0.641** (.084)	0.592*** (.077)	0.589*** (.068)	0.710 (.128)	0.671* (.115)	0.661*** (.093)
Parental education-high school	0.935 (.184)	1.007 (.188)	0.931 (.166)	0.799 (.171)	0.859 (.185)	0.821 (.159)	0.980 (.268)	1.059 (.273)	0.965 (.242)
Parental education-college	0.966 (.153)	1.170 (.191)	1.090 (.188)	0.634* (.119)	0.780 (.158)	0.739 (.148)	1.117 (.269)	1.340 (.333)	1.236 (.322)
Two-parent family	1.013 (.106)	1.013 (.104)	1.053 (.097)	0.914 (.124)	0.914 (.116)	0.946 (.109)	1.020 (.152)	1.025 (.159)	1.083 (.158)
Parental alcohol use	1.037 (.043)	1.018 (.043)	1.000 (.041)	0.968 (.054)	0.948 (.054)	0.922 (.057)	1.100 (.070)	1.082 (.071)	1.056 (.064)
Age	0.905** (.030)	0.887*** (.027)	0.864*** (.024)	0.861*** (.036)	0.851*** (.034)	0.821*** (.029)	0.887* (.042)	0.866*** (.040)	0.830*** (.033)
<i>Strains</i>									
Recent criminal victimization	1.344*** (.076)	1.294*** (.063)	1.167** (.040)	1.477*** (.084)	1.415*** (.078)	1.289*** (.066)	1.375*** (.112)	1.329*** (.102)	1.161 (.100)
Recent life events	1.242*** (.074)	1.144** (.065)	1.083 (.061)	1.354*** (.090)	1.252*** (.078)	1.154* (.064)	1.237* (.107)	1.143 (.096)	1.076 (.094)
Educational strain	0.959 (.051)	0.948 (.046)	0.929 (.050)	1.036 (.061)	1.031 (.058)	1.033 (.068)	1.017 (.079)	1.002 (.072)	0.975 (.083)
School-based strain	1.010 (.051)	1.005 (.047)	0.982 (.040)	0.944 (.063)	0.946 (.060)	0.934 (.048)	1.097 (.091)	1.086 (.087)	1.047 (.072)
<i>Negative Emotions</i>									
Bad temper		1.197 (.142)	1.173 (.130)		1.289* (.166)	1.229 (.158)		1.200 (.238)	1.137 (.226)
Depressive symptoms		1.744*** (.223)	1.498** (.206)		1.634*** (.224)	1.485** (.218)		1.695* (.348)	1.153 (.390)
<i>Personal & Social Resources</i>									
Self-control			0.930 (.048)			1.002 (.068)			0.877 (.071)
Social support			0.862** (.044)			0.813*** (.045)			0.819** (.061)
Self-esteem			1.016 (.069)			1.096 (.080)			1.090 (.122)
Religiosity			1.139* (.062)			1.129 (.070)			1.181 (.104)
Autonomy			1.115 (.063)			1.159 (.110)			1.182** (.074)
School attachment			1.030 (.050)			0.972 (.055)			1.096 (.100)
School commitment			0.990 (.063)			1.074 (.078)			0.963 (.091)
Substance using peers			1.321*** (.067)			1.260** (.099)			1.499*** (.124)
Constant	13.25*** (6.98)	6.30** (3.48)	13.14*** (6.68)	12.89*** (8.56)	5.89* (3.91)	12.81*** (8.29)	6.02* (4.53)	3.13 (2.56)	7.61** (5.48)
Alpha	.746 (.083)	.682 (.076)	.566 (.068)	.375 (.123)	.326 (.114)	.139 (.093)	1.739 (.283)	1.657 (.267)	1.341 (.232)

	General			Violent			Property		
	Model 1 IRR	Model 2 IRR	Model 3 IRR	Model 1 IRR	Model 2 IRR	Model 3 IRR	Model 1 IRR	Model 2 IRR	Model 3 IRR
<i>F</i> (df)	13.53 (10, 119)	14.12 (12, 117)	12.88 (20, 109)	13.63 (10, 119)	12.03 (12, 117)	11.77 (20, 109)	8.11 (10, 119)	7.53 (12, 117)	7.52 (20, 109)

Note: $p<.001=***$; $p<.01=**$; $p<.05=*$ (two-tailed tests with linearized standard errors in parentheses.) All of the strain measures and the social and personal resource measures were standardized in these analyses.

Table 3

Incident Rate Ratios for Interaction Terms from Negative Binomial Regression predicting count of delinquent acts (n=670)

<i>Strains</i>	<i>General Delinquency Models</i>						<i>Violent Delinquency Models</i>				<i>Property Delinquency Models</i>			
	1	2	3	4	5	6	1	2	3	4	1	2	3	4
Criminal victimization							1.37*** (.08)							
Negative recent events					1.12 (.07)	1.13* (.06)		1.16** (.06)	1.22** (.08)	1.23*** (.07)				1.13 (.10)
Educational strain	0.91* (.05)	0.92 (.05)									0.96 (.08)			
School-based strain			1.05 (.05)	1.02 (.04)								1.16* (.08)	1.16* (.08)	
Family structure														
<i>Personal & Social Resources</i>														
Self-control														
Social support		0.87** (.04)			0.85** (.05)				0.80*** (.04)		0.84* (.06)			
Self-esteem	1.01 (.06)													
Religiosity														
Autonomy														
School attachment			1.10 (.06)									1.22 (.13)		
School commitment							1.04 (.07)	1.01 (.08)						
Substance using peers				1.35*** (.07)		1.41 *** (.08)				1.36*** (.11)			1.56*** (.13)	1.64*** (.15)
<i>Interaction</i>														
Strain * Moderator	0.89* (.04)	0.89* (.04)	1.07** (.03)	0.85*** (.03)	1.10* (.05)	0.85*** (.04)	1.12* (.06)	1.13** (.05)	1.10* (.04)	0.86*** (.03)	0.86* (.07)	1.12* (.05)	0.76*** (.05)	0.81** (.05)

Note: $p<.001=***$; $p<.01=**$; $p<.05=*$ (two-tailed tests with linearized standard errors in parentheses.); Only variables included in interaction terms reported above—full model includes all of the controls, strains, negative affect, and personal and social resources. All of the strain measures and the social and personal resource measures were standardized in these analyses.

Table 4
Incident Rate Ratios for Negative Binomial Regression predicting count of delinquent acts by gender (females=330, males=340)

	Females Model 1	Males Model 1	Females Model 2	Males Model 2	Females Model 3	Males Model 3	Females Model 4	Males Model 4	Females Model 5	Males Model 5
<i>Controls</i>										
Parental education- high school	1.289 (.235)	0.794 (.211)	1.201 (.210)	0.752 (.196)	1.165 (.201)	0.749 (.195)	1.196 (.208)	0.847 (.219)	1.134 (.205)	0.755 (.198)
Parental education- college	1.204 (.262)	1.186 (.243)	1.227 (.272)	1.013 (.253)	1.307 (.293)	1.018 (.255)	1.228 (.273)	1.122 (.289)	1.182 (.265)	1.019 (.258)
Two-parent family	1.160 (.186)	0.931 (.125)	1.218 (.191)	0.975 (.131)	1.225 (.190)	0.989 (.137)	1.222 (.191)	0.925 (.123)	1.158 (.179)	0.972 (.130)
Parental alcohol use	1.074 (.065)	0.954 (.060)	1.051 (.064)	0.944 (.066)	1.040 (.062)	0.949 (.067)	1.052 (.064)	0.940 (.069)	1.086 (.065)	0.942 (.067)
Age	0.839*** (.039)	0.917*** (.041)	0.840*** (.036)	0.870** (.038)	0.841*** (.036)	0.868** (.038)	0.840*** (.035)	0.848*** (.038)	0.840*** (.036)	0.871** (.038)
<i>Strains</i>										
Criminal victimization	1.302** (.103)	1.250** (.086)	1.160 (.089)	1.138 (.078)	1.152 (.089)	1.148* (.079)	1.161 (.089)	1.098 (.070)	1.230** (.087)	1.164 (.091)
Negative recent life events	1.112 (.075)	1.211* (.090)	1.058 (.074)	1.152 (.084)	1.056 (.075)	1.152 (.085)	1.060 (.074)	1.195* (.090)	1.045 (.072)	1.158* (.085)
Educational strain	0.958 (.064)	0.963 (.056)	0.967 (.066)	0.918 (.060)	0.931 (.061)	0.920 (.061)	0.972 (.067)	.0925 (.062)	0.948 (.062)	0.923 (.062)
School-based strain	1.006 (.066)	1.011 (.066)	1.020 (.066)	0.973 (.058)	1.043 (.063)	0.974 (.058)	1.025 (.067)	1.024 (.057)	1.025 (.064)	0.972 (.057)
<i>Negative Emotions</i>										
Bad temper	1.200 (.190)	1.285 (.194)	1.259 (.181)	1.132 (.152)	1.240 (.188)	1.126 (.151)	1.250 (.184)	1.165 (.147)	1.210 (.173)	1.129 (.151)
Depressive symptoms	1.534** (.249)	2.036*** (.398)	1.470* (.266)	1.661* (.394)	1.438* (.256)	1.666* (.396)	1.467* (.265)	1.494 (.341)	1.424* (.236)	1.655* (.390)
<i>Personal & Social Resources</i>										
Self-control			0.909 (.059)	0.951 (.078)	0.892 (.061)	0.952 (.079)	0.907 (.059)	0.983 (.077)	0.937 (.060)	0.952 (.079)
Social support			0.873 (.067)	0.845 (.081)	0.857* (.066)	0.847 (.082)	0.876 (.068)	0.818* (.076)	0.863 (.070)	0.843 (.082)
Self-esteem			1.065 (.090)	0.977 (.103)	1.029 (.081)	0.968 (.102)	1.063 (.091)	0.912 (.085)	1.060 (.085)	0.977 (.102)
Religiosity			1.084 (.083)	1.176* (.074)	1.092 (.083)	1.169* (.075)	1.087 (.083)	1.170* (.074)	1.086 (.084)	1.184** (.074)
Autonomy			1.032 (.069)	1.176 (.110)	1.036 (.072)	1.176 (.111)	1.032 (.070)	1.163 (.100)	1.052 (.073)	1.180 (.114)
School attachment			1.068 (.075)	1.062 (.073)	1.092 (.072)	1.064 (.074)	1.070 (.076)	1.127 (.071)	1.075 (.071)	1.065 (.073)
School commitment			0.987 (.071)	0.989 (.068)	0.986 (.069)	0.992 (.068)	0.987 (.071)	1.030 (.068)	0.990 (.075)	0.987 (.070)
Substance using peers			1.267** (.093)	1.355*** (.085)	1.272** (.090)	1.353*** (.083)	1.275** (.098)	1.365*** (.082)	1.233** (.089)	1.356*** (.087)
<i>Interactions</i>										
Educational strain * school attachment					0.825*** (.043)	1.031 (.045)				
School strain * substance using peers							0.973 (.059)	0.783*** (.040)		

	Females Model 1	Males Model 1	Females Model 2	Males Model 2	Females Model 3	Males Model 3	Females Model 4	Males Model 4	Females Model 5	Males Model 5
Criminal victimization * school commitment									1.271*** (.070)	1.039 (.068)
Constant	10.80* (9.88)	3.79* (2.370)	11.54** (9.54)	13.26*** (9.12)	11.25*** (9.09)	13.59*** (9.33)	11.60** (9.58)	23.00*** (16.56)	12.89*** (10.67)	13.27*** (9.17)
Alpha	.520 (.109)	.754 (.122)	.430 (.093)	.611 (.101)	.393 (.093)	.608 (.102)	0.430 (.093)	.537 (.101)	.385 (.094)	.610 (.101)
F (df)	9.16 (11, 118)	4.20 (11, 118)	7.36 (19, 110)	5.82 (19, 110)	6.95 (20, 109)	5.62 (20, 109)	6.83 (20, 109)	9.50 (20, 109)	8.76 (20, 109)	5.71 (20, 109)

Note: $p<.001$ =***, $p<.01$ =**, $p<.05$ =* (two-tailed tests with linearized standard errors in parentheses.). Statistically significant gender differences are highlighted in bold and based on an adjusted Wald test. All of the strain measures and the social and personal resource measures were standardized in these analyses.