Effects of Hurricane Katrina and Other Adverse Life Events on Adolescent Female Offenders: A Test of General Strain Theory

Angela R. Robertson¹, Judith A. Stein², and Lacey Schaefer-Rohleder³

¹ Social Science Research Center, Mississippi State University, Mississippi State, MS

² Center for Collaborative Research on Drug Abuse, Department of Psychology, University of California Los Angeles, Los Angeles, CA

³ School of Criminal Justice, University of Cincinnati, Cincinnati, OH

Abstract

This study tested Agnew's General Strain Theory (GST) by examining the roles of anger, anxiety, and maladaptive coping in mediating the relationship between strain and three outcomes (serious delinquency, minor delinquency, and continued involvement in the juvenile justice system) among adolescent female offenders (N = 261). Strains consisted of adverse life events and exposure to Hurricane Katrina. Greater exposure to Hurricane Katrina was directly related to serious delinquency and maladaptive coping. Hurricane Katrina also had an indirect effect on minor delinquency and Post-Katrina juvenile justice involvement mediated through maladaptive coping. Adverse life events were associated with increased anger, anxiety, and maladaptive coping. Anger mediated the relationship between adverse life events and serious delinquency. Anxiety mediated the relationship between adverse life events and minor delinquency. Maladaptive coping strategies were associated with minor delinquency and juvenile justice involvement. Findings lend support to GST.

Keywords

Hurricane Katrina; female juvenile offenders; General Strain Theory; maladaptive coping

Considerable research has investigated the propensity for deviance, recognizing the integral role of childhood events. The relationship of childhood adversity as a precursor to juvenile delinquency is well established (Holsinger and Holsinger 2005; Rebellon and Van Gundy 2005; Siegel and Williams 2003; Stouthamer-Loeber et al. 2001). However, more research is needed to identify critical mediators of the relationship between various stressors and delinquent behaviors. The current study uses General Strain Theory (GST; Agnew 1992, 2001) to examine the connections between Hurricane Katrina, other adverse life events, and female delinquency. As a group, female adolescent offenders have been exposed to the types of strain that generate a delinquent response (Agnew 2001) such as victimization and multiple trauma exposure (Acoca and Dedel 1998; Dixon, Howie, and Starling 2005; Smith, Leve, and Chamberlain 2006). The current study tests GST by examining the roles of anger, anxiety, and maladaptive coping in mediating the relationship between Hurricane Katrina, other adverse life events, and various indicators of delinquency.

GST

Agnew's (1992) strain theory focuses on the occurrence of strain at the individual level. Strain results from negative interpersonal relationships, adverse life events, and chronic stressors that individuals experience as aversive, that threaten or actually result in loss, or that interfere with goal attainment. An important caveat is that some stressors are more likely to result in crime than others (Agnew 2001). Serious family dysfunction, such as violence among family members and physical or sexual abuse, are strains most likely to lead to delinquent behavior because they are seen as unjust, are high in magnitude (e.g., severity of harm and duration of the strain), and involve exposure to others who model criminal behaviors (Agnew 2001). There is ample evidence that adverse family environments and negative life events are related to drug use, aggression, and other forms of delinquency (Agnew and White 1992; Brezina 1998; Hoffman and Miller 1998; Rhodes and Jason 1990; Wills, Vaccaro, and McNamara 1992).

Drawing on the stress paradigm, Agnew argues negative emotions mediate the strain–delinquency relationship, while social and personal coping resources moderate the relationship (Agnew 1992, 1995). Agnew (1992) suggests that coping resources, such as self-esteem, affect the selection of coping strategies, but this hypothesis has been rarely included in tests of GST. Studies that have attempted to test the conditional effects of strain on delinquency using coping resources as moderators found no evidence to support this hypothesis (Aseltine, Gore, and Gordan 2000; Jang and Johnson 2003; Piquero and Sealock 2000).

Coping strategies are different from coping resources. Coping strategies are used to minimize, avoid, and/or manage specific stressors (Lazarus and Folkman 1984). There are a number of ways to cope with stress, and these strategies are typically grouped into two broad categories: active and avoidant coping (Fields and Prinz 1997). Active coping includes support seeking, problem-solving, and other efforts aimed at gaining control over the stressor, while avoidant coping involves cognitive and behavioral attempts to avoid, escape, or disengage from the stressor (Fields and Prinz 1997). Whether the outcome is delinquency or other problematic behaviors depends on the choice of coping strategies. In general, active coping strategies are associated with better adjustment and avoidant coping strategies are maladaptive (Clarke 2006; Compas et al. 2001).

Only two tests of GST have assessed the possible intervening role of coping strategies. One study mixed active and avoidant types of coping in a single measure of coping, which may account for the fact that coping was not associated with crime (Broidy 2001). Piquero and Sealock (2000) tested five categories of coping as potential mediators of the relationship between strain and two delinquency outcomes: interpersonal aggression and property crimes. The findings suggested that actively seeking social support from peers was positively associated with property crimes and aggression, spiritual coping inhibited property offending only, and having a positive outlook, physical fitness, or skill in managing emotions were not associated with either form of delinquency (Piquero and Sealock 2000). Although both studies included cognitive, emotional, and behavioral coping strategies advanced by Agnew (1992), neither considered research showing that some forms of coping can be maladaptive and result in poorer adjustment among children and youth (Compas et al. 2001; Fields and Prinz 1997). We examine avoidant type coping strategies and test whether these strategies are maladaptive in terms of delinquency and involvement in the juvenile justice system.

GST posits that strain triggers negative emotions, and research has demonstrated that strain leads to anger, anxiety, and depression (Brezina 1996). Anger, however, is viewed as the most important link between strain and deviance, as it creates a desire and energizes the

individual for action (Agnew 1992, 1995). The majority of the empirical evidence supports the role of anger as a mediator of strain and delinquency (Agnew 1985; Aseltine et al. 2000; Brezina 1998; Mazerolle and Piquero 1998; Piquero and Sealock 2000).

Due to the prominent role of anger in GST, the mediating role of other negative emotions has rarely been examined (Aseltine et al. 2000; Katz 2000; Piquero and Sealock 2000). Results of these studies cast doubt on Agnew's (1992 Agnew's (1995) claim that delinquency may occur in response to other types of negative emotions. For example, depression did not mediate the effects of physical and emotional abuse among family members on aggressive behavior or property offenses among juvenile offenders (Piquero and Sealock 2000). However, it is possible that when the emotional reaction to strain is anxiety or depression, self-destructive or escapist forms of deviance, such as substance abuse, are more likely to be manifested (Broidy and Agnew 1997; Mirowsky and Ross 1995). For example, feelings of alienation were associated with substance use and minor delinquency among minority girls, while anxiety was associated with drunkenness among minority women (Katz 2000).

The mixed findings regarding the mediating role of negative emotions may be due to the type of delinquent outcome examined. Inner-directed emotions, such as anxiety and depression, were more strongly associated with drug use than with fighting, while the reverse was true for losing one's temper (Jang and Johnson 2003). Other research has demonstrated the mediating effects of anger for aggressive behavior but not for property crimes or substance abuse (Aseltine et al. 2000; Mazerolle and Piquero 1998; Piquero and Sealock 2000). More research is needed to support Agnew's claims that deviant responses to strain may take a variety of forms and that the type of emotional reaction to strain may influence which deviant outcome is manifested (Broidy and Agnew 1997).

Childhood Adversity and Female Offenders

Childhood adversity and adult victimization are thought to play a central role in some girls' pathways to delinquency and subsequent crime. The proportion of women prisoners who report having a history of childhood victimization is three to four times higher than male offenders and two to three times greater than women in the general public (Harlow 1999). Many female offenders have been physically or sexually abused, neglected, and exposed to violence at home and in their communities (Dixon et al. 2005; Richie 1996; Smith et al. 2006). In addition, family dysfunction and family criminal involvement are common among female offenders (Acoca and Dedel 1998; Robertson, Baird-Thomas, and Stein 2008). In short, female juvenile offenders are frequently exposed to the types of strain that are most likely to lead to delinquency (Agnew 2001), and the adults in their lives may be less available to provide support or may model maladaptive coping and deviant behavior.

Hurricane Katrina: An Added Strain

Hurricane Katrina provided a unique opportunity to investigate the effects of such a traumatic event on delinquency. In August 2005, the southeastern United States experienced one of the deadliest and most costly natural disasters in this nation's history (Swanson et al. 2007). In addition to the loss of life, displacement of families, and the destruction of property, there was a significant increase in social problems, such as domestic violence and mental illness, among adults after Hurricane Katrina (Abramson, Garfield, and Redlener 2007; Kessler et al. 2006; Larrance, Anastario, and Lawry 2007). Children and youth affected by hurricanes exhibit a host of psychological and behavioral problems (Garrison et al. 1995; Hardin et al. 1994; Khoury et al. 1997; Norris 2005b). Six months after Hurricane Katrina, the prevalence of behavioral or conduct problems among children in Federal Emergency Management Agency (FEMA)-subsidized housing doubled (Abramson et al.

2007). Other residents of temporary housing reported problems getting their children to attend school, and many believed that their children had been newly exposed to drugs since displacement (Larrance, Anastario, and Lawry 2007).

Experiencing a natural disaster is not necessarily criminogenic. However, dealing with the aftermath of a natural disaster can lead to anger, irritability, fatigue, sleep disturbance, hyperarousal, and relationship difficulties—particularly when the recovery period is long (NSW Institute of Psychiatry and Centre for Mental Health 2000). In turn, symptoms of psychological distress may lead to acting out. A study of the impact of Hurricane Andrew on public middle school students found that hurricane-related stressors were significantly associated with symptoms of psychological distress, which, in turn, were significantly associated with post-hurricane behavior problems (Khoury et al. 1997). Marsee (2008) recently reported data suggesting that exposure to Hurricane Katrina increased irritability, angry outbursts, and aggression among some high school students on the Mississippi Gulf Coast. These behaviors may bring youth to the attention of law enforcement.

Hurricane Katrina was one of many stressful events that increased psychological distress among female juvenile offenders involved in the Mississippi juvenile justice system (Robertson, Morse, and Baird-Thomas 2009), and these strains may affect girls in other ways. The current study applies GST to female adolescent offenders to investigate how Hurricane Katrina and other adverse life events influence serious and minor delinquent behaviors and involvement in the juvenile justice system. We examine whether these relationships are mediated by their anger, anxiety, and maladaptive coping styles.

Hypotheses

The following hypotheses are tested in this research (see Figure 1):

Hypothesis 1: Strain, as represented by adverse life events and Hurricane Katrina impact, will have a positive effect on delinquent behavior and post-Katrina juvenile justice involvement, such that higher levels of strain are associated with higher levels of delinquency and greater post-Katrina juvenile justice involvement.

Given that strain can generate a range of negative emotions (Brezina 1996) and evidence that the type of emotional reaction may influence the form of deviant adaptation to strain (Jang and Johnson 2003), we examine two types of self-reported delinquency. It is expected that anger will mediate the relationships between strain and serious/violent delinquency. Anxiety will mediate the relationship between strain and minor delinquency, which includes truancy and running away from home. No a priori assumptions are made on the role of specific emotions as mediators of strain on involvement (or continued involvement) in the juvenile justice system after Hurricane Katrina. Whether a youth is arrested and subsequently incarcerated depends on a number of factors including the actions of law enforcement and the courts.

Hypothesis 2: Anger and anxiety will mediate the relationship between strain and delinquency.

There are a number of ways to cope with stress. We focus on a set of coping strategies labeled “maladaptive” because these strategies are associated with higher incidences of behavior problems in children and adolescents (Compas et al. 2001).

Hypothesis 3: Strain will have a positive effect on maladaptive coping, such that greater strain will be associated with greater use of maladaptive coping.

Hypothesis 4: Strain will have an indirect effect on delinquent behaviors mediated by maladaptive coping.

Method

Participants and Procedures

All female adolescents incarcerated in five Mississippi juvenile correctional facilities were eligible for study participation. Subject enrollment began in November 2005, approximately three months after Hurricane Katrina, and ended in December 2006. Initially, study participants were recruited from an STD/HIV risk reduction intervention program (*Healthy Teen Girls*) for females who were committed to the state training school for girls, which accepts adjudicated delinquents from the entire state. With federal funding starting in May 2006, we sought to ensure adequate representation of residents from the areas that received the brunt of Hurricane Katrina by also targeting female detainees from four juvenile detention centers. One of the participating detention centers is located near the beach in Harrison County where 40 percent of the hurricane-related deaths in Mississippi occurred. The other three detention centers are located in the southern part of the state in Jackson, Pike, and Forrest counties.

Of the 351 girls approached, 305 girls (86.9 percent) participated in the study. There was no significant difference between the race of those who refused (55 percent Black) and those who participated (69 percent Black; $\chi^2(2, N = 349) = 3.10, p = .21$). Those who refused tended to be slightly younger (mean age 15.2) than those who participated (mean age 15.6); this difference was not significant, $F(1, 349) = 3.31, p = .07$. Participants ranged in age from 11 to 19 years ($M = 15.6, SD = 1.5$) and were either African American (67 percent) or Caucasian (33 percent).

The assessments were conducted at the detention center, the training school, or in the homes of those who had been released from custody. The data collection process lasted from 45 to 90 minutes for each participant and included three instruments: a structured interview about the impact of Hurricane Katrina, other adverse life events, and arrests/incarcerations history; a self-administered questionnaire on coping strategies; and a self-administered mental health questionnaire, the Adolescent Psychopathology Scale–Short Form (APS-SF; Reynolds 2000). Full data sets that included responses to the APS-SF were available from 261 participants. The APS-SF was added to the protocol after this study was funded in 2006. Because measures that are central to this analysis came from the APS-SF, we restricted our sample to this subset of participants. Participants who completed the APS-SF did not vary from those who did not in terms of age, $F = 3.01, p = .08$, or ethnicity, $F = .01, p = .92$.

This study was approved by the Institutional Review Board of Mississippi State University. Informed assent was obtained from all study participants. Parental consent also was obtained unless the participant was committed to the training school, in which case she was a temporary ward of the state and permission was obtained from the state juvenile justice agency. Participants were paid \$20 for their time.

Measures

Most of the constructs in the model are represented as latent variables. They were created from multi-item scales and are described in more detail below. To avoid too many indicators for the size of the sample, individual items were randomly combined into parcels to obtain mean indicators (Little et al. 2002). The matrices used in structural modeling can become seriously biased in small samples, such as this one, due, in part, to empty cells. Parceling is acceptable in structural modeling when alpha coefficients are high (Yuan, Bentler, and Kano 1997) and when the sets of items are unidimensional so that important features of individual items are not discarded when they are combined with others (Bandalos and Finney 2001). Parceling will typically result in better model fit than models using individual items with

their attendant idiosyncratic measurement error. Furthermore, parcels provide more continuous data points than using individual items.

Background Predictors

Ethnicity—There was a single-item measure of ethnicity coded Black = 1, Other = 0.

Time since Katrina was included as a control because the psychological effects of natural disasters may decline over time. This variable represents the number of days between Katrina landfall and the date of the interview and ranged from 72 to 475 days ($M = 334.2$, $SD = 90.4$).

Hurricane Katrina impact—Four items were used that reflected personal and familial experiences with the hurricane: (1) whether their *community sustained any damage* due to the hurricane (0 = *no*, 1 = *yes*); (2) whether their family sustained any hurricane related *property damage and loss* to their home (0 = *none*, 1 = *some damage/can live in it*, and 2 = *serious damage/cannot live in it*); (3) the number of *dislocations* (i.e., storm evacuation and subsequent moves from shelters to other temporary housing) related to the hurricane ranged from 0 to 2; and (4) participant's ratings of her level of *fear* during the hurricane (1 = *no fear whatsoever* to 10 = *uncontrollable fear*) and *safety* during the hurricane (1 = *perfectly safe* to 10 = *felt life was in danger*). The two ratings were averaged because they were highly correlated. The reliability (α) for the 4 items indicating Hurricane Katrina Impact was .66.

Adverse life events—Two summed indicators were derived from the Life Stressor Checklist–Revised (Wolfe and Kimerling 1997). The first indicator was a count of 19 adverse life events such as parental separation or divorce, family financial problems, foster care placement, physical neglect, emotional abuse, incarceration of a family member, pregnancy, witnessing violence, and victimization (event occurred yes = 1 and no = 0; $\alpha = .76$). The second indicator, derived from a 5-point Likert-type scale (1 = *not at all* to 5 = *extremely*), rated the effect each event had on her life in the past year. The ratings of all events experienced were summed to form a scale ($\alpha = .75$).

Juvenile justice involvement—Three measured variables comprised the latent variables representing juvenile justice involvement occurring throughout their lives up to the time of the hurricane. These included number of times arrested, number of times incarcerated, and the number of days incarcerated. Coefficient alpha (α) for the 3 items = .83. Number of days incarcerated was highly skewed and had a broad range. For statistical purposes, this item was transformed using the square root (Tabachnick and Fidell 2007). Data on juvenile justice involvement were collected from study participants and also from official records. If data were available from both sources, we used self-reports because official records only reflected involvement in the Mississippi juvenile justice system. If self-report data were missing, we used official records. The two sources were significantly correlated with each other ($p \leq .001$). The correlations between self-reported and official records are .51 for number of arrests, .47 for number of incarcerations, and .44 for the total number of days incarcerated.

Intervening Variables

Anger and anxiety—The APS-SF (Reynolds 2000) is a 115-item self-report measure that evaluates symptoms of mental and conduct disorders as defined by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*. This study used items from the APS-SF scales to develop measures of anger and anxiety. The reporting period for anger and anxiety was in the past 6 months. Response choices are coded 0 = *never or almost never*, 1 = *sometimes*, and 2 = *nearly all the time*. The Anger/ Violence Proneness scale

consists of 14 items that deal primarily with feelings of anger and acting out due to anger; only 7 anger items were used in this analysis to avoid a conceptual overlap with the delinquency outcomes that included violent behaviors (α for the 7 items = .80). The 7 items were formed into 3 parcels by combining them at random. The Anxiety scale has 11 items including feeling nervous, upset, jumpy, and worried (α = .88). These 11 items also combined into 3 parcels using the same method described above.

Maladaptive coping—The Brief COPE Inventory (Carver 1997) has been used in prior research among various samples including a community sample recovering from Hurricane Andrew. The total inventory consists of 28 items. Responses to each item ranged from 1 = *I haven't been doing this at all* to 4 = *I have been doing this a lot*. We selected 9 items that reflect maladaptive coping: use of denial (e.g., I've been refusing to believe that it has happened), escapist substance use (using alcohol or drugs to make myself feel better), behavioral disengagement (I've been giving up trying to deal with it), self-blame (I've been blaming myself for things that happened), and self-distraction (I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping). We created 3 parcels of means using the 9 items (α = .78).

Outcomes

Serious and minor delinquency—Conduct Disorder scale from the APS-SF (described above) assessed self-reported delinquency that may or may not have come to the attention of the law. The scale consists of 12 items that cover a variety of status offenses (running away, truancy, and incorrigibility) and delinquent behaviors. Participants reported behaviors that occurred in the past 6 months. Six items reflected a violent and assaultive behavior and more serious forms of delinquency, such as burglary, and were used to form a Serious Delinquency factor (α = .70). Another subscale used 6 items that included petty theft and incorrigible behaviors such as running away and skipping school (α = .69). Items are scored 0 = *no*, 1 = *yes*.

Post-Katrina juvenile justice involvement was measured the same as Pre-Katrina juvenile justice involvement (described above). Reliability (α) for the 3 items = .80.

Analyses

We used the EQS structural equation modeling (SEM) program (Bentler 2006) that compares a proposed hypothetical model with a set of actual data. The closeness of the variance–covariance matrix implied by the hypothetical model to the empirical variance–covariance matrix was evaluated with goodness-of-fit indices. Fit was assessed with the comparative fit index (CFI), the maximum likelihood chi-square, and the root mean square error of approximation (RMSEA). CFI values of .95 or greater are desirable. The RMSEA is a measure of lack of fit per degrees of freedom, controlling for sample size. Values less than .06 indicate a close fitting model. Robust statistics (e.g., Satorra-Bentler Chi-square, robust CFI) were also assessed due to skewness and kurtosis among some of the variables. Values of all robust parameters in the models were highly similar to the maximum likelihood (ML) results and, thus, are not reported.

Each latent construct predicted its proposed manifest indicators in an initial confirmatory factor analysis (CFA). This analysis assessed the adequacy of the proposed factor structure (measurement model) and the relationships among the latent and manifest variables. Once the factor structure was confirmed, we tested predictive latent variable-mediated path models based on the hypotheses (see Figure 1). For Hypothesis 1, only the predictor and outcome variables were included because no mediation was hypothesized. For Hypotheses 2 through 4, Anger, Anxiety, and Maladaptive Coping were placed as intervening variables

between the background predictive variables (Black ethnicity, Adverse Life Events, Katrina Impact, and Pre-Katrina juvenile justice involvement) and the behavioral outcomes of Serious Delinquency, Minor Delinquency and Post-Katrina juvenile justice involvement. Initially, the background variables predicted the intervening variables that in turn predicted the outcomes. Nonsignificant paths and covariances were gradually dropped until only significant paths and covariances remained. Once the significant pathways were determined, we allowed background predictors to predict the outcomes directly if suggested by the Lagrange Multiplier Test (LM test; Bentler 2006). We also examined indirect effects of the background variables on the outcome variables.

Results

Characteristics of the Sample

Participants ranged in age from 11 to 19 years ($M = 15.6 \pm 1.5$) and were either Black (69 percent) or Caucasian (31 percent). Most participants (59 percent) reported that their parents are separated or divorced and for almost all (96.5 percent) the separation/divorce occurred before Hurricane Katrina. Most participants had a history of behavioral problems. For example, 51.7 percent reported that they had been suspended or expelled from school and 64.2 percent had been brought to the attention of the Youth Court prior to Hurricane Katrina. The length of involvement in the juvenile justice system prior to Hurricane Katrina ranged from 0 to 7 years ($M = 1.52 \pm 1.47$). Study participants averaged 3.54 arrests (± 6.78), 2.24 incarcerations (± 4.29), and 48.17 days incarcerated (± 101.84) prior to Hurricane Katrina.

At the time of the hurricane, most (84 percent) of the girls were with their family, 9 percent were either incarcerated or in residential treatment, and the rest were with their boyfriends or others. Almost all (95 percent) of the participants lived in 49 of the 82 Mississippi counties at the time Hurricane Katrina made landfall and 24 percent resided in one of the three Mississippi coastal counties. Those girls who were out of state at the time of Katrina either evacuated Mississippi prior to the storm or moved to Mississippi after the storm. One study participant was in New Orleans at the time of the storm. Just over half (54 percent) of the participants reported damage to their homes and 14.2 percent had their homes seriously damaged or destroyed. More than 43 percent of participants reported at least one dislocation due to Hurricane Katrina. Ten percent reported that someone close to them was either injured or killed by the storm.

Adverse life events were common: 64.8 percent of the girls reported that a parent or other family member had been incarcerated; 15.3 percent were placed in foster care; 24 percent had experienced serious financial problems; 26.8 percent reported emotional abuse; 46.7 percent witnessed violence among family members; 18 percent reported unwanted or forced sex; and 14.6 percent were victims of a violent crime other than sexual assault.

CFA

Table 1 reports the means, standard deviations, and factor loadings for each variable from the initial CFA. All factor loadings were significant ($p \leq .001$). Fit indexes were also quite acceptable: ML $\chi^2 = 481.02$, 323 *df*; CFI = .95, RMSEA = .043. Due to the outstanding fit of this initial model, there were no supplementary covariances added.

Table 2 reports the bivariate correlations among constructs of the model. Focusing on correlates of Hurricane Katrina Impact, we found that it was significantly associated with less Pre-Katrina juvenile justice involvement ($-.30, p \leq .001$), more Maladaptive Coping ($.18, p \leq .05$), and more Serious Delinquency ($.15, p \leq .05$). Black participants were less likely to be affected by Hurricane Katrina ($-.17, p \leq .01$). The longer the period of time until interview, the more the participants were affected by the hurricane ($.15, p \leq .05$). This

last relationship may be due to the recruitment process. In the beginning, girls were recruited from a training school that served the entire state. Four juvenile detention centers located in south Mississippi and on the Mississippi gulf coast were added as recruitment sites. Therefore, subjects who joined the study later were more likely to be from areas of the state hardest hit by Hurricane Katrina.

Path Models and Findings Related to Hypotheses

The minimal model without any mediators, which tested Hypothesis 1 had reasonable fit statistics but did not have the outstanding fit of the CFA or of the full model presented below (ML $\chi^2 = 273.13$, 157 *df*; CFI = .94, RMSEA = .053). The first hypothesis tests the notion that strain has a direct and positive effect on delinquency. Serious Delinquency was significantly predicted by Katrina Impact (regression coefficient = .21; $p < .01$), Adverse Life Events (regression coefficient = .20; $p < .01$), Pre-Katrina juvenile justice involvement (regression coefficient = .23; $p < .01$), and Black ethnicity (regression coefficient = .13; $p < .05$). This model explained 13 percent of the variance in Serious Delinquency. Minor Delinquency was significantly predicted by Adverse Life Events (regression coefficient = .18; $p < .01$) and Time since Katrina (regression coefficient = .14; $p < .05$). This model explained 5 percent of the variance in Minor Delinquency. Post-Katrina juvenile justice involvement was significantly predicted by Adverse Life Events (regression coefficient = .15; $p < .05$). Only 2 percent of the variance in this latent variable was explained in this model. Results of the bivariate minimal path model without any mediating variables provide support for Hypothesis 1. Greater exposure to adverse life events was associated with all three outcomes. However, Hurricane Katrina only exerted a positive and significant effect on serious and violent forms of self-reported delinquency.

The final predictive structural equation model that tested Hypotheses 2 through 4 is presented in Figure 2; nonsignificant paths and covariances were gradually dropped until only significant ones remained. The single-item ethnicity and Time since Katrina variables are in rectangles and the multiple indicator latent variables are in ovals. For readability, correlations between the dependent variable residuals are not depicted but resemble those reported in Table 2. (Correlations between residuals of Anxiety and Anger = .68, Maladaptive Coping and Anger = .39, Maladaptive Coping and Anxiety = .39; Minor and Major Delinquency = .72, Post-Katrina juvenile justice involvement, Major Delinquency = .22, Post-Katrina juvenile justice involvement, and Minor Delinquency = .31.) Again, no relationships were added to this model except for the significant paths from the background variables to the outcome variables suggested by the LM test such as the direct paths from Katrina Impact and Pre-Katrina juvenile justice involvement to Serious Delinquency. Fit indexes are very good: ML $\chi^2 = 509.95$, 354 *df*; CFI = .95, RMSEA = .041. Serious Delinquency was directly predicted by Anger, Pre-Katrina juvenile justice involvement, and Katrina Impact. Minor Delinquency was predicted by Anxiety, Maladaptive Coping, and Time since Katrina. Post-Katrina juvenile justice involvement was predicted by Maladaptive Coping and Pre-Katrina juvenile justice involvement. This model explained 39 percent of the variance in Serious Delinquency, 21 percent of the variance in Mild Delinquency, and 5 percent of the variance in Post-Katrina juvenile justice involvement.

Indirect Effects

Serious Delinquency was indirectly and significantly predicted by Black ethnicity (standardized indirect regression coefficient [SIRC] = .13; $p < .001$), Adverse Life Events (SIRC = .28; $p < .001$), and Pre-Katrina juvenile justice involvement (SIRC = .07; $p < .05$). These effects were mediated through Anger. Katrina Impact had a small but significant effect on Minor Delinquency mediated through Maladaptive Coping (SIRC = .04; $p < .05$). Adverse Life Events had an indirect effect on Minor Delinquency mediated through Anxiety

(SIRC = .22; $p < .001$). Post-Katrina juvenile justice involvement was indirectly affected by Katrina Impact (SIRC = .03; $p < .05$) and Adverse Life Events (SIRC = .07; $p < .05$) through Maladaptive Coping.

GST posits that negative emotions mediate the relationship between strain and delinquency (Hypothesis 2). Considering first the associations among the two measures of strain and anger and anxiety, the results presented in Figure 2 indicate that cumulative adversity is positively associated with both anger and anxiety, while exposure to Hurricane Katrina is associated with neither. The standardized path coefficients for the direct effect of Adverse Life Events of .48 on anger and .53 on anxiety indicate that greater exposure to adversity predicts higher levels of these emotions. The second part of the chain linking strain with delinquency under GST concerns associations among negative emotions and outcomes. There was a significant direct effect of anger on serious delinquency and anxiety on minor delinquency. The effect of Adverse Life Events on self-reported delinquency was fully mediated by anger and anxiety.

Finally, we examined whether the relationship between strain and deviant behavior is influenced by the individuals' coping strategies. In the third and fourth hypotheses, we predicted that strain will have a positive effect on maladaptive coping and an indirect effect on delinquent behaviors mediated by maladaptive coping. The results provide support for these hypotheses. Greater exposure to Katrina and adverse life events were associated with greater use of coping strategies that are maladaptive, such as use of alcohol or other drugs and disengagement. In turn, the greater use of maladaptive coping was associated with minor forms of delinquency and involvement in the juvenile justice system after the hurricane.

Discussion

Our findings support the major hypothesis of GST that negative relationships with others and chronic or high magnitude stressors are most likely to instigate a deviant response (Agnew 1992, 2001). We considered a wide variety of adverse life events including child maltreatment and a natural disaster. Consequently, we were able to examine the cumulative effect of a number of stressors occurring throughout childhood, as well as more recent strain associated with both the immediate impact of Hurricane Katrina and the ongoing recovery period. Both indicators of strain were associated with adolescent deviance. Adverse life events were associated with both minor and serious self-reported delinquency, as well as with arrests and incarceration. Katrina exposure was related to serious and violent delinquency.

Several of the adverse life events, such as incarceration of a family member, physical neglect, domestic violence, and victimization, could be used as measures of social learning and social control theories. Indeed, Agnew (2001) argues that the types of strain most likely to lead to criminal behavior are those that are associated with low social control and the social learning of deviance. GST differs from other criminology theories in the specification of the intervening processes (Agnew 1995). The use of these adverse life events as indicators of strain is justified because controlling for prior juvenile justice involvement, adverse life events increased delinquent behavior through their effect on negative emotions.

This study also contributed to the empirical literature on GST by examining processes that mediate the relationship between childhood adversity and subsequent delinquency. A key aspect of GST is that strain gives rise to one or more negative emotional states and that anger is the most critical emotional reaction for instigating crime (Agnew 1992, 1995). Our results confirmed previous findings on the role of anger in mediating the relationship

between strain and aggressive behavior (Agnew 1985; Brezina 1998; Piquero and Sealock 2000). However, unlike research that found no relationship between anxiety and nonaggressive delinquency (Aseltine et al. 2000; Mazerolle and Piquero 1998), among our sample anxiety mediated the relationship between adverse life events and minor delinquency. Our measure of minor delinquency included escapist behaviors (i.e., running away and truancy). These minor forms of delinquency may be a form of “flight” response initiated by the emotional and physical discomfort associated with anxiety. Other research has demonstrated that anxiety and depression are associated with substance use (Jang and Johnson 2003; Katz 2000) suggesting that the type of deviant outcome is influenced by the emotional response to strain.

Although coping strategies have been evaluated as possible mediators in research on child sexual abuse (Chaffin, Wherry, and Dykman 1997), few studies have examined coping strategies as mediators of the strain–delinquency relationship. Broidy (2001) found no relationship between strain and a measure of coping that combined strategies thought to be adaptive and maladaptive. Piquero and Sealock (2000) found that spiritual coping was associated with less property offending, while seeking support from peers was associated with greater property offending. We examined only avoidant forms of coping, and these maladaptive coping strategies were associated with minor delinquent behavior and involvement in the juvenile justice system. Although there is some evidence that engagement or problem-focused coping efforts are associated with better psychological adjustment (Clarke 2006; Compas et al. 2001), more research is needed to determine which coping strategies reduce delinquency among disadvantaged youth and those exposed to multiple strains.

An unexpected finding of our study was that the actual experience of being involved in the juvenile justice system may have had some impact on adolescent deviance. We included juvenile justice involvement prior to the hurricane as a control variable. We found Pre–Katrina juvenile justice involvement had an indirect effect on serious delinquency mediated by anger. One explanation for these findings is that the juvenile justice system can be traumatizing when family problems and mental health needs associated with girls’ deviance are neglected (Gavazzi, Yarcheck, and Chesney-Lind 2006). Girls are much more likely than boys to enter the juvenile justice system for family-related offenses such as running away, unruly behavior, and domestic violence (Chesney-Lind and Shelden 1998; Gavazzi, Yarcheck, and Chesney-Lind 2006). Studies have shown that there is a lack of intensive family-based programs tailored to the needs of female juvenile offenders (Acoca 1999). Furthermore, abuse by staff in the form of foul and demeaning language, inappropriate touching, isolation, and harsh punishment including extended shackling has been reported in detention facilities across the United States (Acoca 1999) and was documented at one of the study sites. If the needs of female offenders go unmet and they are exposed to further victimization by the juvenile justice system, anger and acting-out are likely responses that may perpetuate further juvenile justice involvement.

Limitations of the Study

This study is not without limitations that suggest some caution when drawing conclusions or making generalizations from our findings. First, there was not a comparison group included in the analyses. Our primary focus was on girls detained in five Mississippi correctional facilities. Thus, the generalizability of our findings may be limited to female juvenile offenders. However, GST has rarely been tested on juvenile offenders, clearly a highly relevant population with which to test the theory. Second, the study has a causal ordering but other possibilities for the ordering of the variables exist, especially because the data are cross-sectional. Other models and directionality of influences might be equally reasonable (MacCallum et al. 1993).

Another limitation of this study is its retrospective design. We interviewed participants between 3 and 16 months after Katrina and relied on their memories of hurricane-related experiences and of adverse life events occurring through their lives. Retrospective studies are subject to a number of methodological problems (Briere 1992; Norris 2005a). However, the costs and difficulties inherent in conducting more ideal research designs, such as randomized or matched control longitudinal research, have made retrospective studies much more common than prospective studies in the disaster (Norris 2005a) and child maltreatment literatures (Briere 1992). We have mitigated this problem somewhat by controlling for the length of time from Katrina until data collection and by controlling for pre-Katrina juvenile justice involvement as background factors in our model.

Finally, all measures are based on self-report, except for juvenile justice involvement obtained from official records. Reports of abuse and neglect are subject to underreporting because of embarrassment or shame or because the person might not define the experience as abusive or neglectful (Widom, Ireland, and Glynn 1995). Our participants' reports of sexual abuse and witnessing violence in the home were very similar to rates in other studies of female juvenile offenders (Acoca and Dedel 1998; Dixon et al. 2005). Although it is possible that some adverse events and experiences were forgotten or not reported, we still observed a strong and significant effect of adverse life events on delinquency. The veracity of self-reported delinquent behavior is also an issue for concern. The girls might have felt constrained from honest reporting of delinquent behaviors while incarcerated, despite efforts to assure valid reporting through assurance of confidentiality and private space where they could respond unobserved. However, given our previous experience in collecting sensitive information from juvenile offenders, we have little reason to question the reliability of the girls' reports.

Despite these limitations, the findings of this study contribute to the growing literature about the relationship between adverse life events of girls and delinquency. The fact that more girls are getting into trouble has focused attention on the gender differences in the developmental pathways to delinquency (OJJDP 1998). Girls' involvement in delinquency has been attributed to exposure to different types of strain from that of boys (Broidy and Agnew 1997; Mazerolle 1998). Our study demonstrates that past and current negative life events and the reactions to strain are important contributors to female delinquency. Thus, Agnew's strain theory is useful in understanding and potentially reducing female involvement in the juvenile justice system.

Acknowledgments

Funding

This research was supported by grants from the National Institutes on Drug Abuse (DA 21968 to Dr. Robertson and DA 01070-37 to Dr. Stein).

References

- Abramson, David; Garfield, Richard; Redlener, Irwin. *The Recovery Divide: Poverty and the Widening Gap among Mississippi Children and Families Affected by Hurricane Katrina*. New York: Columbia University National Center for Disaster Preparedness; 2007.
- Acoca, Leslie. Investing in Girls: A 21st Century Strategy. *Juvenile Justice*. 1999; 6:3–13.
- Acoca, Leslie; Dedel, Kelly. *No Place to Hide: Understanding and Meeting the Needs of Girls in the California Juvenile Justice System*. San Francisco, CA: The National Council on Crime and Delinquency; 1998.
- Agnew, Robert. A Revised Strain Theory of Delinquency. *Social Forces*. 1985; 64:151–67.

- Agnew, Robert. Foundation for a General Strain Theory of Crime and Delinquency. *Criminology*. 1992; 30:47–88.
- Agnew, Robert. Testing the Leading Crime Theories: An Alternative Strategy Focusing on Motivational Processes. *Journal of Research in Crime and Delinquency*. 1995; 32:363–98.
- Agnew, Robert. Building on the Foundation of General Strain Theory: Specifying the Types of Strain Most Likely to Lead to Crime and Delinquency. *Journal of Research in Crime and Delinquency*. 2001; 38:319–61.
- Agnew, Robert; White, Helene Raskin. An Empirical Test of General Strain Theory. *Criminology*. 1992; 30:475–99.
- Aseltine, Robert H.; Gore, Susan; Gordan, Jennifer. Life Stress, Anger and Anxiety, and Delinquency: An Empirical Test of General Strain Theory. *Journal of Health and Social Behavior*. 2000; 41:256–75. [PubMed: 11011504]
- Bandalos, Deborah L.; Finney, Sara J. Item Parceling Issues in Structural Equation Modeling. In: Marcoulides, GA.; Schumacker, RE., editors. *New Developments and Techniques in Structural Equation Modeling*. Mahwah, NJ: Lawrence Erlbaum; 2001. p. 269-96.
- Bentler, Peter M. EQS 6 Structural Equations Program Manual. Encino, CA: Multivariate Software, Inc; 2006.
- Brezina, Timothy. Adapting to Strain: An Examination of Delinquent Coping Responses. *Criminology*. 1996; 34:39–59.
- Brezina, Timothy. Adolescent Maltreatment and Delinquency: The Question of Intervening Processes. *Journal of Research in Crime and Delinquency*. 1998; 35:71–99.
- Briere, John. Methodological Issues in the Study of Sexual Abuse Effects. *Journal of Consulting & Clinical Psychology*. 1992; 60:196–203. [PubMed: 1592948]
- Broidy LM. A Test of General Strain Theory. *Criminology*. 2001; 39:9–36.
- Broidy, Lisa; Agnew, Robert. Gender and Crime: A General Strain Theory Perspective. *Journal of Research in Crime and Delinquency*. 1997; 34:275–306.
- Carver, Charles S. You Want to Measure Coping but Your Protocol's Too Long: Consider the Brief COPE. *International Journal of Behavioral Medicine*. 1997; 4:92–100. [PubMed: 16250744]
- Chaffin, Mark; Wherry, Jeffery N.; Dykman, Roscoe. School Age Children's Coping with Sexual Abuse: Abuse Stresses and Symptoms Associated with Four Coping Strategies. *Child Abuse & Neglect*. 1997; 21:227–40. [PubMed: 9056102]
- Chesney-Lind, Meda; Shelden, Randall G. *Girls, Delinquency, and Juvenile Justice*. Belmont, CA: West/Wadsworth; 1998.
- Clarke, Angela T. Coping with Interpersonal Stress and Psychosocial Health among Children and Adolescents: A Meta-Analysis. *Journal of Youth and Adolescence*. 2006; 35:11–24.
- Compas, Bruce E.; Connor-Smith, Jennifer K.; Saltzman, Heidi; Thomsen, Alexandria Harding; Wadsworth, Martha E. Coping with Stress During Childhood and Adolescence: Problems, Progress, and Potential in Theory and Research. *Psychological Bulletin*. 2001; 127:87–127. [PubMed: 11271757]
- Dixon, Angela; Howie, Pauline; Starling, Jean. Trauma Exposure, Posttraumatic Stress, and Psychiatric Comorbidity in Female Juvenile Offenders. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2005; 44:798–806. [PubMed: 16034282]
- Fields, Laura; Prinz, Ronald J. Coping and Adjustment During Childhood and Adolescence. *Clinical Psychology Review*. 1997; 17:937–76. [PubMed: 9439874]
- Garrison, Carol Z.; Bryant, Elizabeth S.; Addy, Cheryl L.; Spurrier, Pamela G.; Freedy, John R.; Kilpatrick, Dean G. Posttraumatic Stress Disorder in Adolescents After Hurricane Andrew. *Journal of the American Academy of Child & Adolescent Psychiatry*. 1995; 34:1193–201. [PubMed: 7559314]
- Gavazzi, Stephen M.; Yarcheck, Courtney M.; Chesney-Lind, Meda. Global Risk Indicators and the Role of Gender in a Juvenile Detention Sample. *Criminal Justice and Behavior*. 2006; 33:597–612.
- Hardin, Sally Brosz; Weinrich, Martin; Weinrich, Sally; Hardin, Thomas L.; Garrison, Carol. Psychological Distress of Adolescents Exposed to Hurricane Hugo. *Journal of Traumatic Stress*. 1994; 7:427–40. [PubMed: 8087403]

- Harlow, Caroline Wolf. *Prior Abuse Reported by Inmates and Probationers*. Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics; 1999.
- Hoffman, John P.; Miller, Alan S. A Latent Variable Analysis of General Strain Theory. *Journal of Quantitative Criminology*. 1998; 14:83–100.
- Holsinger, Kristi; Holsinger, Alexander M. Differential Pathways to Violence and Self-Injurious Behavior: African American and White Girls in the Juvenile Justice System. *Journal of Research in Crime and Delinquency*. 2005; 42:211–42.
- Jang, Sung Joon; Johnson, Byron R. Strain, Negative Emotions, and Deviant Coping Among African Americans: A Test of General Strain Theory. *Journal of Quantitative Criminology*. 2003; 19:79–105.
- Katz, Rebecca S. Explaining Girls' and Women's Crime and Desistance in the Context of Their Victimization Experiences: A Developmental Test of Revised Strain Theory and the Life Course Perspective. *Violence Against Women*. 2000; 6:633–60.
- Kessler, Ronald C.; Galea, Sandro; Jones, Russell T.; Parker, Holly A. Mental Illness and Suicidality After Hurricane Katrina. *Bulletin of the World Health Organization*. 2006; 84:930–9. [PubMed: 17242828]
- Khoury, Elizabeth L.; Warheit, George J.; Hargrove, Mary C.; Zimmerman, Rick S.; Vega, William A.; Gil, Andres G. The Impact of Hurricane Andrew on Deviant Behavior Among a Multi-Racial/Ethnic Sample of Adolescents in Dade County, Florida: A longitudinal Analysis. *Journal of Traumatic Stress*. 1997; 10:71–91. [PubMed: 9018678]
- Larrance, Ryan; Anastario, Michael; Lawry, Lynn. Health Status Among Internally Displaced Persons in Louisiana and Mississippi Travel Trailer Parks. *Annals of Emergency Medicine*. 2007; 49:590–601. [PubMed: 17397967]
- Lazarus, Richard S.; Folkman, Susan. *Stress, Appraisal, and Coping*. New York: Springer; 1984.
- Little, Todd D.; Cunningham, William A.; Shahar, Golan; Widaman, Keith F. To Parcel or Not to Parcel: Exploring the Question, Weighing the Merits. *Structural Equation Modeling*. 2002; 9:151–73.
- MacCallum, Robert C.; Wegener, Duane T.; Uchino, Bert N.; Fabrigar, Leandre R. The Problem of Equivalent Models in Applications of Covariance Structure Analysis. *Psychological Bulletin*. 1993; 114:185–99. [PubMed: 8346326]
- Marsee, Monica A. Reactive Aggression and Posttraumatic Stress in Adolescents Affected by Hurricane Katrina. *Journal of Clinical Child and Adolescent Psychology*. 2008; 37:519–29. [PubMed: 18645743]
- Mazerolle, Paul. Gender, Strain, and Delinquency: An Empirical Examination. *Justice Quarterly*. 1998; 15:65–91.
- Mazerolle, Paul; Piquero, Alex. Linking Exposure to Strain with Anger: An Investigation of Deviant Adaptations. *Journal of Criminal Justice*. 1998; 26:195–211.
- Mirowsky, John; Ross, Catherine E. Sex Differences in Distress: Real or Artifact? *American Sociological Review*. 1995; 60:449–68.
- Norris, Fran H. Disaster Research Methodology: Past Progress and Future Directions. *Research Education Disaster Mental Health*. 2005a. Retrieved October 2, 2007 (<http://www.redmh.org/research/general/methods.html>)
- Norris, Fran H. Range, Magnitude, and Duration of the Effects of Disasters on Mental Health: Review Update 2005. *Research Education Disaster Mental Health*. 2005b. Retrieved October 2, 2007 (<http://www.redmh.org/research/general/effects.html>)
- NSW Institute of Psychiatry and Centre for Mental Health. *Disaster Mental Health Response Handbook*. North Sydney, Australia: NSW Health; 2000.
- OJJDP. *Guiding Principles for Promising Female Programming: An Inventory for Best Practices*. Washington, DC: U.S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention; 1998.
- Piquero, Nicole Leeper; Sealock, Miriam D. Generalizing General Strain Theory: An Examination of Offending Population. *Justice Quarterly*. 2000; 17:449–84.

- Rebellon, Cesar J.; Van Gundy, Karen. Can Control Theory Explain the Link Between Parental Physical Abuse and Delinquency? A Longitudinal Analysis. *Journal of Research in Crime and Delinquency*. 2005; 42:247–74.
- Reynolds, William M. *Adolescent Psychopathology Scale—Short Form Professional Manual*. Lutz, FL: Psychological Assessment Resources, Inc; 2000.
- Rhodes, Jean E.; Jason, Leonard A. A Social Stress Model of Substance Abuse. *Journal of Consulting and Clinical Psychology*. 1990; 58:395–401. [PubMed: 2212175]
- Richie, Beth E. *Compelled to Crime: The Gender Entrapment of Battered Black Women*. New York: Routledge; 1996.
- Robertson, Angela A.; Baird-Thomas, Connie; Stein, Judith A. Child Victimization and Parental Monitoring as Mediators of Youth Problem Behaviors. *Criminal Justice and Behavior*. 2008; 35:755–71. [PubMed: 20631917]
- Robertson, Angela A.; Morse, David T.; Baird-Thomas, Connie. Hurricane Katrina's Impact on the Mental Health of Adolescent Female Offenders. *Anxiety, Stress & Coping*. 2009; 22:433–48.
- Siegel, Jane A.; Williams, Linda M. The Relationship Between Child Sexual Abuse and Female Delinquency and Crime: A Prospective Study. *Journal of Research in Crime and Delinquency*. 2003; 40:71–94.
- Smith, Dana K.; Leve, Leslie D.; Chamberlain, Patricia. Adolescent Girls' Offending and Health-Risking Sexual Behavior: The Predictive Role of Trauma. *Child Maltreatment*. 2006; 11:346–53. [PubMed: 17043319]
- Stouthamer-Loeber, Magda; Loeber, Rolf; Lynn Homish, D.; Wei, Evelyn. Maltreatment of Boys and the Development of Disruptive and Delinquent Behavior. *Development and Psychopathology*. 2001; 13:941–55. [PubMed: 11771915]
- Swanson, David A.; Forgette, Richard; Van Boening, Mark; Holley, Cliff; Kinnell, Ann Marie. Assessing Katrina's Demographic and Social Impacts on the Mississippi Gulf Coast. *Journal of the Mississippi Academy of Sciences*. 2007; 52:228–42.
- Tabachnick, Barbara G.; Fidell, Linda S. *Using Multivariate Statistics*. 5. Boston, MA: Allyn & Bacon/Pearson Education; 2007.
- Widom, Cathy Saptz; Ireland, Timothy; Glynn, Patricia J. Alcohol Abuse in Abused and Neglected Children Followed-Up: Are They at Increased Risk? *Journal of Studies on Alcohol*. 1995; 56:207–17. [PubMed: 7760568]
- Wills, Thomas A.; Vaccaro, Donato; McNamara, Grace. The Role of Life Events, Family Support, and Competence in Adolescent Substance Use: A Test of Vulnerability and Protective Factors. *American Journal of Community Psychology*. 1992; 20:349–74. [PubMed: 1415032]
- Wolfe, Jessica; Kimerling, Rachel. Gender Issues in the Assessment of Posttraumatic Stress Disorder. In: Wilson, JP.; Keane, TM., editors. *Assessing Psychological Trauma and PTSD*. New York: Guilford; 1997. p. 192-238.
- Yuan, Ke-Hai; Bentler, Peter M.; Kano, Yutaka. On Averaging Variables in a Confirmatory Factor Analysis Model. *Behaviormetrika*. 1997; 24:71–83.

Biographies

Angela A. Robertson, PhD, is a research professor with the Social Science Research Center of Mississippi State University and Research Coordinator of a statewide DUI intervention for first-time offenders. Her research focuses on issues of deviance and health including delinquency, substance abuse, psychological distress, and STD/HIV risk behavior.

Judith A. Stein, PhD, is the associate director of the UCLA/NIDA Center for Collaborative Research on Drug Abuse in the UCLA Department of Psychology. Her specialty is measurement and psychometrics with an emphasis on theory testing using structural equation modeling. She participates in collaborative studies involving research among vulnerable populations.

Lacey Schaefer-Rohleder was awarded the 2007–2009 Loftin Fellowship at the Social Science Research Center, Mississippi State University. She is currently a doctoral student in the School of Criminal Justice at the University of Cincinnati, working for the University of Cincinnati Policing Institute on projects related to violence reduction and desistance.

Figure 1.
Hypothetical mediated model testing General Strain Theory.

Figure 2.

Structural equation model depicting significant regression paths ($N = 261$ incarcerated female adolescents). Large circles represent latent variables; rectangles represent single-item indicators of ethnicity and time since Katrina. Single-headed arrows represent regression coefficients; two-headed arrows represent correlations. Regression coefficients are standardized ($*p \leq .05$, $**p \leq .01$, $***p \leq .001$)

Table 1

Summary Statistics and Factor Loadings in Confirmatory Factor Analysis

Variables	<i>M (SD)</i>	Factor Loadings ^a
I. Katrina Impact		
Area damage (0 to 1)	.80 (0.40)	.62
Personal property loss (0 to 2)	.68 (0.71)	.62
Dislocation (0 to 2)	.49 (0.62)	.49
Fear/safety (0 to 10)	4.42 (2.65)	.44
II. Adverse Life Events		
Total adverse life events (1 to 15)	4.94 (3.17)	.95
Impact of life events (0 to 60)	15.55 (12.03)	.94
III. Pre-Katrina juvenile justice involvement		
Times arrested	3.54 (6.78)	.85
Number of incarcerations	2.24 (4.29)	.69
Number of days incarcerated ^b	48.17 (101.84)	.76
IV. Black (1 = yes, 0 = no)	.69 (0.46)	—
V. Anger (0 to 2)		
Anger 1	0.62 (0.53)	.79
Anger 2	0.55 (0.47)	.75
Anger 3	0.77 (0.51)	.82
VI. Anxiety (0 to 2)		
Anxiety 1	0.77 (0.48)	.84
Anxiety 2	0.78 (0.48)	.87
Anxiety 3	0.71 (0.53)	.83
VII. Negative Coping (1 to 4)		
Negative 1	1.76 (0.64)	.75
Negative 2	1.60 (0.65)	.76
Negative 3	1.50 (0.59)	.74
VIII. Serious Delinquency (0 to 1)		
Serious 1	0.22 (0.32)	.75
Serious 2	0.17 (0.29)	.61
Serious 3	0.22 (0.32)	.69
IX. Minor Delinquency (0 to 1)		
Minor 1	0.37 (0.38)	.73
Minor 2	0.36 (0.38)	.68
Minor 3	0.49 (0.39)	.62
X. Post-Katrina juvenile justice involvement		
Times arrested	1.61 (1.91)	.95
Number of Incarcerations	1.45 (1.85)	.93
Number of days incarcerated ^b	26.60 (50.00)	.44
XI. Time since Katrina ^b (days)	334.18 (90.38)	—

^a All factor loadings are significant, $p \leq .001$.

^bTransformed in analysis due to skewness; actual days reported in table.

Table 2

Correlations among Variables in Model (N = 261)

	1	2	3	4	5	6	7	8	9	10
1. Katrina Impact	—									
2. Adverse Life Events	-.06	—								
3. Pre-Katrina juvenile justice involvement	-.30***	.15*	—							
4. Anger	-.05	.50***	.26***	—						
5. Anxiety	.08	.53***	.15*	.75***	—					
6. Maladaptive Coping	.18*	.33***	.07	.46***	.50***	—				
7. Serious Delinquency	.15*	.21***	.24***	.61***	.44***	.26***	—			
8. Minor Delinquency	.11	.19**	.06	.34***	.38***	.37***	.69***	—		
9. Post-Katrina Juvenile Justice Involvement	.05	.15*	.15*	.16*	.15*	.18**	.27***	.36***	—	
10. Black ethnicity	-.17**	-.03	.05	.18**	-.05	-.09	.08	-.06	-.06	—
11. Time since Katrina	.15*	-.03	-.25***	-.03	.04	.11	-.04	.15*	.06	-.06

*
 $p \leq .05$.**
 $p \leq .01$.***
 $p \leq .001$.