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Multi-Domain Risk and Protective Factor Predictors of Violent Behavior among At-risk Youth

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Abstract

This study extends prior examination of adolescent violence etiology, drawing on an ethnically diverse, community accessed, yet emotionally vulnerable sample ($N = 849$) of adolescents at-risk for school drop-out. A balanced risk and protective factor framework captured theorized dimensions of strain, coping, and support resources. We tested the combined and unique contribution of risk and protective components spanning individual, peer/school, and family predictor domains, including victimization histories. Hierarchical regressions yielded significant overall explanation of violent behaviors as well as unique predictors within each of the three domains. Tests for sex differences and moderating effects suggested that levels of risk and protective factors differed for males and females, although the functional relationships to violence were the same for both sexes. Results are discussed relative to prevention and early intervention programs; particularly the importance of understanding adolescent violent behaviors within a context that addresses stress and distress.

Keywords

adolescence; violence; victimization; development

Adolescent violence remains a serious and prominent public health problem, and the incidence of violence among females is worsening (Bureau of Justice Statistics, 2006). Violent behavior in adolescence is related to other risk factors for healthy development, including substance use, delinquency, emotional distress, and victimization (Barnow, Lucht, & Freyburger, 2005; Smith, White, & Holland, 2003), and has been linked to numerous deleterious outcomes in adulthood including criminality and serious interpersonal violence (Brown, Craig, Harris, Handley, & Harvey, 2007; Liu & Kaplan, 2004). Recent calls (National Institutes of Health, 2006; Surgeon General's Report, 2001) to bolster prevention and early intervention efforts have resulted in a proliferation of research on the developmental etiology of youth violence.

The present study extends this developmental examination of adolescent violence within a conceptual framework that integrates contributions of stress and distress in conjunction with support and coping resources. This examination applies a multidimensional assessment of risk and protection spanning individual, peer and school, and family domains toward explaining adolescent violence, including assessment of sex differences. The ultimate focus here is one of prevention. Thus, our aim is to target mutable factors that, if modified, hold strong promise for reducing risk of future or continued violence. In contrast to universal

programming designed to reach youth in general, our focus is on indicated youth who are showing signs of risk but have not been placed within the juvenile justice system.

Theoretical explanations for the stress–violence link

Multiple lines of inquiry postulate a link between stress and violent behavior (Falshaw, Browne, & Hollin, 1996). A relationship between posttraumatic stress disorder and later aggression, for example, has been fairly well established on the basis of both adult and childhood stress exposures (Bell & Orcutt, 2009; Taft, Schumm, Marshall, Panuzio, & Holtzworth-Munroe, 2008). Traumatic stress theory suggests that stressful and traumatic events can create hypersensitivity to potential threats, impaired social functioning, and increased aggression (Chemtob, Roitblat, Hamada, Carlson, & Twentyman, 1988; Hartman & Burgess, 1993). Stressful experiences may create emotional and cognitive states that victims seek to manage through substance use and risk-taking, augmenting chances of violence exposure or aggression (Clark, Lesnick, & Hegedus, 1997).

Similarly, general strain theory provides developmental considerations, identifying multiple forms of stress that may lead to violent behavior such as an inability or failure to achieve personal goals, actual or anticipated loss of positive stimuli such as valued relationships, and an excess of negative stimuli such as victimization and other adverse life experiences (Agnew, 1992, 2001; Froggio, 2007). These frustrations, losses, and exposures can come from multiple sources, including structural, community, and familial avenues. Negative emotionality (e.g., depression, anxiety, anger), often derivative of persistent stress exposure, serves as one carrier of these experiences into antisocial behavior such as aggression (Greenwald, 2002). Negative emotionality may also pose risk at the level of genetic-environment interplay, as physiological effects of sustained challenge contribute to dysregulation of cortisol-related systems (Lahey & Waldman, 2005). Stressed males, in particular, appear vulnerable to maladaptive emotions and the tendency to behave aggressively in response to stressful situations or failed coping efforts (Hoffman & Su, 1997). These theoretical linkages underscore the need to examine youth violence within a contextual framework that taps distress and supportive characteristics across multiple domains (Fagan, 2005; Gorman-Smith, Henry & Tolan, 2004).

The importance of indicated youth populations

The bulk of research on youth violence has drawn from either normative samples or those associated with clinical or juvenile justice settings. Yet, these findings are not adequately informative to guide prevention programming that targets selected or indicated populations—those who are at higher risk or showing early signs of problems. Approaches that are readily replicable and can access vulnerable yet accessible (i.e., non-adjudicated and non-clinical) youth help bridge this gap. Emotionally vulnerable youth are priority populations for the prevention of interlocking problems such as substance use, aggression, and suicide (U.S. Public Health Service, 1999). Suggestions that self-directed and interpersonal violence share overlapping etiological pathways and that elimination or blunting of common predictors substantially impacts outcomes (Resnick, Ireland, & Borowsky, 2004) compel attention to this group. These youth stand at the interface of elevated risk yet also opportunity to interrupt maladaptive developmental chains and strengthen readiness to transition into young adulthood.

The present study thus targets a youth population that fills a gap between the general population and more criminologically and clinically defined subpopulations. Participants were recruited on the basis of risk for school drop-out, which corresponds with multiple types of psychosocial risk, including substance use, emotional distress, and suicide risk (Herting, 1990), demonstrated for this sample relative to nationally representative samples

(Eggert & Herting, 1993). Thus, these individuals represent those at-risk for entering into clinical and/or criminological settings; however they may yet evolve in the direction of resilience.

Sex differences in violent behavior

There are competing perspectives on the importance and meaning of sex differences identified within adolescent violence. Historically, males have been more prone to violent behaviors, although recent trends indicate that females are catching up (Bureau of Justice Statistics, 2006). Although research on female-perpetrated violence is increasing, theoretical explanations lag behind with little consensus as to what is common or distinct by sex in this domain (Ogders et al., 2008; Smith et al., 2003). Some argue that main effects of sex are less informative than its interplay with other factors contributive to the development of violent behavior patterns (Richardson & Hammock, 2007). This directs attention to whether theorized risk and protective factor compositions vary for males and females as well as how these factors may relate to violent behavior. In this vein, various studies have found some differences as to the strongest predictors of violent behavior for males and females (Hart, O'Toole, Price-Sharps & Shaffer, 2007; Resnick et al., 2004). However, there is not yet a stable pattern as to differences and prior violent involvement and victimization tend to be lead predictors for both sexes.

At present, there is little guidance for how to synthesize results from different studies using divergent sets of predictors. Systematic examination of sex differences is essential to establishing more broadly generalizable findings as to the potential relevance of gender to adolescent violence. Three dimensions are important to prevention programming and will be examined here: 1) whether levels of risk and protective factors differ by sex, 2) the contribution of structures of risk and protective factors to explaining violent behaviors relative to sex, and 3) the moderating effects of sex on the relationships between these structures and violent behaviors.

In summary, past analysis of the etiology of violent behaviors has insufficiently attended to emotionally vulnerable, community-accessed youth as an indicated population target for violence prevention. The goal of this study is assess the explanatory utility of a risk and protective factor analysis theoretically grounded in strain as well as coping and support resources. This analysis draws from multiple domains—individual, peer/school, and family—to assess their cumulative as well as unique contributions. We include victimization history in order to assess unique explanatory contributions net of a direct victimization-offender link. Finally, we test for the contribution of sex in three ways: as a direct predictor, as a moderator, and relative to mean level differences in risk and protective factors.

Methods

Sample and Procedures

Study participants ($N = 848$) were high school students in the 9th through 12th grades in high schools in the Northwest and Southwest regions of the United States. In cooperation with the school districts, students who met established criteria (Herting, 1990) for risk of school dropout were randomly selected and invited to participate in the study. Criteria for dropout risk were: (1) below credits for grade level, (2) top 25th percentile in school absences, (3) GPA 2.3 or less and/or a pattern of slipping grades, (4) prior school dropout status, or (5) standardized school referral as at-risk of school dropout and meeting one or more of criteria 1–3. Use of school dropout/failure operationalized by these criteria results in youth samples with a constellation of risk factors/behaviors and low levels of protective factors consistent with others' research regarding the multi-problem profiles that typify youth at risk of school

failure (Brenner & Collins, 1998; Resnick, 2000). In addition, the criteria allow for consistent sample creation across participating schools and districts. The extent to which these recruitment strategies yield samples at higher levels for risks and lower levels for protective factors as well as elevated levels of violence exposure relative to national averages has been previously demonstrated (Eggert, Herting, & Thompson, 1996; Nurius, Russell, Herting, Randell, & Thompson, 2009).

Following IRB review, information was provided to prospective participants about the types of questions, voluntary nature of participation and monetary compensation. Overall the participation rate across high schools was about 75%; 87% percent of the invited youth completed the in-depth interview. Interviews were in person, standardized, conducted by master's level clinicians, monitored for fidelity, and documented to ensure consistency. Verbal and written assent/consent was obtained from both students and parents or guardians. Approved protocols were followed with respect to minors at risk and mandatory reporting.

Forty-five percent of youth were female. Ages ranged from 14–21 years with three students over age 19, and an average age of 15.98. Ethnic breakdown of the sample included 20.0% Latino/Hispanic, 15.5% African American, 9.9% Asian American/Pacific Islander, 7.2% Native American, 9.0% self-reported mixed or other ethnicity, and 38.4% were Caucasian.

Measurement

Data were collected using the *High School Study Questionnaire* (HSQ) and the *Measure of Adolescent Potential for Suicide* (MAPS) interview. Both the HSQ and MAPS draw from well-known scales (e.g. Rosenberg's Self-esteem Scale, the CES-D) or scales constructed specifically for this population (e.g. the Drug Involvement Scale, DISA). Both have been tested and analyzed extensively for reliability, ease of use, interpretability, and developmental appropriateness (Eggert, Thompson, and Herting, 1994; Walsh, Randell, & Eggert, 1997). All measures used a 7-point scale unless otherwise indicated. These measures reflect a risk and protective framing of proximal and mutable intra- and interpersonal variables derived from an integrated model of strain, coping resources, and social network and support (Thompson, Eggert, & Herting, 2000). A developmental approach for this age group calls for multi-level assessment at the peer/school and family levels in addition to individual characteristics. Thus, factors demonstrated to hold significant risk and protective potential for impaired development are assessed at each level.

Individual domain—The *depression* inventory (16 items, $\alpha = 0.90$) screened for symptoms of depression in the last two weeks including loss of energy, difficulty sleeping, etc. *Anxiety* tapped excessive worry (about school, home, work, expectations), physical agitation, fear and frightening dream/thoughts, humiliation, and stomachaches in the last two weeks (13 items, $\alpha = 0.87$). The *hopelessness* scale (14 items, $\alpha = 0.89$) assessed feelings of discouragement and hopelessness, lack of enjoyment in life, and no viable solutions to problems. The *anger* scale included questions on inwardly directed anger (self-hate, self-blame, holding grudges), and externalized anger (losing control, fighting) (11 items, $\alpha = 0.85$). Based on yes/no responses to thirty-one stressful events experienced within the past two weeks, a *number of stressful events* scale was calculated. The *effect of stress* was reflected in the mean of how much distress each event had caused, based on 0–6 Likert type scale (0 = not at all, 2 = a little, 4 = moderately, 6 = a great deal). *Self-esteem*, based on four items ($\alpha = 0.78$), assessed perceptions of self-worth and positive qualities, feeling useful, and taking a positive attitude toward self. A nine item *personal control* scale measured perceptions of being in control of one's life and the ability to cope and adjust ($\alpha = 0.85$). The number of positive coping strategies were assessed with five items that tapped *problem solving coping*, the range of coping strategies used, and the level of problem-solving coping

($\alpha = 0.72$). Substance use, including *alcohol use*, was measured as the frequency of beer, wine and hard liquor use ($\alpha = 0.71$), and *other drug use* (3 items, frequency of marijuana, hard drug, and polydrug use, $\alpha = 0.71$). Other *high risk behaviors* included trouble with the law, driving recklessly, unprotected sex, running away from home, and life-threatening risks (9 items, 0 = Never, 3 = Sometimes, 6 = Many times, $\alpha = 0.73$).

Peer/School domain—An 8-item scale assessed *peer high risk behavior* related to how many friends use drugs/alcohol, skip school, fight, and get into trouble at school or with the law ($\alpha = 0.88$). *Conventional peer bonding* contained five items that reflected the number of friends the student had who attend church or similar, are active in school/community clubs, plan to go to college, volunteer, and know the respondents parent(s) well ($\alpha = 0.64$). *School goals met* combined six items that rated students' perception of their attendance, G.P.A., performance, working towards a future career, and compliance with school rules ($\alpha = 0.85$). *School satisfaction* contained four items and measured students' perceptions of their schedules, performance, attendance and the school atmosphere ($\alpha = 0.70$). *Amount of peer support* was the mean of classmate and best friend support ($r = 0.44$) given on a range from -10 (non-supportive) to 10 (very supportive). *Availability of peer support* rated how available best friends and classmates were on a 0–6 (never to always) scale ($r = 0.43$). *Sense of belonging* contained three items examining feelings of belonging and loneliness ($\alpha = 0.64$).

Family domain—A five-item *sense of family support* scale tapped perceptions of family support, help, and communication ($\alpha = 0.89$). *Amount of parent support* measured students' perceptions of support from either or both of their parents on a 21 point scale (-10 = nonsupportive, 10 = supportive; $r = 0.49$). Students also rated how *available* their parents were on a 0–6 point scale (never to always; $r = 0.43$). *Parents for help* included two items assessing whether students thought they could turn to their parents for help ($r = 0.64$). Three single items were included that assessed *family distress*, *serious conflicts with parents*, *thoughts of running away*, and *parental drug use*.

Violence histories—*Violent victimization* was assessed with five items: two witnessing (parental violence toward a family member, family member destroying things) and three directly experiencing (physical abuse, sexual abuse, and physical injury) ($\alpha = 0.70$). *Violent behaviors* were assessed through six items: physically injuring someone else, thinking about hitting someone when angry, physically or emotionally harming a member of the opposite sex, deliberately damaging someone's property, getting into fights, and getting disciplined for fighting at school ($\alpha = 0.72$). Scale construction of cumulative exposures was achieved by summing the frequency of exposure (0 = never, 3 = sometimes, 6 = many times) across all violence forms. An aggregate violent behavior score was also established on the number of different types of behaviors. Specifically, responses to each item were collapsed into yes/no categories (0 = never, 1 = once or more) and these were summed, resulting in a 0–6 range.

Results

Analysis plan

Counterbalancing the benefits of a risk and protective assessment at multiple levels is the value of parsimony in statistical analysis. We, thus, employed Principal Components Analysis (PCA) as a mean of producing parsimony and addressing multicollinearity among the sets of theorized predictor variables within the three domains. The resulting components provide an empirically supported method of establishing, for the purposes of this

investigation, ways that these separate measures can be distilled into coherent risk and protective structures.

Hierarchical multiple regression was then applied to test the unique and combined contribution of the risk and protective components in explaining violent behavior, followed by the addition of victimization experiences to the model. The effects of sex were tested both as a direct predictor of and as a moderator of the relationships between the components and violent behaviors. Race/ethnicity was included as a control variable, with Caucasians as the omitted reference group, consistent with previous studies. As the violent behaviors measure demonstrated moderate positive skew, regressions were repeated with a log-transformed dependent variable, which did not differ substantially from the results with the untransformed outcome that are presented here. Finally, mean level sex differences across the components were tested to indicate differentials in assets or deficits of male and female youth relative to factors holding risk or protective potential for their violent behavior.

Principal components analysis (PCA) results

All components with eigenvalues greater than one were retained, and interpretations were based on results with Varimax rotation with loadings of .50 or higher used to determine factor membership. PCA results for the individual domain established three components (see Table 1); the first was characterized by loadings of the stress and emotional distress measures. We term this component *intrapersonal strain*. The second component was dominated by protective factors of self-esteem, personal control, and problem-solving, with a negative contrast from hopelessness. This component reflects confidence in oneself and personal agency and, thus, is labeled *self-efficacy*. The final individual component was dominated by substance use and other risky behaviors, labeled *risk taking*. Within the peer/school domain, two components emerged. The first was characterized by conventional peer and school engagement, with peer risk avoidance; we labeled this component *prosocial engagement*. Items constituting the second component captured *peer support*. Within the family domain, the first component capturing the greatest explanation of variance was characterized by parental and family support and is labeled *family support*. The second component, dominated by serious conflicts, parental drug use, and wanting to run away, was labeled *family strain*.

Individual scores for components were saved to be used in regression analyses. Double loadings of variables within domains are to be expected given that some constructs are functionally overlapping (e.g., low self-esteem and hopelessness). Although double loadings are limited here, as a check on these component structures we created mean-based scales, both with and without double-loading items. The regression results did not differ substantially from the results presented here, thus indicating satisfactory stability of the saved component scores.

Hierarchical linear regressions

In the first regression model (Table 2), all components were added simultaneously into the regression equation while accounting for sex and race. This model achieved significance, and accounted for 30.4% of the total variance in violence behavior. Of the components, all but two—family support and peer support—provided unique significant contribution beyond that provided by other predictors. The components for intrapersonal strain and risky behaviors were the strongest predictors based on the standardized regression coefficients.

The addition of victimization in the second model accounted for an additional 8.0% of variance. Self-efficacy was no longer significant at an alpha level of 0.05, and the

coefficients associated with intrapersonal strain, risky behaviors, and family distress were reduced. In the final model, victimization was the strongest single predictor of violence.

The moderating effect of sex was tested by creating multiplicative interaction terms for each component with sex that were then entered as an additional step in the regression analyses. None of the *F* tests for these additions achieved significance; thus, these interaction terms were not included in the final model.

Mean differences in variables by sex

In addition to assessing the potential role of sex as a moderator of how the components contribute to violent behavior, this study is concerned with the relative profiles of assets and deficits for male and female adolescents. Thus, *t*-tests of mean differences were undertaken for all variables used in these analyses (see Table 3). Significant sex differences emerged for all domains. Within risk-related variables, females reported significantly higher levels of intrapersonal strain indicators, parental conflict, thoughts of running away, and victimization experiences. Males reported greater risk-taking and violent behaviors. Among protective-related variables, females reported more conventional peer bonding and amount of peer support, whereas males were higher on self-esteem, personal control, sense of belonging, and parent support availability.

Females reported higher level of victimization and males higher level of violent behavior based on summed frequencies. Sex differences were also evident in the counts of different types of aggressive behaviors. In a range of 0–6 types assessed, males reported a mean of 2.94 and females 2.46 ($t = 15.52, p < .001$). Males reported proportionately higher multi-form aggression than females. That is, 42.3% males reported 4–6 types of violent behaviors and females 31.2%.

Discussion

This report tests a multidimensional assessment of risk and protective factors that gauge adolescent strain, coping resources, and social network and support to explain violent behaviors. The results support the value of addressing youth violence within a context that recognizes the important roles that stress and resource profiles operate as developmental contributors to propensity for violence. Furthermore, these results support the premise that violent behaviors in youth are partially manifestations of risk and protective factors across individual, peer/school, and family domains. Anticipated differences in levels of risk and protective factors, as well as violent behaviors, were observed between males and females. However, tests of sex as a moderator did not achieve significance, suggesting that the functional relationships of these contributors to violence are comparable for males and females.

Main Component Effects

Individual Domain—The components that emerged were useful in organizing multiple risk and protective variables into a stress and resource framework, and were conceptually coherent and interpretable both with regards to their internal consistency and their association with violent behaviors. In spite of the common co-occurrence of these risk and protective factors (e.g., depression and lower self-esteem), only a limited degree of double loadings on components were observed, facilitating interpretation. Although the primary use of PCA is to condense a set of variables into a smaller set of uncorrelated components, the component structures provide insights as to the ways that separate variables come together to create functional pathways.

The strongest predictors in the regression model that excluded victimization were at the individual level: intrapersonal strain and risk-taking behaviors. These findings parallel those of Sussman, Skara, Weiner, & Dent (2004) who found that youths' perceptions of stress and substance use predicted violent behavior five years later. Although impaired emotional functioning—especially anger—is often seen as a potential contributor to violence (e.g., Resnick et al., 2004), the strength of the prediction from intrapersonal strain reflects the often overlooked emotional needs of youth who report violent behaviors (Russell, Nurius, Herting, Walsh, & Thompson, in press). Use of substances and other unsafe behaviors, particularly in the presence of elevated stress and distress, represent maladaptive means of coping. Although curbing risk-taking behaviors is a common prevention aim, its unique contribution to explaining violent behaviors alongside the contribution of elevated intrapersonal strain argues for intervention strategies that attend to co-occurring needs of stress reduction, mental health supports, and education about maladaptive coping behaviors.

Self-efficacy has a demonstrated role in adolescent development as a personal resource important to achievement, such as academic performance, as well as resilience (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). Here we see self-efficacy positively associated with violent behavior, controlling for other predictors. We do not interpret this to imply that fostering youth self-esteem, personal control, and coping strategies will likely lead to violent behavior. Rather, self-efficacy is a personal resource that needs to be positively directed, in this case toward nonviolent ways of managing threat, conflict, or expression of power. Violent behaviors are acts of agency, albeit maladaptive, contrasted with withdrawal. Notably, inclusion of victimization significantly reduces the positive association of self-efficacy, as victimization erodes youths' sense of value, power, and hope (Burack, et al., 2006). Thus, programming needs to take these nuanced relationships into account, targeting injuries to self-efficacy as a function of victimization and directing interventions to augment control and coping skills away from aggression, even in the face of continued experiences of victimization and exclusion.

Peer/School Domain—Although protective factors have been much less investigated relative to risk factors, findings here illustrate the importance of peer/school resources for deterring violent behaviors. The significant inverse association of prosocial engagement supports theorizing that prosocial peer and school ties can serve in protective roles for violent behavior (Frey, Ruchkin, Martin, & Schwab-Stone, 2009; Herrenkohl et al., 2008; Schnurr & Lowman, 2008). In our findings, this protective contribution sustains significance even net of all other factors. It is during the pivotal developmental periods of childhood and adolescence that contextual factors are likely to have strongest effects on violent behavior (Huesmann, Dubow, & Boxer, 2009). Schools are logical sites to shape these contextual inputs; for example, for youth to receive support from peers and teachers and engage in positive activities.

Indeed, these findings argue for schools as very important partners in violence prevention programming. Even among youth who were recruited on the basis of high risk of school drop out, school-based affiliations, goals, and satisfaction hold power. This is true for both males and females. These factors serve to buffer strain and build social skills that ameliorate risks for violence. The separate factor of peer support has been associated with violent behavior (Benhorin & McMahon, 2008; Bearinger et al., 2005), it contributes less powerfully than school-based elements such as those captured in the prosocial engagement factor. A student's active and sustained participation in a school community augments their ability to gain support from others and develop self-conceptions and skills. Consistent with findings related to antisocial trajectories (Morrison, Robertson, Lauie, & Kelly, 2002), prosocial school engagement can protect at-risk youth from slipping into negative coping behaviors that can isolate them isolate and remove them as well as foster resilience.

Family Domain—Both family strain and family support were significantly related to violent behavior. The addition of victimization reduced the predictive power of family strain, suggesting a high degree of overlap between youths' victimization experiences and family dysfunction, possibly including family as sources of victimization. Family context is a powerful contributor to emotional distress, substance use, school engagement, and peer ties as well as violent behaviors (e.g., Banyard, Cross, & Modecki, 2006; Harachi et al., 2006). Thus, effects of family factors are quite likely to include indirect effects through individual and peer factors in addition to their direct links to violent behaviors. These findings reflect the importance of dual attention to reducing strain and augmenting resources. High levels of family strain are, for youth such as those sampled here, critical targets in their own right. Prevention efforts that foster parental support may be swamped for some families until strain can be reduced to a manageable level. As with intrapersonal strain, special attention to family strain is requisite. Prevention programming, particularly with indicated youth, needs to offer modules that can calibrate sufficient "dose" of intervention at varying levels consistent with student needs.

Victimization explained a substantial amount of additional variability in acts of violence—8% above and beyond all other included elements of risk and protection. This highlights the especially strong relationship victimization has to violent behaviors (Maas et al., 2008; Stouthamer-Loeber, Loeber, Homish, & Wei, 2001). It also points to the need for early interventions with violence-exposed youth that prevent the development of maladaptive behaviors and coping (Fang & Corso, 2007). The reduction of intrapersonal strain, self-efficacy, and risk-taking coefficients with the addition of victimization history suggests that the relationships between these factors and violent behaviors may be partially mediated by victimization experiences. This is consistent with findings of multiple etiological pathways through which victimization leads to violence, including distress, substance misuse, and unsafe behaviors (Boxer et al., 2008; Flannery, Singer, & Wester, 2006).

Race and Sex Effects

Recent revision of general strain theory applied to the explanation of criminal behavior has yielded strong evidence of a stress-crime relationship, and of racial disparities in perpetration to be at least partly explained by greater exposure to stressful events and more limited access to protective resources (Eitle & Turner, 2003). Our own findings regarding African American youth reporting elevated levels of violent behavior may well be understood on this basis. Although we do not have measures of childhood adversity nor lifespan exposure to stressful events to directly test this premise, other research suggests that the differences found in crime rates by race are at least partly explained by differences in adversity and stress (Fite, Wynn, Pardini, 2009).

With respect to sex differences, the main effects of sex—indicating higher levels of violence by males—remained significant in the full model, while controlling for all other predictors. The lack of significant interactions between sex and the risk and protective factor components suggests that the linear relationships between these variables and violence are comparable for males and females. In other words, these risk and protective factors foster or reduce the development of violence in males and females in similar ways. While this indicates that prevention efforts can implicate the same kinds of theorized mechanisms that underlie programming logic (e.g., how protective factors can buffer strain), it does not reveal whether differential attention to various factors may be merited across the sexes on the basis of the relative level of risk or protective characteristics.

The t-test results highlight sex differences in reported levels of many risk and protective factors, as well as for violent behavior. Females reported greater levels of both intrapersonal and family strain as well as lower levels of protective factors such as self-esteem and peer

support. In contrast, males reported higher levels of risky behaviors and lower levels of conventional peer bonding and overall peer support. Female youth reported higher levels of prior victimization, whereas males higher levels of violent behavior. Although risk and protective factors relate to violent behavior with comparable linear trends, sex differences in risk and protective profiles provide guidance for relative emphasis in prevention and early intervention programming.

Limitations

One limitation of this study is that all measurements are self-reported. Although we do not have independent corroboration of other variables, follow-up studies conducted with this sample have demonstrated strong reliability--highly correlated violence reports separate surveys, as well as construct validity--adolescent violence measures correlated with young adulthood trauma symptoms and concurrent emotional distress (Nurius & Thompson, 2008). These measures have been used with thousands of youth across multiple studies and have consistently demonstrated satisfactory psychometric properties.

The cross-sectional nature of this investigation prohibits direct tests of causality. Our aim was to assess the multivariate association of risk and protective factors to violent behavior theorized within a strain, coping, and support framework. These findings provide conceptually coherent characterization of relationships within a cross-sectional analysis, and provide a basis to merit extension to longitudinal methods that can more fully test temporality of cause and effect. Finally, the sample was not recruited on a nationally representative basis. Thus, generalizations must be made with caution. However, the inclusion of two distinctive geographical regions, random sampling, and a diverse sample are strong assets, which partially offset this limitation.

Conclusions

Despite these limitations, this report holds strong implications for interventions, particularly for school-based prevention programming. Most notably is the importance of understanding violent behaviors within a context that incorporates strain and supports across multiple domains. Many adolescents who exhibit violent behaviors are ensconced within juvenile justice settings, in which salient distress and impoverished resources may not be well addressed (Abrams, Kim, & Anderson-Nathe, 2005).

The finding that all domains are significant contributors to violence suggests that interventions need to address problems in multiple domains—family, peer/school, and individual—in order to effectively offset propensity for violent behaviors (Barnow et al., 2005; Farrell & Flannery, 2006). Consistent with longitudinal findings (e.g., Farrell & Sullivan, 2004), our results point to childhood violence exposure as a critical “upstream” contributor to later dysfunction, including propensity to violence and cascading effects into young adulthood. In addition to traditional targets such as teaching non-violent strategies for resolving conflicts and challenging violence supportive attitudes (O’Donnell, Stueve, Myint-U, Duran, Agronick, Wilson-Simmons, 2006), interventions must attend to reducing or buffering strain, meeting mental health needs, and actively fostering development of prosocial school and family supports.

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References

- Abrams LS, Kim K, Anderson-Nathe B. Paradoxes of treatment in juvenile corrections. *Child & Youth Care Forum*. 2005; 34(1):7–25.
- Agnew R. 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; 38:319–361.
- Agnew R. Foundation for a General Strain Theory of crime and delinquency. *Criminology*. 1992; 30:47–87.
- Bandura A, Barbaranelli C, Caprara GV, Pastorelli C. Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child Development*. 2001; 72(1):187–206. [PubMed: 11280478]
- Banyard VL, Cross C, Modecki KL. Interpersonal violence in adolescence: Ecological correlates of self-reported perpetration. *Journal of Interpersonal Violence*. 2006; 21(10):1314–1332. [PubMed: 16940398]
- Barnow S, Lucht M, Freyberger HJ. Correlates of aggressive and delinquent conduct problems in adolescence. *Aggressive Behavior*. 2005; 31(1):24–39.
- Bell KM, Orcutt HK. Posttraumatic stress disorder and male-perpetrated intimate partner violence. *Journal of the American Medical Association*. 2009; 302:562–564. [PubMed: 19654390]
- Bearinger LH, Pettingell S, Resnick MD, Skay CL, Potthoff SJ, Eichhorn J. Violence perpetration among urban American Indian youth: Can protection offset risk? *American Pediatric and Adolescent Medicine*. 2005; 159:270–277.
- Benhorin S, McMahon SD. Exposure to violence and aggression: Protective roles of social support among urban African American youth. *Journal of Community Psychology*. 2008; 36(6):723–743.
- Boxer P, Morris AS, Terranova AM, Kithakye M, Savoy SC, McFaul AF. Coping with exposure to violence: Relations to emotional symptoms and aggression in three urban samples. *Journal of Child and Family Studies*. 2008; 17(6):881–893.
- Brenner ND, Collins JL. Co-occurrence of health risk behaviours among adolescents in the United States. *Journal of Adolescent Health*. 1998; 22:209–213. [PubMed: 9502008]
- Brown GW, Craig TKJ, Harris TO, Handley RV. Parental maltreatment and adulthood cohabiting partnerships: A life-course study of adult chronic depression -- 4. *Journal of Affective Disorders*. 2008; 110(1–2):115–125. [PubMed: 18299152]
- Burack JA, Flanagan T, Peled T, Sutton HM, Zygmuntowicz C, Manly JT. Social perspective-taking skills in maltreated children and adolescents. *Developmental Psychology*. 2006; 42(2):207–217. [PubMed: 16569161]
- Bureau of Justice Statistics. Criminal victimization in the United States 2005. Washington, DC: U.S. Department of Justice; 2006.
- Chemtob CM, Roitblat HL, Hamada RS, Carlson JG, Twentyman CT. A cognitive action theory of post-traumatic stress disorder. *Journal of Anxiety Disorders*. 1988; 2:253–275.
- Clark DB, Lesnick L, Hegedus AM. Traumas and other adverse life events in adolescents with alcohol abuse and dependence. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1997; 36:1744–1751. [PubMed: 9401336]
- Department of Health and Human Services. Youth violence: A report of the Surgeon General. [Accessed 27 June, 2008]. Available at: www.surgeongeneral.gov/library/youthviolence/report.html
- Eggert LL, Herting JR. Drug involvement among potential dropouts and typical youth. *Drug Education*. 1993; 23:31–55. [PubMed: 8487141]
- Eggert LL, Herting JR, Thompson E. Drug Involvement Scale for Adolescents (DISA). *Journal of Drug Education*. 1996; 26(2):101–130. [PubMed: 8758883]
- Eggert LL, Thompson EA, Herting JR. A measure of adolescent potential for suicide (MAPS): development and preliminary findings. *Suicide and Life-Threatening Behavior*. 1994; 24(4):359–381. [PubMed: 7740594]
- Eitle D, Turner RJ. Stress exposure, race, and young adult male crime. *Sociological Quarterly*. 2003; 2:243–269.

- Fagan A. The relationship between adolescent physical abuse and criminal offending: Supporting for an enduring and generalized cycle of violence. *Journal of Family Violence*. 2005; 20(5):279–290.
- Falshaw L, Browne KD, Hollin CR. Victim to offender: A review. *Aggression and Violent Behavior*. 1996; 1:389–404.
- Fang X, Corso PS. Child maltreatment, youth violence, and intimate partner violence: Developmental relationship. *American Journal of Preventive Medicine*. 2007; 33(4):281–290. [PubMed: 17888854]
- Farrell AD, Flannery DJ. Youth violence prevention: Are we there yet? *Aggressive and Violent Behavior*. 2006; 11:138–150.
- Farrell AD, Sullivan TN. Impact of witnessing violence on growth curves for problem behaviors among early adolescents in urban and rural settings. *Journal of Community Psychology*. 2004; 32:505–525.
- Fite PJ, Wynn P, Pardini DA. Explaining discrepancies in arrest rates between Black and White male juveniles. *Journal of Consulting and Clinical Psychology*. 2009; 77(5):916–927. [PubMed: 19803571]
- Flannery DJ, Singer M, Wester K. Violence exposure, psychological trauma, and suicide risk in a community sample of dangerous adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2006; 40:435–442. [PubMed: 11314569]
- Frey A, Ruchkin V, Martin A, Schwab-Stone M. Adolescent in transition: School and Family Characteristics in the development of violent behaviors entering high school. *Child Psychology and Human Development*. 2009; 40(1):1–13.
- Froggio G. Strain and juvenile delinquency: A critical review of Agnew's general strain theory. *Journal of Loss & Trauma*. 2007; 12(4):383–418.
- Gorman-Smith D, Henry DB, Tolan PH. Exposure to community violence and violence perpetration: The protective effects of family functioning. *Journal of Clinical Child and Adolescent Psychology*. 2004; 33(3):439–449. [PubMed: 15271602]
- Greenwald, R. *Trauma and juvenile delinquency: Theory, research, and interventions*. Binghamton, NY: The Haworth Maltreatment and Trauma Press; 2002.
- Harachi TW, Fleming CB, White HR, Ensminger ME, Abbott RD, Catalano RF, et al. Aggressive behavior among girls and boys during middle childhood: Predictors and sequelae of trajectory group membership. *Aggressive Behavior*. 2006; 32:279–293.
- Hart JL, O'Toole SK, Price-Sharp JL, Shaffer TW. The risk and protective factors of violent juvenile offending: An examination of gender differences. *Youth Violence and Juvenile Justice*. 2007; 5(4): 367–384.
- Hartman CR, Burgess AW. Information processing of trauma. *Child Abuse & Neglect*. 1993; 17:47–58. [PubMed: 8435786]
- Herrenkohl TI, McMorris BJ, Catalano RF, Abbott RD, Hemphill SA, Toumbourou JW. Risk factors for violence and relational aggression in adolescence. *Journal of Interpersonal Violence*. 2008; 22(4):386–405. [PubMed: 17369443]
- Herting JR. Predicting at-risk youth: Evaluation of a sample selection model. *Communicating Nursing Research*. 1990; 23:178.
- Huesmann LR, Dubow EF, Boxer P. Continuity of aggression from childhood to early adulthood as a predictor of life outcomes: Implications for the adolescent-limited and life-course-persistent models. *Aggressive Behavior*. 2009; 35(2):136–149. [PubMed: 19189380]
- Hoffman JP, Su SS. The conditional effects of stress on delinquency and drug use: A strain theory assessment of sex differences. *Journal of Research in Crime and Delinquency*. 1997; 34(1):46–78.
- Lahey, BB.; Waldman, ID. A developmental model of the propensity to offend during childhood and adolescence. In: Farrington, DP., editor. *Integrated developmental & life-course theories of offending*. New Brunswick: Transaction Publishers; 2005. p. 15-50.
- Liu RX, Kaplan HB. Role stress and aggression among young adults: The moderating influences of gender and adolescent aggression. *Social Psychology Quarterly*. 2004; 67(1):88–102.
- Maas C, Herrenkohl TI, Sousa C. Review of research on child maltreatment and violence in youth. *Trauma, Violence, and Abuse*. 2008; 9(1):56–67.

- Morrison GM, Robertson L, Laurie B, Kelly J. Protective factors related to antisocial behavior trajectories. *Journal of Clinical Psychology*. 2002; 58:277–290. [PubMed: 11836709]
- National Institutes of Health State-of-the-Science Conference Statement. Preventing violence and related health-risking, social behaviors in adolescents October 13–15, 2004. *Journal of Abnormal Child Psychology*. 2006; 34(4):457–470. [PubMed: 16927189]
- Nurius PS, Russell PL, Herting JR, Randell BP, Thompson EA. Violence exposure, stress, and distress: Charting at-risk youth from adolescence to emerging adulthood. *Journal of Child and Adolescent Trauma*. 2009; 2(2):106–123. [PubMed: 21494415]
- Nurius, PS.; Thompson, EA. Grant summary report. 2008. Violence, stress, and distress: Integrating research of high-risk youth.
- Odgers CL, Moffitt TE, Broadbent JM, Dickson N, Hancox RJ, Harrington H, et al. Female and male antisocial trajectories: From childhood origins to adult outcomes. *Development and Psychopathology*. 2008; 20:673–716. [PubMed: 18423100]
- O'Donnell L, Stueve A, Myint-U A, Duran R, Agronik G, Wilson-Simmons R. Middle school aggression and subsequent intimate partner physical violence. *Journal of Youth and Adolescence*. 2006; 35:693–703.
- Resnick MD. Protective factors, resiliency, and healthy development. *Adolescent Medicine*. 2000; 11(1):157–164. [PubMed: 10640344]
- Resnick MD, Ireland M, Borowsky I. Youth violence perpetration: What protects? What predicts? Findings from the National Longitudinal Study of Adolescent Health. *Journal of Adolescent Health*. 2004; 35(5):424e1–424e10. [PubMed: 15488438]
- Richardson DS, Hammock GS. Social context of human aggression: Are we paying too much attention to gender? *Aggression and Violent Behavior*. 2007; 12:417–426.
- Russell PL, Nurius PS, Herting JR, Walsh E, Thompson EA. Violent victimization and perpetration: Joint and distinctive implications for adolescent development. *Victims and Offenders*. In press.
- Schnurr MP, Lohman BJ. How much does school matter? An examination of adolescent dating violence perpetration. *Journal of Youth and Adolescence*. 2008; 37:266–283.
- Smith PH, White JW, Holland LJ. A longitudinal perspective on dating violence among adolescent and college-age women. *American Journal of Public Health*. 2003; 93(7):1104–1109. [PubMed: 12835193]
- Stouthamer-Loeber M, Loeber R, Homish DL, Wei E. Maltreatment of boys and the development of disruptive and delinquent behavior. *Development and Psychopathology*. 2001; 13(4):941–955. [PubMed: 11771915]
- Sussman S, Skara S, Weiner MD, Dent CW. Prediction of violence perpetration among high-risk youth. *American Journal of Health Behavior*. 2004; 28(2):134–144. [PubMed: 15058514]
- Taft CT, Schumm JA, Marshall AD, Panuzioi J, Holtzworth-Munroe A. Family-of-origin maltreatment, posttraumatic stress disorder symptoms, social information processing deficits, and relationship abuse perpetration. *Journal of Abnormal Psychology*. 2008; 117:637–646. [PubMed: 18729615]
- Thompson EA, Eggert LL, Herting JR. Mediating effects of an indicated prevention program for reducing youth depression and suicide risk behaviors. *Suicide and Life-Threatening Behavior*. 2000; 30:252–271. [PubMed: 11079638]
- U.S. Public Health Service. The surgeon general's call to action to prevent suicide. Washington, DC: Author; 1999.
- Walsh E, Randell BP, Eggert LL. The measure of adolescent potential for suicide (MAPS): A tool for assessment and crisis intervention. *Reaching Today's Youth*. 1997; 2(1):22–29.

Table 1

Principal Components Analyses

Individual Domain Components	Intrapersonal strain	Self-efficacy	Risk taking
Eigenvalue	4.851	1.836	1.302
% variance	40.425%	15.304%	10.848%
Rotated eigenvalue	3.769	2.276	1.945
Rotated % variance	31.408%	18.964%	16.205%
<u>Rotated loadings:</u>			
Depression	.870	-.304	.032
Anxiety	.868	-.139	.065
Hopelessness	.666	-.605	.070
Anger	.774	-.166	.207
Number stressful events	.555	.132	.425
Effect of stress	.525	-.195	-.099
Self-esteem	-.542	.618	.005
Personal control	-.397	.795	-.008
Problem-solving coping	.009	.780	-.119
Alcohol use	-.027	-.156	.828
Other drug use	-.010	-.122	.832
High risk behaviors	.423	.231	.555

Peer/School Domain Components	Prosocial engagement	Peer support
Eigenvalue	2.316	1.439
% variance	33.083%	20.551%
Rotated eigenvalue	1.931	1.824
Rotated % variance	27.582%	26.051%
<u>Rotated loadings:</u>		
Peer high risk behavior	-.749	.115
Conventional peer bonding	.548	.363
School goals met	.762	.168
School satisfaction	.658	.054
Amount of peer support	.234	.663
Availability of peer support	.027	.808
Sense of belonging	-.024	.745

Family Domain Components	Family support	Family strain
Eigenvalue	3.401	1.043
% variance	48.579%	14.898%
Rotated eigenvalue	3.023	1.420
Rotated % variance	43.190	20.287
<u>Rotated loadings:</u>		
Sense of family support	.754	-.082
Amount of parent support	.645	-.009

Family Domain Components	Family support	Family strain
Availability of parent support	.867	-.193
Parents for help	.860	-.174
Serious conflicts with parents	-.556	.506
Thoughts of running away	-.477	.593
Parental drug use	.098	.860

Table 2

Hierarchical multiple regression of violent behavior

	Model 1	Model 2
R^2	0.31	0.40
F	27.48***	35.78***
$R^2 \Delta$		0.08***
Sex (Female = 2, Male = 1)	-2.12 (-0.18)***	-2.09 (-0.17)***
Native American	1.35 (0.06)	1.09 (0.05)
Asian/Pacific Islander	0.21 (0.01)	0.18 (0.01)
African American	2.10 (0.13)***	1.52 (0.09)**
Hispanic	0.43 (0.03)	0.53 (0.04)
Mixed race/Other	0.49 (0.02)	0.29 (0.01)
Intrapersonal strain	1.90 (0.32)***	1.21 (0.20)***
Self-efficacy	0.72 (0.12)***	0.40 (0.07) ⁺
Risk taking	1.69 (0.28)***	1.30 (0.22)***
Prosocial engagement	-0.77 (-0.13)***	-0.76 (-0.13)***
Peer support	-0.27 (-0.05)	-0.24 (-0.04)
Family support	-0.50 (-0.08)*	-0.17 (-0.03)
Family strain	0.62 (0.10)***	0.39 (0.07)*
Victimization		0.42 (0.33)***

 $p < .001$

**
 $p < .01$

*
 $p < .05$

⁺
 $p = .06$

Note. Betas notation: Unstandardized (standardized). Sex interaction terms were created and tested for each component, with no significant results.

Table 3

T-tests of all variables by sex (Means and standard deviations)

	Males	Females	<i>t</i>
Individual level:			
Intrapersonal Strain			
Depression	1.38 (0.88)	1.89 (1.09)	-7.31***
Anxiety	1.16 (0.80)	1.63 (1.04)	-7.25***
Hopelessness	1.32 (0.81)	1.59 (0.95)	-4.44***
Anger	1.79 (1.11)	2.08 (1.16)	-3.76***
Number stressful events	11.23 (5.32)	12.99(5.19)	-4.85***
Effect of stress	1.92 (1.00)	2.22 (1.06)	-4.16***
Self-Efficacy			
Self-esteem	4.47 (1.24)	4.09 (1.38)	4.19***
Personal control	4.29 (1.02)	3.95 (1.11)	4.61***
Problem-solving coping	3.20 (1.21)	3.17 (1.17)	0.35
Risk Taking			
Alcohol use	0.95 (1.22)	0.99 (1.16)	-0.48
Other drug use	0.57 (0.90)	0.64 (0.95)	-1.11
High risk behaviors	0.87 (1.02)	0.69 (0.81)	2.89**
Peer/school level:			
Prosocial Engagement			
Peer high risk behavior	2.62(1.53)	2.49 (1.54)	1.21
Conventional peer bonding	2.84 (1.19)	3.09 (1.16)	-3.02**
School goals met	3.71 (1.31)	3.69 (1.39)	0.22
School satisfaction	3.17 (1.12)	3.06 (1.15)	1.46
Peer Support			
Amount peer support	5.50 (3.27)	6.74 (2.73)	-6.01***
Availability peer support	4.02 (1.38)	4.18 (1.27)	-1.68
Sense of belonging	4.85 (1.01)	4.53 (1.15)	4.26***
Family level:			
Family Support			
Sense of family support	3.33 (1.61)	3.33 (1.78)	-0.06
Amount parent support	5.90 (4.45)	5.87 (4.32)	0.09
Availability of parent support	4.52 (1.43)	4.21 (1.63)	2.84**
Parents for help	3.66 (1.79)	3.63 (1.83)	0.24
Family Strain			
Serious parental conflicts	1.90 (1.74)	2.25 (1.91)	-2.76**
Thoughts of running away	1.03 (1.57)	1.44 (1.77)	-3.60***

	Males	Females	<i>t</i>
Parental drug use	0.46 (1.28)	0.59 (1.46)	-1.34
Victimization	3.94 (4.34)	4.77 (5.23)	-2.48*
Violent behavior	7.02 (5.92)	5.67 (6.10)	3.27***

 $p < .001$

**
 $p < .01$

*
 $p < .05$