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The Moderating Effects of Peer and Parental Support on the Relationship Between Vicarious Victimization and Substance Use

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Abstract

General Strain Theory hypothesizes that youth engage in delinquency when they experience strains, particularly victimization, though this relationship may be attenuated for victims who receive social support from significant others (Agnew, 2006). Utilizing prospective data from youth aged 8-17 participating in the Project on Human Development in Chicago Neighborhoods (PHDCN), this paper tests these hypotheses. Consistent with strain theory, adolescents who reported more vicarious victimization (i.e., witnessing and hearing about violence perpetrated against others) had an increased likelihood of tobacco, alcohol, and marijuana use in the short-term and 2.5 years later. While peer support did not moderate the relationship between vicarious victimization and substance use, family support did. However, in contrast to strain theory's predictions, family support was less protective for victims compared to non-victims. Implications of these findings for intervention and prevention services are discussed.

Keywords: Victimization, Exposure to Violence, Social Support, Adolescent Substance Use, General Strain Theory

Exposure to Violence, Social Support, and Substance Use

Much research has demonstrated that youth who are themselves violently victimized, and who witness or hear about violence perpetrated against others, are at risk for many negative outcomes, including problems in school and/or relationships, mental health problems, and involvement in aggressive or violent behaviors (Kilpatrick et al., 2000; Macmillan, 2001; Mrug & Windle, 2009b). While the effects of exposure to violence on substance use have also been identified (e.g., Kilpatrick et al., 2000; Schwab-Stone et al., 1995), comparatively few studies have assessed this relationship. This lack of research is surprising, given the high rates at which adolescents report engaging in substance use (Johnston, O'Malley, Bachman, & Schulenberg, 2011), and the fact that substance use by teenagers has also been linked to many adverse outcomes, including mental health problems, academic failure, delinquency, and violence (Donovan, 2004; J. David Hawkins, Richard F. Catalano, & Janet Y. Miller, 1992; Windle et al., 2009), as well as drug abuse and dependency during adulthood (Hingson, Heeren, & Winter, 2006; Windle et al., 2009).

Victimization research has also tended to focus on child maltreatment and other direct experiences of violent victimization. Less attention has been paid to indirect victimization, such as witnessing violence or knowing others who have been victimized, even though youth appear to be most likely to experience these types of victimization. For example, according to the 2008 National Survey of Children's Exposure to Violence (NatSCEV), among youth aged 14-17, 42 percent had witnessed an assault in their community, whereas 27 percent had been physically assaulted by a peer, and 17 percent reported any type of child maltreatment (Finkelhor, Turner, Ormrod, & Hamby, 2009). This paper seeks to add to the victimization literature by examining the consequences of indirect victimization on adolescents; specifically, whether or not witnessing and/or hearing about violence perpetrated to others increases the likelihood of substance use, and if this relationship is moderated by the provision of social support to victims.

The Impact of Victimization on Adolescent Substance Use

In criminological literature, various theories have been used to explain the relationship between victimization and delinquency, including routine activities/lifestyle theory (e.g., Ousey, Wilcox, & Fisher,

Exposure to Violence, Social Support, and Substance Use

2011; Schreck, Stewart, & Osgood, 2008), self-control theory (Gottfredson & Hirschi, 1990), and social learning theory (Akers, 1985). Our study is guided by General Strain Theory (GST) (Agnew, 2001, 2006) and other stress-response theories (Copeland-Linder, Lambert, Chen, & Ialongo, 2011; Foster & Brooks-Gunn, 2009). These perspectives are particularly relevant for explaining the relationship between indirect victimization and substance use, as well as the potential for positive social support to buffer the negative impact of victimization on drug use.

According to GST (Agnew, 2006), adverse life experiences---strains or stressors---lead to delinquency, including both violence and substance use, primarily because they engender strong, negative emotional responses which must be alleviated. Agnew (1992) acknowledges that a variety of stressors can lead to delinquent behaviors, but he emphasizes that violent victimization is particularly likely to do so, given its potential to cause emotional distress. Victims who perceive that they or those close to them were unjustly attacked or who suffer embarrassment or injury from the event(s) may become angry and seek to gain revenge (Hay & Evans, 2006; Moon, Morash, Perez McCluskey, & Hwang, 2009). Alternatively, they may become anxious or depressed by the event(s) and seek to reduce, escape from, or alleviate these emotions by getting drunk or using illegal drugs (Agnew, 2006; Taylor & Kliewer, 2006). Taylor and Kliewer (2006) term this type of reaction “avoidant coping,” in that victims may use drugs to relieve the negative emotions produced by the traumatic event(s), particularly when other responses, such as attacking the source of stress directly, are not available.

Agnew has identified important factors that can increase the likelihood that strains will lead to delinquency; namely, when the stressors: 1) are perceived as unjust/unfair, (2) are associated with low social control, (3) are long-term (recurring), (4) involve an important area of one’s life, and (5) create some incentive for criminal coping (Agnew, 2001). Victimization fulfills many of these criteria, as it is often perceived as unjust, it frequently occurs in places lacking formal or informal supervision (i.e., social control), it can cause pain or injury to the individual or those s/he cares about, and it is a common, often recurring experience for adolescents (Finkelhor, Turner et al., 2009; Truman, 2011).

Exposure to Violence, Social Support, and Substance Use

According to GST, both direct experiences of victimization (e.g., physical or sexual assault) and “vicarious” victimization, such as witnessing or knowing about violence perpetrated against others, are likely to inspire criminal coping (Agnew, 2002). Most of the empirical studies of exposure to violence have focused on direct victimization, perhaps due to the perception that it will be particularly traumatic for individuals, given its potential to cause physical harm. However, it is also true that adolescents are more likely to suffer vicarious victimization than direct victimization (Agnew, 2006; Finkelhor, Turner et al., 2009), making it high in magnitude. Further, witnessing violence can increase fear and anxiety both in the short- and long-term, if future occurrences are anticipated (Kort-Butler, 2010). It may also cause anger or depression, particularly among those whose close friends and/or family members have been injured.

Although GST would predict a relationship between vicarious victimization and substance use, little empirical research has tested this hypothesis. Nonetheless, the research that has examined this relationship has generally demonstrated a positive association between witnessing violence and increased alcohol, marijuana, or other drug use/abuse (Kilpatrick et al., 2000; Kilpatrick et al., 2003; Schwab-Stone et al., 1995; Sullivan, Kung, & Farrell, 2004; Zinzow et al., 2009). Although these studies have helped draw attention to the negative effects of vicarious victimization, they have some limitations. First, many have relied on cross-sectional data. Given evidence that the relationship between victimization and substance use may be reciprocal (Mrug & Windle, 2009a; Thompson, Sims, Kingree, & Windle, 2008), prospective data are needed to establish which behavior—substance use or victimization—precedes the other. Some longitudinal studies have indicated that indirect forms of victimization increase subsequent alcohol (Mrug & Windle, 2009a; Sullivan et al., 2004; Thompson et al., 2008), marijuana (Vermeiren, Schwab-Stone, Deboutte, Leckman, & Ruchkin, 2003) and other drug use (Farrell & Sullivan, 2004) among adolescents, but such research is relatively rare and deserves replication, particularly to assess the generalizability of the findings to other populations. The current study will examine the contemporaneous impact of vicarious victimization on alcohol, tobacco, and marijuana use and investigate whether these relationships are maintained two to three years following victimization.

Exposure to Violence, Social Support, and Substance Use

While prior work has provided at least preliminary evidence that vicarious victimization can increase the likelihood of substance use, not all studies have tested this relationship in fully specified models. That is, more concerned with identifying the “pure” effects of victimization on drug use, some tests have failed to control for other factors that could also explain this relationship. For example, delinquent peer associations and low levels of self-control have each been associated with victimization and substance use (Agnew, 2002; Lin, Cochran, & Mieczkowski, 2011; Sullivan, Farrell, Kliewer, Vulin-Reynolds, & Valois, 2007), but very few studies have controlled for these variables. Failure to include other relevant risk and protective factors in statistical models risks mis-specifying and potentially overstating the relationship between victimization and substance use. The current study capitalizes on a rich dataset that allows for the inclusion of a broad set of control variables to help minimize the potential for finding a spurious relationship between vicarious victimization and substance use.

Moderating Effects of Social Support on the Relationship between Victimization and Substance Use

Lastly, relatively few studies have examined factors which may moderate the impact of victimization on delinquency. GST acknowledges that individuals experience a variety of stressors relatively frequently and not all will engage in deviant coping strategies (Agnew, 1992). One’s likelihood of delinquency may be moderated by a variety of factors, including social support. Social support and close attachments to others have been identified as protective factors which can minimize the impact of a variety of stressful experiences or risk factors on problem behaviors such as substance use (J. David Hawkins et al., 1992; Luthar & Goldstein, 2004). In the case of victimization, strong social support is expected to help victims more positively deal with strain and minimize the effects of the negative emotions produced by victimization (Aceves & Cookston, 2007; Kort-Butler, 2010; O’Donnell, Schwab-Stone, & Muyeed, 2002; Sullivan et al., 2004). Having close ties to others provides greater opportunities for emotional and physical aid (House, Umberson, & Landis, 1988). In addition, because youth are developmentally less equipped to handle stress and negative emotions using prosocial coping mechanisms, having positive support from family members and peers provides resources they can draw upon to help alleviate the negative effects of strain (Agnew, 2006).

Exposure to Violence, Social Support, and Substance Use

Only a few studies have examined whether or not social support moderates the impact of victimization on substance use. O'Donnell and colleagues (2002) examined whether social support, including family, school, and peer support, affected resilience (including reduced substance use) among youth who had experienced and witnessed violence. This study showed that victims of both types of violence who had strong family and school support were less likely to engage in substance abuse than those who lacked such support. However, peer support exerted a negative influence on resilience to substance use. That is, for youth who had experienced or witnessed violence, substance use was *greater* among those with higher levels of peer support.

Sullivan, Kung, and Farrell (2004) and Kliewer et al. (2006) also found evidence of moderating effects on the relationship between vicarious victimization and drug use when considering family support, but in opposite directions. Sullivan et al. (2004) found that the effect of witnessing violence on smoking and drunkenness was non-significant for those with low levels of family support and parental monitoring, but there was a strong, negative and significant relationship for those with higher levels of family support. However, Kliewer et al. (2006) found that family cohesion and parental monitoring attenuated the risk of engaging in drug use among those who had witnessed violence, such that those with greater family support were less likely to use drugs following victimization compared to those with lower levels of support. Two additional studies (Hay & Evans, 2006; Taylor & Kliewer, 2006) did not show any evidence that family support moderated the effects of witnessing or experiencing victimization.

Research has also shown mixed results regarding how family (Aceves & Cookston, 2007; Gorman-Smith, Henry, & Tolan, 2004; Hardaway, McLoyd, & Wood, 2012; Rosario, Salzinger, Feldman, & Ng-Mak, 2003) and peer support (Rosario et al., 2003) moderate the effects of exposure to violence on general delinquency (excluding drug use). For example, Rosario et al. (2003) reported that peer support buffered the effects of witnessing violence on delinquency for boys, but it strengthened the effect of direct victimization on delinquency for both boys and girls. Thus, while some studies have demonstrated support for general strain theory's hypothesis that social support should reduce the potential for vicarious victimization to increase delinquency and drug use, others have not.

The Current Study

Although the negative effects of victimization on adolescents are well established, the degree to which vicarious or indirect forms of victimization affects substance use are somewhat unclear, and relatively few studies have assessed whether or not, and how, social support may moderate this relationship. The current study seeks to build upon and add to prior work in this area. We rely on prospective data to analyze both the immediate impact of vicarious victimization on substance use and whether or not effects are maintained 2.5 years following victimization. In addition, we examine if family and peer support moderate these relationships. Analyses include a range of relevant control variables and utilize data from Hispanic, African American, and Caucasian youth spanning the ages of 8 to 16, thus representing the full span of adolescence and the developmental periods at which both secondary exposure to violence (Finkelhor, Ormrod, & Turner, 2009) and use of illegal substances are likely to be increasing (Johnston et al., 2011). Two research questions are addressed:

- 1) What are the direct effects of vicarious victimization on the likelihood of alcohol, cigarette, and marijuana use?
- 2) To what extent is the relationship between vicarious victimization and substance use moderated by an individual's level of family and peer support?

Methods

Sample and Data

The data for the present study were taken from the Project on Human Development in Chicago Neighborhoods (PHDCN), a multi-wave, interdisciplinary study that examines how community, family, and individual factors contribute to the onset, development, continuance, and desistance of antisocial behaviors (Earls, Brooks-Gunn, Raudenbush, & Sampson, 2002). To establish a representative sample of Chicago residents, the PHDCN research staff created 343 neighborhood clusters (NCs) from all of Chicago's 847 census tracts and then stratified the clusters by seven categories of socioeconomic and racial-ethnic diversity. Eighty neighborhood clusters were selected based on a stratified probability

Exposure to Violence, Social Support, and Substance Use

sample from the 343 NCs for the Longitudinal Cohort Study (LCS), and respondents from within each cluster were then sampled. In order to be eligible for inclusion in the longitudinal panel, households had to include at least one child in one of seven targeted age cohorts (newborns, 3, 6, 9, 12, 15, and 18 years). Of the 8,347 eligible respondents, 6,228 (75%) agreed to participate in the study (Earls et al., 2002).

The LCS data were collected through in-home observations and interviews with primary caregivers and their children at three time points. The current study relies on data collected at waves one and two from youth in three age cohorts (9, 12, and 15). Wave one data were collected in 1994-97 from 2,345 youth in 79 neighborhood clusters and wave two data were collected in 1997-2000 with 1,987 (85%) youth. The analysis sample, those who provided data on all key variables, included 1,919-2,003 participants at wave one (depending on the outcome assessed) and 1,573-1,648 participants at wave two. As show in Table 1, at wave one, this sample was 50% male, ethnically diverse, and was a mean age of 12 years.

- Insert Table 1 here -

Measures

Substance Use. Adolescents' self-reports of substance use were collected via a self-report questionnaire at waves one and two using items derived from the National Household Survey on Drug Abuse (1991). At both time points, youth reported the number of days they drank alcohol, smoked cigarettes, and used marijuana in the past year, with nine response choices ranging from 0 days to 200 or more days. As shown in Table 1, only a small proportion of the sample reported any use of alcohol (14%), cigarettes (10%), or marijuana (7%) at wave one; at wave two, use was somewhat higher (rates of 24%, 19%, and 11%, respectively), but most individual reported using substances only a few times in the past year. Given these responses, and consistent with much prior work in this area, we created dichotomous outcomes reflecting *alcohol use*, *cigarette use*, and *marijuana use* at wave one and wave two which compared adolescents who reported any use in the past 12 months with those who had not.

Vicarious victimization. *Vicarious victimization* was assessed at wave one based on eight items created by the PHDCN staff. Participants were asked, during their lifetime, whether or not: any of their

Exposure to Violence, Social Support, and Substance Use

family members had ever been hurt or killed by a violent act (two separate items); any of their close friends had ever been hurt or killed by a violent act (two separate items); they had seen or been present when somebody was shoved, kicked or punched; they had seen someone attacked by a knife; they had heard a gunshot; or they had seen someone shot. Responses to these eight dichotomous items were then summed to create the *vicarious victimization* variable which could range from zero to eight.

Social Support. Peer support and family support were each based on youth reports at wave one using items from the Provision of Social Relations survey (Turner, Frankel, & Levin, 1983). For *peer support*, participants were asked to rate the degree to which they felt nine statements ($\alpha=.70$) regarding their relationships with friends were true (using a three-point scale, from “not true” to “very true”): (a) when I’m with my friends I feel completely able to relax and be myself, (b) I share the same approach to life that many of my friends do, (c) people who know me trust me and respect me, (d) when I want to go out to do things, I know that many of my friends would enjoy doing these things with me, (e) I have at least one friend I could tell anything to, (f) I feel very close to some of my friends, (g) people who know me think I am good at what I do, (h) my friends would take the time to talk to me about my problems, and (i) I feel alone even when with my friends (reverse coded). Based on the same three-point scale, to gauge *family support*, participants were asked to rate the degree to which they felt the following six statements ($\alpha=.67$) regarding their relationship with their family were true: (a) no matter what happens, I know that my family will always be there for me should I need them, (b) my family lets me know they think I am a worthwhile person, (c) people in my family have confidence in me, (d) people in my family help me find solutions to my problems, (e) I know my family will always stand by me, and (f) I am not sure if I can rely on my family (reverse coded). For each variable, items were summed such that higher values represented greater social support.

Control variables. A number of control variables representing individual, peer, and family experiences shown in other research to be related to substance use were included in the analyses (e.g., Hawkins, Catalano, & Miller, 1992). All measures were assessed at wave one. Adolescent self-reports were used to assess age, race/ethnicity, gender, and peer drug use. *Age* was coded as the youth’s age in

Exposure to Violence, Social Support, and Substance Use

years. Dummy variables were created to represent the gender and race/ethnicity of the participant, with *males* compared to females and *African American*, *Hispanic*, and youth from *Other* racial/ethnic groups compared to *Caucasian* youth. *Peer drug use* was a summary measure based on youth reports of the number of their friends who used alcohol, tobacco, marijuana, or other drugs during the past year (alpha=.76), each assessed on a four-point scale, ranging from one (“none”) to four (“all”). These items were standardized and summed, with higher values representing higher levels of peer drug use.

Additional control variables were based on responses from the adolescent’s primary caregiver. *Family SES* was a factor score based on parent education, employment and income (alpha 0.58). *Low self-control* was based on caregivers’ responses to 17 items (alpha=.75) from the Emotionality, Activity, Sociability, and Impulsivity (EASI) Temperament survey (Buss & Plomin, 1975; see also Gibson, Sullivan, Jones, & Piquero, 2010). Parents rated their child’s behavior in terms of inhibitory control, decision-making, sensation-seeking, and persistence using a five-point Likert scale (1=uncharacteristic of child; 5=characteristic of child). Items were then standardized and summed with higher scores reflecting lower self-control. To assess youth *anger*, caregivers rated the degree to which their child had “bad temper tantrums or a hot temper” in the past six months, using one item from the Child Behavior Checklist assessed on a three-point scale (from “not true” to “very/often” true). Similarly, youth *depression* was measured based on the caregivers responses to 14 items (alpha=.79) comprising the depression/anxiety subscale of the Child Behavior Checklist (Achenbach, 1991). The caregiver was asked to rate the child’s behavior in the past six months according to a three-point scale (0=not true at all; 1=somewhat/sometimes true; 2=very/often true). Sample items included: cries a lot, complains of loneliness, feels worthless or inferior and is too fearful or anxious. Items were then standardized and summed with higher scores reflecting higher levels of depression. Finally, *parental supervision* was based on in-home interviews conducted by trained PHDCN staff. The primary caregiver was asked to report whether or not he/she used each of 13 supervision techniques, including making and enforcing rules, interacting with children’s peers, visiting the child’s teacher or school, and discouraging drug use. These dichotomous items were summed; higher scores indicate greater supervision. Three other family-

Exposure to Violence, Social Support, and Substance Use

related variables (parental problems with alcohol and drug use, parental warmth, and family conflict) were considered but not included in the final analysis models because they were not significantly related to any of the substance use outcomes.

Table 1 presents the descriptive statistics for all dependent, independent, and control variables.

Analysis Strategy

The analysis utilized multi-level modeling techniques in order to account for the hierarchical structure of the data, given that respondents were drawn from 79 neighborhoods. Specifically, hierarchical modeling techniques (Hierarchical Linear Modeling [HLM], see Raudenbush & Bryk, 2002) were used to adjust for the correlated error that existed between adolescents living within the same neighborhood. All variables were fixed and grand-mean centered.

Bernoulli models, analogous to logistic regression models, were used to analyze the effects of vicarious victimization on the drug use outcomes assessed at wave one, with each dichotomous outcome modeled separately. Similar models were used to predict outcomes measured at wave two, but these analyses also controlled for the specific form of drug use reported at wave one that matched the wave two outcome (e.g., models predicting alcohol use at wave two controlled for alcohol use at wave one). The analyses proceeded in two steps. First, the relationship between the independent variables and each dependent variable were estimated while controlling for the other variables. Second, in order to examine the moderating effects of social support, interaction terms were created between vicarious victimization and each type of social support after each of the variables was mean centered to reduce collinearity, and the two newly created variables were added in separate models. Tolerance values were all above .40, suggesting that multicollinearity was not a problem in the final models (Allison, 1999).

Results

Wave One Substance Use

The results for models assessing the contemporaneous relationship between vicarious victimization and the prevalence of substance use assessed at wave one are shown in Table 2. Model 1

Exposure to Violence, Social Support, and Substance Use

examines the relationship between victimization and each type of substance controlling for all other individual risk factors (but excluding the interaction terms). As shown, many of the control variables were not significantly related to substance use at wave one. However, age (being older), being male, and peer drug use were associated with increased use for each substance. Further, African-Americans were significantly less likely than Caucasians to report any alcohol or cigarette use. The results also indicated that parental supervision was related to a lower likelihood of alcohol use and marijuana use, anger was associated with a greater likelihood of alcohol use, low self-control was associated with a greater chance of cigarette use, being Hispanic (vs. Caucasian) or Other race or ethnicity (vs. Caucasian) reduced the likelihood of cigarette use, and those with higher levels of depression or from households with greater socioeconomic status were more likely to report marijuana use.

Vicarious victimization was significantly and positively related to alcohol ($b=.25, p<.01$), cigarette ($b=.16, p<.01$), and marijuana ($b=.24, p<.01$) use, with increasing levels of victimization related to a greater likelihood of substance use. Peer social support was significantly related to alcohol use ($b=.07, p<.05$); adolescents who reported more peer social support had an increased likelihood of engaging in alcohol use. Family social support was also significantly related to alcohol use ($b=-.12, p<.01$); however, the relationship was in the opposite direction, with family social support significantly related to a reduced likelihood of any drinking. No significant relationships were found between peer or family social support and past year cigarette or marijuana use.

Model 2 added the vicarious victimization and peer support interaction term to the basic models in order to assess whether or not peer support moderated the relationship between victimization and substance use. None of the interaction terms were statistically significant, indicating that peer support did not moderate the effect of vicarious victimization on substance use at wave one.

In Model 3, the interaction between vicarious victimization and family support was assessed for each of the three outcomes. Family support moderated the effect of exposure to violence on the likelihood of alcohol ($b=.04, p<.05$), cigarette ($b=-.04, p<.05$), and marijuana ($b=.08, p<.01$) use. Specifically, the

Exposure to Violence, Social Support, and Substance Use

relationship between vicarious victimization and each outcome was stronger among those with greater levels of family support, compared to those with lower levels of support.

-Insert Table 2 here-

Wave Two Substance Use

The results for models examining the effect of vicarious victimization on substance use assessed at wave two are shown in Table 3. Model 1 examined the impact of victimization on each type of substance controlling for other risk factors. The effects of the control variables in these models were similar to those found in the cross-sectional analyses, with an increased likelihood of substance use reported by older youth and those whose peers engaged in substance use. In addition, substance use at wave one significantly predicted use at wave two for all three substances.

Vicarious victimization significantly increased the likelihood of alcohol use ($b=.13, p<.01$) and marijuana use ($b=.21, p<.01$). No significant relationship was found between vicarious victimization and cigarette use. Peer support was significantly related to an increased likelihood of using all substances (alcohol: $b=.06, p<.05$; cigarettes: $b=.11, p<.01$; marijuana: $b=.09, p<.01$). Family support, on the other hand, was significantly related to a decreased likelihood of engaging in cigarette use ($b=-.13, p<.01$) and marijuana use ($b=-.15, p<.01$), but was not significantly related to alcohol use.

Interaction terms were included in Models 2 (peer support X vicarious victimization) and 3 (family support X vicarious victimization). None of these terms were statistically significant, indicating that neither peer support nor family support moderated the relationship between vicarious victimization and subsequent substance use. However, family support showed potential moderating effects; the interaction terms were marginally significant for alcohol use ($b=.03, p=.075$) and marijuana use ($b=.04, p=.053$), and in the same direction as in prior analyses, with the relationship between vicarious victimization and substance use stronger for those reporting greater levels of family support compared to those with lower levels of support.

-Insert Table 3-

Discussion

Exposure to Violence, Social Support, and Substance Use

General strain theory (Agnew, 1992) hypothesizes that strains in general and victimization in particular are likely to increase deviant behavior among adolescents, as they struggle to cope with these unwanted, stressful experiences and the negative emotions generated by them. While GST has strong empirical support (Agnew, 2006; Hay & Evans, 2006), comparatively little research has tested the impact of vicarious victimization (i.e., witnessing or hearing about violence perpetrated to others) on substance use, particularly using longitudinal data and controlling for other important risk factors related to such use. In this study, increasing levels of vicarious victimization were significantly related to an increased likelihood of smoking, drinking, and marijuana use in the short term. These relationships were maintained 2.5 years later for alcohol and marijuana use, but the effect of vicarious victimization on subsequent tobacco use was only marginally significant ($p < .10$). These findings support and add to the relatively limited prospective research that has also reported increased rates of substance use among youth following indirect exposure violence in their community (Farrell & Sullivan, 2004; Mrug & Windle, 2009a; Sullivan et al., 2004; Thompson et al., 2008; Vermeiren et al., 2003).

While the results generally supported GST, two claims put forth by Agnew (1992) were not supported. First, Agnew (1992) posited that vicarious victimization and other strains are likely to lead to deviance only when they engender negative emotions, including anger and depression, which must then be alleviated. While we did not formally test whether or not anger or depression mediated the effects of vicarious victimization on substance use, the findings suggested that this did not occur. In all but one model (cigarette use at wave two), vicarious victimization retained its significant effect on substance use when anger and depression were included as control variables, and these emotions were significantly related to outcomes only in a few cases. While our assessment of negative emotions did not assess whether or not these feelings occurred as a direct result of victimization, and therefore captured more trait-based than situational emotions, their failure to mediate the effects of vicarious victimization is consistent with some other studies that have formally tested this aspect of GST (Jang & Rhodes, 2012; Kaufman, 2009; Moon et al., 2009).

Exposure to Violence, Social Support, and Substance Use

Secondly, the results were not consistent with strain theory's hypothesis that social support would attenuate the impact of victimization on delinquency. In our analyses, peer support did not moderate the effects of vicarious victimization on any form of substance use at either time point. To date, very few other studies have assessed the degree to which peer social support moderates strains/victimization, and the available evidence has found that peer support may amplify or mitigate the negative effects of victimization on delinquency (O'Donnell et al., 2002; Rosario et al., 2003). Our results indicated that peers were important in shaping substance use, in that adolescents who had friends who used drugs were much more likely to engage in all three substances assessed. Further, higher levels of peer support were related to a greater likelihood of substance use in the majority of cases (particularly when assessing wave two outcomes). However, none of the victimization/peer support interaction terms were significant, suggesting that peer support did not moderate the relationship between vicarious victimization and substance use as Agnew (2002) has suggested. It may be that for some victims (e.g., those whose friends use drugs), peer support can be detrimental, while for others, it is more protective, and these contradictory patterns led to null findings overall. More research is needed to further investigate how and for whom peer support may condition the relationship between victimization and adolescent substance use.

The findings regarding family support were also somewhat at odds with strain theory. Consistent with this perspective, as well as literature identifying family support as an important protective factor that can minimize the likelihood of children's problem behaviors (e.g., Aceves & Cookston, 2007; Sullivan et al., 2004), adolescents who reported higher levels of family support were less likely to engage in substance use in about half the models. That is, in these cases, the direct effects of family support were protective for the full sample, with children who had closer relationships with family members less apt to use alcohol, cigarettes, and marijuana.

The moderating effects of family support, however, were not consistent with strain theory, which would hypothesize that victims with the highest levels of family support would be less likely to use substances compared to those with lower levels of support. In the current study, the relationship between vicarious victimization and each form of substance use assessed at wave one was *stronger* for those with

Exposure to Violence, Social Support, and Substance Use

higher levels of family support compared to those with lower levels. . That is, family support did not protect or buffer the impact of victimization on substance use. Instead, the protective effect was greater for non-victims compared to victims. While not predicted by strain theory, these findings are similar to other research indicating “protective reactive effects” (Luthar, Cicchetti, & Becker, 2000). In such studies, peer (O'Donnell et al., 2002; Rosario et al., 2003) and family support (Aceves & Cookston, 2007; Gorman-Smith et al., 2004; Hardaway et al., 2012; Rosario et al., 2003; Sullivan et al., 2004), even while conferring advantages (i.e., less substance use) among the full sample, had weaker protective effects for individuals in higher-risk conditions (e.g., experiencing indirect victimization). For example, and similar to our study, Sullivan et al. (2004) found that family support had significant, negative effects on the initiation of alcohol and tobacco use among a sample of 6th grade students, but the impact of witnessing violence on drinking and smoking was stronger for those with higher versus lower levels of family support. Victimization was not related to substance use for those with low levels of family support but had a significant detrimental effect for those with higher levels of family support.

Our results suggest that for youth experiencing very low levels of family support, vicarious victimization may lose some of its salience. Further analyses of the data (not shown) indicated that these youth reported higher levels of peer substance use, had lower self-control, and had higher scores on the anger and depression measures compared to those with more family support. Thus, it may be that for youth experiencing high levels of risk across multiple domains of their lives, the effects of any one risk factor (e.g., vicarious victimization) are weakened. Considered from a different perspective, it could be that youth who experience the discontinuity of living in more benign conditions (i.e., with supportive parents) while simultaneously witnessing or hearing about violence feel the effects more strongly, and are thus at greater risk for experiencing problematic outcomes following this stressor. Another possible explanation for the positive interaction between vicarious victimization and family support at wave one is that victimized youth may have sought out or elicited social support from family members following the violent event(s). That is, social support could increase following episodes of indirect victimization. Since

Exposure to Violence, Social Support, and Substance Use

both vicarious victimization and family support were measured at wave one, we cannot rule out this type of association.

Though these moderating effects are consistent with some other research, our conjectures regarding why these relationships were evidenced in the current study are speculative, and additional research is needed to further explore the extent to which and processes whereby social support affects victims' subsequent behavior. The current study has other limitations that could be addressed in future research. Respondents in this study did not report very much or very frequent substance use, and our outcome variables were limited to dichotomous measures assessing whether or not victims engaged in any substance use, not how much or how often they used substances. Thus, it would be informative to investigate both the direct and moderated effects of vicarious victimization on frequent and/or severe drug use. Similarly, while our measure of vicarious victimization took into account the number of different types of violence seen or heard about, we did not analyze the frequency of such victimizations (i.e., the absolute number of times respondents witnessed or found about other others' victimization). We also acknowledge that our sample, while ethnically diverse, was drawn only from one city, Chicago, and may not reflect the experiences of youth in other parts of the U.S. or other countries.

Despite these limitations, this study adds to our understanding of how vicarious victimization impacts substance use. Further, we have explored some of the conditions under which this relationship is more or less likely to occur, which has important implications for intervention. Our findings underscore the importance of providing victims with services to improve their coping skills in order to minimize the likelihood that they will engage in substance use following such experiences. This includes service provision to youth from relatively stable and supportive households, as well as those who may be exposed to a variety of risk factors in addition to vicarious victimization, which places them at even greater risk for substance use (as well as other problem behaviors). To address these populations, universal services might be implemented, such as school-based programs that help enhance youth emotional competence and/or reduce other risk factors by, for example, providing students with skills to cope with stress and anxiety, recognize and respond appropriately to negative emotions, or resist peer influences to use drugs.

Exposure to Violence, Social Support, and Substance Use

Intervention and prevention services should also be offered in schools and community settings to target high-risk youth. For example, intensive family therapy programs seek to build more positive relationships between youth and parents and to reduce children's involvement with deviant peers. Providing these types of services more widely across communities can help significantly reduce rates of drug use as well as the other negative consequences that stem from exposure to community violence.

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Exposure to Violence, Social Support, and Substance Use

Table 1. Sample Means and Standard Deviations ($n = 2,345$ at Wave 1)

	Mean	SD	Min	Max
Outcomes				
<u>Wave 1</u>				
Ever used alcohol in last year	.14	.34	.00	1.00
Ever used cigarettes in last year	.10	.30	.00	1.00
Ever use marijuana in last year	.07	.26	.00	1.00
<u>Wave 2</u>				
Ever used alcohol in last year	.24	.42	.00	1.00
Ever used cigarette in last year	.19	.39	.00	1.00
Ever used marijuana in last year	.11	.31	.00	1.00
Independent variables				
Vicarious victimization	2.99	1.90	.00	8.00
Peer social support	22.49	3.31	8.00	27.00
Family social support	16.25	1.94	6.00	18.00
Control variables				
Age	11.99	2.43	7.77	16.91
Male	.50	.50	.00	1.00
African American	.36	.48	.00	1.00
Caucasian	.14	.35	.00	1.00
Hispanic	.46	.50	.00	1.00
Other race/ethnicity	.04	.19	.00	1.00
Family SES	.06	1.00	-2.07	1.72
Low self-control	-.00	1.00	-2.52	3.40
Peer drug use	.00	1.00	-0.73	4.79
Parental supervision	11.64	1.50	4.00	13.00
Anger	.51	.70	.00	2.00
Depression	.04	1.04	-.94	6.03

Exposure to Violence, Social Support, and Substance Use

Table 2. The Relationship between Vicarious Victimization and Wave One Alcohol, Cigarette, and Marijuana Use, and Moderating Effects of Social Support¹

	Alcohol Use (N=1,995)			Cigarette Use (N=2,003)			Marijuana Use (N=1,919)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)
Intercept	-3.30** (.17)	-3.31** (.17)	-3.34** (.17)	-3.58** (.18)	-3.59** (.18)	-3.63** (.18)	-4.75** (.30)	-4.77** (.30)	-4.92** (.31)
Vicarious victimization	.25** (.05)	.26** (.05)	.28** (.05)	.16** (.06)	.17** (.06)	.19** (.06)	.24** (.07)	.25** (.07)	.32** (.07)
Age	.59** (.06)	.59** (.06)	.59** (.06)	.47** (.06)	.47** (.06)	.47** (.06)	.59** (.09)	.59** (.09)	.60** (.09)
Male	.44* (.18)	.44* (.18)	.44* (.18)	.38* (.19)	.39* (.19)	.38* (.19)	.63** (.23)	.64** (.23)	.64** (.23)
Afr. American ^a	-1.46** (.28)	-1.46** (.28)	-1.46** (.28)	-1.35** (.29)	-1.34** (.29)	-1.36** (.29)	.13 (.36)	.15 (.36)	.11 (.37)
Hispanic ^a	-.49 (.25)	-.49 (.25)	-.49 (.26)	-.88** (.27)	-.87** (.27)	-.87** (.27)	-.11 (.36)	-.09 (.36)	-.10 (.36)
Other race ^a	-.80 (.52)	-.81 (.52)	-.83 (.53)	-1.23* (.58)	-1.23* (.58)	-1.29* (.59)	-.19 (.66)	-.20 (.66)	-.38 (.69)
Peer drug use	.65** (.09)	.66** (.09)	.64** (.09)	.86** (.09)	.87** (.09)	.85** (.09)	.91** (.11)	.91** (.11)	.87** (.11)
Family SES	.17 (.09)	.17 (.09)	.17 (.09)	.11 (.10)	.11 (.10)	.11 (.10)	.27* (.12)	.27* (.12)	.26* (.12)
Low self-control	-.09 (.09)	-.09 (.09)	-.09 (.10)	.34** (.10)	.34** (.10)	.34** (.10)	.01 (.12)	.01 (.12)	.02 (.12)
Supervision	-.17** (.05)	-.17** (.05)	-.17** (.05)	-.06 (.06)	-.06 (.06)	-.06 (.06)	-.17* (.07)	-.17* (.07)	-.17 (.07)
Anger	.29* (.14)	.30* (.14)	.30* (.14)	.00 (.15)	.01 (.15)	.01 (.15)	-.01 (.17)	-.01 (.17)	-.02 (.17)
Depression	-.03 (.09)	-.03 (.09)	-.02 (.09)	.03 (.10)	.03 (.10)	.03 (.10)	.26* (.11)	.26* (.11)	.26* (.11)
Peer support	.07* (.03)	.07* (.04)	.08* (.03)	.02 (.03)	.03 (.04)	.03 (.03)	.07 (.04)	.10 (.05)	.08 (.04)
Family support	-.12** (.04)	-.12** (.04)	-.17** (.05)	-.04 (.05)	-.04 (.05)	-.11 (.06)	-.09 (.05)	-.09 (.05)	-.25** (.07)
Interactions									
Peer Support x Victimization	--	-.00 (.02)	--	--	-.01 (.02)	--	--	-.01 (.02)	--
Family Support x Victimization	--	--	.04* (.02)	--	--	.04* (.02)	--	--	.08** (.02)
X^2	76.54	76.28	77.28	85.27	84.89	87.55	82.34	82.64	88.44

** p ≤ .01 * p ≤ .05

¹Analyses were conducted using Bernoulli models with fixed effects for all variables

^aReference category: Caucasian

Exposure to Violence, Social Support, and Substance Use

Table 3. The Relationship Between Vicarious Victimization and Wave Two Alcohol, Cigarette, and Marijuana Use, and Moderating Effects of Social Support ¹

	Alcohol Use (N=1,635)			Cigarette Use (N=1,648)			Marijuana Use (N=1,573)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)
Intercept	-1.76** (.10)	-1.77** (.10)	-1.77** (.10)	-2.01** (.10)	-2.01** (.10)	-2.02** (.10)	-3.27** (.18)	-3.27** (.18)	-3.33** (.19)
Vicarious victimization	.13** (.05)	.14** (.05)	.14** (.05)	.08 (.05)	.08 (.05)	.09 (.05)	.21** (.06)	.20** (.06)	.24** (.06)
Age	.46** (.04)	.46** (.04)	.46** (.04)	.35** (.04)	.35** (.04)	.35** (.04)	.48** (.07)	.48** (.07)	.48** (.07)
Male	.18 (.15)	.18 (.15)	.18 (.15)	.19 (.16)	.19 (.16)	.19 (.16)	.74** (.21)	.74** (.21)	.75** (.21)
Afr. American ^a	-.80** (.25)	-.79** (.25)	-.81** (.25)	-.91** (.24)	-.91** (.24)	-.91** (.24)	-.28 (.32)	-.28 (.32)	-.28 (.32)
Hispanic ^a	-.09 (.23)	-.09 (.23)	-.08 (.23)	-.05 (.22)	-.05 (.22)	-.05 (.22)	-.38 (.31)	-.38 (.31)	-.36 (.31)
Other race ^a	-.35 (.47)	-.36 (.47)	-.36 (.47)	-1.16* (.56)	-1.16* (.56)	-1.17* (.56)	-1.09 (.72)	-1.08 (.72)	-1.19 (.74)
Peer drug use	.24** (.08)	.24** (.08)	.24** (.08)	.08 (.09)	.08 (.09)	.08 (.09)	.25* (.11)	.25* (.11)	.25* (.11)
Family SES	.14 (.08)	.14 (.08)	.14 (.08)	.18* (.08)	.18* (.08)	.18* (.08)	.19 (.11)	.19 (.11)	.19 (.11)
Low self-control	.15 (.08)	.15 (.08)	.15 (.08)	.18* (.09)	.19* (.09)	.18* (.09)	.02 (.11)	.02 (.11)	.02 (.11)
Supervision	.03 (.05)	.02 (.05)	.03 (.05)	.04 (.05)	.04 (.05)	.04 (.05)	-.14* (.07)	-.14* (.07)	-.14* (.07)
Anger	.08 (.12)	.08 (.12)	.08 (.12)	.18 (.12)	.18 (.12)	.18 (.12)	.24 (.16)	.24 (.16)	.24 (.16)
Depression	-.14 (.08)	-.14 (.08)	-.13 (.08)	-.20* (.09)	-.20* (.09)	-.19* (.09)	-.18 (.11)	-.18 (.11)	-.17 (.11)
W1 substance use	1.08** (.20)	1.08** (.20)	1.06** (.20)	1.82** (.22)	1.82** (.22)	1.81** (.22)	1.84** (.27)	1.84** (.27)	1.77** (.28)
Peer support	.07* (.03)	.07* (.03)	.07* (.03)	.11** (.03)	.11** (.03)	.11** (.03)	.09* (.04)	.09* (.04)	.10* (.04)
Family support	-.02 (.04)	-.02 (.04)	-.05 (.04)	-.13** (.04)	-.13** (.04)	-.14** (.04)	-.15** (.05)	-.15** (.05)	-.21** (.06)
Peer Support x Victimization	--	-.01 (.01)	--	--	.01 (.01)	--	--	.00 (.02)	--
Family Support x Victimization	--	--	.03 (.02)	--	--	.01 (.02)	--	--	.04 (.02)
X ²	90.82	90.00	91.27	72.97	73.20	72.52	104.01*	104.24*	103.50*

** p ≤ .01 * p ≤ .05

¹Analyses were conducted using Bernoulli models with fixed effects for all variables.

^aReference category: Caucasian