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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 (GST) hypothesizes that youth are more likely to engage in delinquency when they experience vicarious victimization, defined as knowing about or witnessing violence perpetrated against others, but that this relationship may be attenuated for those who receive social support from significant others. Based on prospective data from youth aged 8 to 17 participating in the Project on Human Development in Chicago Neighborhoods (PHDCN), this article found mixed support for these hypotheses. Controlling for prior involvement in delinquency, as well as other risk and protective factors, adolescents who reported more vicarious victimization had an increased likelihood of alcohol use in the short term, but not the long term, and victimization was not related to tobacco or marijuana use. Peer support did not moderate the relationship between vicarious victimization and substance use, but family support did. In contrast to strain theory's predictions, the relationship between vicarious victimization and substance use was stronger for those who had higher compared with lower levels of family support. Implications of these findings for strain theory and future research are discussed.

Keywords

vicarious victimization; social support; adolescent substance use; general strain theory

General strain theory (GST; Agnew, 2002, 2006) has identified victimization as a form of strain particularly likely to lead to deviance and delinquency, and much prior research has supported this hypothesis (Hay & Evans, 2006; Jennings, Piquero, & Reingle, 2012;

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Declaration of Conflicting Interests

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Turanovic & Pratt, 2013). Moreover, research has shown that victimization can have diverse negative outcomes for adolescents, including problems in school and/or relationships, mental health problems, and externalizing problems, including aggressive and violent behaviors (Evans, Davies, & DiLillo, 2008; Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009; Kilpatrick et al., 2000; Macmillan, 2001; Mrug & Windle, 2009b). Despite this theoretical and empirical attention, most empirical studies exploring the impact of victimization have focused on child maltreatment and other direct experiences of violent victimization (Acosta, Albus, Reynolds, Spriggs, & Weist, 2009; Buka, Stichick, Birdthistle, & Earls, 2001), perhaps because this form of violence can result in physical harm and may therefore be seen as most traumatic. Less attention has been paid to indirect or “vicarious” (Agnew, 2002, 2006) forms of victimization, such as witnessing violence and knowing others who have been victimized, although youth appear to be most likely to experience these types of victimization as opposed to direct forms of victimization (Finkelhor, Turner, Ormrod, & Hamby, 2009; Gorman-Smith, Henry, & Tolan, 2004; Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). For example, according to the 2008 National Survey of Children’s Exposure to Violence (NatSCEV), among youth aged 14 to 17, 42% had witnessed an assault in their community, whereas 27% had been physically assaulted by a peer, and 17% had reported any type of child maltreatment (Finkelhor, Turner, et al., 2009). Given this high prevalence and the relative neglect of vicarious victimization in the literature, the current study focuses on assessing the negative consequences of this form of victimization.¹

Another limitation of past research has been the relatively scant attention to assessing the effects of exposure to violence on adolescent substance use (e.g., Kilpatrick et al., 2000; Schwab-Stone et al., 1995). That relatively few studies have examined this relationship 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; Hawkins, Catalano, & Miller, 1992; Windle et al., 2009), as well as drug abuse and dependency during adulthood (Hingson, Heeren, & Winter, 2006; Windle et al., 2009). Correspondingly, little research has examined the degree to which protective factors such as social support moderate the impact of vicarious victimization on substance use, although there is evidence that not all individuals who experience victimization will engage in delinquency or drug use (Agnew, 2001, 2006; Aisenberg & Herrenkohl, 2008; Lynch, 2003). This article seeks to add to the victimization literature by examining the consequences of indirect or vicarious victimization on adolescents, specifically, whether witnessing and/or hearing about violence perpetrated to others increases the likelihood of substance use, and whether this relationship is moderated by the provision of social support.

¹Throughout the remainder of the article, we will refer to adolescents who have reported vicarious victimization as having been “exposed to violence” and as “victims,” even though they have not directly experienced violence but rather have witnessed or are aware of violence perpetrated against others.

The Impact of Vicarious Victimization on Adolescent Substance Use

A number of criminological theories have been used to explain the relationship between victimization and delinquency, including routine activities/lifestyle theory (e.g., Ousey, Wilcox, & Fisher, 2011; Schreck, Stewart, & Osgood, 2008), self-control theory (Gottfredson & Hirschi, 1990), and social learning theory (Akers, 1985). Our study is guided by GST (Agnew, 2002, 2006), given its explicit identification of vicarious victimization as a problematic strain that may increase the likelihood of delinquency, as well as its attention to social support as a potential protective factor that may buffer the negative impact of exposure to violence on substance use. The present study does not aim to fully test GST but, instead, focuses on testing one specific aspect of the theory: social support as a protective factor that may reduce the impact of victimization on substance use.

GST posits that adverse life experiences—strains or stressors—lead to delinquency primarily because they engender strong, negative emotional responses that create pressure for resolution (Agnew, 2006). 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 that it is likely to cause emotional distress that can prompt delinquent coping mechanisms meant to alleviate this stress. Agnew (2002) further states that victimization can take many forms and that three types are most likely to result in delinquency: direct or experienced victimization (e.g., physical or sexual assault), anticipated victimization (e.g., fear that one will be victimized in the future), and—the focus of the current study—vicarious victimization (e.g., witnessing or knowing about violence perpetrated against others).

Similar to episodes of direct victimization, vicarious victimization fulfills many of the criteria posited by Agnew (2001) as necessary to increase the likelihood that strains will lead to delinquency. That is, vicarious victimization will lead to problem behaviors to the degree that it is (a) perceived as unjust or unfair, (b) high in magnitude, (c) associated with low social control, and (d) creates some pressure for deviant coping. Furthermore, according to Agnew (2002), vicarious victimization is most likely to result in delinquency when it is perpetrated against those who are most similar to youth and with whom they spend the most time (e.g., friends and family). It is likely that when these intimates are the targets of violence, adolescents will perceive such attacks as unjust, unfair, and high in magnitude, thereby increasing their salience. Moreover, vicarious victimization is a common and often repeated experience during adolescence (Finkelhor, Turner, et al., 2009; Truman, 2011), which is also expected to increase its impact. Adolescent exposure to violence tends to occur in places lacking formal or informal supervision (i.e., social control), for example, in high-risk, high-crime neighborhoods (Sampson & Lauritsen, 1994) or in less monitored parts of the school environment (e.g., playgrounds or bathrooms; Olweus, Limber, & Mihalic, 1999). Such circumstances not only increase opportunities for victimization but also may make it more difficult for victims to receive aid or support immediately following the episode(s).

Last, vicarious victimization is likely to engender the negative emotions posited by GST to make deviant or illegal coping mechanisms more likely (Agnew, 1992, 2002). For example, witnessing violence can increase fear and anxiety both in the short term and long term, if

future occurrences are anticipated (Agnew, 2002; Kort-Butler, 2010). Adolescents who believe that those close to them were unjustly attacked 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; Mrug & Windle, 2009a). 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.

According to Agnew and White (1992), vicarious victimization should be positively related to substance use. This hypothesis has been supported by a number of studies using cross-sectional data that have 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 findings are helpful in beginning to highlight the negative effects of vicarious victimization, this body of research has some limitations. First, 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. A few longitudinal studies have been conducted and have indicated that vicarious victimization increases subsequent alcohol use (Mrug & Windle, 2009a; Sullivan et al., 2004) and alcohol and marijuana use (Farrell & Sullivan, 2004) among adolescents, but additional research that relies on prospective data is needed to assess the generalizability of these findings. The current study will examine the contemporaneous impact of vicarious victimization on alcohol, tobacco, and marijuana use and investigate whether these relationships are maintained 2 to 3 years following victimization.

Second, not all studies have tested the impact of vicarious victimization in fully specified models. That is, some research has been more concerned with identifying the “pure” effects of victimization on drug use and has 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 exposure to violence and with substance use (Lin, Cochran, & Mieczkowski, 2011; Sullivan, Farrell, Kliewer, Vulin-Reynolds, & Valois, 2007), but very few studies have controlled for these variables. In addition, little research has controlled for adolescent involvement in other types of delinquent activities (e.g., perpetration of property or violent offenses), although there is evidence that such behaviors may increase the likelihood of victimization (Jennings et al., 2012) or substance use (Elliott, 1994; Hawkins et al., 1992). 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 seeks to minimize the potential for finding a spurious relationship between vicarious victimization and substance use by including a broad set of control variables in the analyses.

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

Although GST posits that strains such as victimization will increase the likelihood of delinquency, the theory acknowledges that individuals experience a variety of stressors relatively frequently and not all will engage in deviant coping strategies in response to these strains (Agnew, 1992). The likelihood of delinquency can be moderated by a variety of factors, including social support or the presence of supportive personal relationships. As it relates to the current article, strong social support is expected to help victims more positively deal with and/or minimize the negative emotions engendered by vicarious exposure to violence (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 support (House, Umberson, & Landis, 1988) and for observing how others positively cope with stress (Aceves & Cookston, 2007). In addition, because youth are developmentally less equipped to handle stress and negative emotions, having positive support from peers, family members, and/or other adults provides resources they can draw on to help alleviate the problematic effects of strain (Agnew, 2006).

A number of studies have tested the degree to which social support moderates the relationship between strains other than victimization and other types of delinquent behaviors, and this research has generally reported mixed evidence regarding the ability of social support to mitigate the impact of strains (Agnew, 2006). Much research has shown that support from or attachment to peers, family members, and/or other adults does not significantly affect the relationship between general strains (e.g., experiencing stressful life events) and delinquency (Paternoster & Mazerolle, 1994; Robbers, 2004), violence (Stogner & Gibson, 2010), or drinking (Windle & Windle, 1996). Greater evidence of moderation has been demonstrated in studies examining the impact of victimization on youth behavior problems, but results have not always supported GST. Some research has shown, as expected, that youth who experience or witness victimization have a decreased likelihood of perpetrating violence when they have higher levels of social support (Aceves & Cookston, 2007; Brookmeyer, Henrich, & Schwab-Stone, 2005; Gorman-Smith et al., 2004; Hardaway, McLoyd, & Wood, 2012; Kort-Butler, 2010; Rosario, Salzinger, Feldman, & Ng-Mak, 2003). However, in other studies, exposure to violence has been demonstrated to have a stronger impact on problem behaviors for those who report greater levels of social support (Hammack, Richards, Luo, Edlynn, & Roy, 2004; Proctor, 2006; Rosario et al., 2003). For example, Rosario et al. (2003) reported that peer support weakened the effects of witnessing violence on delinquency for boys but strengthened the effect of direct victimization on delinquency for boys and girls. Hammack et al. (2004) found that the relationship between witnessing violence and anxiety was stronger for girls with higher versus lower levels of social support.

Very little research has examined the degree to which social support moderates the impact of vicarious victimization on substance use, which is the focus of the current study. Similar to the broader GST literature, available evidence has not always shown social support to buffer the negative impact of vicarious victimization on alcohol or other drug use (Proctor,

2006). For example, O'Donnell and colleagues (2002) reported that adolescents who witnessed violence in their neighborhoods and who had strong family and school support were less likely to engage in substance abuse than those who lacked such support, but the victimization/substance use relationship was stronger for adolescents with higher levels of peer support. Kliewer et al. (2006) found that family cohesion attenuated the risk of engaging in drug use among those who had witnessed violence, but Sullivan et al. (2004) found that the effect of witnessing violence on smoking and drunkenness was stronger for those with higher versus lower levels of parental support. Finally, Taylor and Kliewer (2006) did not show any evidence that family support moderated the effects of witnessing violence on alcohol use.

The Current Study

To summarize, GST posits that victimization is likely to increase delinquency among adolescents, but the degree to which vicarious or indirect forms of victimization affect substance use is less clear, and relatively few studies have assessed whether social support moderates this relationship. Prior tests of GST have indicated that support from family members and/or peers does buffer the impact of strains on delinquency, as hypothesized by Agnew (2006), but other research has shown the opposite to be true, with a stronger relationship between stressful life events (including victimization) and youth offending for those who experience greater levels of social support. The current study builds on this rather limited area of research and seeks to provide greater clarity regarding the relationship between vicarious victimization, social support, and adolescent substance use. We rely on prospective data to analyze both the immediate impact of vicarious victimization on tobacco, alcohol, and marijuana use and whether effects are maintained 2.5 years following victimization. In addition, we examine whether family and peer support moderates these relationships. Analyses include a range of control variables and utilize data from Hispanic, African American, and Caucasian youth spanning the ages of 8 to 16 when victimization is reported, thus representing the developmental periods at which this type of strain (Finkelhor, Ormrod, & Turner, 2009) and use of illegal substances (Johnston et al., 2011) are likely to be increasing. Two research questions are addressed:

Research Question 1: What are the direct effects of vicarious victimization on the likelihood of alcohol, cigarette, and marijuana use?

Research Question 2: To what extent is the relationship between vicarious victimization and substance use moderated by an individual's level of family and peer support?

Method

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 stratified probability sampling from the 343 NCs for the Longitudinal Cohort Study (LCS), and respondents from within each cluster were then sampled. 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 care-givers and their children at three time points. The current study relies on data collected at Waves 1 and 2 from youth in three age cohorts (9, 12, and 15). Wave 1 data were collected in 1994–1997 from 2,345 youth in 79 of the 80 neighborhood clusters (one cluster did not contain youth in the age cohorts included in this analysis), and Wave 2 data were collected in 1997–2000 from 1,987 (85%) of these youth. The analysis sample, those who provided data on all key variables, included 1,918 to 2,002 participants at Wave 1 (depending on the outcome assessed) and 1,572 to 1,647 participants at Wave 2.² As shown in Table 1, at Wave 1, this sample was 50% male, ethnically diverse, and was a mean age of 12 years.

Measures

Substance use—Adolescents' self-reports of substance use were collected via a self-report questionnaire at Waves 1 and 2 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 1; at Wave 2, use was somewhat higher (rates of 24%, 19%, and 11%, respectively), but most individuals reported using substances only a few times in the past year. Given these responses, and consistent with much prior work in this area (Kilpatrick et al., 2000; Mrug & Windle, 2009b; Zinzow et al., 2009), we created dichotomous outcomes reflecting *alcohol use*, *cigarette use*, and *marijuana use* at Waves 1 and 2, which compared adolescents who reported any use in the past 12 months with those who had not. The Wave 1 measures are used as the dependent variable in the first set of analyses and as control variables in the analyses that assess the impact of vicarious victimization on Wave 2 substance use.

²Due to missing data on the independent and dependent variables, 351 (alcohol use), 343 (cigarette use), and 427 (marijuana use) of the 2,345 respondents participating at Wave 1 were dropped from the analyses using listwise deletion, and 353 (alcohol use), 340 (cigarette use), and 415 (marijuana use) of the 1,987 respondents participating at Wave 2 were dropped. A comparison of the sample of all youth in Cohorts 9 to 15 participating at Wave 1 ($n = 2,345$) and our analysis samples at Wave 1 yielded no significant differences on our primary variables, although there were some differences in control variables. The analysis samples had significantly fewer youth of "other" races (when analyzing Wave 1 alcohol, cigarette, and marijuana use) and were slightly older (for Wave 1 marijuana use only). Compared with the initial sample, our analysis samples at Wave 2 had fewer youth of "other" races (for all three outcomes), were significantly older (for marijuana use), and had more parental monitoring (for alcohol and cigarette use), less prior delinquency (for cigarette use), and lower levels of peer support (for all outcomes).

Vicarious victimization—*Vicarious victimization* was assessed at Wave 1 and was based on eight items ($\alpha = .71$) created by the PHDCN staff. Participants were asked, during their lifetime, whether any of their 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.³ Responses to these eight dichotomous items were then summed to create the *vicarious victimization* variable that could range from zero to eight.

Social support—Peer support and family support were each based on youth reports at Wave 1 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 3-point scale, from *not true* to *very true*): (a) “When I am 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 3-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 whether 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 (e.g., Hawkins et al., 1992) were included in the analyses. All measures were assessed at Wave 1. Adolescent self-reports were used to assess age, sex, and race/ethnicity. *Age* was coded as the youth’s age in years. Dichotomous variables were created to represent the sex and race/ethnicity of the participant, with *males* compared with females and *African American, Hispanic*, and youth from *Other* racial/ethnic groups compared with *Caucasian* youth. *Family socioeconomic status (SES)* was based on responses from the adolescent’s primary caregiver to three items reflecting the maximum personal or household income earned in the past year (reported on a 7-point Likert-type scale), the highest level of education reached by either parent (1 = *less than high school*, 2 = *high school*, 3 = *more than high school*), and whether

³For each of the four items related to witnessing violence, respondents were asked to report where the act occurred, with response choices including “at your school” and “in your neighborhood,” “outside your neighborhood,” and “in your home.” Nearly all respondents (97%–100%) who reported any vicarious victimization of these types stated that the violence occurred outside of their homes, at school, or in their immediate or surrounding neighborhood. These responses indicate that youth were primarily reporting on witnessing violence that was not domestic in nature.

the primary caregiver was currently employed or had been employed in the previous year (0 = *no*, 1 = *yes*). The final variable was a factor score representing all three items ($\alpha = .58$).

Additional control variables were based on responses from the adolescent's primary caregiver. *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 5-point Likert-type 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 6 months, using one item from the Child Behavior Checklist assessed on a 3-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 6 months according to a 3-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. *Parental supervision* was based on in-home interviews conducted by trained PHDCN staff. The primary caregiver was asked to report whether he or 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-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.

To capture *peer drug use*, youth reported the number of their friends who used alcohol, tobacco, marijuana, or other drugs during the past year ($\alpha = .76$), each assessed on a 4-point scale, ranging from 1 (*none*) to 4 (*all*). These items were standardized and summed, with higher values representing higher levels of peer drug use. Finally, analyses control for youth involvement in general *delinquency*. This variable is based on youth reports from Wave 1 based on items from the Self-Report Delinquency Questionnaire (Huizinga, Esbensen, & Weiher, 1991). Adolescents reported the number of times in the past year they had committed each of 22 illegal acts, including public order offenses (e.g., disorderly conduct and prostitution), property offenses (e.g., property damage, breaking and entering, and purse snatching or pickpocketing), drug sales (e.g., selling marijuana), and violence (e.g., throwing objects at people, hitting someone, attacking someone with a weapon). Each item was dichotomized (*no offending* = 0, *any offending act* = 1) and summed to measure the total number (count) of delinquent acts. Table 1 presents the descriptive statistics for all dependent, independent, and control variables.

Analysis Strategy

The analysis utilized multi-level modeling techniques 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 1, with each dichotomous outcome modeled separately. Similar models were used to predict outcomes measured at Wave 2, but these analyses also controlled for prior use of each drug outcome (e.g., models predicting alcohol use at Wave 2 controlled for alcohol use at Wave 1). The analyses proceeded in two steps. First, the relationship between the independent variables and each dependent variable was estimated while controlling for the other variables. Second, to examine the moderating effects of social support, interaction terms were created between vicarious victimization and each type of social support (each of the variables were mean centered to reduce collinearity), and the two newly created variables were added in separate models. Tolerance values were all above 0.40, suggesting that multicollinearity was not a problem in the final models (Allison, 1999).

Results

Wave 1 Substance Use

The results for models assessing the contemporaneous relationships between vicarious victimization and the likelihood of any alcohol use, tobacco use, and marijuana use are shown in Table 2. Model 1 examines the relationship between victimization and each type of substance controlling for social support, various risk and protective factors, and Wave 1 delinquency, prior to the inclusion of the interaction terms. As shown, vicarious victimization was significantly and positively related to alcohol use only ($b = .15, p < .01$), with increasing episodes of victimization related to a greater likelihood of alcohol use. Peer social support was significantly related to both alcohol use ($b = .08, p < .05$) and marijuana use ($b = .09, p < .05$) but not cigarette use; adolescents who reported more peer social support had an increased likelihood of engaging in any alcohol use and any marijuana use. No significant relationships were found between family social support and any use of alcohol, cigarettes, or marijuana at Wave 1.

Of the control variables, age (being older), peer drug use, and prior delinquency were associated with an increased likelihood of each type of substance use. Furthermore, African Americans were significantly less likely than Caucasians to report any alcohol or cigarette use, whereas Hispanic youth and those from other racial/ethnic groups were less likely than Caucasians to report any cigarette use. The results also indicated that parental supervision was related to a lower likelihood of alcohol use and marijuana use, low self-control was associated with a greater chance of cigarette use, and those with higher levels of depression were more likely to report any marijuana use.

Model 2 added the vicarious victimization and peer support interaction term to the models. None of the interaction terms were statistically significant, indicating that peer support did not moderate the relationship between vicarious victimization and any of the examined substances at Wave 1. In Model 3, the interaction between vicarious victimization and family support was assessed for each of the three outcomes. Family support significantly moderated the relationship between vicarious victimization and alcohol ($b = .05, p < .05$), cigarette ($b = .05, p < .05$), and marijuana use ($b = .09, p < .01$). Specifically, the relationship between vicarious victimization and the likelihood of each substance was stronger among those with greater levels of family support compared with those with lower levels of support.

Wave 2 Substance Use

The results for models examining the effect of vicarious victimization on substance use assessed at Wave 2 are shown in Table 3. Model 1 examined the impact of victimization on each type of substance controlling for other risk and protective factors, as well as prior delinquency and prior substance use. In these models, vicarious victimization did not significantly affect the likelihood of alcohol, cigarette, or marijuana use. Peer support was significantly related to an increased likelihood of using all substances (alcohol: $b = .07, p < .01$; cigarettes: $b = .11, p < .01$; marijuana: $b = .10, p < .01$). Family support, however, was significantly associated with a decreased likelihood of cigarette use ($b = -.12, p < .01$) and marijuana use ($b = -.12, p < .01$) but did not significantly affect the prevalence of alcohol use.

The effects of the control variables in these models were similar but not identical to those found in the cross-sectional analyses. The likelihood of substance use at Wave 2 was greater for older versus younger respondents and for those who had engaged in a greater number of delinquent acts at Wave 1 (though delinquency affected alcohol and marijuana use only). In addition, African American youth were less likely than Caucasians to report any alcohol or cigarette use, and those from other racial/ethnic groups were less likely than Caucasian youth to report any smoking. Higher levels of family SES, as well as lower levels of self-control, were each related to an increased likelihood of cigarette use, whereas depression reduced the likelihood of smoking, and parental supervision was associated with a lower likelihood of marijuana use. Finally, substance use at Wave 1 significantly predicted an increased likelihood of use at Wave 2 for all three substances.

Interaction terms were included in Models 2 (peer support by vicarious victimization) and 3 (family support by vicarious victimization). No statistically significant results were found for the peer support interaction terms, indicating that peer support did not moderate the relationship between vicarious victimization and substance use at Wave 2. However, family support moderated the effect of vicarious victimization on the likelihood of alcohol ($b = .04, p < .05$) and marijuana ($b = .05, p < .05$) use. Specifically, the relationship between vicarious victimization and alcohol and marijuana use was stronger among those with greater levels of family support compared with those with lower levels of support.

Discussion

GST (Agnew, 2002, 2006) 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 they generate. Although 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 against others) on substance use, particularly using longitudinal data and controlling for other important risk and protective factors related to such use. The goal of the current study was to test the hypotheses that vicarious victimization would be related to increased alcohol, tobacco, and marijuana use, and to investigate the potential for social support to moderate these relationships.

The results indicated that increasing levels of vicarious victimization were related to an increased likelihood of alcohol use by adolescents in the short term, but not tobacco or marijuana use. In addition, vicarious victimization did not have a longer-term impact on any of the three types of substances assessed when controlling for prior use. These findings are surprising, given that a few prospective studies have found increased rates of substance use among youth following indirect exposure to violence in their communities (Farrell & Sullivan, 2004; Mrug & Windle, 2009b; Sullivan et al., 2004). The current study provides a very stringent analysis of the impact of vicarious victimization, however, given that it controls for an array of variables representing individual, peer, and family characteristics that may influence victimization and/or substance use, few of which have been included in other longitudinal studies. Moreover, our analyses controlled for youth involvement in other forms of delinquency. When this variable was omitted from analyses, as is the case in the other longitudinal studies cited above, vicarious victimization was related to an increased likelihood of all three substances at Wave 1, as well as alcohol and marijuana use at Wave 2.

Our findings were not consistent with Agnew's (1992, 2006) hypothesis that social support will attenuate the impact of victimization on delinquency. Our results indicated that peers were important in shaping substance use, in that adolescents who had friends who used drugs were more likely to engage in all three substances assessed. Furthermore, higher levels of peer support were related to a greater likelihood of substance use in the majority of cases, a finding also suggested in some research examining the relationship between friendship quality and substance use (Boman, Stogner, & Miller, 2013; Urberg, Luo, Pilgrim, & Degirmencioglu, 2003). However, none of the victimization/peer support interaction terms was significant, suggesting that peer support did not moderate the relationship between vicarious victimization and substance use as Agnew (1992, 2002, 2006) has suggested.

These findings are consistent with studies showing that social support does not significantly affect the relationship between general strains (e.g., experiencing stressful life events) and delinquency (Paternoster & Mazerolle, 1994; Robbers, 2004; Windle & Windle, 1996). Only a few studies have assessed the degree to which peer social support moderates strains/victimization, however, and 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). Thus, it may be that for some victims (e.g., those whose friends use

drugs), peer support can be detrimental, whereas for others, it is more protective, and these contradictory patterns lead to null findings overall. More research is needed to investigate this possibility and to further explore 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 GST. 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; Hawkins et al., 1992; Sullivan et al., 2004), adolescents who reported higher levels of family support were less likely to engage in substance use in some of 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 engage in any alcohol, cigarette, and marijuana use.

The moderating effects of family support were not consistent with GST. In the current study, the relationship between vicarious victimization and substance use was *stronger* for those with higher levels of family support compared with those with lower levels, in five of the six models that tested for moderation. That is, family support did not protect or buffer the impact of victimization on substance use, as GST would predict (Agnew, 1992). Although not predicted by strain theory, these findings are similar to other research indicating "protective reactive effects" of social support (Luthar, Cicchetti, & Becker, 2000). In such studies, peer (O'Donnell et al., 2002; Rosario et al., 2003) and family support (Proctor, 2006; Sullivan et al., 2004) had weaker protective effects for individuals experiencing 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 sixth-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 with 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 witnessing or hearing about violence feel the effects more strongly and are, thus, at greater risk of experiencing problematic outcomes following this stressor. It is also possible that youth who receive more social support from their families will have closer emotional bonds with them. In turn, violence that harms family members will likely be highest in magnitude for these individuals, placing them at greater risk of deviance according to GST (Agnew, 2001). Although 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 that more fully tests the complexities of the victimization/delinquency relationship posited by GST (Agnew, 2001, 2002, 2006). 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 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. We also acknowledge that our sample, although ethnically diverse, was drawn only from one city, Chicago, and may not reflect levels of substance use, victimization, or other experiences of youth living in other parts of the United States or other countries.

Although 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 others' victimization), nor the impact of repeat victimization or "stress proliferation" (Slocum, 2010) that may have occurred across Waves 1 and 2 of the study. Longitudinal studies that assess the continuity (or discontinuity) of victimization and social support over time, and how these patterns are related to substance use, would help elucidate our understanding of GST. We were also unable in this study to assess the relative impact of direct, anticipated, and vicarious victimization on substance use, or to disentangle the impact of witnessing violence from knowing or hearing about violence perpetrated toward others. Additional research is needed to help test Agnew's (2002) assertion that all these forms of victimization are important in shaping delinquency and that social support may moderate the impact of each of them. Finally, our measure of vicarious victimization included an assessment of whether adolescents' family members had been victims of violence but did not adequately capture the degree to which respondents may have witnessed violence occurring in the home (e.g., intimate partner violence). Additional studies are needed to compare the impact of exposure with violence in the home and the community settings on substance use, and how social support (particularly family support) may affect these relationships.

In summary, the current study has added to our understanding of the degree to which vicarious victimization affects substance use. Further investigation of this relationship, as well as the conditions under which and mechanisms through which victimization affects adolescent development, can help improve the specificity and generalizability of GST, as well as inform the development of prevention services intended to reduce rates of adolescent substance use.

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

	M	SD	Min	Max
Dependent variables				
Wave 1				
Ever used alcohol in last year	0.14	0.34	0.00	1.00
Ever used cigarettes in last year	0.10	0.30	0.00	1.00
Ever used marijuana in last year	0.07	0.26	0.00	1.00
Wave 2				
Ever used alcohol in last year	0.24	0.42	0.00	1.00
Ever used cigarette in last year	0.19	0.39	0.00	1.00
Ever used marijuana in last year	0.11	0.31	0.00	1.00
Independent variables				
Vicarious victimization	2.99	1.90	0.00	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	0.50	0.50	0.00	1.00
African American	0.36	0.48	0.00	1.00
Hispanic	0.46	0.50	0.00	1.00
Other race/ethnicity	0.04	0.19	0.00	1.00
Caucasian	0.14	0.35	0.00	1.00
Family SES	0.06	1.00	-2.07	1.72
Low self-control	-0.00	1.00	-2.52	3.40
Anger	0.51	0.70	0.00	2.00
Depression	0.04	1.04	-0.94	6.03
Parental supervision	11.64	1.50	4.00	13.00
Peer drug use	0.00	1.00	-0.73	4.79
Delinquency	1.19	1.95	0.00	17.00

Note. SES = socioeconomic status.

Table 2
 The Relationship Between Vicarious Victimization and Wave 1 Alcohol, Cigarette, and Marijuana Use, and Moderating Effects of Social Support.

	Alcohol use (<i>n</i> = 1,994)			Cigarette use (<i>n</i> = 2,002)			Marijuana use (<i>n</i> = 1,918)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)
Intercept	-3.33** (0.17)	-3.33** (0.17)	-3.73** (0.17)	-3.57** (0.18)	-3.58** (0.18)	-3.62** (0.18)	-4.74** (0.30)	-4.77** (0.30)	-4.92** (0.32)
Vicarious victimization	0.15** (0.06)	0.15* (0.06)	0.17** (0.06)	0.03 (0.06)	0.03 (0.06)	0.06 (0.06)	0.06 (0.07)	0.07 (0.08)	0.15 (0.08)
Peer support	0.08* (0.03)	0.08* (0.04)	0.09** (0.03)	0.04 (0.04)	0.05 (0.04)	0.04 (0.04)	0.09* (0.04)	0.12* (0.05)	0.09* (0.04)
Family support	-0.08 (0.05)	-0.08 (0.05)	-0.14** (0.05)	-0.00 (0.05)	-0.00 (0.05)	-0.08 (0.06)	-0.02 (0.06)	-0.02 (0.06)	-0.20** (0.07)
Age	0.59** (0.06)	0.59** (0.06)	0.60** (0.06)	0.46** (0.06)	0.46** (0.06)	0.46** (0.06)	0.60** (0.10)	0.60** (0.10)	0.62** (0.10)
Male	0.32 (0.18)	0.32 (0.18)	0.32 (0.18)	0.25 (0.20)	0.25 (0.20)	0.24 (0.20)	0.43 (0.25)	0.44 (0.25)	0.45 (0.25)
African American ^a	-1.50** (0.28)	-1.49** (0.28)	-1.50** (0.28)	-1.38** (0.29)	-1.37** (0.29)	-1.39** (0.29)	0.12 (0.38)	0.14 (0.38)	0.09 (0.39)
Hispanic ^a	-0.45 (0.26)	-0.45 (0.26)	-0.44 (0.26)	-0.87** (0.27)	-0.86** (0.27)	-0.86** (0.27)	-0.09 (0.37)	-0.07 (0.37)	-0.08 (0.38)
Other race ^a	-0.83 (0.53)	-0.83 (0.53)	-0.84 (0.54)	-1.26* (0.61)	-1.27* (0.61)	-1.32* (0.64)	-0.27 (0.72)	-0.28 (0.72)	-0.49 (0.78)
Family SES	0.13 (0.09)	0.13 (0.09)	0.12 (0.09)	0.06 (0.10)	0.06 (0.10)	0.05 (0.10)	0.20 (0.13)	0.21 (0.13)	0.19 (0.13)
Low self-control	-0.13 (0.10)	-0.13 (0.10)	-0.13 (0.10)	0.32** (0.10)	0.32** (0.10)	0.32** (0.11)	-0.05 (0.13)	-0.05 (0.13)	-0.05 (0.13)
Anger	0.26 (0.14)	0.26 (0.14)	0.27 (0.14)	-0.06 (0.15)	-0.05 (0.15)	-0.05 (0.15)	-0.10 (0.19)	-0.09 (0.19)	-0.10 (0.19)
Depression	-0.05 (0.10)	-0.05 (0.10)	-0.05 (0.09)	0.02 (0.10)	0.02 (0.10)	0.02 (0.10)	0.25* (0.12)	0.25* (0.12)	0.24* (0.12)
Supervision	-0.16** (0.06)	-0.16** (0.06)	-0.16** (0.06)	-0.06 (0.06)	-0.06 (0.06)	-0.05 (0.06)	-0.16* (0.07)	-0.16* (0.07)	-0.15* (0.07)
Peer drug use	0.53** (0.09)	0.53** (0.09)	0.52** (0.09)	0.76** (0.10)	0.77** (0.10)	0.74** (0.10)	0.76** (0.12)	0.76** (0.12)	0.71** (0.12)
Delinquency	0.25** (0.04)	0.25** (0.04)	0.26** (0.04)	0.25** (0.05)	0.25** (0.05)	0.26** (0.05)	0.35** (0.05)	0.35** (0.05)	0.35** (0.05)
Peer support × Victimization	—	-0.00 (0.02)	—	—	-0.01 (0.02)	—	—	-0.02 (0.02)	—
Family support × Victimization	—	—	0.05* (0.02)	—	—	0.05* (0.02)	—	—	0.09** (0.03)
χ^2	76.83	76.65	76.85	76.90	76.53	78.97	83.98	84.27	88.85

Note. Analyses were conducted using Bernoulli models with fixed effects for all variables. SES = socioeconomic status.

^aReference category: Caucasian.

* *p* .05.

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Table 3
The Relationship Between Vicarious Victimization and Wave 2 Alcohol, Cigarette, and Marijuana Use, and Moderating Effects of Social Support.

	Alcohol use (<i>n</i> = 1,634)			Cigarette use (<i>n</i> = 1,647)			Marijuana use (<i>n</i> = 1,572)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)
Intercept	-1.77** (0.10)	-1.77** (0.10)	-1.77** (0.10)	-1.99** (0.10)	-1.98** (0.10)	-1.99** (0.10)	-3.27** (0.18)	-3.27** (0.18)	-3.33** (0.19)
Vicarious victimization	0.05 (0.05)	0.06 (0.05)	0.06 (0.05)	0.05 (0.05)	0.05 (0.05)	0.06 (0.05)	0.13 (0.07)	0.12 (0.07)	0.16* (0.07)
Peer support	0.07** (0.03)	0.08** (0.03)	0.08** (0.03)	0.11** (0.03)	0.11** (0.03)	0.12** (0.03)	0.10** (0.04)	0.10* (0.04)	0.11** (0.04)
Family support	0.01 (0.04)	0.01 (0.04)	-0.02 (0.05)	-0.12** (0.04)	-0.12** (0.04)	-0.13** (0.05)	-0.12* (0.05)	-0.12* (0.05)	-0.19** (0.06)
Age	0.47** (0.04)	0.47** (0.04)	0.47** (0.04)	0.35** (0.04)	0.35** (0.04)	0.35** (0.04)	0.49** (0.07)	0.49** (0.07)	0.50** (0.07)
Male	0.13 (0.15)	0.12 (0.15)	0.12 (0.15)	0.16 (0.16)	0.16 (0.16)	0.16 (0.16)	0.68** (0.21)	0.68** (0.21)	0.69** (0.21)
African American ^a	-0.81** (0.25)	-0.81** (0.25)	-0.83** (0.25)	-0.91** (0.24)	-0.91** (0.24)	-0.91** (0.24)	-0.24 (0.32)	-0.24 (0.32)	-0.24 (0.32)
Hispanic ^a	-0.05 (0.23)	-0.05 (0.23)	-0.04 (0.23)	-0.04 (0.22)	-0.03 (0.22)	-0.03 (0.22)	-0.37 (0.31)	-0.37 (0.31)	-0.34 (0.31)
Other race ^a	-0.36 (0.48)	-0.37 (0.48)	-0.37 (0.48)	-1.16* (0.56)	-1.15* (0.56)	-1.17* (0.56)	-1.09 (0.71)	-1.08 (0.71)	-1.19 (0.73)
Family SES	0.11 (0.08)	0.11 (0.08)	0.11 (0.08)	0.17* (0.08)	0.16* (0.08)	0.16* (0.08)	0.17 (0.11)	0.17 (0.11)	0.17 (0.11)
Low self-control	0.14 (0.09)	0.14 (0.09)	0.14 (0.09)	0.18* (0.09)	0.18* (0.09)	0.18* (0.09)	0.00 (0.11)	0.00 (0.11)	0.01 (0.11)
Anger	0.03 (0.12)	0.03 (0.12)	0.04 (0.12)	0.16 (0.13)	0.16 (0.13)	0.16 (0.13)	0.18 (0.17)	0.18 (0.17)	0.18 (0.16)
Depression	-0.13 (0.08)	-0.14 (0.09)	-0.13 (0.08)	-0.19* (0.09)	-0.19* (0.09)	-0.19* (0.09)	-0.17 (0.12)	-0.17 (0.12)	-0.16 (0.11)
Supervision	0.02 (0.05)	0.02 (0.05)	0.02 (0.05)	0.04 (0.05)	0.04 (0.05)	0.04 (0.05)	-0.14* (0.07)	-0.14* (0.07)	-0.14* (0.07)
Peer drug use	0.16 (0.09)	0.16 (0.09)	0.16 (0.09)	0.04 (0.09)	0.04 (0.09)	0.04 (0.09)	0.19 (0.11)	0.19 (0.11)	0.18 (0.11)
Delinquency	0.22** (0.05)	0.22** (0.05)	0.23** (0.05)	0.09 (0.05)	0.09* (0.05)	0.09 (0.05)	0.19** (0.05)	0.19** (0.05)	0.20** (0.05)
Wave 1 substance use	0.94** (0.20)	0.95** (0.20)	0.91** (0.20)	1.73** (0.23)	1.73** (0.23)	1.72** (0.23)	1.57** (0.28)	1.57** (0.28)	1.48** (0.29)
Peer support × Victimization	—	-0.01 (0.01)	—	—	0.01 (0.01)	—	—	0.00 (0.02)	—
Family support × Victimization	—	—	0.04* (0.02)	—	—	0.02 (0.02)	—	—	0.05* (0.02)
χ^2	89.08	88.55	89.40	74.76	75.03	74.37	105.44*	105.77*	104.82*

Note. Analyses were conducted using Bernoulli models with fixed effects for all variables. SES = socioeconomic status.

^aReference category: Caucasian.

* $p < .05$.
** $p < .01$.

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