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ORIGINAL ARTICLE

Unraveling the Relationships between Low Self-Control, Substance Use, Substance-Using Peers, and Violent Victimization

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Abstract

Low self-control, substance use, and affiliations with delinquent peers have been tied to victimization, but the related relationships between these variables and their effects on violent victimization have rarely been studied. The current study considers whether low self-control, substance use, and affiliations with substance-using peers shape violent victimization, and how these variables are related to one another, within an integrated self-control/routine activities theoretical model using path modeling in MPLUS and two waves of data from the National Longitudinal Study of Adolescent to Adult Health (Add Health). Results suggest that (1) low self-control increases substance use and affiliations with substance-using peers, (2) substance use and affiliations with substance-using peers reciprocally shape each other, and (3) all three variables directly and indirectly shape violent victimization, providing direction for theoretical and policy development.

Keywords Victimization · Self-control · Substance use · Delinquent peers · Adolescence

Research has identified a number of factors explaining victimization, with two prominent theoretical bases being Gottfredson and Hirschi's general theory of crime and Cohen and Felson's routine activities theory. The central variable in the general theory of crime, low self-control, can be framed as an antecedent to victimization because individuals low in self-control fail to consider future consequences, and the sensation-

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seeking element of low self-control draws individuals to risky situations, even if they have previously been victimized (Schreck, Stewart, & Fisher, 2006). The general theory of crime has been frequently integrated with routine activities theory, which argues that engaging in certain routine activities, where one is surrounded by motivated offenders and capable guardianship is lacking, can create victimization. That is, it is not just self-control that varies among individuals, but also their opportunities to be exposed to situations conducive to victimization. When considered together, victimization is thus explained as occurring because individuals lacking in self-control are more likely to engage in routine activities that in turn create higher risk for victimization.

To date, some research has made this connection between low self-control, risky routine activities, and victimization risks (e.g., Franklin, Franklin, Nobles, & Kercher, 2012; Holtfreter, Reisig, & Pratt, 2008; Schreck et al., 2006; Schreck, Wright, & Miller, 2002), but several potentially important types of risky routine activities have generally been treated separately from their relationship to low self-control. Two variables in particular that have been understudied in their relationship to low self-control and victimization are substance use and affiliating with delinquent others. These variables have been linked to victimization, but usually separately from low self-control (e.g., Champion et al., 2004; Messman-Moore et al., 2008; Schreck & Fisher, 2004; Schreck, Fisher, & Miller, 2004). That these variables have not been more readily linked together is surprising, given that the general theory of crime argues that substance use is one of the so-called "analogous behaviors" in which low self-control individuals engage along with acts of force and fraud, and the theory's insistence that low self-control predates and acts as a means of self-selection into delinquent peer groups, i.e. birds of a feather flock together (Gottfredson & Hirschi, 1990). Consequently, the relationships between low self-control, substance use, peer influence, and victimization need to be further explored.

The current study expands the literature on victimization by examining the interrelationships between low self-control, substance use, affiliating with delinquent peers, and their relationship to victimization. The study draws from data from a national probability sample of adolescents and uses path modeling to examine the directional relationships between low self-control, three different types of substance use, affiliations with substance-using peers, and their relationship to violent victimization. In doing so, the paper aims to 1) simultaneously estimate the direct and indirect relationships between these variables, in order to determine which variables most strongly shape violent victimization, and 2) better capture the true effects between substance use and affiliating with substance-using peers, to address the controversy and mixed findings in the criminological literature on the causal direction of the peers-delinquency relationship (e.g., Matsueda & Anderson, 1998; Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1994). Finally, this focus on a unified self-control-routine actitivies model represents a further step toward theoretical integration, which is an emerging topic in modern criminology (Agnew, 2003, 2011).

Explaining Victimization

Low self-control, substance use, and affiliating with delinquent peers have been tied to victimization, but often in isolation from one another. The following sections review

the theoretical and empirical literatures on low self-control and risky routine activities, and how they relate to victimization, separately and together.

Low Self-Control

Gottfredson and Hirschi's general theory of crime posits that criminal and delinquent behaviors can be most readily explained by a lack of self-control. While the theory was originally offered as one of offending, it has become popular for explaining risks for victimization, as well. Schreck (1999) posited that, much like substance use and affiliating with delinquent peers, victimization could be a "crime-analogous" outcome. Low self-control can directly shape victimization in various ways. The selfishness and belligerence that are often the markers of low self-control can lead to disagreements with others, and thus perhaps physical altercations. The lack of foresight, unwillingness to plan ahead, and impulsivity that individuals low in self-control often display may make them easier targets for various types of interpersonal criminal victimization, because the individual sets themselves up as a "soft target" through their behaviors. Individuals low in self-control have a preference for risky behaviors and activities, many of which are the exact kinds of activities that routine activities theory would argue heighten one's risks of becoming a crime victim. These kinds of activities can include involvement in delinquent and criminal behaviors, substance use, and spending time with delinquent others. To date, the research literature is clear that low self-control is a risk factor for victimization (see Piquero, MacDonald, Dobrin, Daigle, & Cullen, 2005; Pratt, Turanovic, Fox, & Wright, 2014; Schreck, 1999; Schreck et al., 2002; Stewart, Elifson, & Sterk, 2004).

Substance Use and Delinquent Peer Affiliation as Risky Routine Activities

Cohen and Felson's (1979) routine activities theory argues that individuals place themselves at risk for victimization through their everyday behaviors. Substance use and affiliating with delinquent peers are two such behaviors that can create risks for experiencing victimization. An individual's substance use creates risks for victimization because it can expose one to criminals via drug markets, and the pharmacological effects of drugs and alcohol can make one a more vulnerable target for harm (Kodjo, Auinger, & Ryan, 2004). Spending time with delinquent peers is risky because it means one is frequently exposed to motivated offenders, and it is these peers within their social networks who are often the same people more likely to victimize vulnerable individuals (Papachristos & Wildeman, 2014).

While routine activities theory has not often been specifically cited in much of this literature, the view that the pharmacological effects of drugs and alcohol make one vulnerable to victimization has been the source of much research (see Abbey, 2002; Felson & Burchfield, 2004; Krebs, Lindquist, Warner, Fisher, & Martin, 2009; Messman-Moore, Coates, Gaffey, & Johnson, 2008; Slaughter, 2000). A limited amount of research has identified substance use as a risk factor for victimization through the lens of routine activities theory. In a sample of 8th and 10th graders, Windle (1994) found that substance use correlated with victimization. Cass (2007) found in a sample of college students that drug use predicted risks for sexual assault. Iratzoqui (2015) proposed a model of victimization across the life-course that integrated

general strain and routine activities theory, and found that binge drinking and illicit drug use significantly predicted later victimization.

Much like with substance use, affiliating with delinquent peers has been described as a risky routine activity and tied to victimization. From the perspective of routine activities theory, spending time with delinquent peers may in part be risky because much of juvenile offending is done in a group context (see Reiss Jr, 1988; Reiss Jr & Farrington, 1991), and this offending may increase risks for victimization. Research has backed up these theoretical expectations about the relationship between peer delinquency and victimization (see Fox, Lane, & Akers, 2013; Peterson, Taylor, & Esbensen, 2004; Schreck & Fisher, 2004; Schreck et al., 2004; Schreck et al., 2002; Taylor, Peterson, Esbensen, & Freng, 2007).

Low Self-Control, Substance Use, and Delinquent Peer Affiliation

The research cited above demonstrates that low self-control and the risky routine activities substance use and affiliating with delinquent peers all increase risks for victimization. There is also some evidence that the variables themselves are related. This makes sense, since the central variable of the general theory of crime, low self-control, is hypothesized to be correlated with engagement in risky behaviors that put one in contact with motivated offenders, and potentially make one a softer target more vulnerable to victimization. Substance use and affiliating with delinquent peers both fit this mold of risky behaviors that should be shaped by having low levels of self-control. Substances like alcohol and marijuana are attractive to a person low in self-control because they provide immediate, short-term pleasure. That using these substances may be illegal, either due to age or overall status of the substance, only adds to the thrill. Research to date, whether or not it has specifically cited the general theory of crime, has supported the notion that low self-control increases substance use (see Dawe & Loxton, 2004; Hwang & Akers, 2003; Sussman, McCuller, & Dent, 2003; Wills, Walker, Mendoza, & Ainette, 2006; Wills, Ainette, Stoolmiller, Gibbons, & Shinar, 2008). Additionally, self-control theory claims that individuals low in self-control have unstable peer relationships, that they self-select into like-minded peer groups, and that the impulsivity and self-centeredness exhibited by those low in self-control cause them to be rejected by their conventional peers. This claim would suggest that low self-control is a cause of delinquent peer affiliations, and indeed, research has suggested exactly that (see Chapple, 2005; Cheung & Cheung, 2008; Holt, Bossler, & May, 2012; Longshore, Chang, Hsieh, & Messina, 2004; Longshore, Chang, & Messina, 2005).

In sum, research shows that low self-control, substance use, and affiliating with delinquent peers all increase the likelihood of victimization, and that low self-control increases involvement in risky routine activites, including substance use and delinquent peer affiliations. Several studies to date have drawn in some of these elements, but left some nuances of these relationships unclear, including (1) the full causal relationship between self-control and victimization, and (2) the reciprocal relationship between self and peer delinquent behavior, and specifically self and peer substance use (D'Amico & McCarthy, 2006; Simons-Morton & Chen, 2006; Wills & Cleary, 1999). This omission is problematic given the relatively small amount of research and theorizing that has combined expectations from the general theory of crime and routine activities theory to offer a compelling argument for how the two theories complement each other. An

important step, then, is to link the theoretical and empirical research literature by drawing these variables together into an integrated model to explain victimization, and by examining the direct and indirect relationships in which variables like self-control, substance abuse, and delinquent peers may play roles in increasing the risk for victimization at different points in time.

The Current Study

The current study presents a more nuanced integrated low self-control/routine activities model examining the various relationships between low self-control, substance use, and substance-using peers, and victimization. This model and the presented analyses address gaps in the extant literature in several ways. First, the current study focuses specifically on risky behaviors related to substance use. Since those low in self-control are attracted to substance use, they may be especially attracted to peers who also engage in these behaviors. Second, the current study addresses potential reciprocal effects between one's own delinquency and peer delinquency. Given the controversy in the criminological literature about the causal ordering of these variables (e.g., Matsueda & Anderson, 1998; Thornberry et al., 1994), the models employed here will examine the relationship between individual and peer substance use in both directions to identify which relationship is stronger. Third, the theoretical model underlying the present analysis represents an attempt at theoretical integration in the literature on victimization. Lastly, the analyses utilize the Mplus software to assess the proposed mediated relationships, which allows for the measurement of direct, indirect, and reciprocal effects between the various variables to identify the most empirically supported model of victimization.

The current study is guided by two research questions:

1) Do low self-control and routine activities related to substance use provide an integrated explanation of victimization?
2) Does individual or peer substance use more strongly mediate the relationship between low self-control and victimization risk?

Data and Methods

The National Longitudinal Study of Adolescent to Adult Health (Add Health) is a longitudinal panel study of a nationally representative, school-based probability sample of youth who were in grades 7–12 in the United States beginning in 1994–95 (Udry, 2003). Add Health employed cluster and systematic sampling methods to select 80 public and private high schools and 52 middle schools representative of U.S. regions, urban composition, school size and type, and ethnicity (Harris et al., 2003). Add Health first collected data with an in-school survey, then, for a randomly selected subsample, followed up with a series of in-home interviews conducted in 1994–95 (Wave I), 1996 (Wave II), 2001–02 (Wave III), and 2007–08 (Wave IV). At Wave II, Add Health did not reinterview those who were seniors in high school at Wave I, but otherwise retained the original sample. The current study utilized data from the restricted data set, which is

identical to the public-use data set but contains the full sample of respondents, and data from respondents who completed both the Wave I & II surveys, and for whom sampling weights were available ($n = 13{,}559$).[1] Table 1 provides descriptive statistics for the study variables.

Variables

Dependent Variable

Respondents were asked at Wave II four questions regarding their direct experiences with violent victimization: how often in the past 12 months they had been jumped, had a knife or gun pulled on them, were cut or stabbed, or were shot. For all four questions, the possible responses included never (0), once (1), and more than once (2). Given that very few respondents reported repeat victimization, the final *Violent Victimization WII* measure was transformed into an ordinal measure that recorded if a respondent was never (0) a victim of violence in the 12 months prior to Wave II, if they were victimized once (1), or if they were victimized more than once (2–8 recoded to 2). With this coding, 84.6% of the sample reported zero violent victimizations, 8.5% reported one violent victimization, and 6.9% reported more than one violent victimization.

Independent Variables

The key predictors of adolescent violent victimization include low self-control, substance-using peers, and substance use. The appropriate method for measuring self-control has been the source of much debate in the criminological literature (Beaver, DeLisi, Mears, & Stewart, 2009; Longshore, 1998; Longshore & Turner, 1998). While the Grasmick, Tittle, Bursik Jr, and Arneklev (1993) scale is most widely used to assess self-control, these items are not available in the Add Health data. However, Pratt and Cullen's (2000) meta-analysis revealed that the association between low self-control and antisocial outcomes is not contingent on utilizing the Grasmick et al. (1993) scale. The current study used a low self-control measure developed by Beaver et al. (2009) for use in the Add Health survey. This low self-control scale contains 19 items from both self-report and parent responses during the Wave I interviews which measure a respondent's temper, self-centeredness, attention span, and use of rational decision-making. A composite measure of *Low Self-Control* was created by summing these items, with higher scores denoting lower levels of self-control (alpha = .73). Prior research has shown that this scale has predictive validity (Beaver et al., 2009; Belsky & Beaver, 2011; Bunch, Iratzoqui, & Watts, 2018; Watts & McNulty, 2016).

While Add Health collects information on several different types of substance use, for consistency, the same types of substance use were measured for both peer and individual substance use, as available. Respondents were asked at Wave I how many of their three best friends smoked at least one cigarette per day, drank alcohol at least once a month, and smoked marijuana at least once a month. These items were summed into

[1] Missing data on the independent and control variables was handled via multiple imputation in Stata, while missing data on the dependent variable was left as missing.

Table 1 Descriptive statistics

Variables	Range	Full Sample (N = 13,559)
		Mean (SE)
Violent Victimization WII	0–2	.22 (00)
Low Self-Control	0–76	37.02 (.06)
Substance-Using Peers	0–9	2.42 (.02)
Marijuana Use	0/1	.14 (.00)
Alcohol Use	0–18	2.17 (.03)
Other illicit Drug Use	0/1	.05 (.00)
Male	0/1	.49 (.00)
White	0/1	.63 (.00)
Hispanic	0/1	.17 (.00)
Age WII	11–23	16.23 (.01)
Public Assistance WI	0/1	.10 (.00)
Maternal Warmth	5–25	22.14 (.03)
Unstructured Socializing	0–3	1.97 (.01)
Violent Victimization WI	0–4	.30 (.01)
Fighting WI	0/1	.32 (.00)

an index of *Substance-Using Peers* where higher values indicate more substance use (alpha = .76). Prior research has established the predictive validity of this measure in the Add Health sample (Beaver, Wright, & DeLisi, 2008; Watts & McNulty, 2015).

Individual substance use at Wave I was measured with three separate measures of self-reported substance use.[2] *Marijuana Use* was a single dichotomous measure indicating whether the respondent reported smoking marijuana in the past 30 days at Wave I (1 = yes). *Alcohol Use* was a global measure comprised of three measures from Wave I that asked about how often respondents drank, how often they got drunk, and how often they drank five or more drinks in a row in the past 12 months, where higher scores denoted more alcohol use (alpha = .91). *Other Illicit Drug Use* was a single dichotomous measure indicating whether the respondent reported using cocaine, inhalants, or any other illicit drug other than marijuana in the past 30 days at Wave I (1 = yes). Different forms of substance use may generate different levels of risk for violent victimization. For example, as marijuana has not been shown to make offenders prone to violence (Phillips, 2012), the drug is less representative of the illegal drug market that is more often synonymous with violence, which may structure a lower risk for victimization as compared to alcohol and illicit drug use (Kodjo et al., 2004).

[2] In the current analyses, peer substance use was measured with a composite measure of substance use, while individual substance use was captured using three separate measures. This methodology was selected for several reasons. First, prior research on Add Health has traditionally treated the peer substance use as a univariate delinquency measure. Second, the various forms of substance use tend to be correlated, such that substance-using peers may influence self substance use as a whole, rather than specific types having an effect on individual usage generally. Third, respondents' peers were only asked about certain types of substance use, which did not directly equivocate with those asked of respondents themselves; thus, the attempt here was to use the most closely equivalent questions to best capture the concept of delinquent peers via substance use.

Controls

A number of demographic controls were included in the specified paths. General controls included *Male*, *White* (0 = non-white), *Hispanic* (0 = non-Hispanic), *Age*, and one measure of socioeconomic status, *Public Assistance*. The measure of public assistance indicated whether the respondent's family was receiving any sort of public assistance, such as welfare or food stamps, at the Wave I survey (1 = yes). Research consistently shows racial and ethnic differences in violence among youth (Musu-Gillette et al., 2018), age is related to violence (Sweeten, Piquero, & Steinberg, 2013), and research has shown a correlation between socioeconomic status and violence (Rosen, Scott, & DeOrnellas, 2017).

Several theoretical controls were also included. *Maternal Warmth* measured the quality of the mother-child bond. Specifically, five items were combined that asked whether the target respondent's mother was warm and loving, how much they thought she cared about them, how close they were, whether they were satisfied with their communication, and their overall satisfaction with the relationship, with higher scores representing a stronger maternal bond (alpha = .84). Prior research has shown that parental bonds relate to both victimization and violence (Bunch et al., 2018; Iratzoqui, 2017; Watts, 2017). *Unstructured Socializing* was a single item from Wave I asking respondents how often in the past week they just hung out with friends, with possible responses from never to 5 or more times. Unstructured socializing has been shown to relate to general delinquency, substance use, and violence among youth populations (Hoeben, Meldrum, & Young, 2016; Hoeben & Weerman, 2016; Maimon & Browning, 2010; Osgood & Anderson, 2004). Prior violent victimization was controlled by combining responses to the same four items at Wave I, measured as a count of how many of the four types of victimization they experienced. Lastly, *Fighting* at Wave I indicated whether the respondent reported being in a physical fight in the 12 months prior to Wave I (1 = yes). Drinking and illicit drug use have been linked to violence (Kodjo et al., 2004; Swahn & Donovan, 2004), so it is important to parse out their relationships to victimization.

Analytic Strategy

The current study examined the full set of relationships between self-control, substance use, peer substance use, and adolescent violent victimization using path analysis, a form of structural equation modeling, within the MPLUS software. Path analysis is particularly suited for modeling multiple pathways between variables because it is able to estimate direct, indirect, and total effects simultaneously within a single model, to better understand the underlying causal processes.

Another reason for using path analysis in the current study is the theoretical justification for reciprocal relationships between individual and peer substance use. That is, while individual substance use may influence the substance use of peers, peer substance use may also affect individual substance use, and both of these may increase overall victimization risk (e.g., Cass, 2007; Fox et al., 2013; Iratzoqui, 2015; Schreck et al., 2004, 2002). Path analysis has the benefit of being able to estimate non-recursive models in which variables can be modeled as both exogenous and endogenous variables within a path diagram. However, one issue with the current data was that

both individual and peer substance use were captured at the Wave I survey. Typically, using measures from the same wave of data collection prevents claims of causal ordering, but the current study aimed to minimize the potential confounding effects by 1) specifying coviarances between disturbance terms as 0 within non-recursive models (see, Pekrun, Hall, Goetz, & Perry, 2014); 2) assuming self-control as a temporally stable measure as theoretically specified (i.e., Gottfredson & Hirschi, 1990, but see Na & Paternoster, 2012); 3) explicitly assuming the instrumental variable (i.e., self-control) has a larger effect on the endogenous variables (i.e., individual and peer substance use) (e.g., Hay & Forrest, 2008); and 4) using a large, nationally representative dataset like Add Health (see, Wong & Law, 1999). Thus, while not a perfect specification, the analyses assessed for causal relationships between self-control, individual and peer substance use, and victimization. The Mplus software was also employed to run the path analysis because it relies upon an direct maximum likelihood (ML) estimate to handle additional missing data on the items of interest.

Figure 1 represents the full set of relationships modeled in the path analyses, as well as the accompanying controls included within each path of the model.[3] In each series of models, the relationships between low self-control, substance use, peer substance use, and violent victimization were looked at in two ways, 1) a model where low self-control was linked to violent victimization *first* through peer substance use and *then* through personal substance use, and 2) a model where low self-control was linked to violent victimization *first* through personal substance use and *then* through peer substance use. With this specification, the reciprocal relationships between self-delinquency and peer delinquency can be assessed and compared, to identify which relationship best supports empirically the proposed theoretical relationships.[4] Model fit for each of the final path analyses indicated good fit, with the least-fitted model well above the recommended values (RMSEA = .016; CFI = .994; TLI = .968).[5]

Results

Tables 2, 3, and 4 represent the different path analyses that empirically modeled the direct and indirect relationships between low self-control, individual and peer substance use, and violent victimization. While Mplus reports both unstandardized and standardized coefficients, standardized coefficients are preferred, because they allow for the comparison of effects across models. All coefficients

[3] Because Mplus automatically specifies covariances between all variables, the battery of controls did not need to be the same for each path. This specification avoids overidentifying the model (i.e., by including unnecessary syntax), and the model was identical to a model in which all of the covariates would have been included for both paths of the model.

[4] In all models, both the paths linking low self-control to individual substance use and victimization, as well as those linking low self-control to peer substance use and victimization, were specified. Because Mplus allows simultaneous estimation, the reciprocal relationships were held to 0, to isolate individual effects.

[5] The models were estimated using weighted least squares estimation, to enable the ability to measure model fit in models with categorical outcomes. Model fit is also typically assessed with R^2, which also serves to demonstrate a variable's influence in explaining variability in the dependent variable. Due to the ordinal nature of the endogenous variable in the path analyses, there is no equivalent measure of R^2, though pseudo R-squared measures can replace its role as a measure of goodness-of-fit, and are reported for each full model (Ordinal Logistic Regression: Mplus Data Analysis Examples).

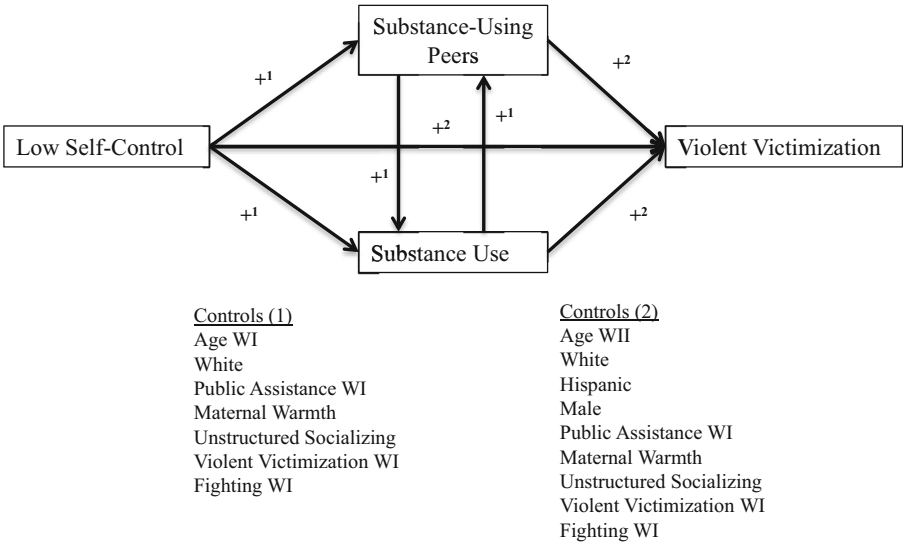

Fig. 1 Empirical model

reported in Tables 2, 3, and 4 represent the standardized effects of each direct and indirect relationship between the variables.

In Table 2, both individual marijuana use and peer substance use were influential in explaining violent victimization, both directly ($b = .116$, $p < .01$; $b = .062$, $p < .01$) and indirectly ($b = .034$, $p < .01$; $b = .062$, $p < .01$). These relationships remained statistically significant when the antecedent effect of low self-control was accounted for, though the effect size diminished ($b = .013$, $p < .01$; $b = .001$, $p < .01$). The reciprocal relationship between marijuana use and peer substance use was also significant in both directions ($b = .549$, $p < .001$; $b = .532$, $p < .01$). In the final models, while the direct relationship between low self-control and violent victimization remained statistically significant ($b = .060$, $p < .01$), the indirect relationship between low self-control and victimization was stronger following a peer to individual effect ($b = .013$, $p < .01$) than the reverse ($b = .001$, $p < .01$).

Tables 3 and 4 report the findings in which alcohol use and other illicit drug use were considered as other forms of individual substance use. Table 3 shows that both alcohol use and peer substance use played significant roles in predicting violent victimization. Both variables predicted victimization directly ($b = .029$, $p < .01$; $b = .110$, $p < .01$) and indirectly ($b = .050$, $p < .01$; $b = .014$, $p = .011$). Low self-control reduced, but not eliminated, these effects ($b = .005$, $p < .01$; $b = .013$, $p < .01$). The reciprocal relationship between alcohol use and deviant peer substance use remained, as well ($b = .457$, $p < .01$; $b = .465$, $p < .01$). However, alcohol use appeared to be more of a driving factor linking low self-control and violent victimization. In the full models, the model in which individual substance abuse preceded peer substance use better explained the indirect effect between low self-control and violent victimization ($b = .009$, $p < .01$) than the reverse relationship ($b = .003$, $p < .01$). The direct relationship between low self-control and violent victimization remained significant ($b = .070$, $p < .01$).

Table 2 The direct and indirect effects of low self-control on substance-using peers, marijuana, and victimization

	b
Direct effects on substance-using peers	
Low self-control → Substance-using Peers	.086**
Marijuana use → Substance-using Peers	.549**
Direct effects on substance use	
Low self-control → Marijuana use	.109**
Substance-using Peers → Marijuana use	.532**
Direct effects on victimization	
Marijuana use → Victimization	.116**
Substance-using Peers → Victimization	.062**
Low self-control → Victimization	.060**
Indirect effects on victimization	
Marijuana use → Substance-using Peers → Victimization	.034**
Substance-using Peers → Marijuana use → Victimization	.062**
Low self-control → Marijuana use → Victimization	.013**
Low self-control → Substance-using Peers → Victimization	.001**
Low self-control → Marijuana use → Substance-using Peers → Victimization	.001**
Low self-control → Substance-using Peers → Marijuana use → Victimization	.013**

$n = 13{,}559$

$^{*}p \leq .05$; $^{**}p \leq .01$

$r^2 = .335$

Table 4 reports the final series of models with other illicit drug use. Both illicit drug use as well as peer substance use directly ($b = .089$, $p < .01$; $b = .089$, $p < .01$) and indirectly ($b = .035$, $p < .01$; $b = .034$, $p < .01$) predicted victimization. Low self-control as an antecedent variable reduced but did not eliminate these relationships ($b = .021$, $p < .01$; $b = .018$, $p < .01$). The reciprocal relationship between individual substance use and peer substance use was also statistically significant in both directions ($b = .387$, $p < .01$; $b = .382$, $p < .01$). In the full models, low self-control had a greater indirect effect on violent victimization when illicit drug use predicted peer substance use ($b = .008$, $p < .01$) than the other way around ($b = .007$, $p < .01$), though the difference was relatively minimal. Low self-control also directly predicted violent victimization risk ($b = .058$, $p < .01$).

The distinction between the smaller and full models is both statistically and substantively significant. Statistically, the coefficient representing the effect in the full model is typically expected to be smaller, as its size represents the multiplicative effect working through low self-control, substance use, *and* substance-using peers to explain violent victimization. Thus, even though the coefficients are relatively small numerically, the fact that they remain statistically significant even within a rigorously specified model speaks to a strong relationship between low self-control, individual and peer substance use, and victimization. Yet, these effects are also substantively significant, indicating that each of these variables plays an important role in linking low self-control

Table 3 The direct and indirect effects of low self-control on substance-using Peers, alcohol, and victimization

	b
Direct effects on substance-using peers	
Low self-control → Substance-using Peers	.121**
Alcohol use → Substance-using Peers	.457**
Direct effects on substance use	
Low self-control → Alcohol use	.090**
Substance-using Peers → Alcohol use	.465**
Direct effects on victimization	
Alcohol use → Victimization	.029**
Substance-using Peers → Victimization	.110**
Low self-control → Victimization	.070**
Indirect effects on victimization	
Alcohol use → Substance-using Peers → Victimization	.050**
Substance-using Peers → Alcohol use → Victimization	.014*
Low self-control → Alcohol use → Victimization	.005**
Low self-control → Substance-using Peers → Victimization	.013**
Low self-control → Alcohol use → Substance-using Peers → Victimization	.009**
Low self-control → Substance-using Peers → Alcohol use → Victimization	.003**

$n = 13{,}559$

$^{*}p \leq .05$; $^{**}p \leq .01$

$r^2 = .328$

and victimization risk. The theoretical self-control model argues that this variable can be the single factor in explaining criminological outcomes, including victimization. Indeed, each of the relationships grew less influential once self-control was taken into account. Yet, the combined theoretical model (i.e., self-control and routine activities) provides a compelling argument that other factors can build on self-control to provide a more complete explanation of victimization risk. Both individual and peer behavior, related to substance use, can directly and indirectly increase victimization risk. Specifically, across the models, substance use and peer substance use both increase the likelihood for violent victimization, especially when substance-using youth have lower self-control.

Discussion

The current study sought to build upon the general theory of crime and routine activities literatures by examining the totality of relationships between the variables of low self-control, substance use, delinquent peers, and violent victimization using two waves of the Add Health data. The study was guided by two research questions regarding the extent of these relationships. The first research question addressed whether low self-control and routine activities related to substance use provided an integrated

Table 4 The direct and indirect effects of low self-control on substance-using Peers, illicit drugs, and victimization

	b
Direct effects on substance-using peers	
Low self-control → Substance-using Peers	.113**
Illicit drug use → Substance-using Peers	.387**
Direct effects on substance use	
Low self-control → Illicit drug use	.162**
Substance-using Peers → Illicit drug use	.382**
Direct effects on victimization	
Illicit drug use → Victimization	.089**
Substance-using Peers → Victimization	.089**
Low self-control → Victimization	.058**
Indirect effects on victimization	
Illicit drug use → Substance-using Peers → Victimization	.035**
Substance-using Peers → Illicit drug use → Victimization	.034**
Low self-control → Illicit drug use → Victimization	.021**
Low self-control → Substance-using Peers → Victimization	.018**
Low self-control → Illicit drug use → Substance-using Peers → Victimization	.008**
Low self-control → Substance-using Peers → Illicit drug use → Victimization	.007**

$n = 13{,}559$

$^{*}p \leq .05$; $^{**}p \leq .01$

$r^2 = .333$

explanation of victimization. The current research suggests yes. In all models, low self-control both directly and indirectly predicted violent victimization. Both measures of routine activities, individual and peer substance use, also predicted victimization. However, both measures of individual and peer substance use frequently demonstrated stronger direct effects than low self-control on victimization across models. The consistency of these findings even within the full models suggests that these variables are more likely to work in concert, rather than competing against one another, to provide a more complete explanation of victimization. This finding expands on earlier research, particularly by Schreck et al. (2004) and Schreck et al. (2006), and suggests that the general theory and routine activities theory should be considered complementary and not independently in their explanation of victimization. Future research should continue to focus on theoretical integration in explaining victimization.

The second research question asked whether individual or peer substance use more strongly mediated the relationship between low self-control and victimization risk. The results suggest mixed findings. Both individual substance use, including marijuana, alcohol, and other illicit drug usage, and peer substance use played similar roles in 1) directly predicting higher victimization risk; 2) indirectly predicting victimization risk due to lower self-control; and 3) indirectly predicting victimization risk through lower self-control. The reciprocal relationship between individual and peer substance use was also supported between peer substance use and all forms of individual substance use.

Yet, individual and peer substance use varied in their strength in explaining victimization across models. In two of the models, individual substance use had a larger effect on peer substance use than the other way around. Thus, the question of whether peer or self behavior "comes first" is still under debate (McGloin & Thomas, 2019).

The current research study did present certain limitations in its findings. The Add Health data present some issues with measurement that are not consistent with the theoretical concepts and arguments of the general theory of crime and routine activities theory. First, it should be reiterated that the current measure of low self-control is not ideal, as it deviates from the standard and widely accepted Grasmick et al. (1993) scale of self-control, and is missing some of the core parts of the concept of self-control as described by Gottfredson and Hirschi (1990), namely risk taking. Future research would do well to examine similar models with a more traditional scale of low self-control that other sources of data may be able to provide. Similarly, the model here is limited to examining violent victimization because Add Health does not contain measures concerning property victimization at Wave II. In addition, the sole consideration of substance use as an individual and peer measure of delinquency leaves open the possibility that other measures of delinquency may play different or stronger roles in influencing the relationship between self-control and victimization.

Finally, the current study does raise limitations of the Add Health data in definitively establishing causal ordering of the individual and peer substance use variables. Given that the general theory of crime strongly suggests that self-control should have precedence in the model and predate the other independent variables, it would be preferable to have self-control assessed earlier in the life-course, and at a time point before the measures of individual and peer substance use to increase confidence in causal ordering. While the use of path analysis and the ability to account for the reciprocal relationship between individual and peer substance use does help to isolate the possible causal relationship between the two variables in each direction, it is an imperfect solution. Estimating a non-recursive model with cross-sectional data can be aided by a larger sample size, as is the sample available in Add Health, but any evidence of statistically significant findings can also be a function of the larger sample size. Consequently, a causal relationship without variables captured at multiple time points is still uncertain, so future research should utilize data that has these measures available.

The findings from the current study, however limited, do present some clear implications for theoretical and policy development. From a theoretical perspective, these results support the growing literature that argue for the theoretical integration of the general theory of crime with other theoretical models. In the current study, the best-fitting models, and those with the strongest overall effects, were the models in which *all* theoretical variables were considered in modeling risk for violent victimization. One recommendation for further research is to explore the full extent by which self-control and routine activities can be integrated with other theories to provide the fullest explanation of victimization.

From a policy standpoint, the finding that individual propensities and behavior (e.g., self-control, substance use) play more a role in predicting victimization than our associations should guide policy development in several ways, including prevention and response. For example, because individual substance use consistently predicted victimization, policy geared towards substance abuse prevention may have a long-term effect on victimization risk. Wright, Caspi, Moffitt, and Silva (1999) suggest public

policy should not attempt to rehabilitate, but only work to prevent future offenders in childhood when psychological characteristics shaping self-control can still be affected. Consequently, behavioral therapies geared towards substance abuse prevention, particularly with efforts like family interventions, may do more to address the potential for delinquency onset as well as continuation throughout the life course (Vermeulen-Smit, Verdurmen, & Engels, 2015). Given evidence that substance abuse is a particular type of delinquency that is more likely to persist throughout the life course, targeted prevention efforts in this area may be more effective at reducing crime long-term than general delinquency prevention efforts (Arnett, 2005).

Additionally, policy should also focus on refining the receipt of victim services to reconcile victim's offending histories in their program outreach and programming. Evidence suggests that both substance use, which can be a criminal violation depending on the substance and age of user, and victimization are likely to continue over the life course, leaving individuals "permanently vulnerable" (Finkelhor, Ormrod, & Turner, 2007). The continuation of substance use may also be likely to bring victims to the attention of the criminal justice system, who would consider them offenders. Yet, receipt of social services often relies on victims not having any criminal history. Many social services limit services to victims who do not have a criminal history or if there was evidence they "contributed to their own harm", which includes any evidence of participation in illegal behavior, such as whether they were under the influence at the time of victimization (Newmark, Liner, Bonderman, & Smith, 2003; Rutledge, 2011). These restrictions are often written explicitly into state statutes (Miers, 2014). Thus, one effort may be to focus on social service changes within this realm that would better reflect the victim/offender overlap in how criminal justice resources are allocated to crime victims.

In conclusion, the results from the current study suggest that, in terms of explaining victimization, the relationship between the general theory of crime and routine activities theory deserves further exploration. Variables from both theories can potentially be merged to explain victimization, and this kind of modeling needs to be expanded to include other risky routine activities and types of victimization, as well as variables from other theoretical paradigms.

APPENDIX: Items for Scaled Variables

Low Self-Control

1. All things considered, how is your child's life going?
2. You get along well with your child.
3. You can trust your child.
4. Does your child have a bad temper?
5. You never argue with anyone.
6. When you get what you want, it's usually because you worked hard for it.
7. You never criticize other people.
8. Difficult problems make you very upset.
9. When making decisions, you usually go with your "gut feeling" without thinking too much about the consequences of each alternative.

10. When you have a problem to solve, one of the first things you do is get as many facts about the problem as possible.
11. When attempting to find a solution to a problem, you usually try to think of as many different ways to approach the problem as possible.
12. When making decisions, you generally use a systematic method for judging and comparing alternatives.
13. After carrying out a solution to a problem, you usually try to analyze what went right and what went wrong.
14. You feel socially accepted.
15. Do you have trouble getting along with your teachers?
16. Do you have trouble paying attention in school?
17. Do you have trouble keeping your mind focused?
18. Do you have trouble getting along with other students?
19. Do you have trouble getting your homework done?

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