

# “Can’t Stop, Won’t Stop”: Self-Control, Risky Lifestyles, and Repeat Victimization

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## Abstract

*Objectives* Drawing from lifestyle-routine activity and self-control perspectives, the causal mechanisms responsible for repeat victimization are explored. Specifically, the present study investigates: (1) the extent to which self-control influences the changes victims make to their risky lifestyles following victimization, and (2) whether the failure to make such changes predicts repeat victimization.

*Methods* Two waves of panel data from the Gang Resistance Education and Training program are used ( $N = 1,370$ ) and direct measures of change to various risky lifestyles are included. Two-stage maximum likelihood models are estimated to explore the effects of self-control and changes in risky lifestyles on repeat victimization for a subsample of victims ( $n = 521$ ).

*Results* Self-control significantly influences whether victims make changes to their risky lifestyles post-victimization, and these changes in risky lifestyles determine whether victims are repeatedly victimized. These changes in risky lifestyles are also found to fully mediate the effects of self-control on repeat victimization.

*Conclusions* Findings suggest that future research should continue to measure directly the intervening mechanisms between self-control and negative life outcomes, and to conceptualize lifestyles-routine activities as dynamic processes.

**Keywords** Self-control · Risky lifestyles · Routine activity theory · Repeat victimization

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## Introduction

Criminal victimization is associated with a wide array of negative outcomes, both personally and socially. The consequences of crime and violence can manifest in the loss of property or lost wages for victims (MacMillan, 2000; Miller et al. 1996), in personal injury and mental distress (MacMillan 2001; Moore et al. 1994), and in various criminogenic behaviors including drug use and offending (Agnew 2002; Jennings et al. 2012; Piquero et al. 2005). And while victimization on its own is harmful enough to individuals, one of the most consistent and well-known findings to emerge out of this body of work concerns the phenomenon of repeat victimization (Farrell 1995; Tseloni and Pease 2003; Pease, 1998; Sparks 1981). Specifically, criminal victimization occurs disproportionately among a few individuals in a given population, meaning that those who are victimized once are more likely to be victimized again (Fagan and Mazerolle, 2011; Farrell and Pease 1993; Finkelhor et al. 2007; Gottfredson 1984). Accordingly, for all of the problems experienced by victims of crime, given the accumulation of negative consequences it is safe to assume that things may be worse for repeat victims.

The problem is that, despite the influential body of literature documenting the frequency and distribution of victimization within a population, we still do not have a firm understanding as to *why* certain victims are more likely to be repeatedly victimized over others (Daigle et al. 2008; Outlaw et al. 2002; Schreck et al. 2006). The explanation most commonly set forth is provided by routine activity and lifestyle theories, which holds that those who experience repeat victimization are more likely to participate in “high-risk” activities (e.g., substance abuse or violence)—behaviors that tend to occur in the absence of capable guardianship and in the company of motivated offenders (Cohen and Felson 1979; Forde and Kennedy 1997; Hindelang et al. 1978; Maxfield 1987; Miethe and Meier 1990). Nevertheless, while routine activity and lifestyle approaches have received considerable empirical support in the context of repeat victimization research (Lauritsen and Quinet 1995; Miethe et al. 1990; Wittebrood and Nieuwebeerta 2000), such explanations cannot sufficiently account for individual *variation* in repeat victimization. Put simply: not all victims become repeat victims and, given the current state of the literature, we are not really sure why that is (Averdijk 2011; Fisher et al. 2010).

What is missing from a more comprehensive theoretical explanation of repeat victimization? We argue here that explaining the variation between two types of victims (i.e., those who experience repeat victimization and those who do not) requires the consideration of their respective levels of self-control (Gottfredson and Hirschi, 1990; Schreck et al. 2006). In particular, individuals with low self-control are impulsive and stubborn, and tend to find the kinds of risky activities typically associated with victimization to be a lot of fun (Forde and Kennedy 1997; Higgins and Tewksbury 2007; Reisig and Pratt 2011). Since those with low self-control will have a tendency to pursue short-term, immediate pleasure, victims with low self-control may be unable or unwilling to make meaningful changes to their high-risk (yet enjoyable) lifestyles after being victimized (Hay and Evans 2006; Schreck et al. 2006; Turanovic and Pratt 2012). And by continuing to take part in such risky behaviors, victims with low self-control may be those most likely to experience repeat victimization.

To address these issues in the context of repeat victimization, two waves of adolescent panel data from the national evaluation of the Gang Resistance Education and Training program (Esbensen 2003) are used to examine: (1) whether self-control influences whether victims alter their risky lifestyles post victimization, and (2) whether those who continue to engage in risky behaviors are more likely to experience repeat victimization. In examining

these questions, we include direct measures of changes to various risky lifestyles and we estimate two-stage maximum likelihood models to explore the effects of self-control and changes in risky lifestyles on repeat victimization. In doing so, we continue the line of work integrating lifestyle-routine activity and self-control perspectives with the broader purpose of specifying the causal mechanisms responsible for repeat victimization.

### Lifestyle-Routine Activity Theory and Repeat Victimization

Theories of victimization typically assume that individuals are differentially exposed to crime and violence by virtue of their social position, geographic conditions, and their own actions (MacMillan 2001). Lifestyle theory, for instance, as put forth by Hindelang et al. (1978), proposes that status characteristics (e.g., age, sex, race) are associated with certain role expectations that result in routine behavioral patterns or lifestyles. Those who spend more of their time differentially exposed to “high risk times, places, and people” (particularly in public places at night and among strangers) have greater exposure to potential offenders and are therefore at greater risk to be victimized (Hindelang et al. 1978:245). In a similar vein, routine activity and opportunity perspectives suggest that victimization is determined by individuals’ exposure and proximity to potential offenders, their levels of guardianship against victimization, and their attractiveness as targets (Cohen and Felson 1979; Cohen et al. 1981, Meithe and Meier 1990; Skogan and Maxfield 1981). In the context of violence, guardianship and attractiveness typically refer to the actions of victims that hinder their ability to defend themselves against an attacker (e.g., drug and alcohol use), or that increase their suitability for victimization (e.g., aggressive or belligerent behavior) (Esbensen and Huizinga 1991; Spano et al. 2008; Lauritsen et al. 1991). As such, according to both lifestyle and routine activity perspectives, behaviors that are “risky” (i.e., violent, criminal, or deviant) should increase the likelihood of victimization (Burrow and Apel 2008; Gover 2004; Mustaine and Tewksbury 1998; Sampson and Lauritsen 1990; Schreck et al. 2008; Smith and Ecob 2007; Taylor et al. 2008).

Victimization, in turn, has a number of negative consequences. Aside from financial damages and bodily injury, victimization has been associated with emotional troubles, depression, shock, and insecurity, as well as anger and fear (Agnew 2002; Boney-McCoy and Finkelhor 1995; Norris and Kaniasty 1994; Shapland and Hall 2007). Given these adverse effects, scholars have argued that victims of violence should be compelled to make meaningful *changes* to their behaviors in an effort to avoid being victimized again in the future—what Hindelang et al. (1978:129) deemed the “once bitten twice shy” hypothesis. Despite these arguments, research has been inconclusive regarding the extent to which victims successfully alter their routine activities and lifestyles post-victimization to affect the likelihood of future victimization (Averdijk 2011; Fisher et al. 2010; Miethe et al. 1990). Studies have found victimization to be associated with certain changes in broader opportunity structures, such as residential turnover following a victimization incident (Dugan 1999; Xie and McDowall 2008). Nevertheless, studies that treat individual routine activities and lifestyles as dynamic, shifting processes that can affect the likelihood of repeat victimization are rare in the literature.

As but one example, Miethe et al. (1990) examined individual patterns in lifestyles-routine activities over two waves of panel data and found that the odds of being repeatedly victimized were highest among persons who continued to engage in risky activities. Specifically, their results indicated that victimization was explained largely by “changes and stability in lifestyles over time” (Miethe et al. 1990:367), and that victims who

consistently engaged in frequent nighttime activities outside of the household were most likely to be victimized again. More recently, Averdijk (2011) examined the impact of victimization on individual changes to routine activities such as shopping and evenings away from home. The results of this study demonstrated that violent victimization was associated with decreases in these activities, but that changes in shopping and frequency of evenings away from home did not affect the likelihood of experiencing subsequent victimization—a finding in opposition to theoretical expectations. Averdijk's work is important in that it extends the work of Miethe et al. (1990) and attempts to identify processes responsible for repeat victimization. Due to data limitations, however, Averdijk (2011) was unable to obtain more detailed indicators of routine activities or to account for respondents' participation in deviant or criminal behaviors that may have served as more robust determinants of victimization (Lauritsen et al. 1991, 1992; Lauritsen and Quinet 1995).

In sum, although prior research has not been exhaustive, the conclusions reached by these studies suggest that victimization results in changes in individual lifestyles and routine activities, and that such changes affect the risk of further victimization. Questions still remain, however, as to why some victims continue to engage in the types of high-risk activities that increase their chances of being victimized again. So while those who are not repeatedly victimized might be more likely to change their risky behavioral patterns post-victimization, *why* they do so (while others do not) is still unclear (Ellingworth et al. 1995; Farrell 1992, 1995; Gottfredson 1981; Menard and Huizinga 2001).

### Self-Control and Risky Lifestyles

As Schreck et al. (2006) originally hypothesized, those who are victimized repeatedly (versus those who are not) may have relatively lower levels of self-control. According to Gottfredson and Hirschi (1990), those who lack self-control tend to dislike settings that require discipline, supervision, or other constraints on their behavior. Furthermore, individuals with low self-control are not only more likely to engage in risky behaviors, but they tend to do so *stubbornly and persistently*, with disregard for the consequences these acts may bring (Schreck 1999; Reisig et al. 2009; Pratt and Cullen, 2000). Such individuals are unlikely to consider how their actions may affect others, and they would typically spend little time contemplating how engaging in such activities might put them at risk to be harmed in the future.

Rooted in this conceptualization, self-control has emerged as one of the most important predictors of criminal victimization—a body of research inspired largely by Schreck's (1999) contribution. Schreck (1999) extended and reformulated Gottfredson and Hirschi's (1990) theory of self-control into a theory of vulnerability, arguing that those with low self-control differentially place themselves in dangerous situations and are less likely to take the precautions necessary to avoid being a victim of crime.<sup>1</sup> Support for Schreck's (1999) work has been widespread, and while this area of research is still relatively new, low

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<sup>1</sup> Schreck's (1999) argument could be viewed as an integration of the common dichotomy of heterogeneity versus state dependence explanations of victimization (see Lauritsen and Quinet 1995; Tseloni and Pease 2003; Wittebrood and Nieuwbeerta 2000). And although choosing one set of labels over another is somewhat arbitrary (Nagin and Paternoster 2000), we find Schreck's use of the terms self-control and opportunity to simply be more useful in the present context because it is more consistent with the broader literature on victimization and repeat victimization.

self-control has been found to be among the strongest predictors of victimization across a variety of contexts and in many forms, even when controlling for other robust criminogenic risk factors (Baron et al. 2007; Fox et al. 2009; Higgins et al. 2009; Holtfreter et al. 2008, 2010; Kerley et al. 2009; Piquero et al. 2005).

In light of strong and consistent support for the relationship between self-control and victimization, it is important to note that prior research has not found routine activity and lifestyle factors to fully mediate the effect of self-control on victimization, as Schreck's (1999) original specification might seem to suggest. Instead, self-control has been found to exert both direct *and* indirect effects on victimization. For instance, associating with deviant peers and engaging in risky behaviors (such as offending, substance use, and spending time in unsupervised and unmonitored social activities) have also been found to increase the probability of victimization, independent of one's level of self-control (Franklin 2011; Schreck et al. 2002; Stewart et al. 2004).

Although low self-control and risky activities are unmistakably important predictors of victimization (Baron, 2003; Clodfelter et al. 2010; Evans et al. 1997; Forde and Kennedy 1997; Kennedy and Forde 1990), few studies have simultaneously assessed these concepts in the context of repeat victimization (see Averdijk and Loeber 2012). Schreck et al. (2006) were the first to examine whether individuals with low self-control were at an increased risk of experiencing repeat victimization, and whether self-control influenced the relationship between prior victimization and participation in risky lifestyles (i.e., respondents' delinquency and friendships with delinquent peers). The findings by Schreck et al. (2006) suggested that individuals with low self-control had an increased risk of experiencing repeat victimization, and that those with low self-control were likely to engage in risky lifestyles after being victimized.

In establishing the foundation for assessing the relationship between self-control and repeat victimization, Schreck et al. (2006) generated several opportunities for future research to build upon their findings. Most importantly, the authors hypothesized that "the presence of low self-control in an individual would be associated with a lessened likelihood that one would *make changes* in lifestyles or friendships in response to victimization" (Schreck et al. 2006:325, emphasis added). This is an insightful statement, yet Schreck et al. (2006) did not measure these risky lifestyles as changes in their study. They were instead treated as static indicators of risky lifestyle patterns in a subsequent wave of data that were then used to predict later victimization. We see this distinction as vital to a theoretical understanding how self-control and risky activities form the pathway between victimization and repeat victimization. To be sure, we agree with Schreck et al.'s (2006) assessment that the relationship between self-control and changes in risky lifestyles is fundamental to an understanding of repeat victimization. Nevertheless, if the *theory* underlying repeat victimization specifies the importance of changes to high-risk behaviors (which it does), we feel that it is equally important that the *measures* of those theoretical constructs reflect changes as well (which they do in the present study).

## Current Focus

Collectively, the body of work discussed above reflects a long-standing concern in criminology regarding explanations for repeat victimization. Although considerable ground-work has been laid, there remains much to be clarified regarding the causal mechanisms responsible for repeat victimization. Accordingly, the current study has two primary

objectives. First, we investigate the extent to which victims' levels of self-control explain changes to their risky lifestyles post-victimization. Specifically, we argue that individuals with low self-control may be more likely to engage persistently in risky activities after being victimized since they are less likely to consider the harmful costs of their actions or to see beyond the immediate thrills that such behaviors provide. Second, we test whether repeat victimization is the consequence of changes victims make (or do not make) to their risky lifestyles. Given that risky behaviors reduce capable guardianship and place individuals in the company of motivated offenders, we hypothesize that victims who are unable or unwilling to stop engaging in these activities will be more likely to be victimized repeatedly. By attempting to uncover the causal mechanisms through which self-control and risky lifestyles operate, our broader purpose is to establish a theoretically-informed and empirically-supported understanding of the nature of repeat victimization.

## Methods

### Data

This research uses two waves of panel data from the fifth stage of the national evaluation of the Gang Resistance Education and Training (GREAT) study (1995–1999) (Esbensen, 2003). Although the primary purpose of collecting this data was to evaluate the GREAT program, there are few longitudinal datasets that can offer theoretically-relevant measures with which to explore self-control and repeat victimization. The initial data collection (wave one: 1995) sampled over three thousand sixth and seventh graders attending 22 schools in six cities: Philadelphia (PA), Portland (OR), Phoenix (AZ), Omaha (NE), Lincoln (NE), and Las Cruces (NM).<sup>2</sup> These cities represent a variety of contexts in terms of city size and location, and thus capture a diverse group of students attending public schools in a variety of environments (Esbensen, 2003). The third and fourth waves of panel data are used (referred to as time 1 and time 2 throughout), since these particular waves contain certain routine activity and lifestyle indicators that were not captured in prior waves. Youth included in the current study are primarily ninth and tenth graders, ranging in age from 12 to 15 at time 1.<sup>3</sup> Response rates for each of the waves used are 86 and 76 %, respectively (Esbensen, 2003), and sample attrition and missing data reduced the sample

<sup>2</sup> Sample demographic characteristics of age, gender, and race are distributed similarly across all six cities. On average, however, respondents in Portland were slightly younger and Philadelphia contained a higher proportion of Black respondents relative to other cities. Principal investigators caution that these data are not a random subsection of adolescents. For a more detailed description of the GREAT program's methodology and data collection procedures, see Esbensen et al. (2001).

<sup>3</sup> As some may argue, a young adolescent sample may not be ideal to study the changes victims make to their lifestyles post-victimization. We recognize that such youths likely have less opportunity to restructure their behavioral routines than do older teenagers or adults. Nevertheless, a sufficient degree of variation is present across all measures of lifestyle changes from time 1 to time 2, and patterns involving self-control, changes in risky lifestyles, and repeat victimization occur in theoretically expected directions. Like others who have used the GREAT data to test general theoretical propositions involving self-control and victimization before us (e.g., Agnew et al. 2011; Jennings et al. 2010; Schreck et al. 2006), we deem our use of these data appropriate but recognize that we may be providing a conservative test of theory, since youth are unlikely to possess boundless autonomy.

for our analysis to 1,370 individuals.<sup>4</sup> We place the majority of empirical focus on a subsample of all respondents who reported being victims of violence at time 1 ( $n = 521$ ).

### Selection Variable

The selection variable, *victimization*, is a dichotomous construct reflecting whether each individual was a victim of one or more of the following violent acts during the 6 months prior to the time 1 interview: (1) “hit by someone trying to hurt you;” (2) “attacked by someone with a weapon or force to get money or things from you,” and; (3) “attacked by someone with a weapon or by someone trying to seriously hurt or kill you” (1 = victim, 0 = not a victim).<sup>5</sup> Principal components analysis confirmed that these items are unidimensional ( $\lambda = 1.97$ , all factor loadings exceed .66) and are associated with a single latent construct. Approximately 37.8 percent of the sample ( $n = 521$ ) reported being a victim of violence, and these victims comprise our subsample of interest for the analyses assessing changes in lifestyles and repeat victimization. Summary statistics for variables included in the multivariate analyses are provided in Table 1.

### Dependent Variable

The primary dependent variable of interest, *repeat victimization*, indicates whether those who were victimized at time 1 were victimized again at time 2. Specifically, repeat victimization reflects whether victims experienced subsequent violent acts (i.e., physical assault, robbery, and assault with a weapon) during the 6 months prior to the time 2 interview. Response categories for repeat victimization are fixed along a scale ranging from 0 (not victimized) to 5 (victimized 5 or more times). Principal components analysis demonstrated that the three survey items used to construct repeat victimization are unidimensional ( $\lambda = 1.75$ , all factor loadings exceed .74). Approximately 54.5 % of those who reported having been victimized at time 1 also reported subsequent victimization at

<sup>4</sup> Cases without complete victimization information at time 1 and time 2 were excluded in addition to cases containing implausible or extreme responses. Missing data due to item nonresponse on other key variables were handled using the multiple imputation suite (*mi impute*) available in Stata 12.0 ( $m = 20$  imputations). Multiple imputation is a well-established approach to dealing with missing data (Acocck 2005; Allison, 2000; Carlin et al. 2008; Rubin 1987; Schafer 1997), and the imputation model was specified using all variables in the present study (Royston 2004). Prior to imputation, approximately 1.82 percent of the 79,460 cells in the data file used in the present study contained missing values. Imputing the data allowed us to retain approximately 23 percent of our sample that would have otherwise been eliminated via listwise deletion. It is important to note that previous studies have reported that individuals lost after wave one in the GREAT data demonstrate higher levels of victimization and delinquency than those who participated in later waves (Agnew et al. 2011; Schreck et al. 2006), and that item nonresponse rates in the GREAT dataset have been shown to be higher among those with lower levels of self-control (Watkins and Melde, 2007). As a result, the findings reported below may represent conservative estimates since variation in the “tails” of the distributions of key variables of interest—which may otherwise serve to inflate the relationships of theoretical interest (particularly the relationships surrounding victimization, self-control, and risky lifestyles)—has been somewhat truncated. In using the imputed data, however, the possibility of making such an inferential error is minimized considerably over simple listwise deletion methods for missing values.

<sup>5</sup> We recognize that other forms of non-violent victimization (e.g., theft) are also relevant to the study of repeat victimization (Averdijk and Loeber 2012; Farrell et al. 1995; Tseloni and Pease 2003). Although no victimization experience is trivial, in the present study we focus solely on violent, interpersonal victimization, and specifically on those types of violence that are associated with participation in risky lifestyles (Schreck et al. 2006; Stewart et al. 2004). Given the severity of violent victimization (MacMillan 2001), we are justified in assuming that many victims will feel compelled to make lifestyle changes to try and avoid being victimized again in the future.

**Table 1** Summary statistics

	Full sample ( $N = 1,370$ )		Victim subsample ( $n = 521$ )		
	Mean or %	SD	Mean or %	%	SD
<i>Selection variable</i>					
Victimization	38 %	.49	100 %		–
<i>Dependent variable</i>					
Repeat victimization	–	–	1.60		1.86
<i>Key independent variable</i>					
Low self-control	22.75	5.90	23.81		6.07
<i>Intervening variables</i>					
Change in risky socializing	–	–	5.34		1.48
Change in substance use	–	–	.96		.72
Change in violence	–	–	.94		.48
Change in violent friends	–	–	1.45		.20
<i>Control variables</i>					
Age	13.17	.62	13.17		.67
Male	47 %	.50	59 %		.49
Black	16 %	.36	13 %		.33
Latino/a	18 %	.38	16 %		.37
Other minority	11 %	.32	10 %		.30
Gang member	4 %	.19	6 %		.24
<i>Exclusion restrictions</i>					
Attachment to father	27.26	8.80	–		–
Commitment to school	12.17	1.79	–		–
Ethnic belonging	14.59	2.70	–		–
Self-esteem	12.19	2.08	–		–

time 2 ( $n = 284$ ). A comprehensive list of the survey items used to construct variables and their corresponding mean scores are provided in “[Appendix 1](#)”.<sup>6</sup>

### Key Independent Variable

*Low self-control* is an 8-item composite measure from time 1, originally derived from Grasmick, Tittle, Bursik and Arneklev’s (1993) Low Self-Control Scale. These 8 items capture key dimensions of risk-seeking and impulsivity (see also Schreck et al. 2006). While measures of self-control differ considerably across studies (see Piquero 2008), the full body of criminological scholarship on self-control indicates similar patterns of empirical findings despite the wide variability in self-control measurement strategies (Piquero 2008; Pratt and Cullen 2000). Furthermore, research shows that the dimensions

<sup>6</sup> Repeat victimization was measured dichotomously (1 = victimized again, 0 = not victimized again) in supplemental analyses, and the pattern of findings remained similar. We present analyses using a continuous measure of victimization since dichotomizing a continuous variable is typically only appropriate when the distribution of that variable is highly skewed (Irwin & McClelland, 2003; Streiner 2002). Indeed, the distribution of repeat victimization is relatively normal among the victim subsample (skew = .84; kurtosis = 2.20), and transforming it to a binary scheme would run the risk of losing important information on our outcome of interest.



we capture here have consistently been shown to be related to various criminal and analogous behaviors (Higgins et al. 2008; Reisig and Pratt, 2011). These items include: (1) “I often act on the spur of the moment without stopping to think;” (2) “I don’t devote much thought and effort to preparing for the future;” (3) “I often do whatever brings me pleasure here and now, even at the cost of some distant goal;” (4) “I’m more concerned with what happens to me in the short run than in the long run;” (5) “I like to test myself every now and then by doing something a little risky;” (6) “sometimes I will take a risk just for the fun of it;” (7) “I sometimes find it exciting to do things for which I might get in trouble;” and, (8) “excitement and adventure are more important to me than security.” Respondents indicated their agreement to these items using a 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Responses were summed to produce a range of scores from 8 to 40 (Cronbach’s alpha = .84, mean inter-item  $r = .46$ ), where higher scores indicate lower levels of self-control.

### Intervening Variables

The intervening variables, which will be treated as outcomes in a series of regression models, include within-individual changes in victims’ risky lifestyles that capture changes in risky socializing, substance use, violent behavior, and friendships with violent peers. Changes were calculated by producing residual change scores for each of the four risky lifestyles examined (Bohrstedt 1969; Bursik and Webb 1982; Cronbach and Furby, 1970).<sup>7</sup> To derive these measures, the level of each variable at time 2 was regressed on its level in the preceding period (e.g.,  $risky\ socializing_{time2} = f[risky\ socializing_{time1}]$ ), and this equation was used to generate predicted values for each risky lifestyle at time 2. The resulting scores were then subtracted from the observed levels at time 2, resulting in residual change scores.<sup>8</sup>

*Change in risky socializing* captures changes in the amount of time victims spent in unstructured and unsupervised socializing activities from time 1 to time 2 that likely increase the chances of experiencing harm and violence (Felson and Boba 2010; Maimon and Browning 2010; Osgood and Anderson 2004; Osgood et al. 1996). Levels of risky socializing were produced using two measures reflecting the average amount of time per week each respondent spent: (1) “hanging around with your current friends not doing anything in particular where no adults are present;” and, (2) “getting together with your current friends where drugs and alcohol are available.” Such forms of risky socializing increase victimization risk since peers likely encourage and reward acts of violence (particularly while under the influence of drugs and alcohol), the absence of authority figures reduces the potential for social control responses to violence, and the lack of structure leaves time available to experience victimization (Gottfredson et al. 2007; Henson et al. 2010; Swahn et al. 2008). Response categories ranged from 0 (no time spent in these activities) to 12 (12 or more hours per week), from which residual change scores

<sup>7</sup> Residual change scores are calculated rather than raw change scores ( $D = Y - X$ ) to produce more reliable indicators of change from Time 1 to Time 2. As Cronbach and Furby (1970: 74) note, “Residualizing removes from the posttest score...the portion that could have been predicted linearly from pretest status.” Furthermore, Cronbach and Furby (1970: 74) go on to detail that “the residualized score is primarily a way of singling out individuals who changed more (or less) than expected,” indicating that these scores are well-suited for carrying out our research objectives.

<sup>8</sup> The range in values for each residual change variable produced among the subsample of victims is as follows: change in risky socializing (3.99–9.16); change in substance use (.44–2.95); change in violence (.41–2.20); change in violent friends (1.27–2.08).

were derived. Principal components analysis confirmed that these two items are associated with a single latent construct (time 1:  $\lambda = 1.58$ , factor loadings  $>.85$ ; time 2:  $\lambda = 1.58$ , factor loadings  $>.89$ ).

*Change in substance use* reflects changes in victims' use of drugs and alcohol from time 1 to time 2 that may affect their likelihood of repeat victimization (Fagan, 1990; Felson and Burchfield, 2004; Lauritsen et al. 1991; Windle 1994). Levels of substance use were constructed using three observed measures of the number of times each individual used the following substances in the 6 months prior to their interview: (1) alcohol, (2) marijuana, and (3) other illegal drugs. Responses on each item ranged from 0 to 12, and were summed to construct one measure of total substance use (time 1:  $\lambda = 2.08$ , factor loadings  $>.74$ ; time 2:  $\lambda = 2.01$ , factor loadings  $>.77$ ). Scores ranged from 0 to 36 and were natural log-transformed (+1) to reduce skewness before producing substance use residual change scores (skewness of substance use was reduced from 2.78 to .97 at time 1, and from 2.08 to .67 at time 2).

*Change in violence* represents changes in respondents' total reported violent behaviors from time 1 to time 2 that are related to victimization risk (Berg et al. 2012; Sampson and Lauritsen 1990; Schreck et al. 2008). As has been demonstrated consistently in prior work, one of the strongest predictors of victimization is an individual's involvement in crime and violence (Jensen and Brownfield 1986; Singer 1981; Stewart et al. 2004).<sup>9</sup> Levels of violence were captured using measures reflecting the number of times during the 6 months prior to the interview that respondents reported committing the following acts: (1) "hit someone with the idea of hurting them;" (2) "used a weapon or force to get money or things from people;" and, (3) "attacked someone with a weapon." Responses on each item ranged from 0 to 12, and were summed to construct one total indicator (time 1:  $\lambda = 1.75$ , factor loadings  $>.66$ ; time 2:  $\lambda = 2.01$ , factor loadings  $>.70$ ). Scores of violence ranged from 0 to 36 incidents, and the variable was logged (+1) to reduce skewness prior to generating residual change scores (skewness was reduced from 2.09 to .49 at time 1, and from 2.84 to .78 at time 2).

*Change in violent friends* captures changes in the number of victims' violent friends from time 1 to time 2 that likely affect the chances of victimization (Lauritsen and Quinet, 1995; Schreck et al. 2004; Taylor et al. 2007).<sup>10</sup> Levels of violent friends were constructed using three measures that asked respondents how many of their friends had engaged in violent acts during the 6 months prior to each interview.<sup>11</sup> The same forms of violence

<sup>9</sup> For an extensive review of empirical studies on the overlap between victimization and offending, see Jennings et al. (2012).

<sup>10</sup> Routine activity theory suggests that the most convenient, visible, and accessible targets for crime are individuals with whom one spends time (Felson and Boba 2010). The same construct was included as an indicator of risky lifestyles specified by Schreck et al. (2006), and we also deem it as an important and theoretically-relevant indicator to include in the present examination (see also Lauritsen et al. 1992; Schreck et al. 2002).

<sup>11</sup> A potential drawback of the GREAT data is that it relies on students' knowledge of their friends' violent behaviors. Research has demonstrated that respondents' perceptions of peer delinquency may be biased to a certain extent by hearsay or by the likelihood of individuals to project their own tendencies onto their friends (Haynie and Osgood 2005; Weerman and Smeenk 2005; Young et al. 2011). Nevertheless, respondent-generated peer measures remain common when investigating peer violence in both criminological and victimization research (Lauritsen et al. 1992; Pratt et al. 2010; Schreck et al. 2002), and our finding that those with low self-control continue to maintain friendships with violent peers post-victimization is consistent with theoretical expectations. Even so, we recognize a potential inferential risk when using such measures (Gottfredson and Hirschi 1987). To examine in greater detail the impact of victimization on violent peer groups—a focus well beyond that of the present examination—researchers may wish to use network data from other sources such as the National Longitudinal Study of Adolescent Health (Add Health).

were included as in the self-reported measure described above (i.e., assault, robbery, and assault with a weapon), and closed-ended responses ranged from 1 (none of my friends) to 5 (all of my friends). The three items used to measure violent friends in this analysis are associated with a single latent construct (time 1:  $\lambda = 2.07$ , factor loadings  $>.75$ ; time 2:  $\lambda = 2.18$ , factor loadings  $>.72$ ). Scores ranged from 3 to 15, and the natural log of this construct at time 1 and time 2 was taken to reduce skewness before creating residual change scores (skewness was reduced from 2.06 to .69 at time 1, and from 2.08 to .79 at time 2).

### Control Variables

Several demographic control variables are also included in the multivariate analyses that have been demonstrated to have associations with victimization, low self-control, risky behaviors, and repeat victimization (Miethe and Meier 1994; Lauritsen et al. 1992; Pratt et al. 2004; Sampson and Lauritsen 1990). These variables include *age* (the respondent's age in years at time 1), *male* (1 = male, 0 = female), and indicators of race/ethnicity that consist of *Black* (1 = yes, 0 = otherwise), *Latino/a* (1 = yes, 0 = otherwise), and *other minority* (1 = yes, 0 = otherwise), where *White* serves as the omitted reference category. An indicator of respondents' gang membership at time 1 is also included, which is associated with increased victimization and involvement in risky behaviors (1 = currently in a gang; 0 = not currently in a gang) (Peterson et al. 2004; Pyrooz and Decker 2012; Taylor et al. 2007).

### Exclusion Restrictions

Incidental selection into victimization at time 1 (i.e., into the subsample of interest) is potentially non-random. Accordingly, controls for selection or unobserved heterogeneity are needed before the causal models predicting changes in risky lifestyles and repeat victimization are identified (Berk 1983; Heckman 1979; Stolzenberg and Relles 1997). Doing so requires the use of exclusion restrictions—variables that are statistically associated with the selection variable (i.e., victimization) but that are not significant correlates of the intervening or dependent variables of interest (i.e., changes in risky lifestyles and repeat victimization) (Bushway et al. 2007).

Driven by theoretical expectations, an exhaustive review of the data was undertaken to identify four exclusion restrictions. The first, *attachment to father*, is a six-item summated scale that captures the relationship quality and attitudes towards one's father (Cronbach's alpha = .89, mean inter-item  $r = .57$ ). The second exclusion restriction, *commitment to school*, is a three-item additive scale assessing respondents' dedication to achieving success in school (e.g., "I try hard in school") (Cronbach's alpha = .76, mean inter-item  $r = .40$ ). *Ethnic belonging* is the third exclusion restriction, and is a four-item summated scale derived from the Positive Ethnic Attitudes and Sense of Belonging subscale of the Multigroup Ethnic Identity Measure (Phinney 1992) (Cronbach's alpha = .68, mean inter-item  $r = .28$ ). Lastly, *self-esteem* is included as the fourth exclusion restriction, and is constructed using three items derived from the Bachman Revised Rosenberg Self-Esteem Scale (Bachman, 1970) (Cronbach's alpha = .81, mean inter-item  $r = .45$ ).

Existing research supports that these measures are appropriate exclusion restrictions. All five exclusion restrictions taken from time 1 represent indicators that are substantively related to victimization but that are also relatively in flux over time—particularly during adolescence—which likely explains their statistical association with victimization at time 1

and not at time 2. Indeed, attachments to parents and school (Hamilton 2000), feelings of belonging to one's ethnic group (Phinney and Chavira, 1992), and levels of self-esteem (Trzesniewski et al. 2003) all tend to fluctuate during the teen years. For example, paternal attachment and school commitment are two measures of Hirschi's (1969) social bonds that likely act as insulators against victimization (Felson 1986; Schreck 1999), yet static indicators of these bonds have rarely been found to be predictive of repeat victimization longitudinally (Schreck et al. 2006). Moreover, higher levels of both ethnic belonging and self-esteem have been linked to lower involvement in risk-taking behaviors and victimization in numerous cross-sectional studies (Bruce and Waelde, 2008; Donnellan et al. 2005; Fox and Farrow, 2009; McGee and Williams, 2000; Wakefield and Hudley 2007), but their predictive utility in explaining delinquent behaviors and victimization across time has not been well-supported.<sup>12</sup> Bivariate correlations confirmed that all exclusion restrictions were significant correlates of victimization ( $p < .05$ , two-tailed test), but weak and insignificant correlates of changes to risky lifestyles and repeat victimization (see "Appendix 2").

### Analytic Strategy

The analyses proceed in two steps. First, after conducting various model diagnostics to rule out the presence of harmful levels of collinearity, bivariate relationships are estimated between key theoretical measures of interest to determine whether statistical associations existed in theoretically-expected ways. The second step involves estimating a series of multivariate regression models to assess the impact of self-control and changes in risky lifestyles on repeat victimization.

Analyses predicting changes to risky lifestyles (our intervening variables) and repeat victimization are estimated using a series of two-stage full information maximum likelihood (FIML) regression models to address possible incidental selection effects.<sup>13</sup> This strategy involves a probit model for selection (in this case, predicting victimization using the full sample) that is estimated simultaneously with a second-stage OLS model predicting lifestyle changes (using the subsample of victims) (Bushway et al. 2007; Heckman, 1979). The FIML is a straightforward maximum likelihood model that specifies the joint distribution between first- and second-stage equations and maximizes its corresponding log-likelihood function (Jones 2007).

This strategy relies on the strict assumption that error terms between stage-one and stage-two equations are distributed bivariate normal.<sup>14</sup> Possible problematic correlations

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<sup>12</sup> These patterns are unlikely to be unique to these particular variables, but rather likely reflect the more "general" trend of reduced magnitude of the effects of variables from cross-sectional to longitudinal research designs (see the discussion by Moffitt 1993).

<sup>13</sup> Different types of selection necessitate different model specifications and statistical estimators. If selection into the subsample is *explicit* or random, we would not expect selection bias to be an issue, and a simple two-part model (or an "uncorrected model") would be the appropriate modeling strategy (Bushway et al. 2007; Duan et al. 1984). In the present study, however, selection into the victim subsample is *incidental* and potentially non-random. Accordingly, changes to risky lifestyles and repeat victimization are likely conditional on being selected into the victim subsample, and these issues are taken into account with our modeling strategy.

<sup>14</sup> Following the recommendations of Bushway and colleagues (2007), we compared maximum likelihood estimates with those provided by simple two-part models (for all outcomes) and with Heckman's two-step correction (for changes in risky lifestyles). Heckman's two-step estimator involves the estimation of a probit model for selection, and then calculates an inverse Mills ratio that is inserted into a second OLS model of interest (Heckman 1976). Alternatively, in a simple two-part model, no correction is inserted and no

between stage-one and stage-two error terms are reduced by including the exclusion restrictions (described previously) in the stage-one model predicting victimization (Bushway et al. 2007; Leung and Yu 1996). Multivariate regression models presented in Tables 2 and 3 are estimated with robust Huber-White standard errors that are adjusted to control for the clustering of respondents in classrooms (Long and Freese 2006).<sup>15</sup> All models are estimated using Stata 12.0 (Stata Corp, College Station, TX).

## Results

We began by assessing bivariate correlations between the variables used to estimate the regression models seen in Tables 2 and 3. As anticipated, key independent variables are associated with the outcomes of interest in expected directions (seen in Appendix 2). Although correlation coefficients among independent variables do not exceed an absolute value of .40, additional model diagnostics were conducted to determine whether collinearity would bias the parameter estimates. Variance inflation factors (VIF) among variables for all models seen in Tables 2 and 3 are below 2.0, well below the standard “conservative” cutoff of 4.0 (Fox 1991). Furthermore, none of the condition index values for equations presented in Tables 2 and 3 exceed 19, which is under the critical threshold of 20 specified by Leung and Yu (1996) for selection models. According to this evidence, observed correlations between the independent variables should not result in biased estimates or inefficient standard errors due to multicollinearity.<sup>16</sup>

Turning to our first research objective, victimization was regressed on the independent variables and exclusion restrictions described above using the full study sample. Model  $\chi^2$  statistics indicated that the probit model (or the stage-one model) fit the data well, and estimates are presented in model 1 of Table 2. Net of control factors, we found that self-control exhibited a statistically significant effect on victimization at time 1, demonstrating that lower levels of self-control correspond with a greater likelihood of being a victim of violence for participants in the sample ( $b = .023$ ,  $z = 3.18$ ,  $p = .002$ ). It is also important to note that three exclusion restrictions (i.e., attachment to father, commitment to school, and self-esteem) significantly influenced whether study participants were victims of violence at time 1, and these effects occurred in theoretically expected directions.

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Footnote 14 continued

additional technique is required—models are simply estimated one after the other, with the assumption that random selection into the subsample occurred (Duan et al. 1984). In comparing estimates across these various methods, standard errors were notably inconsistent. To ensure our estimates are as unbiased and efficient as possible, we report results from the FIML models. As Bushway and colleagues (2007: 159) point out, “when the error assumptions are met the FIML will always be more efficient than the Heckman two-step, a fact which has been demonstrated in numerous simulation studies” (see also Leung and Yu 1996; Puhani 2000).

<sup>15</sup> Clustered robust standard errors are intended to make the standard errors robust to both serial correlation (due to the non-independence of observations within clusters) and to heteroskedasticity (due to differing variance estimates emerging from the observations between clusters) without having to make any assumptions about the functional form of either (Rogers 1993; Wooldridge 2009).

<sup>16</sup> A review of existing Monte Carlo studies suggests that the FIML is more efficient if the collinearity between the inverse Mills ratio (calculated from the stage 1 equation) and the other regressors is moderate (Puhani 2000). Results from regressing the inverse Mills ratio on independent variables for lifestyle change equations revealed that exclusion restrictions are appropriate ( $R^2 < .45$ ), and condition indices are low. Puhani (2000) argued that situations where condition numbers exceed 20 and where collinearity is problematic are those in which simple two-part models should be estimated. If there are no collinearity problems, however, the FIML estimator is recommended and appropriate.

**Table 2** Two-stage full information maximum likelihood models predicting changes in victims' risky lifestyles

Variables	Victimization <sup>a</sup>		Change in risky socializing <sup>b</sup>		Change in substance use <sup>b</sup>		Change in violence <sup>b</sup>		Change in violent friends <sup>b</sup>	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 4	Model 5	Model 4	Model 5	
	<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)	<i>z</i>
Low self-control	.023 (.007)	.020 (.004)	.032 (.005)	.022 (.004)	.022 (.004)	.022 (.004)	.022 (.004)	.022 (.004)	.022 (.004)	5.39**
Age	-.051 (.063)	-.011 (.027)	.41	.066 (.042)	.066 (.042)	.066 (.042)	.066 (.042)	.066 (.042)	.066 (.042)	1.36
Male	.285 (.072)	.395**	2.01*	.098 (.059)	.098 (.059)	.098 (.059)	.098 (.059)	.098 (.059)	.098 (.059)	1.61
Black	-.097 (.129)	-.75	-1.92	-.122 (.065)	-.122 (.065)	-.122 (.065)	-.122 (.065)	-.122 (.065)	-.122 (.065)	.06
Latino/a	-.191 (.116)	-1.64	-3.81**	.134 (.081)	.134 (.081)	.134 (.081)	.134 (.081)	.134 (.081)	.134 (.081)	1.66
Other minority	-.156 (.137)	-1.41	-2.91**	-.086 (.097)	-.086 (.097)	-.086 (.097)	-.086 (.097)	-.086 (.097)	-.086 (.097)	-.88
Gang member	.738 (.237)	3.11**	4.05**	.775 (.163)	.775 (.163)	.775 (.163)	.775 (.163)	.775 (.163)	.775 (.163)	4.75**
Attachment to father	-.021 (.007)	-2.92*								
Commitment to school	-.218 (.100)	-2.20*								
Ethnic belonging	-.018 (.014)	-1.32								
Self-esteem	-.037 (.018)	-2.04*								
Constant	3.170 (1.686)	1.88	.739 (.311)	2.37*	2.37*	2.37*	2.37*	2.37*	2.37*	-0.88
Rho $\chi^2$			3.41							3.31
Model $\chi^2$	148.02**	131.13**								106.35**
Nagelkerke $R^2$	.16									51.71**

Entries are unstandardized coefficients (*b*) and clustered robust standard errors

<sup>a</sup> Stage-one model using full sample ( $N = 1,370$ )

<sup>b</sup> Stage-two models using subsample of victims ( $n = 521$ )

\*  $p < .05$ ; \*\*  $p < .01$  (two-tailed test)

**Table 3** Two-stage full information maximum likelihood models predicting repeat victimization

Variables	Repeat victimization <sup>a</sup>														
	Model 1			Model 2			Model 3			Model 4			Model 5		
	<i>b</i> (SE)	<i>z</i>	<i>b</i> (SE)	<i>z</i>	<i>b</i> (SE)	<i>z</i>	<i>b</i> (SE)	<i>z</i>	<i>b</i> (SE)	<i>z</i>	<i>b</i> (SE)	<i>z</i>			
Low self-control	.042 (.016)	2.62**	.013 (.011)	1.10	.019 (.015)	1.29	.024 (.016)	1.55	.018 (.021)	.85					
Change in risky socializing			.529 (.229)	2.31*											
Change in substance use					.470 (.136)	3.44**									
Change in violence							.757 (.182)	4.16**							
Change in violent friends															
Age	-.017 (.127)	-.13	-.036 (.161)	-.22	-.034 (.113)	-.30	-.049 (.111)	-.44	.662 (.179)	3.70**					
Male	.487 (.212)	2.29*	.506 (.796)	.64	.432 (.189)	2.29*	.417 (.242)	1.72	.229 (.162)	1.41					
Black	-.209 (.259)	-.81	-.205 (.503)	-.41	-.112 (.200)	-.56	-.210 (.225)	-.93	-.345 (.264)	-1.30					
Latino/a	-.530 (.232)	-2.28*	-.470 (.424)	-1.11	-.534 (.251)	-2.13*	-.428 (.262)	-1.64	-.486 (.271)	-1.79					
Other minority	.159 (.286)	.56	.196 (.529)	.37	.256 (.259)	.99	.291 (.260)	1.12	.263 (.306)	.86					
Gang member	.861 (.387)	2.22*	.383 (.581)	.66	.379 (.491)	.77	.562 (.533)	1.06	.471 (.651)	.72					
Constant	.579 (1.67)	.35	.028 (2.68)	.01	1.059 (1.51)	.70	.827 (1.54)	.53	-1.82 (1.76)	-1.04					
Rho $\chi^2$	1.82		1.80		1.78		1.77		1.77						
Model $\chi^2$	20.32**		25.77**		42.27**		36.88**		26.30**						

Entries are unstandardized coefficients (*b*) and clustered robust standard errors. Stage-one probit models predicting victimization not shown here (see Table 2 model 1)

<sup>a</sup> Subsample of victims (*n* = 521)

\* *p* < .05; \*\* *p* < .01 (two-tailed test)

Models 2 through 5 in Table 2 present the effects of self-control and control variables on changes in risky lifestyles for those who reported having been victimized at time 1.<sup>17</sup> Each FIML model estimates a rho coefficient ( $\rho$ ), which is the correlation between the first and second stage error terms. A statistically significant rho coefficient indicates that the error terms are significantly correlated and that sample selection is a detectable source of bias. With the exception of model 5 in Table 2 predicting changes in violent friends, test statistics for rho coefficients were not statistically significant ( $p > .05$ ), suggesting that selection bias is not problematic in models 2 through 4. Nevertheless, correlations between errors were still non-zero. Following the recommendations of Bushway et al. (2007) we report FIML models as these equations produce more precise parameter estimates of theoretical relationships.

The results presented in Table 2 demonstrate that low self-control exerts uniformly robust effects on changes to victims' risky behaviors across all four regression models (models 2 through 5). Victims low in self-control are significantly more likely to continue to engage in risky socializing ( $b = .020$ ,  $z = 5.33$ ,  $p < .001$ ), to use drugs and alcohol ( $b = .032$ ,  $z = 5.61$ ,  $p < .001$ ), to engage in violence ( $b = .022$ ,  $z = 5.39$ ,  $p < .001$ ), and to retain violent friends ( $b = .010$ ,  $z = 6.49$ ,  $p < .001$ ). Moreover, based on the  $z$  scores presented in Table 2, low self-control emerged as the strongest predictor of lifestyle changes within each model, dominating the effects of gang membership and other robust demographic characteristics typically used to predict participation in risky lifestyles (e.g., Gibson et al. 2012; Lauritsen et al. 1992; Osgood et al. 1996; Wittebrood and Nieuwebeerta 2000). Overall, the broader takeaway from the results presented in Table 2 is that, net of controls, patterns of change in risky lifestyles post-victimization are to a large extent the product of one's level of self-control.

To examine our second research question concerning whether low self-control and changes in risky lifestyles predict repeat victimization, we estimated five additional two-stage FIML models, shown in Table 3 (using the same stage-one equation predicting victimization as presented in Table 2). Rho test statistics indicated that sample selection was not a detectable source of bias in models predicting repeat victimization ( $p > .05$ ). Similar to the models described previously in Table 2, we proceed with presenting FIML models in Table 3 in order to present more efficient estimates.<sup>18</sup>

The effects presented in model 1 of Table 3 demonstrate that, net of control variables, low self-control is a positive and significant predictor of repeat victimization ( $b = .042$ ,  $z = 2.62$ ,  $p = .009$ ). As seen in models 2 through 5 in Table 3, however, when changes in risky lifestyles are included as covariates alongside self-control, the effects of low self-control on repeat victimization diminish to non-significance. Across all four models, changes in risky lifestyles exert the strongest effects on repeat victimization and fully mediate the effects of low self-control. Indeed, the results reveal that victims who do not stop engaging in risky socializing ( $b = .529$ ,  $z = 2.31$ ,  $p = .021$ ) or substance use ( $b = .470$ ,  $z = 3.44$ ,  $p = .001$ ), who fail to desist from violence ( $b = .757$ ,  $z = 4.16$ ,  $p < .001$ ), and who continue to be friends with violent peers ( $b = .662$ ,  $z = 3.70$ ,  $p < .001$ ) are more likely to experience repeat victimization.

The data thus far suggest that repeat victimization is a consequence of the changes victims make (or do not make) to their risky lifestyles post-victimization, and that these

<sup>17</sup> As mentioned above, each dependent variable in Models 2 through 5 represents a residual change score. To clarify the interpretation of these change scores, positive, larger values on the change variables represent larger residuals, which reflect less change from time 1 to time 2.

<sup>18</sup> In simple two-part models the standard errors were notably lower and coefficients were inflated, although the broad pattern of results remained the same as we present here.



changes are predicted by self-control. Despite the similarity across the models presented within Tables 2 and 3, further analyses were conducted to assess the robustness of the results. Specifically, additional models were estimated to include various combinations of changes in risky activities to predict repeat victimization (not shown).<sup>19</sup> Using all possible combinations of changes in risky behaviors (7 different estimations), the effects remained the same: changes in routine activities significantly predicted repeat victimization ( $p < .05$ ) and eliminated the influence of self-control. Next, a second-order factor was created using each of the four change variables to create one indicator of total change in risky lifestyles ( $\lambda = 2.42$ , all factor loadings exceed .75). Low self-control was a strong predictor of total change in risky lifestyles ( $b = .216$ ,  $z = 8.45$ ,  $p < .001$ ), and the total change variable emerged as a powerful determinant of repeat victimization ( $b = .154$ ,  $z = 3.74$ ,  $p < .001$ ) which wiped out the effects of low self-control ( $b = .015$ ,  $z = .88$ ,  $p = .380$ )—a pattern no different than what was found previously. These relationships were not only generally stable across all estimations using the full subsample of victims, but also among male victims only ( $n = 308$ ) and female victims only ( $n = 213$ ).

In addition, we specified models that controlled for changes in victims' conventional routine activities that included time spent engaging in activities with family, in athletics or school-based activities, in religious activities, and in community activities. These conventional activities had no bearing on any of our findings, and were weak and insignificant correlates of repeat victimization ( $p > .20$ ). The consistency of findings across all specifications and the use of maximum likelihood estimates give us added confidence that the relationships we found are not methodological artifacts. In short, the pattern in the data is clear: self-control determines whether individuals make changes to their risky lifestyles post-victimization, and these changes are powerful determinants of repeat victimization that fully mediate the influence of self-control.

## Discussion

Numerous empirical studies have verified that prior victimization contributes strongly to the risk of future victimization (Finkelhor et al. 2007; Gottfredson 1984; Lauritsen and Quinet 1995; Menard 2002; Outlaw et al. 2002), yet a clear theoretical explanation for this linkage has yet to emerge in the criminological literature. Not all individuals who are victimized once are victimized again, and why some people are more likely to experience repeat victimization over others has remained an empirical question without a clear answer. While prior work has hinted that risky lifestyles and one's level of self-control may be fundamental to understanding this process, no study to date has assessed *directly* the causal mechanisms at work between victimization and repeat victimization. Given this gap in the literature, the purpose of the present study was to gain a better theoretical and empirical understanding of repeat victimization. To that end, three broad conclusions can be drawn from our findings.

First, future research should continue to measure directly the intervening mechanisms between self-control and negative life outcomes like victimization and repeat victimization. The theoretical processes through which self-control is assumed to operate have

<sup>19</sup> A series of diagnostic tests similar to those described previously were first conducted to ensure that the models estimated to test for robustness were not biased due to collinearity. Condition indices were below 20 in all of the models specified, and VIF scores did not exceed 2.80. Collinearity issues prevented the inclusion of changes in violence and changes in violent friends as independent variables in the same model.

typically been “black boxed” in prior work and have therefore rarely been tested explicitly. Instead, the typical empirical approach is to correlate self-control with some outcome measure, control for a bunch of other stuff statistically, and then see if self-control retains its effect in a multivariate model (see Pratt and Cullen 2000). If it does, we generally assume that the unmeasured causal process we have specified is, in fact, responsible for that relationship. This strategy, which leaves much to be desired, has been the “norm” in self-control research in criminology despite both longstanding (Piquero and Tibbetts 1996) and recent (Reisig and Pratt 2011) calls to measure directly the causal processes linking self-control with various outcomes. By including direct measures of intervening variables, our results confirmed what has only been argued theoretically in the literature—that the changes victims make to their risky lifestyles represent the causal mechanisms through which self-control influences repeat victimization.

Second, individual routine activities are not static, but are instead dynamic processes that should be conceptualized and measured as such in victimization research. Since the changes individuals make to their risky behaviors appear to be fundamental to our understanding of repeat victimization, future studies should explore how individuals modify their routine activities in response to changing social conditions and to other significant life circumstances (e.g., unemployment, marriage, birth of a child). In doing so, scholars should continue to examine how self-control shapes these reactions in ways that could either lead to or prevent repeat victimization. Moreover, research should proceed by investigating the ecological, structural, and situational factors associated with victimization (see, e.g., Anderson 1999; Berg et al. 2012; Brantingham and Brantingham 1981; Lauritsen and Heimer 2010; Miethe and McDowall 1993; Skogan 1990; Stewart et al. 2006) that may affect whether individuals alter their routine behaviors over time. In short, now that we have a more firm understanding of the individual-level causal processes at work between victimization and repeat victimization, a useful next step will be to assess how those processes are embedded in the broader social context and may be either variant or invariant over the life course.

Third, in addition to the theoretical contributions advanced by this study, our findings have important implications regarding victim support services. Put simply, in addition to providing a safe physical environment and supportive coping resources, victim programming should be targeted toward encouraging victims to make changes to the problematic behaviors that may have facilitated, provoked, or precipitated their prior victimization. To be sure, our study does not indicate that those who escape repeat victimization do so by running out to join church groups, or by adopting more conventional activities (Averdijk 2011; Farrell and Pease, 1993; Hindelang et al. 1978; Miethe et al. 1990). Such victims simply diminish the extent to which they engage in risky acts, and we argue that problematic routine activities are the ones deserving of criminologists’ focus. Helping victims to limit their use of drugs and alcohol, to avoid participating in violence or in unstructured and unmonitored social activities, and to minimize friendships with violent peers may substantially decrease the likelihood that they are repeatedly victimized.

Furthermore, including self-control as a “responsivity” factor into these services could also increase their effectiveness, especially because victims with low self-control may be more difficult to treat (Gottfredson and Hirschi 1990; Piquero et al. 2010). Such victims may be less willing to change their habits, less able to retain what they are taught in support interventions, and less likely to remain in treatment services (Harris and Miller, 1990; Moeller et al. 2001; Krishnan-Sarin et al. 2007). Principles of responsivity emphasize individual characteristics throughout all aspects of behavioral intervention (e.g., modeling, graduated practice, reinforcement, cognitive restructuring),

where services are designed to fit individual cognitive levels and personality styles (Andrews 2006; Andrews and Bonta 2010; Andrews et al. 2006). Those responsible for delivering victim services should be sensitive to victims' self-control deficits, and should tailor their services in ways that will help individuals avoid the risky activities that lead to repeat victimization.<sup>20</sup>

It is important to recognize, however, that the current study included only three forms of personal victimization among adolescents (assault with or without a weapon and robbery), all of which are likely to occur out of the home and in the absence of capable guardianship (Felson and Boba 2010). Other forms of personal victimization such as domestic violence and sexual assault—serious forms of “hidden” violence that occur disproportionately and repeatedly among a certain segment of the population (Catalano et al. 2009; Felson et al. 2005; Truman and Rand 2010)—were not explored. While a growing body of work has demonstrated self-control to be predictive of sexual victimization and in-home violence (Franklin 2011; Kerley et al. 2008), the situational antecedents of these incidents may be unique from those discussed in the current study (Dugan and Apel 2005; Fisher et al. 2010; Franklin et al. 2012). Furthermore, low self-control and risky behaviors have been found to increase the likelihood of fraud and Internet victimization (Holtfreter et al. 2008, 2010; Reising et al. 2009), as well as other non-violent incidents (Fox et al. 2009; Schreck 1999; Schreck et al. 2006). We therefore leave open several opportunities for future research to assess whether the effects of changes in risky lifestyles-routine activities are similar across different forms of victimization.

In the end, repeat victimization is a complex phenomenon. Existing research in this area has barely begun to scratch the surface of important questions that might be asked, especially when it comes to uncovering how individual traits, attitudes, and preferences shape the pathway between victimization and repeat victimization. While one's level of self-control is certainly an important determinant of victimization and involvement in risky lifestyles, it is not the only potentially important precursor to repeat victimization. Incorporating key concepts from other major criminological theories (i.e., biosocial perspectives, general strain theory, and violent subcultural theories) to better understand how individuals respond to and cope with their victimization is a vital next step in this area of research (Pratt and Turanovic 2012). Indeed, integrating key criminological perspectives—rather than pitting them against one another—will be critical as we move toward a more comprehensive understanding of the causal processes associated with victimization and its consequences.

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## Appendix 1

See Table 4.

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<sup>20</sup> It is worth noting that scholars who have struggled to disentangle the relationship between self-control and repeat victimization in prior work have been hesitant to make suggestions for victim support services, since the direct mechanisms through which self-control influences victimization were not yet made clear. Until the present study, it seemed that efforts to reduce victimization would have the greatest hope of success if they could proactively instill self-control in young children (see e.g., Schreck et al. 2002, 2006). Given our findings, it is clear that victim-prevention efforts should help victims change their problematic routine activities through responsive programming, rather than change their levels of self-control—a much more feasible and practical solution to preventing repeat victimization (Lauritsen and Archakova 2008; Piquero et al. 2010).

**Table 4** Scale items and summary statistics

Scale items	Mean
Victimization (Time 1)	0.38
<i>In the last 6 months have you...?</i>	
Been hit by someone trying to hurt you? (1 = yes)	0.40
Had someone use a weapon or force to get money or things from you? (1 = yes)	0.06
Been attacked by someone with a weapon or by someone trying to seriously hurt or kill you? (1 = yes)	0.05
Repeat victimization (Time 2) <sup>a</sup>	1.61
<i>In the last 6 months have you...?</i>	
Been hit by someone trying to hurt you? <sup>b</sup>	1.44
Had someone use a weapon or force to get money or things from you? <sup>b</sup>	0.25
Been attacked by someone with a weapon or by someone trying to seriously hurt or kill you? <sup>b</sup>	0.17
Low self-control (Time 1)	22.75
<i>How much do you disagree or agree with the following statements?</i>	
I often act on the spur of the moment without stopping to think <sup>c</sup>	3.13
I don't devote much thought and effort to preparing for the future <sup>c</sup>	2.38
I often do whatever brings me pleasure here and now, even at the cost of some distant goal <sup>c</sup>	2.88
I'm more concerned with what happens to me in the short run than in the long run <sup>c</sup>	2.81
I like to test myself every now and then by doing something a little risky <sup>c</sup>	3.49
Sometimes I will take a risk just for the fun of it <sup>c</sup>	3.35
I sometimes find it exciting to do things for which I might get in trouble <sup>c</sup>	3.15
Excitement and adventure are more important to me than security <sup>c</sup>	2.65
Risky socializing (Time 1) <sup>a</sup>	4.26
Risky socializing (Time 2) <sup>a</sup>	4.76
<i>How many hours do you spend doing this during an average week?</i>	
Hanging around with your current friends not doing anything in particular where no adults are present. (Time 1) <sup>d</sup>	3.74
Getting together with your current friends where drugs and alcohol are available. (Time 1) <sup>d</sup>	1.85
Hanging around with your current friends not doing anything in particular where no adults are present. (Time 2) <sup>d</sup>	2.29
Getting together with your current friends where drugs and alcohol are available. (Time 2) <sup>d</sup>	4.32
Substance use (Time 1) <sup>a</sup>	3.29
Substance use (Time 2) <sup>a</sup>	4.60
<i>Please indicate how many times you've used each drug in the past 6 months</i>	
Alcohol. (Time 1) <sup>d</sup>	1.86
Marijuana. (Time 1) <sup>d</sup>	1.08
Other illegal drugs. (Time 1) <sup>d</sup>	0.34
Alcohol. (Time 2) <sup>d</sup>	2.51
Marijuana. (Time 2) <sup>d</sup>	1.67
Other illegal drugs. (Time 2) <sup>d</sup>	0.33
Violence (Time 1) <sup>ah</sup>	3.07
Violence (Time 2) <sup>ah</sup>	2.71
<i>Indicate how many times in the past 6 months you have done each thing</i>	
Hit someone with the idea of hurting them. (Time 1) <sup>d</sup>	2.95
Used a weapon or force to get money or things from people. (Time 1) <sup>d</sup>	0.23
Attacked someone with a weapon. (Time 1) <sup>d</sup>	0.40
Hit someone with the idea of hurting them. (Time 2) <sup>d</sup>	2.22
Used a weapon or force to get money or things from people. (Time 2) <sup>d</sup>	0.17

**Table 4** continued

Scale items	Mean
Attacked someone with a weapon. (Time 2) <sup>d</sup>	0.31
Violent friends (Time 1) <sup>ah</sup>	5.36
Violent friends (Time 2) <sup>ah</sup>	5.08
<i>During the last year, how many of your current friends have done the following?</i>	
Hit someone with the idea of hurting them. (Time 1) <sup>e</sup>	2.60
Used a weapon or force to get money or things from people. (Time 1) <sup>e</sup>	1.30
Attacked someone with a weapon. (Time 1) <sup>e</sup>	1.48
Hit someone with the idea of hurting them. (Time 2) <sup>e</sup>	2.36
Used a weapon or force to get money or things from people. (Time 2) <sup>e</sup>	1.27
Attacked someone with a weapon. (Time 2) <sup>e</sup>	1.46
Attachment to father (Time 1)	27.26
<i>Think about your father or father-figure and circle the number that best represents your attitude</i>	
Can't talk about anything (1) - - - - - (7) Can talk about anything <sup>f</sup>	4.76
Never trusts me (1) - - - - - (7) Always trusts me <sup>f</sup>	5.01
Does not know any of my friends (1) - - - - - (7) Knows all my friends <sup>f</sup>	3.93
Never understands me (1) - - - - - (7) Always understands me <sup>f</sup>	4.12
Never ask his advice (1) - - - - - (7) Always ask his advice <sup>f</sup>	4.10
Never praises me when I do well (1) - - - - - (7) Always praises me when I do well <sup>f</sup>	5.09
Commitment to school (Time 1)	12.17
<i>How much do you agree or disagree with these statements?</i>	
I try hard in school <sup>e</sup>	4.05
Education is so important that it's worth it to put up with things about school that I don't like <sup>e</sup>	3.99
Grades are very important to me <sup>e</sup>	4.18
Ethnic belonging (Time 1)	14.59
<i>How much do you agree or disagree with these statements?</i>	
I have a strong sense of belonging to my own ethnic group <sup>e</sup>	3.23
If I were to be born all over again, I would want to be born into a different ethnic group from the one I belong to <sup>ci</sup>	4.08
I sometimes feel that I don't belong with any ethnic group <sup>ci</sup>	3.01
I feel good about my cultural or ethnic background <sup>e</sup>	3.89
Self-esteem (Time 1)	12.19
<i>Indicate how often you think these statements describe you</i>	
I am a useful person to have around. <sup>e</sup>	3.91
I am able to do things as well as most other people <sup>e</sup>	4.20
When I do a job, I do it well <sup>e</sup>	4.10

Means of individual scale components are derived from non-imputed data

- <sup>a</sup> Measures derived from subsample of victims only
- <sup>b</sup> Response set ranging from 0 = None to 5 = 5 or more
- <sup>c</sup> Response set ranging from 1 = Strongly disagree to 5 = Strongly agree
- <sup>d</sup> Response set ranging from 0 = Never to 12 = 12 or more
- <sup>e</sup> Response set ranging from 1 = None of them to 5 = All of them
- <sup>f</sup> Response set ranging from 1 = Strongly disagree to 7 = Strongly agree
- <sup>g</sup> Response set ranging from 1 = Almost never to 5 = Almost always
- <sup>h</sup> Natural, unlogged form
- <sup>i</sup> Reverse scored

Appendix 2

See Table 5.

Table 5 Zero-order correlations

Variables	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Victimization	.34*	.15*	.17*	.16*	.35*	.26*	.00	.19*	-.06*	-.03	-.03	.11*	-.13*	-.16*	-.06*	-.10*
2 Repeat victimization	–	.17*	.15*	.20*	.32*	.26*	-.02	.19*	-.04	-.03	.01	.11*	-.03	-.04	-.05	-.05
3 Low self-control	.15*	–	.37*	.40*	.34*	.41*	.14*	.12*	-.07*	.09*	-.01	.16*	-.28*	-.07*	-.14*	-.28*
4 Δ Risky socializing	.14*	.35*	–	.44*	.34*	.37*	.13*	.05	-.00	-.03	-.08*	.21*	-.02	-.00	-.02	-.03
5 Δ Substance use	.21*	.40*	.47*	–	.45*	.44*	.13*	.04	-.09*	.15*	-.09*	.33*	-.04	-.01	-.03	-.04
6 Δ Violence	.24*	.26*	.32*	.39*	–	.56*	.09*	.18*	.06*	.00	-.10*	.26*	-.04	-.02	-.01	-.04
7 Δ Violent friends	.25*	.34*	.34*	.42*	.61*	–	.06*	.26*	.09*	.04	-.06*	.28*	-.03	-.03	-.04	-.03
8 Age	.02	.21*	.17*	.16*	.15*	.10*	–	.06*	.01	.09*	-.14*	.07*	-.07*	-.02	-.01	-.03
9 Male	.15*	.10*	.00	.03	.10*	.25*	.07	–	-.01	-.03	-.04	.07*	.11*	-.02	-.03	-.03
10 Black	-.05	-.14*	-.03	-.11*	.03	.09*	-.06	-.06	–	-.20*	-.15*	-.02	-.01	-.06*	.04	.10*
11 Latino/a	-.07	.16*	-.04	.17*	.01	.04	.15*	-.03	-.17*	–	-.17*	.09*	-.02	.01	.12*	-.10*
12 Other minority	.05	.01	-.09*	-.07	-.12*	-.09*	-.13*	-.02	-.13*	-.15*	–	.00	-.01	-.03	-.03	-.05
13 Gang member	.12*	.17*	.19*	.35*	.21*	.30*	.07	.03	.01	.13*	.00	–	-.04	.01	-.05	.00
14 Attachment to father	-.05	-.25*	-.06	-.07	-.05	-.07	-.12*	.09*	.04	-.02	-.05	-.06	–	.04	.14*	.24*
15 Commitment to school	-.07	-.03	-.07	-.06	-.07	-.08	-.08	-.03	.02	.01	-.07	.02	.07	–	.42*	.02
16 Ethnic belonging	-.07	-.10*	-.04	-.07	-.05	.01	.01	.04	.14*	.13*	-.03	-.04	.13*	.08	–	.21*
17 Self-esteem	-.06	-.24*	-.08	-.06	-.06	-.07	-.08	-.03	.16*	-.10*	-.04	.04	.21*	.02	.21*	–

Bivariate correlations for the full sample are located above the diagonal of the matrix, and correlation coefficients for the subsample of victims are featured below the diagonal  
 \*  $p < .05$ , two-tailed test

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