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Gender Differences in the Effects of Exposure to Violence on Adolescent Substance Use

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Abstract

To date, research exploring gender differences in the relationship between exposure to community violence and substance use has been limited. This study employs longitudinal data from the Project on Human Development in Chicago Neighborhoods (PHDCN) to assess the exposure to violence–substance use relationship and explore whether this relationship varies by gender. We find that the two forms of exposure to violence—direct (primary) and indirect (secondary)—independently increase the frequency of subsequent alcohol use, binge drinking, and marijuana use among males and females. One gender difference emerged, as females who had been directly victimized engaged in more frequent binge drinking than males who had been directly victimized. Across both sexes, the effect of each form of violence weakened when other predictors of substance use were included in the models. Future directions for this research are discussed, including policy recommendations to help adolescents cope with victimization experiences.

Keywords

exposure to violence; substance use; community violence; gender; victimization

Despite growing recognition of the many negative consequences of exposure to violence, there has been relatively little research examining the impact of violent victimization experienced in the community on adolescent substance use (Buka, Stichick, Birdthistle, & Earls, 2001; Sullivan, Kung, & Farrell, 2004). Although some research has examined the effects of exposure to community violence on mental health problems or violent behaviors, far fewer studies have examined its impact on substance use. This oversight is problematic given the high rates at which teenagers are both exposed to violence and likely to use drugs. According to the 2008 National Survey of Children's Exposure to Violence, 60% of youth were exposed to violence in the prior year, either directly (i.e., were a victim of violence) or indirectly (i.e., witnessed violence or knew someone who had been victimized; Finkelhor, Turner, Ormond, Hamby, & Kracke, 2009). In 2010, about one fourth of high school seniors reported engaging in binge drinking, 41% drank alcohol in the last month, and 35% used marijuana in the past year (*Monitoring the Future*, see Johnston, O'Malley, Bachman, & Schulenberg, 2011).

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Gender differences in the relationship between exposure to violence and substance use have also been overlooked (Begle et al., 2011). Although there is substantial evidence that males are more likely than females to be exposed to violence in their communities (Begle et al., 2011; Buka et al., 2001; Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003), very few empirical studies have examined whether males and females *react to* this exposure differently, including, for example, engaging in different amounts of or types of substance use.

THEORETICAL EXPLANATIONS FOR GENDER DIFFERENCES IN EXPOSURE TO VIOLENCE AND SUBSTANCE USE

The lack of empirical studies examining this issue is somewhat surprising, given that some theoretical perspectives suggest that gender differences exist in the effects of exposure to violence. Feminist criminologists have identified victimization as a particularly salient risk factor for female crime, with violent victimization often considered to be the first step in females' pathways to delinquency and crime (Belknap & Holsinger, 2006; Chesney-Lind, 1997; Fagan, 2001). A significant contribution of feminist theory has been the recognition that girls and women are victimized at high rates and are particularly likely to experience physical abuse and sexual assault perpetrated within their homes and at the hands of family members, friends, and intimate partners (Belknap & Holsinger, 2006; Chesney-Lind, 1997; Daly & Chesney-Lind, 1988; Fagan, 2001). These experiences may be more problematic for girls compared to boys, given that females tend to spend more time in the home and are socialized to place more emphasis on family relationships (Chesney-Lind, 1997; Keenan & Shaw, 1997). Feminist theories have also linked females' victimization experiences to later offending, as evidenced in studies of incarcerated female offenders, which show that lifetime victimization is substantially higher among female offenders compared to the general population of females and seemingly higher than that of incarcerated males (e.g., Belknap & Holsinger, 2006; Browne, Miller, & Maguin, 1999; Gilfus, 1992; Harlow, 1999).

According to many feminist theories, early traumatic experiences may lead females to engage in survival strategies that result in illegal activities such as running away from home, shoplifting, and other forms of street crime, particularly for homeless girls (Bloom, Owen, & Covington, 2005; Chesney-Lind, 2002). Importantly for this study, feminist perspectives also emphasize that victimization and exposure to violence may be more likely to result in internalizing problems among female victims, as they struggle to cope with the stress of being harmed or violated, whereas boys may be more likely to respond with externalizing and aggressive behaviors (Keenan & Shaw, 1997). In this vein, girls may be more likely to use illegal substances as a coping strategy, to escape from the trauma caused by victimization, and/or to self-medicate (Chesney-Lind, 1997). In fact, many convicted female offenders struggle with drug addiction and often cite their victimization and early traumatic experiences as the reasons they turned to drug use at an early age (Daly, 1992). Whether or not exposure to neighborhood violence would also result in gendered patterns of illegal behavior, particularly substance use, is less clear, given that feminist theories tend to focus on victimization that occurs within the home or family.

Feminist theories have much in common with general strain theory (GST; Agnew, 1992), which has also been used to explain gender differences in the relationship between exposure to violence and delinquency. GST suggests that when people experience strain, they often respond with a range of negative emotions (e.g., anger, frustration, depression), and that crime and/or delinquency is employed as a coping mechanism to reduce the burden of the strain as well as the negative emotions caused by strain. Criminal and delinquent coping is especially likely among people who lack the ability to prosocially cope with strain. According to Broidy and Agnew (1997), victimization is a form of strain that is particularly

likely to result in criminal coping mechanisms such as substance use. GST differentiates between different types of victimization but contends that all forms of victimization can lead to delinquency (Agnew, 2006). Individuals can directly experience victimization (e.g., being personally hit or robbed) or may be vicariously/indirectly exposed to violence (e.g., by witnessing violence against others). When faced with intense strains from either experience, victims are apt to develop negative emotions such as anger or depression, which, in turn, must be relieved via positive or negative coping strategies.

GST has been used to explain both male and female delinquency, and Agnew (2006) asserts that GST applies to both sexes. However, the theory also posits that males and females are likely to experience different types of strain, differ in their emotional responses to strain, and differ in their propensities to react to strain with criminality and delinquent behaviors (see Broidy & Agnew, 1997 for a discussion). Compared to females, males tend to be exposed to higher rates of violence in the community setting. They also tend to be more likely to respond to such events with anger, frustration, violence, and aggression and to resort to violence as a coping strategy for dealing with strain (Broidy & Agnew, 1997). In contrast, females are more likely to experience depression and other internalizing problems following direct victimization and exposure to victimization (i.e., indirect or vicarious strain). They may also be less likely to retaliate overtly and maybe more likely to engage in self-destructive or “escapist” offenses, including substance use. Thus, females may use internalizing coping strategies to alleviate and/or cope with exposure to violence, whereas males would be more apt to employ externalizing coping strategies (Kaufman, 2009). Based on GST, we would hypothesize that girls will be more likely than boys to respond with substance use following exposure to violence. However, Broidy and Agnew’s (1997) gendered discussion of strain theory has focused more on illegal behaviors other than substance use, and it may be that this type of coping mechanism is equally likely to be used by boys and girls.

Past Research

Empirical research that includes both male and female respondents have reported significant, positive associations between direct and indirect exposure to violence experienced in the community and alcohol and/or other substance use by teenagers (Fagan, 2003; Farrell & Sullivan, 2004; Kilpatrick et al., 2003; Kliewer & Murrelle, 2007; Kliewer et al., 2006; Schwab-Stone et al., 1995; Zinzow et al., 2009). The few studies that have assessed gender differences in the effects of exposure to violence on youth substance use report significant associations between exposure to violence in the community and increased substance use for both sexes and have not reported significant gender differences in the strength of these relationships (Kaufman, 2009; Kilpatrick et al., 2000; Sullivan et al., 2004; Thompson, Sims, Kingree, & Windle, 2008). For instance, Kaufman (2009) found that being a victim of violence was associated with regular drinking among both male and female teenagers, and Kilpatrick and colleagues (2000) reported no significant gender differences in the effects of witnessing violence on alcohol use or drug dependence among youth. These two studies are especially notable in that they controlled for many other risk factors related to substance use and still found significant effects, for both genders, on substance use.

The pattern of results suggests that the relationship between exposure to violence and substance use is robust, although it may also vary in strength according to the types of exposure to violence and substance use examined. Preliminary evidence further suggests that the exposure to violence–substance use relationship is similar for males and females, but more evidence is needed to establish generalizability across sexes. There are also significant methodological differences between studies that may influence results. Notably, much research has relied on cross-sectional data, few studies have examined both direct and indirect forms of exposure to violence, and studies have varied in the measurement of

substance use (substance use vs. substance abuse; alcohol use vs. alcohol *and* other drug use, etc.). Reliance on cross-sectional data is problematic because it precludes identification of causal pathways and because substance use may precede exposure to violence rather than the reverse (Begle et al., 2011; Buka et al., 2001; Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). In addition, longitudinal studies, which do not control for prior substance use, and investigations that do not include other relevant risk factors for substance use may produce inflated relationships between exposure to violence and substance use (Kilpatrick et al., 2000).

Only a few studies have attempted to differentiate the effects of direct victimization from witnessing violence occurring to others (Kilpatrick et al., 2000). Most examine one or the other separately (e.g., Kliewer & Murrelle, 2007; Kliewer et al., 2006), and we could find no examples that examined their relative impact on substance use or that examined gender differences in these relationships. This oversight is problematic because it is possible that different forms of violence may result in different types of effects. For example, GST might predict that direct exposure to violence would be most likely to result in aggressive behavior because victims seek to attack the source of the strain, whereas indirect exposure would be more likely to result in substance use when confrontation is not possible or feasible (Taylor & Kliewer, 2006). How gender may further complicate these pathways is uncertain, given the lack of research in this area.

In summary, although it is clear that exposure to violence can have many detrimental effects, its specific relationship to subsequent substance use, as well as how this relationship varies by gender, has not been widely examined. In particular, there is a need for longitudinal studies that differentiate the effects of indirect and direct exposure to violence on future substance use, control for relevant predictors, and examine gender differences in these relationships. This study seeks to fill this gap in knowledge by using longitudinal data to examine the relative effects of direct and indirect exposure to violence on alcohol use, binge drinking, and marijuana use among a sample of teenagers living in Chicago.

METHODS

Sample

The Project on Human Development in Chicago Neighborhoods (PHDCN) is a longitudinal study designed to examine the effects of families, schools, and neighborhoods on prosocial and antisocial behavioral development of children and adolescents (Earls, Brooks-Gunn, Raudenbush, & Sampson, 2002). The PHDCN identified 343 neighborhood clusters (NCs), derived from 847 census tracts in Chicago, which were subsequently stratified by racial/ethnic and socioeconomic diversity. Eighty neighborhoods were then selected via stratified probability sampling, and participants within these NCs were sampled for the Longitudinal Cohort Study (LCS). Households with at least one child in one of the seven age cohorts (ages 0, 3, 6, 9, 12, 15, and 18 years) were eligible for inclusion in the LCS, and interviews of 6,228 youth subjects and their primary caregivers (75% of the eligible population) were conducted (Earls et al., 2002). Given our focus on adolescent substance use, this study uses data collected at Waves 2 and 3 from three cohorts (youth aged 9, 12, and 15 years; $n = 796$ males and 819 females).

Measures

Dependent Variables—Adolescent substance use was measured by three outcomes—frequency of alcohol use, binge drinking, and marijuana use—each assessed at Wave 3 using questions from the National Household Survey on Drug Abuse (1991). *Frequency of alcohol use* and *frequency of marijuana use* reflect the number of days (on a 9-point ordinal scale

ranging from 0 to 200 or more days) in the past year the respondent reported using alcohol and marijuana, respectively. *Frequency of binge drinking*, measured on a 6-point ordinal scale ranging from 0 to 10 or more days, reflects the number of days in the past month the adolescent drank five or more drinks in a row.

Independent Variables: At Wave 2, adolescents were asked about their past year indirect and direct exposure to violence. *Any indirect exposure to violence* was created from six items reflecting whether or not the adolescent saw someone chased, attacked with a weapon, shot, shot at, or threatened at least once, or hit two or more times[1] in the past year ($\alpha = .72$). The same items were used to create *any direct exposure to violence*.[2] Respondents were asked if they had personally been the victim of any of the six acts ($\alpha = .54$). Both measures were dichotomized, comparing respondents who reported not being exposed to violence (coded as 0) to those reporting experiencing one or more events in the past year (coded as 1).[3] Although the reliability of direct exposure to violence is somewhat low, previous studies have supported the reliability and validity of these measures and have suggested that they be kept separate (Brennan, Molnar, & Earls, 2007; Selnar-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998).[4]

Control Variables: The analyses controlled for the risk factors from various contexts (i.e., individual, peer, family) that have been associated with substance use in prior research (Hawkins, Catalano, & Miller, 1992). Adolescent self-reports at Wave 1 and primary care-givers' responses at Waves 1 and 2 were used to assess demographic characteristics. *Age* was measured as the youth's age in years. *Household salary*, which is assessed from the adolescents' primary caregivers' responses, was based on an 11-point scale (1 [*less than $5,000*], 11 [*more than $90,000*]) and indicates the total household income earned in the past year. Race/ethnicity was measured by three dichotomous variables, *Hispanic, African American*, and *other* race, with Whites (non–Hispanic Whites) serving as the reference category.

We also controlled for Wave 1 *child's low self-control* based on the Emotionality, Activity, Sociability, and Impulsivity (EASI) Temperament survey (Buss & Plomin, 1975; see also Gibson, Sullivan, Jones, & Piquero, 2010). Child's self-control was assessed by primary caregivers' rating of their child's inhibitory control, decision making, sensation seeking, and persistence ($\alpha = .75$). Each of the 17 items were assessed on a 5-point Likert scale (1 [*uncharacteristic of child*], 5 [*characteristic of child*]), then summed and standardized; higher scores reflect lower self-control. Self-control is considered one of the strongest risk factors for delinquency, including "analogous behaviors" such as substance use (Gottfredson & Hirschi, 1990; Pratt & Cullen, 2000). We also accounted for the perceived *availability of drugs*, which has also been shown to be strongly predictive of adolescent substance use (Beyers, Toumbourou, Catalano, Arthur, & Hawkins, 2004; Cleveland, Feinberg, Bontempo, & Greenberg, 2008; Gibbons et al., 2004). Availability of drugs was measured during Wave 2 and based on a 4-point scale (1 [*probably impossible*], 4 [*very easy*]) representing

[1]Approximately 50% of females and 59% of males had seen someone hit at least once in the past year, and including this item increased the overall prevalence of being indirectly exposed to violence to approximately 62% and 71% of females and males, respectively. Thus, seeing someone hit appeared to be a relatively normative experience. To limit the focus to somewhat less common experiences and more conservative estimates of indirect exposure to violence, we restricted the measure to those who had seen someone hit two or more times in the past year. All other items in this measure were based on having witnessed violence one or more times.

[2]All items in the direct exposure to violence measure were based on having been victimized one or more times.

[3]Most exposures to violence took place outside the home and either in the school or in the community settings.

[4]Indirect and direct exposure to violence were significantly correlated with each other ($r = .36$) but did not present problems with collinearity in statistical models.

respondents' perceptions of the ease in which they could obtain cigarettes, alcohol, and marijuana (α = .87). These items were standardized and summed.

Extant research has suggested that delinquent peers are one of the strongest predictors of adolescent substance use (Elliott, Huizinga, & Ageton, 1985; Windle et al., 2009), and there is also some evidence that peer influences can vary for males and females (e.g., Agnew & Brezina, 1997; Mazerolle, 1998). We controlled for peer deviance by including *peer substance use* in the models. This variable, measured at Wave 2, represents the proportion of youths' friends who used marijuana, alcohol, and tobacco in the past year. These items were based on a 4-point scale (1 [*none of them*], 4 [*all of them*]) and were standardized and summed (α = .85). Research has also suggested that children of alcoholic or substance-using parents have an increased likelihood to use substances earlier in adolescence (e.g., Chassin, Pillow, Curran, Molina, & Barrera, 1993; Kilpatrick et al., 2000; Kilpatrick et al., 2003; Kliewer et al., 2006; Windle et al., 2009). To account for this relationship, we included a measure of *parental problem drinking*, derived from the Short Michigan Alcohol Screening Test (Selzer, Vinokur, & van Rooijen, 1975). Parental problem drinking reflects the degree to which the primary caregiver was considered to have a drinking problem (α = .75). Primary caregivers were asked 13 questions regarding their drinking habits, perceptions of whether they or their friends/family considered them to be a problem drinker, and the consequences of their drinking. If the primary caregiver answered "Yes" to at least two questions, he or she was considered to have a drinking problem (1 [*problem drinkers*], 0 [*no problem drinking*]).

Because research has suggested that higher levels of parental monitoring may influence the likelihood of substance use and/or condition the relationship between exposure to violence and substance use (e.g., Chassin et al., 1993; Kliewer et al., 2006; Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000; Sullivan et al., 2004), we included a measure assessing the level of parental oversight experienced by the youth. *Curfew*, assessed from primary caregivers' responses at Wave 2, is the sum of three dichotomous items (α = .60), reflecting if the child had a curfew on weekday and weekend nights; higher scores indicate stricter curfews. Finally, because much research has established that prior behaviors are strong predictors of future behaviors and that earlier onset of substance use may be associated with future problematic behaviors (e.g., dependence; Hawkins et al., 1992; Windle et al., 2009), we included measures of prior substance use in our analyses. Prior substance use was measured by three dichotomous variables assessed from Wave 2: *prior alcohol use* (included only in the alcohol analyses), *prior binge drinking* (included only in the binge drinking analyses), and *prior marijuana use* (included only in the marijuana analyses).

Statistical Analyses

This study includes 796 males and 819 females living within 79 Chicago neighborhoods.[5] Although this study focuses on the individual-level factors that influence adolescent substance use, youth were clustered within neighborhoods, so it is important to account for possible confounding neighborhood effects. Hierarchical modeling techniques (hierarchical linear modeling [HLM], see Raudenbush & Bryk, 2002) were used to adjust for the correlated error that exists among individuals living within the same neighborhoods. All individual-level predictors were group-mean centered and were fixed to remove between-neighborhood variation as well as to ease the interpretation of coefficients. The dependent variables were analyzed using fixed-effect Poisson models in HLM that corrected for overdispersion.

[5]One neighborhood cluster dropped out once we restricted our analysis to adolescents in only three cohorts.

The models proceeded in a series of three steps to more comprehensively assess the relationship between the type of exposure to violence experienced and subsequent substance use. Sequencing the models also facilitates comparison of these findings with those from past research, which may not have included the full set of control variables included in this investigation. The first step was to estimate the bivariate relationship between indirect exposure and substance use for both males and females for each outcome (see Models 1 in Tables 2 through 4). Next, we assessed whether the magnitude of indirect exposure was affected by the inclusion of demographic controls (see Models 2 in Tables 2 through 4). Finally, we included the other psychosocial control variables (see Models 3 in Tables 2 through 4) to assess the impact of indirect exposure on substance use once all potentially relevant covariates of substance use were accounted for. These steps were then repeated to assess the stepwise impact of direct exposure to violence on all outcomes for males and females (see Tables 5 through 7). Differences in the magnitude of the effects for both indirect and direct exposure were calculated between males and females on all outcomes using equality of coefficient tests (Clogg, Petkova, & Haritou, 1995).

RESULTS

The sample consisted of 49% males and 51% females, most of whom were about 14 years old. Approximately half of the sample was Hispanic, one third was African American, and the remainder were non–Hispanic Whites or of another ethnicity. Indirect exposure to violence was common among both males and females—approximately 66% of males and 55% of females had witnessed someone being chased, attacked with a weapon, shot, shot at, or threatened at least once during the past year, or hit more than one time. Direct exposure was less common, although still reported among 32% of males and 23% of females. For both forms of exposure, the most common experience was hitting—either seeing someone hit (indirect exposure; 47% of males and 39% of females) or being hit (direct exposure; 18% of males and 15% of females).

Males reported experiencing higher levels of indirect and direct exposure to violence (Table 1). Specifically, compared to females, males were more likely to report seeing someone chased, hit more than one time, attacked with a weapon, and threatened. They were also more likely than females to be directly victimized by being chased, attacked with a weapon, shot, and shot at in the past year. Males also reported greater frequencies of each type of substance use.

Indirect Exposure to Violence and Adolescent Substance Use

The results of the effects of indirect exposure to violence on the frequency of subsequent alcohol use for males and females are reported in Table 2. Indirect exposure significantly increased the frequency of alcohol use among males. However, its influence became nonsignificant once all control variables were included (Model 3). The effect of indirect exposure to violence for females, however, maintained a strong, positive, and significant impact on the frequency of alcohol use, even when all other variables were in the models. The magnitude of the effect of indirect exposure on alcohol use did not significantly differ between males and females.

The results of the effects of indirect exposure to violence on the frequency of binge drinking are presented in Table 3. Similar to the models predicting alcohol use, indirect exposure to violence significantly increased the frequency of binge drinking for both males and females. In the full models (Models 3), the effect of seeing someone victimized became nonsignificant for males but retained significance for females. Nevertheless, there were no differences in the magnitude of the effect of indirect exposure in any of the models comparing males and females.

The models using indirect exposure to violence to predict the frequency of marijuana use for males and females are reported in Table 4. For both males and females, indirect exposure increased the frequency of using marijuana at Wave 3. Although the strength of the relationship decreased as relevant predictors were included in the models, indirect exposure remained a strong and significant predictor of increased marijuana use for both sexes. The magnitude of the effect of indirect exposure, however, was not significantly different across the models comparing males and females.

Direct Exposure to Violence and Adolescent Substance Use

The effects of direct exposure to violence on the frequency of subsequent alcohol consumption, binge drinking, and marijuana use are reported in Tables 5, 6, and 7, respectively. For both males and females, direct exposure significantly increased the frequency of alcohol use (Table 5). Its effect lessened and became nonsignificant once other predictors, such as peer substance use and availability of drugs, were included in the models. Similar to the effects of indirect exposure, there were no differences in the magnitude of the effects of direct exposure between males and females.

Regarding binge drinking, being personally victimized significantly increased the frequency of future binge drinking for both males and females, although its impact on males became nonsignificant once all other relevant factors were included (Table 6, Model 3). Direct exposure to violence retained its significance for females across all models. In addition, equality of coefficient tests revealed that direct exposure exerted a significantly stronger impact on future binge drinking for females compared to males, but this difference was only evident in the models controlling for demographic characteristics (Models 2).

Finally, the results predicting the frequency of marijuana use are displayed in Table 7. For both males and females, the effects of direct exposure to violence on subsequent marijuana use were significant. For both sexes, direct exposure increased future marijuana use, but this effect became nonsignificant once the models controlled for other relevant predictors. There were no differences in the magnitude of the direct exposure effect between sexes.

The Relative Impact of Indirect and Direct Exposure to Violence on Adolescent Substance Use

To more fully test the differences of the relative influence of direct and indirect exposure to violence on future substance use, we also examined models that included all control variables as well as both forms of exposure. The results are displayed in Table 8. With the exception of marijuana use, the effects of both indirect and direct exposure on subsequent male substance use were nonsignificant once all relevant variables were included, suggesting that other factors may be more salient predictors for males. On the contrary, indirect exposure maintained a strong and significant impact on future alcohol, binge drinking, and marijuana use for females. Direct exposure, however, did not retain significance. These results suggest that seeing someone else being victimized is a stronger predictor of future substance use for female youth. However, it is also important to note that, according to the equality of coefficient tests, gender differences in the magnitude of these effects were not statistically significant.

DISCUSSION

This study sought to address a gap in the literature regarding the relationship between exposure to violence and adolescent substance use. In particular, extant research has lacked studies that compare the relative effects of direct and indirect exposure on substance use, have not employed longitudinal data, and have failed to examine potential gender

differences in these relationships. Based on the data from a large, longitudinal study, this investigation found that both direct and indirect exposure to violence increased subsequent substance use, and this relationship was significant for males and females. Although this is the overall pattern of results, three specific findings were also evidenced.

First, the significant relationship between exposure to violence in the community and substance use among adolescents is consistent with most prior research in this area (Fagan, 2003; Farrell & Sullivan, 2004; Kaufman, 2009; Kilpatrick et al., 2000; Kilpatrick et al., 2003; Kliewer & Murrelle, 2007; Kliewer et al., 2006; Schwab-Stone et al., 1995; Taylor & Kliewer, 2006; Zinzow et al., 2009). These findings are also consistent with the general postulations of GST, whereby persons who experience direct or indirect (i.e., vicarious) strains are at high risk for developing strong, negative emotions, which must be managed via either prosocial or antisocial (i.e., criminal) responses, such as substance use (Agnew, 2002, 2006). The findings, however, show somewhat less support for this relationship compared to prior studies, given that the effect of exposure to violence did not always retain its significance in the full models, which controlled for prior substance use and a range of other risk factors. The inclusion of these variables and the use of longitudinal data is a more rigorous test of the impact of violence exposure on substance use compared to many other past studies (which have often relied on cross-sectional data and a more limited number of control variables) and may explain the somewhat weaker impact of exposure to violence evidenced in this study. These results also suggest that other experiences, notably peer influences, may be more salient predictors of substance use than exposure to violence (see also Kilpatrick et al., 2000).

Second, in this study, analyses directly compared the magnitude of the effects of direct and indirect exposure to violence on substance use, whereas past studies have typically assessed only one or the other forms of victimization, or have included both types in a summary measure of exposure to violence. The results presented here suggest that indirect exposure may be a more important predictor of substance use compared to direct exposure, although this difference may be more relevant for females. This finding is unexpected given that GST hypothesizes that personal and direct experiences with strains should have the strongest relationship to criminality or delinquency (Agnew, 2006). Nevertheless, the theory also notes that indirect and vicarious strains are important and can engender negative emotions and criminal coping mechanisms, particularly when youth witness violence occurring to those close to them (e.g., friends or family members; Agnew, 2002).

With one exception (marijuana use), the effects of both types of violence were nonsignificant in the full models predicting substance use among male respondents. However, for females, the effect of indirect exposure retained its significance across each outcome, and direct exposure did so for binge drinking. Furthermore, when indirect and direct exposure were included in the same analyses (Table 8), only indirect exposure predicted the frequency of marijuana use for males, and both forms of exposure failed to predict the other outcomes for males. In addition, indirect exposure was a significant predictor of substance use for females, but direct exposure was not. These differing results underscore the importance of assessing the degree to which different types of exposure to violence are likely to result in different types of outcomes.

Third, our findings highlight the importance of examining gender differences in the exposure to violence–substance use relationship, which has rarely been done in past studies. Overall, the results did not indicate many significant gender differences in the impact of direct and indirect exposure to violence on substance use. Although a few differences emerged when examining results separately for males and females, the equality of coefficient tests indicated only one significant gender difference in the magnitude of effects:

The effect of direct exposure to violence on binge drinking was stronger for females compared to males (although only in the model including only demographic characteristics). These findings are similar to the few other empirical studies that have tested for, but have not found, significant gender differences in the relationship between exposure to violence and substance use (Kaufman, 2009; Kilpatrick et al., 2000; Sullivan et al., 2004; Thompson et al., 2008). In addition, many previous tests of GST have reported that other strains have similar effects for males and females on various delinquent behaviors (Agnew & Brezina, 1997; Hoffman & Su, 1997; Mazerolle, 1998).

Although GST has suggested that the relationship between exposure to violence and delinquency may vary by gender (Agnew, 1992; Broidy & Agnew, 1997), we did not find strong evidence of this in our study. GST has posited that males are more likely to respond to strains with outward forms of anger, such as violence and aggression (Broidy & Agnew, 1997), and females are more likely to internalize their reactions to strains, such as experiencing depression or using substances to cope with the pains of being exposed to violence (Kaufman, 2009). As Agnew (2002) has suggested, in this study, males were more likely to experience strains in the form of exposure to violence, but males and females were equally likely to engage in substance use as a coping mechanism. These findings are consistent with the more general tenets of the theory, which was formulated as a “general” theory of crime intended to explain delinquency and criminality for all persons regardless of sex or other demographic differences. It should be noted, however, that substance use has received limited attention in theoretical discussion and empirical tests of GST. Therefore, the degree to which exposure to violence leads to substance use via strain processes—and gender differences in these processes—is not as robustly understood compared to other outcomes (e.g., crime, aggression).

Our findings were also not completely congruent with feminist theories of crime, which suggest that victimization and exposure to violence are significant risk factors for female criminality and possibly more important in leading to illegal behaviors among females versus males (Belknap & Holsinger, 2006; Chesney-Lind, 1997; Fagan, 2001). In contrast to this perspective, our findings indicate that exposure to violence had a similar impact on female and male substance use. It is important to note, however, that feminist theories emphasize sexual assault as a particularly salient predictor of female criminality, and our measures of exposure did not include sexual assault. In addition, feminist theories have not discussed in detail the gender differences in the effects of victimization experienced outside the home (which are more commonly experienced by males), as we do in this study, and it may be that this form of violence engenders more similar responses from males and females, at least in terms of substance use. The analyses did show that exposure to violence, in the form of direct victimization, was a stronger predictor of binge drinking for females than males, which is more consistent with the predictions of feminist theories. Heavy drinking is far less common among adolescents and may be indicative of more serious negative responses to traumatic experiences, particularly the desire to self-medicate and/or escape from the emotions engendered by victimization. In this case, then, our findings may *partially* support feminist theories’ expectations as well as certain tenants from GST (i.e., that females are more likely to cope with internalizing or “escape” behaviors).

This study thus adds to mounting evidence that exposure to violence can lead to increased substance use among adolescents and should be a call to action to ensure that victims receive assistance to help them cope with the traumas they have experienced. Counseling and other supportive services should target youth who have disclosed episodes of direct and indirect exposure to violence either via school personnel (i.e., counselors or nurses), given the high rates of exposure to violence among school-aged youth, or community-based agencies serving youth (e.g., Boys & Girls Clubs, YMCAs) who may not regularly attend school.

More universal and preventive interventions should also be delivered to provide all youth with services and to reach them *before* victimization or exposure to violence occurs and/or leads to substance use. Effective school-based prevention programs—such as Promoting Alternative Thinking Strategies (PATHS; Greenberg, Kusche, & Mihalic, 1999) and Life Skills Training (Botvin, Griffin, & Nichols, 2006)—can be used to enhance behavioral and emotional competence among elementary and middle school–aged children by providing them with skills to cope with stress and anxiety and to recognize and respond appropriately to negative emotions. It is also important for communities to adopt strategies that will reduce youth perpetration of violence, which should, in turn, decrease the likelihood that adolescents will be victimized and/or witness victimization. Fortunately, models of school- and community-based programs that have been shown to reduce the perpetration and/or victimization of youth are available (Hahn et al., 2007; Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999; Hawkins et al., 2011; Sussman, Dent, & Stacy, 2002). Regardless of the specific strategies employed by practitioners and community members, our findings show that services should be delivered to all youth, regardless of age or gender, because exposure to violence appears to be widespread and equally influential in increasing the likelihood of substance use.

Although this study has addressed an important gap in the literature linking exposure to violence and negative social behaviors and has relevance for policy and practice, it has some limitations. First, the generalizability of this study is limited. Data were only collected in one city—Chicago—at one period—the 1990s. Second, the PHDCN was designed to explore the development of adolescents nested within neighborhoods. We were only interested in comparing gender differences in the individual-level, longitudinal impact of exposure to violence on substance use. Although this study controlled for potential neighborhood influences, additional research is needed to examine the degree to which neighborhood characteristics may be related to the relationship between exposure to violence and substance use. Third, this study only used dichotomous measures to assess indirect or direct exposure to violence. We did not examine how the amount or frequency of victimization impacted substance use, and it is possible that the effects of exposure would have been stronger if operationalized as a scale reflecting the number of violent experiences the youth was exposed to. Only a few studies have examined these types of relationships (operationalizing victimization and exposure to violence as a scale; see Sullivan et al., 2004; Thompson et al., 2008), although this research has not assessed gender differences. Thus, more research is necessary in this area. In general, although this study adds to the limited literature exploring the relationship between exposure to violence and adolescent substance use, more research is clearly needed to untangle the relationships between direct and indirect violence exposure, subsequent substance use, and gender.

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TABLE 1

Sample Means and Standard Deviations[a]

	Males		Females		
	M	**SD**	**M**	**SD**	**Min–Max**
Outcomes					
Wave 3 alcohol use **	1.27	1.94	1.00	1.59	0–8
Wave 3 binge drinking **	0.40	1.06	0.16	0.63	0–5
Wave 3 marijuana use **	0.88	2.04	0.56	1.58	0–8
Independent variables					
Any indirect exposure to violence **	0.66	0.48	0.55	0.50	0–1
Saw someone get chased **	0.44	0.50	0.31	0.46	0–1
Saw someone get hit more than one time **	0.47	0.50	0.39	0.49	0–1
Saw someone get attacked with a weapon **	0.22	0.42	0.15	0.36	0–1
Saw someone get shot	0.09	0.28	0.07	0.26	0–1
Saw someone get shot at	0.13	0.33	0.10	0.30	0–1
Saw someone get threatened *	0.24	0.43	0.20	0.40	0–1
Any direct exposure to violence **	0.32	0.47	0.23	0.42	0–1
Been chased **	0.15	0.36	0.06	0.25	0–1
Been hit	0.18	0.38	0.15	0.36	0–1
Been attacked with a weapon **	0.05	0.21	0.02	0.14	0–1
Been shot *	0.01	0.07	0.00	0.00	0–1
Been shot at **	0.04	0.20	0.02	0.13	0–1
Been threatened	0.10	0.30	0.08	0.27	0–1
Control variables					
Age (at Wave 2) *	13.79	2.51	14.05	2.46	9.11–19.89
Household salary	4.87	2.51	4.64	2.48	1–11
African American	0.32	0.47	0.37	0.48	0–1
Hispanic	0.47	0.50	0.45	0.50	0–1

	Males		Females		
	M	**SD**	**M**	**SD**	**Min–Max**
White	0.16	0.37	0.15	0.36	0–1
Other race/ethnicity	0.05	0.21	0.03	0.18	0–1
Low self-control **	0.09	0.97	−0.09	0.97	−2.52–3.40
Availability of drugs	−0.08	1.00	0.01	0.99	−1.35–1.60
Peer substance use	−0.06	0.98	−0.01	0.98	−0.86–2.99
Parental problem drinking	0.12	0.32	0.12	0.33	0–1
Curfew	2.86	0.46	2.85	0.49	0–3
Prior alcohol use	0.21	0.41	0.22	0.41	0–1
Prior binge drinking	0.05	0.23	0.04	0.21	0–1
Prior marijuana use	0.10	0.30	0.10	0.30	0–1

[a] Based on 796 males and 819 females.

* $p \leq .05$.

** $p \leq .01$ reflects significance levels based on *t* tests assessing differences in the means between sexes.

TABLE 2

Fixed Effect Poisson Models of the Influence of Indirect Exposure to Violence on Wave 3 Frequency of Alcohol Use (Standard Errors in Parentheses)[a]

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Intercept	0.15*	−0.16*	−0.15	−0.06	−0.30**	−0.35**
	(0.06)	(0.07)	(0.08)	(0.07)	(0.08)	(0.09)
Independent variables						
Indirect exposure	0.92**	0.48**	0.21	0.81**	0.53**	0.31**
	(0.13)	(0.11)	(0.12)	(0.10)	(0.09)	(0.11)
Control variables						
Age	—	0.36**	0.19**	—	0.30**	0.18**
		(0.02)	(0.02)		(0.02)	(0.03)
Household salary	—	0.04	0.01	—	0.04*	0.05*
		(0.02)	(0.02)		(0.02)	(0.02)
African American	—	−0.09	−0.12	—	−0.55**	−0.44*
		(0.23)	(0.25)		(0.20)	(0.22)
Hispanic	—	0.18	0.18	—	−0.40*	−.23
		(0.19)	(0.24)		(0.16)	(0.21)
Other race/ethnicity	—	−0.20	−0.27	—	20.56*	−0.69**
		(0.33)	(0.48)		(0.27)	(0.23)
Low self-control	—	—	−0.09*	—	—	0.02
			(0.04)			(0.06)
Availability of drugs	—	—	0.32**	—	—	−0.005
			(0.07)			(0.07)
Peer substance use	—	—	0.16**	—	—	0.27**
			(0.06)			(0.07)
Parental problem drinking	—	—	0.09	—	—	0.13
			(0.14)			(0.14)
Curfew	—	—	0.07	—	—	−0.03
			(0.09)			(0.08)

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Prior alcohol use	—	—	0.40**	—	—	0.47**
			(0.12)			(0.14)
χ^2	101.41	184.15	216.23	126.67	177.62	159.93

[a]Based on 796 males and 819 females.

*$p \leq .05$.

**$p \leq .01$.

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TABLE 3

Fixed Effect Poisson Models of the Influence of Indirect Exposure to Violence on Wave 3 Frequency of Binge Drinking (Standard Errors in Parentheses)[a]

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Intercept	−1.08**	−1.47**	−1.42**	−1.92**	−2.21**	−2.44**
	(0.11)	(0.14)	(0.15)	(0.16)	(0.19)	(0.20)
Independent variables						
Indirect exposure	1.27**	0.71**	0.05	1.02**	0.81**	0.55*
	(0.25)	(0.17)	(0.17)	(0.26)	(0.23)	(0.23)
Control variables						
Age	—	0.45**	0.23**	—	0.31**	0.07
		(0.03)	(0.04)		(0.05)	(0.06)
Household salary	—	0.13**	0.05	—	0.15**	0.22**
		(0.03)	(0.03)		(0.04)	(0.05)
African American	—	0.52	0.53	—	−0.30	−1.32*
		(0.27)	(0.37)		(0.49)	(0.54)
Hispanic	—	0.85**	1.12**	—	−0.34	−0.22
		(0.25)	(0.39)		(0.35)	(0.37)
Other race/ethnicity	—	0.66*	0.87*	—	−0.08	−0.66
		(0.32)	(0.45)		(0.42)	(0.39)
Low self-control	—	—	0.07	—	—	0.13
			(0.08)			(0.15)
Availability of drugs	—	—	0.40**	—	—	0.02
			(0.13)			(0.17)
Peer substance use	—	—	0.27*	—	—	0.50**
			(0.12)			(0.16)
Parental problem drinking	—	—	0.17	—	—	20.04
			(0.23)			(0.53)
Curfew	—	—	0.11	—	—	0.09
			(0.12)			(0.21)

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Prior binge drinking	—	—	0.62 *	—	—	1.96 **
			(0.26)			(0.26)
χ^2	145.29	256.21	267.37	119.62	175.56	292.71

[a] Based on 796 males and 819 females.

* $p \leq .05$.

** $p \leq .01$.

TABLE 4

Fixed Effect Poisson Models of the Influence of Indirect Exposure to Violence on Wave 3 Frequency of Marijuana Use (Standard Errors in Parentheses)[a]

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Intercept	−0.30**	−0.48**	−0.43**	−0.72**	−1.08**	−1.25**
	(0.10)	(0.11)	(0.12)	(0.11)	(0.12)	(0.16)
Independent variables						
Indirect exposure	1.37**	1.05**	0.57**	1.16**	0.91**	0.47*
	(0.18)	(0.19)	(0.22)	(0.19)	(0.21)	(0.24)
Control variables						
Age	—	0.27**	0.13**	—	0.37**	0.02
		(0.03)	(0.05)		(0.03)	(0.06)
Household salary	—	0.03	−0.01	—	0.03	0.01
		(0.03)	(0.03)		(0.03)	(0.03)
African American	—	0.16	−0.41	—	−0.05	−0.09
		(0.30)	(0.40)		(0.27)	(0.29)
Hispanic	—	−0.05	−0.37	—	−0.75**	−0.25
		(0.24)	(0.41)		(0.19)	(0.22)
Other race/ethnicity	—	−0.36	−0.58	—	0.59	0.76
		(0.40)	(0.43)		(0.47)	(0.48)
Low self-control	—	—	0.19*	—	—	0.35**
			(0.08)			(0.08)
Availability of drugs	—	—	0.19	—	—	0.46**
			(0.11)			(0.16)
Peer substance use	—	—	0.29*	—	—	0.25*
			(0.11)			(0.12)
Parental problem drinking	—	—	−0.20	—	—	0.37
			(0.22)			(0.25)
Curfew	—	—	0.20	—	—	−0.24*
			(0.12)			(0.12)

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Prior marijuana use	—	—	0.38	—	—	1.39**
			(0.21)			(0.26)
χ^2	126.40	163.46	165.13	112.06	180.21	286.68

[a]Based on 796 males and 819 females.

*$p \leq .05$.

**$p \leq .01$.

TABLE 5

Fixed Effect Poisson Models of the Influence of Direct Exposure to Violence on Wave 3 Frequency of Alcohol Use (Standard Errors in Parentheses)[a]

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Intercept	0.20**	−0.16*	−0.16	−0.03	−0.28**	−0.34**
	(0.06)	(0.07)	(0.09)	(0.07)	(0.08)	(0.09)
Independent variables						
Direct exposure	0.50**	0.26**	0.13	0.54**	0.31**	0.11
	(0.11)	(0.10)	(0.09)	(0.10)	(0.08)	(0.11)
Control variables						
Age	—	0.38**	0.19**	—	0.31**	0.19**
		(0.02)	(0.03)		(0.02)	(0.03)
Household salary	—	0.04*	0.01	—	0.04	0.05*
		(0.02)	(0.02)		(0.02)	(0.02)
African American	—	−0.11	−0.13	—	−0.48*	−0.36
		(0.24)	(0.25)		(0.20)	(0.22)
Hispanic	—	0.13	0.16	—	−0.36*	−0.18
		(0.18)	(0.24)		(0.16)	(0.20)
Other race/ethnicity	—	−0.18	−0.24	—	−0.54	−0.59*
		(0.35)	(0.49)		(0.30)	(0.23)
Low self-control	—	—	−0.07	—	—	0.01
			(0.04)			(0.06)
Availability of drugs	—	—	0.34**	—	—	−0.0001
			(0.07)			(0.08)
Peer substance use	—	—	0.16**	—	—	0.29**
			(0.05)			(0.07)
Parental problem drinking	—	—	0.09	—	—	0.15
			(0.14)			(0.14)
Curfew	—	—	0.07	—	—	−0.02
			(0.09)			(0.08)

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Prior alcohol use	—	—	0.41**	—	—	0.50**
			(0.12)			(0.14)
χ^2	90.77	174.52	214.45	119.05	173.44	154.40

[a] Based on 796 males and 819 females.

* $p \leq .05$.

** $p \leq .01$.

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TABLE 6

Fixed Effect Poisson Models of the Influence of Direct Exposure to Violence on Wave 3 Frequency of Binge Drinking (Standard Errors in Parentheses)[a]

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Intercept	−0.995**	−1.47**	−1.42**	−1.94**	−2.22**	−2.44**
	(0.10)	(0.14)	(0.15)	(0.15)	(0.18)	(0.21)
Independent variables						
Direct exposure	0.64**	0.36**[b]	0.11	1.12**	0.92**	0.58*
	(0.16)	(0.14)	(0.16)	(0.25)	(0.24)	(0.29)
Control variables						
Age	—	0.47**	0.24**	—	0.30**	0.08
		(0.03)	(0.04)		(0.06)	(0.06)
Household salary	—	0.12**	0.05	—	0.14**	0.20**
		(0.03)	(0.03)		(0.04)	(0.05)
African American	—	0.51	0.51	—	−0.33	−1.19*
		(0.27)	(0.37)		(0.55)	(0.49)
Hispanic	—	0.83**	1.11**	—	−0.38	−0.25
		(0.24)	(0.38)		(0.33)	(0.35)
Other race/ethnicity	—	0.80*	0.89	—	−0.11	−0.42
		(0.37)	(0.46)		(0.45)	(0.34)
Low self-control	—	—	0.07	—	—	0.09
			(0.08)			(0.16)
Availability of drugs	—	—	0.40**	—	—	−0.01
			(0.13)			(0.17)
Peer substance use	—	—	0.26*	—	—	0.58**
			(0.12)			(0.15)
Parental problem drinking	—	—	0.21	—	—	−0.06
			(0.24)			(0.57)
Curfew	—	—	0.11	—	—	0.14
			(0.11)			(0.22)

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Prior binge drinking	—	—	0.61 *	—	—	1.80 **
			(0.26)			(0.26)
χ^2	128.49	238.52	271.56	121.74	161.76	275.96

[a] Based on 796 males and 819 females.

[b] Difference in the effect of direct exposure between males and females is significant at $p \leq .05$ (Models 2).

* $p \leq .05$.

** $p \leq .01$.

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TABLE 7

Fixed Effect Poisson Models of the Influence of Direct Exposure to Violence on Wave 3 Frequency of Marijuana Use (Standard Errors in Parentheses)*

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Intercept	−0.22*	−0.44**	−0.41**	−0.66**	−1.03**	−1.23**
	(0.09)	(0.10)	(0.12)	(0.11)	(0.12)	(0.16)
Independent variables						
Direct exposure	0.69**	0.49**	0.29	0.87**	0.60**	−0.01
	(0.17)	(0.16)	(0.16)	(0.20)	(0.17)	(0.21)
Control variables						
Age	—	0.29**	0.13**	—	0.38**	0.01
		(0.03)	(0.05)		(0.03)	(0.06)
Household salary	—	0.03	−0.01	—	0.02	0.01
		(0.03)	(0.03)		(0.03)	(0.03)
African American	—	0.13	20.41	—	20.003	0.01
		(0.49)	(0.40)		(0.27)	(0.28)
Hispanic	—	−0.11	−0.39	—	−0.68**	−0.15
		(0.41)	(0.40)		(0.16)	(0.21)
Other race/ethnicity	—	−.33	−0.57	—	0.53	0.83
		(0.56)	(0.43)		(0.55)	(0.50)
Low self-control	—	—	0.21*	—	—	0.34**
			(0.09)			(0.09)
Availability of drugs	—	—	0.23*	—	—	0.49**
			(0.11)			(0.16)
Peer substance use	—	—	0.30**	—	—	0.30**
			(0.12)			(0.12)
Parental problem drinking	—	—	20.20	—	—	0.37
			(0.22)			(0.25)
Curfew	—	—	0.19	—	—	−0.24
			(0.12)			(0.13)

	Males			Females		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Prior marijuana use	—	—	0.40	—	—	1.41**
			(0.21)			(0.26)
χ^2	94.47	123.34	146.71	100.44	172.86	281.53

[a]Based on 796 males and 819 females.

*$p \leq .05$.

**$p \leq .01$.

TABLE 8

Fixed Effect Poisson Models of Wave 3 Frequency of Alcohol/Substance Use[a]

	Males			Females		
	Frequency of Wave 3 Alcohol Use	**Frequency of Wave 3 Binge Drinking**	**Frequency of Wave 3 Marijuana Use**	**Frequency of Wave 3 Alcohol Use**	**Frequency of Wave 3 Binge Drinking**	**Frequency of Wave 3 Marijuana Use**
Intercept	−0.15	−1.42**	−0.42**	−0.34**	−2.45**	−1.25**
	(0.08)	(0.15)	(0.12)	(0.09)	(0.21)	(0.16)
Independent variables						
Indirect exposure	0.18	0.01	0.50*	0.30**	0.42*	0.50*
	(0.13)	(0.18)	(0.24)	(0.11)	(0.21)	(0.23)
Direct exposure	0.09	0.11	0.17	0.07	0.49	−0.09
	(0.10)	(0.17)	(0.17)	(0.11)	(0.28)	(0.20)
χ^2	216.04	268.57	164.88	159.83	288.21	285.93

Note. Analyses include all control variables.

[a]Based on 796 males and 819 females.

*$p \leq .05$.

**$p \leq .01$.