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Adolescent Exposure to Violence and Intimate-Partner Violence Mediated by Mental Distress

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Abstract

Adolescent exposure to violence (ETV) is associated with multiple negative health outcomes. Despite evidence linking adolescent ETV with later experiences of physical, sexual and psychological intimate partner violence (IPV) victimization, more longitudinal evidence is needed, and potential explanatory mechanisms should be tested. We examine data collected over 17 years to analyze the mediating effects of mental distress and substance use on the association between cumulative ETV in adolescence and IPV in adulthood. Adolescent (M_{ages}=15-18 years) ETV was associated with IPV outcomes in adulthood (M_{age}=32 years). In parallel mediation models, mental distress in emerging adulthood (M_{ages}=20-23 years) fully mediated the effect of adolescent ETV on later IPV outcomes. Although substance use predicted experience of IPV, it did not mediate the association between ETV and IPV. These findings have implications for understanding trajectories of risk following violence exposure and inform intervention work through identifying developmental periods where ETV contributes to later IPV victimization.

Keywords

cumulative exposure to violence; depression, anxiety; substance use; intimate partner violence; emerging adulthood

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In the United States, 36.4% of women and 33.6% of men experience sexual violence, physical violence, and/or stalking by an intimate partner during their lifetime (Smith et al., 2018). Estimates of lifetime perpetration of physical IPV are 28.2% for women and 21.4% for men (Desmarais, Reeves, Nicholls, Telford, & Fiebert, 2012). A systematic research review reported severe and often permanent health impacts of IPV victimization, including hypertension, chronic pain, neurological damage, and gastrointestinal disorders (Stockman, Hayashi, & Campbell, 2015). Adverse psychological consequences of IPV victimization include depression, post-traumatic stress disorder, and suicidality (Black, et al., 2010). The high prevalence and detrimental effects of IPV make it both an individual and broader public health concern. Risk for IPV perpetration and victimization follows a developmental trajectory, increasing throughout adolescence into emerging adulthood, at which time the rate of risk decreases but can remain high for previous victims (Capaldi, Knoble, Shortt, & Kim, 2012; Thulin, Heinze, Kusunoki, Hsieh, & Zimmerman, 2020). Although exposure to violence (ETV) during childhood and adolescence has been shown to predict future IPV victimization and perpetration, the pathways through which ETV influences later experiences of IPV are not well understood (Hilton, Ham, & Green, 2016; Whitfield, Anda, Dube, & Felitti, 2003). From a developmental psychopathology-informed, mechanistic perspective, articulating how violent experiences during adolescence contribute to later IPV risk is an important step toward better understanding long term implications of ETV for young adult relationships (Cox, Mills-Koonce, Propper, & Garié, 2010).

Exposure to violence in adolescence is a well-documented risk factor for correlates of IPV victimization including mental health outcomes such as depression and anxiety, and other problematic coping outcomes, such as drug and alcohol use, suggesting candidates for potential intervening mechanisms through which ETV influences later IPV victimization (Boynton-Jarrett, Hair, & Zuckerman, 2013; Chen, 2010; Chen, Corvo, Lee, & Hahm, 2017; Turner, Finkelhor, & Ormrod, 2010). Evidence from cross-sectional IPV and broader victimization studies indicates that mental distress mediates the association between ETV and IPV, but we are unaware of any prospective longitudinal studies examining pathways through which cumulative ETV in adolescence predicts experiences of IPV victimization in adulthood. Such work is needed in order to identify developmentally-sensitive opportunities for intervention. Moreover, IPV research to date focuses primarily on risk factors at the individual level. We aim to examine the relationship between ETV and IPV using a developmentally-informed, socioecological framework and stress-coping perspective. Specifically, we assess ETV across individual-, family- and community-domains during adolescence as a predictor of IPV victimization in adulthood and whether mental distress and substance use in emerging adulthood mediate that association.

Exposure to Violence during Adolescence

ETV in adolescence is associated with multiple forms of violent victimization throughout the life course including peer victimization, dating violence (i.e., an adolescent form of IPV), and IPV in adulthood (Ehrensaft et al., 2003; Gómez, 2010; Reijntjes, Kamphuis, Prinzie, & Telch, 2010; Tillyer, 2013; Turanovic & Pratt, 2015; Voith, Topitzes, & Reynolds, 2016; Widom, Czaja, & Dutton, 2014). ETV can be divided into direct and indirect exposures. Direct exposure is defined as experiencing violent victimization like physical,

sexual, and psychological abuse, whereas indirect exposure to violence is defined as witnessing forms of violence like abuse between family members or violent crime in the community (e.g., physical fights, shootings) (Evans, Davies, & DiLillo, 2008; Finkelhor, Turner, Shattuck, & Hamby, 2015; Sternberg, Baradaran, Abbott, Lamb, & Guterman 2006). ETV is a prevalent risk factor for youth, with more than two thirds of US youth 17 years and younger experiencing at least one form of direct or indirect exposure to violence annually (Finkelhor et al., 2015). Of youth reporting ETV, 60.8% reported violent victimization (e.g., physical assault) and 24.5% reported witnessing violence in the forms of family conflict and community-level violent crime in the past year (Finkelhor et al., 2015). Yet, individuals face the greatest ETV risk in adolescence and emerging adulthood (approximate ages of 12 and 24 years), as youth in this age range experience more ETV than any other age group (Truman & Rand, 2009). This increased risk for exposure may be developmentally-related as adolescents begin to engage in more person-context interactions, develop interpersonal skills, and with increased autonomy spend more time outside of the house in community (including school) settings (Shanahan, 2000). African American youth are at particular risk for exposure to community-based violence due to their disproportionate overrepresentation in urban areas, characterized by significantly higher levels of violence than rural and suburban areas (Browning et al., 2017; Cooley-Strickland et al., 2009; Voisin, 2007). Not only are African American adolescents more likely than White and Hispanic youth to experience direct violent victimization, but also more likely to have witnessed a violent crime or know someone who has been in a violent altercation (Paxton, Robinson, Shah, & Schoeny, 2004; Perron, Gotham, & Cho, 2008). Adolescent exposure to forms of interpersonal violence may shape how youth understand and engage with others, which in turn can have lasting influences on how youth engage in early adult relationships (Heinze, Hsieh, Aiyer, Buu, & Zimmerman, 2020). As such, it is important to study the relationship between adolescent ETV exposure and adult IPV outcomes in populations most susceptible for experiencing violent events.

Researchers differentiate between isolated exposure to victimization, consistent or repeated experiences of one type of victimization, and polyvictimization (i.e., exposure to multiple and repeated forms of violence) and the sequelae of negative outcomes over the life course (Finkelhor, Baradaran, Abbott, Lamb, & Guterman, 2015; Heyman & Slep, 2002; Hughes, Parkinson, & Vargo, 1989; Sternberg et al., 2006; Turner, Shattuck, Finkelhor, & Hamby, 2017). As data from the 2015 National Survey of Children's Exposure to Violence indicated, 38.7% of children surveyed reported more than one form of direct victimization in the past year, and of those children who reported any direct victimization, 64.5% reported multiple co-occurring forms of violence (Finkelhor et al., 2015). The tendency of violent events to co-occur underscores the need to assess violence exposure across socio-ecological levels (i.e., direct violence, indirect family violence, indirect neighborhood violence) as risk factors for later violent experiences. Moreover, developmental theory provides some explanation for how multiple types of violence exposure in the home and community may lead to later IPV risk directly by strengthening the expectation that violence is a method through which to resolve conflict, as well as indirectly through stress and coping processes (Reese-Weber & Kahn, 2005; Semenza, 2019; Wenzel, Glanz, & Lerman, 2002).

Applying Developmental Theories in Understanding ETV and IPV

We approach this work from a developmental psychopathology perspective, as we are interested in understanding the mechanisms through which adolescent ETV may lead to adult IPV victimization, and our longitudinal design allows us to examine these processes as they emerge across sensitive developmental periods. The positive association between adolescent ETV and adult IPV victimization may be explained in part by Social Learning Theory. Social Learning Theory posits that children and adolescents develop behavioral norms, attitudes, and beliefs through observation and behavior-modeling and has been applied to IPV contexts (Bandura, 1971; Jouriles, Norwood, McDonald, & Peters, 2001). Adolescence is a particularly salient period of developing behavioral norms and learning to make autonomous choices, as well as a time when dating begins and conflict-solving strategies are necessary in developing friendships and relationships. Youth exposed to violence within multiple socio-ecological domains may expect and accept the use of violence as a means of communicating and solving interpersonal conflicts (Cascardi, 2016; Gómez, 2010; Huesmann & Guerra, 1997). Moreover, chronic stressors like ETV can compromise adolescents' everyday decision-making and processing (Whitfield et al., 2003). We suggest this normalization of violent communication in adolescence may increase the risk of violence in intimate partnerships, specifically among vulnerable populations experiencing an undue burden of violence-related stressors (Johnson, 2006).

Social learning operates primarily at the individual and interpersonal-levels and is consistent with previous frameworks to understand the relationship between ETV and IPV which tended to focus on individual risk factors such as child abuse (i.e., direct ETV) or exposure to interparental IPV (i.e., indirect ETV) (Capaldi et al., 2012; Heyman & Slep, 2002; Voith et al., 2016). Yet, researchers have also noted that empirical studies need to include other levels of the social ecology to better understand the influence of factors beyond the individual-and interpersonal-levels (Capaldi et al., 2012; Heise, 1998). Ecological theory postulates that personal development is influenced by individual, family, and community influences and can be applied to understand how ETV at multiple levels may have a cumulative effect on experiences of IPV (Bronfenbrenner, 1986). Community-level factors, such as witnessing community violence, frequently co-occur with factors of an adolescent's interpersonal environment and should be accounted for in order to understand the full ramifications of violence exposure. Researchers, for example, found predictive relationships between negative neighborhood factors and IPV victimization, including that concurrent exposure to community violence was positively associated with IPV victimization in adult populations (Beyer, Wallis, & Hamberger, 2013; Thulin, Heinze, Kusunoki et al., 2020). Combined with individual-level exposures, neighborhood violence compounds social learning of violence behavior and adds to risks associated with ETV, contributing both directly and indirectly to longer term violence outcomes, including IPV. Despite the increased risk, not all youth exposed to violence experience later IPV victimization. Given the myriad negative sequelae of ETV, it is necessary to consider whether intervening mechanisms can explain some of the heightened risk for IPV experienced by youth exposed to violence. We explore two documented consequences of adolescent ETV-- mental distress

and substance use--that are also correlates of IPV victimization and are candidates for mediating mechanisms.

Mental Distress and Substance Use as Mediators of the Effect of ETV on IPV

Adolescent ETV is associated with increased risk for internalizing problems (e.g., post-traumatic stress disorder, depression, anxiety) and high-risk coping behaviors (e.g., substance use, sexual risk-taking) (Aiyer, Heinze, Miller, Stoddard, & Zimmerman, 2014; Eisman, Stoddard, Heinze, Caldwell, & Zimmerman, 2015; Evans et al., 2008; Golding, 1999; Gorman-Smith & Tolan, 1998; Heleniak, King, Monahan, & McLaughlin, 2018; Heyman & Slep, 2002; Holt, Buckley, & Whelan, 2008; Howell, 2011; Jouriles, Rosenfield, McDonald, & Mueller, 2014; Moylan et al., 2010; Sternberg et al., 2006; Vu, Jouriles, McDonald, & Rosenfield, 2016). At the community level, exposure to community violence predicted depressive and anxiety symptoms in female African American youth while indirect community-level violence exposure can also lead to internalizing symptoms and emotional dysregulation (Chen, 2010; Heleniak et al., 2018). Moreover, poor mental health is a negative outcome of trauma, including ETV, and is often associated with increased substance use (Griffin, Botvin, Scheier, Epstein, & Doyle, 2002; Repetto, Zimmerman, & Caldwell, 2004). In addition to their own effect on well-being, negative outcomes of exposure to violence in childhood and adolescence, including both internalizing behaviors and substance use and other maladaptive coping strategies, are known to increase risk for IPV in adulthood (Capaldi et al., 2012; Walton-Moss, Manganello, Frye, & Campbell, 2005).

The Transactional Model of Stress and Coping is useful for evaluating mental distress and substance use as processes of maladaptive coping with stressors such as direct and indirect exposure to violence. The model suggests that stressful experiences are interpreted as transactions between an individual and their environments while encountering stressful events (Wenzel et al., 2002). Stressors have a negative effect on psychological well-being, which in turn is associated with negative coping mechanisms to protect against the deleterious effects of stressors (Lazarus & Folkman, 1984). Stress does not affect all people equally because the effects of an external stressor may be mediated by the person's assessment of the stressor and the psychological, social, and cultural resources available to individuals (Lazarus & Folkman, 1984; Wenzel et al., 2002). ETV can be viewed as a significant chronic stressor that has long-lasting detrimental effects on an individual's health and developmental adjustments, and the psycho-physiological effect of such stressors is particularly salient among African American youth (Aiyer et al., 2014; Heinze, Stoddard, Aiyer, Eisman, & Zimmerman, 2017). Consequently, adolescents with high levels of ETV may develop depression, anxiety, and substance use behaviors in response to excessive stress, each of which further link to antisocial behavior, social isolation, and heightened risks of IPV. From a developmental psychopathology perspective, ETV exposure for some adolescents may set off a cascade of maladaptive coping behaviors across emerging adulthood that in turn increase later IPV risk. Because mental distress and substance use frequently co-occur in youth, it is important to examine both as mediators to understand the

pathways between ETV and IPV (Griffin et al., 2002; Repetto et al., 2004). We therefore examine mental distress and substance use as potential mediators of the pathway between ETV in adolescence and IPV in adulthood.

Present Study

We examine processes by which trauma and stress resulting from exposure to violence may solidify and ultimately characterize the coping mechanisms and violence expressed in intimate partner relationships in a predominantly African American sample residing in a high risk, urban environment. We aim to fill several gaps in the literature focused on adolescent exposure to violence and its effect on IPV: we use a prospective longitudinal design; utilize a cumulative measure of exposure to violence capturing direct and indirect forms of exposure; and examine mediation effects of mental distress, measured as depression and anxiety, and substance use, measured as alcohol and marijuana use, on the relationship between adolescent ETV and adult IPV victimization (Figure 1). Specifically, we test the direct association between adolescent ETV (approximately ages 15-18) and later reported IPV (approximately age 32) and a hypothesized parallel mediation model where emerging adult (ages 20-23) substance use and mental distress explain some portion of the total effect between adolescent ETV and IPV experienced as an adult. ETV is operationalized as the cumulative effect of three types of violence during adolescence - direct violent victimization by any person, indirect observed family violence, and indirect exposure of observing violence in the community - across time. We expect that adolescent ETV will be positively associated with subsequent experience of IPV in adulthood. We hypothesize mental distress and substance use in emerging adulthood will mediate the associations between cumulative adolescent ETV and adult IPV victimization, such that ETV will be associated with both higher levels of mental distress and substance use, which in turn predict more IPV experiences. In addition, researchers have noted systematic sex, race/ethnicity, level of education, and socioeconomic status differences in both rates of violence exposure and IPV victimization (Fleming, McCleary-Sills, Morton, Levtov, Heilman, & Barker, 2015; Rennison & Planty, 2003; Turner et al., 2017). Age at baseline may also have a potential influence on violence exposure as older participants may accrue a higher number of violent experiences (Heinze et al., 2017). We therefore included these variables as covariates in the analyses to account for potential confounding due to demographic influences.

Method

Participants

The study sample includes 850 participants at baseline attending one of four public high schools in Flint, Michigan in 1994. Twelve waves of data were collected over 17 years (W12: 2012). Our analysis draws from nine waves of data representing waves one through four, five through eight, and wave 12. At the first wave of data collection (W1: 1994), participants were in mid-adolescence (9^{th} grade, mean age = 14.9 years old). The goal of the original study was to investigate resiliency among youth who were at risk of leaving school before graduation and were at risk for high school dropout because of low school

achievement status. To be eligible for the study, participants had to have a grade point average of 3.0 or lower at the end of the eighth grade, were not diagnosed by the school as having emotional or developmental impairments, and self-identified as African American, White, or African American and White (Zimmerman, 2014). At baseline, the sample was 50% female and predominantly African American (African American = 80.1%; White = 16.8%; White and Black = 3.1%).

Procedure

Participants completed structured interviews at each wave of data collection during high school years (Waves 1 to 4; 1994 to 1997), four years after high school (Waves 5 to 8; 1999 to 2002), and four more years when respondents were in their early thirties (Waves 9 to 12; 2008 to 2012). Each interview lasted 50–60 minutes. Participants completed a paper and pencil questionnaire after the interview to collect data on substance use and sexual behavior to ensure more confidentiality for these questions. Prior to the data collection process, researchers obtained consent from each participant. The retention rates of the original study were generally high for the first eight waves (90% from Waves 1 to 4, 65% from Waves 5-8) and dropped to 44% for the last four waves due to a longer interval between waves 8 and 9 (almost six years). This study, the Flint Adolescent Study was approved by The University of Michigan Institutional Review Board (#H03-00001309-R2) and meets the requirements for the protection of human subjects.

Measures

Cumulative exposure to violence.—Three subscales were used to assess the participant's experience of violent victimization, family conflict, and observed violence during the high school years (Waves 1-4; mean ages approximately 15-18 years old). We generated the cumulative index by calculating the sum of each standardized subscale within each wave. A composite cumulative exposure to violence score was then generated by calculating the mean across the four waves. A similar approach was used in previous studies (Heinze et al., 2017). The specific subscales are described in detail below.

Direct physical violence victimization [W1-W4].—Three items assessed frequency of violence-related victimization in the past 12 months. The three questions were "I had someone threaten to hurt me", "I had something taken from me by physical force", and "I experienced being physically assaulted or hurt by someone." Participants reported the frequency on a scale ranging from 1 (*0 times*) to 5 (*4 or more times*). Cronbach's α ranged from 0.52 to 0.59 during wave 1 to 4.

Violent family conflict [W1-W4].—Two items assessed reported level of fighting and violence in the participants' family (Moos & Moos, 1994). Participants indicated how often family members got so angry they threw things and how often family members hit each other in anger. The response options included 1 (*hardly ever*), 2 (*once in a while*), 3 (*sometimes*), and 4 (*often*). Alphas for these two items ranged from 0.68 to 0.83.

Observed violence [W1-W4].—Two items assessed observations of violent behavior. The participants reported the number of times they had "seen someone commit a violent

crime where a person was hurt", and "seen someone get shot, stabbed or beaten up" in the last 12 months (Richters & Saltzman, 1990). Participants reported the frequency on a scale ranging from 1 (*0 times*) to 5 (*4 or more times*). Alphas for these two items from wave 1 to 4 ranged from 0.68 to 0.83.

Mental distress [W5-8].—Items from the Brief Symptom Inventory (Derogatis & Spencer, 1983) were used to assess participants' self-reported symptoms of depression (5 items, Cronbach's α ranged from 0.84 to 0.86) and anxiety (6 items, Cronbach's α ranged from 0.81 to 0.86) during waves 5-8. Participants responded using a five-point rating scale from 1 (*not true*) to 5 (*very true*) with higher scores indicating more psychological distress symptoms. A mean score for depression and anxiety symptoms was created for each wave by first averaging responses on all ten items within the wave. We then averaged anxiety and depression scores across waves 5 to 8 to create a composite variable of mental distress in emerging adulthood.

Substance use [W5-8].—Questions asking the frequency of participants' alcohol and marijuana use were drawn from the Monitoring the Future study (Johnston, O'Malley, & Bachman, 2003). Two items assessed alcohol use during waves 5-8. Participants reported the frequency of alcohol use over the past 30 days using a 7-point frequency scale: 1 (*none*), 2 (*1 to 2 times*), 3 (*3 to 5 times*), 4 (*6 to 9 times*), 5 (*10 to 19 times*), 6 (*20 to 39 times*), and 7 (*more than 40 times*). They also reported alcohol use over the past 12 months using the same Likert scale. The two measures were summed to create an alcohol use variable. Two similar items assessed the frequency of marijuana use during waves 5-8. Participants reported the frequency of marijuana use over the past 30 days and the past 12 months using the same 7-point Likert described above. Summed scores were generated for alcohol use and marijuana use within each wave 5-8. Finally, a composite mean was generated for average alcohol and marijuana use across waves 5-8.

Intimate partner violence (IPV) [W12].—We assessed participants' experience of IPV in both physical/sexual and psychological forms during their young adulthood (Wave 12; mean age approximately 32 years) (Capaldi et al., 2012; Widom et al., 2014). Two items assessed physical/sexual IPV by asking participants in the last 12 months, "has a partner slapped, kicked, pushed, choked, or punched you?" and "has a partner forced or coerced you to have sex?" Three items assessed psychological IPV by asking participants in the last 12 months, "has a partner threatened you with gun or knife to scare/hurt you?", "has a partner made you feel afraid you could be physically hurt?", and "has a partner repeatedly yelled/spoke in a way that made you feel frightened or rejected?" Response options were yes/no for each of the questions. We then recoded participants' responses to the five questions into two dichotomous variables: physical/sexual IPV (1 = *answered yes to either of the two physical/sexual IPV experiences*; 0 = *otherwise*) and psychological IPV (1= *answered yes to any of the three psychological IPV experiences*; 0 = *otherwise*). We also included an any IPV outcome (1=*answered yes to any of the five IPV experiences*; 0 = *otherwise*).

Demographics.—Age, sex, and race/ethnicity were assessed at baseline administration (Wave 1). Race was dichotomized (0 = *Black* or *Mixed Black/African American* and 1 =

White). Participants' age at baseline was calculated using reported birth month and year and was included as a covariate in the analysis. Employment status was assessed at wave 12 with a question asking the participant to indicate all conditions that apply to him/her: presently working, a full-time student, a part-time student, staying at home to care for children, or unemployed. Responses were recoded into a binary employment status variable (1 = *unemployed*; 0 = *full-time employed, part-time employed, full-time student or staying at home to care for children*) and included as an additional covariate. Highest education was assessed at wave 12 and captured the highest degree or certification participants received (0 = *no degree* to 5 = *master's degree or higher*).

Missing Data

Across the 12 waves of data collection, 376 (44.2%) participants had data for all variables used in our analysis. Missingness for exposure to violence (W1-W4) and perceived stress (W5-W8) variables ranged from 0.4–10.2% to 4.9–34.2%, respectively. Missingness for Wave 1 covariates ranged from 0.1–11.9%, although this missing data appeared to be missing at random, MCAR test $\chi^2(44) = 55.78$, $p = 0.11$. Missingness for the IPV measures (W12) was 55%. To account for differential attrition, we first examined missingness at wave 12 based on baseline demographics and exposure to violence. Wave 12 respondents did not differ by race, $\chi^2(1)$ 0.07, $p = 0.79$, but were more likely to be female than respondents at baseline, $\chi^2(1)$ 16.83, $p < 0.001$. Exposure to violence at baseline did not predict attrition by Wave 12, $t(847) = -132$, $p = 0.19$, but participants present at Wave 12 reported higher levels of both depression, $t(847) = -3.48$, $p < 0.001$ and anxiety at baseline, $t(847) = -2.97$, $p < .01$. Baseline rates of alcohol and marijuana use did not differ between participants present at Wave 12 and those who discontinued, $t(801) = 0.75$, $p = 0.45$ and $t(803) = -0.22$, $p = 0.82$, respectively. Given observed baseline differences in mental health, we conducted analyses (see detail below) using both observed cases (i.e., complete case analysis) and multiple imputation.

Analytic Plan

We examined associations between adolescent ETV and the likelihood of experiencing physical/sexual, psychological, and any IPV from a partner at mean age 32 years using logistic regression with maximum likelihood estimation. We first examined direct effects of ETV and demographic covariates on the probability of experiencing each form of IPV. Next, we introduced substance use and mental health between mean ages 20-23 years as separate mediators for each outcome. Finally, we estimated a parallel mediation model that included both substance use and mental health at mean ages 20-23 years as simultaneous mediators. Analyses were conducted using STATA version 15. Indirect effects were estimated using the STATA binary mediation package with bootstrapped standard errors.

As a supplemental analysis, we replicated the parallel mediation analysis using imputed data. Following recommendations from Schafer and Graham (2002), we used chained multiple imputation in STATA for each variable in the analyses with missing values (Schafer & Graham, 2002; Van Buuren, Boshuizen, & Knook, 1999). The method employs Bayesian estimation, drawing random values from posterior distributions ($n = 10$) of missing values (Rubin, 2004). To augment the accuracy of the imputed models, we included additional

baseline [W1] covariates as predictors of missing values that are not included in the final analysis, including: parental support, John Henryism active coping, self-acceptance, family relationship quality, peer relationship quality, school relevance, participants' fear of violence in both neighborhoods and schools, approval of violence, and delinquent behavior. Variables included in the imputation model are not included in our theoretical model and thus not included with our baseline measures described above.

Results

Bivariate correlations showed small to moderate positive associations between ETV and each IPV outcome (Table 1). ETV was moderately correlated with alcohol/marijuana use at both baseline and in emerging adulthood. Similarly, ETV was correlated positively with psychological distress at baseline and in emerging adulthood. Age was correlated with ETV experience with older students reporting more exposure. In contrast, ETV was negatively associated with the highest education achieved. No other demographic variables were correlated with ETV. Descriptive statistics for demographic covariates included in the analyses are reported in Table 2.

Direct Effect of Adolescent Cumulative ETV

Table 3 contains estimated direct effects of cumulative ETV in adolescence and demographic covariates on physical/sexual, psychological, and any IPV at mean age 32 years. Adolescent ETV was associated with higher likelihood of experiencing both psychological IPV and any IPV, but not physical IPV. Specifically, a unit change in adolescent ETV was associated with significantly higher odds of reporting psychological IPV, OR = 2.61, 95% C.I. [1.49, 4.58] and any IPV, OR = 1.79, 95% C.I. [1.07, 3.00], holding demographic variables constant. Of the demographic variables, only sex and highest education were associated with later experiences of experiencing physical/sexual IPV. Specifically, for males in the sample, the odds of reporting experiences of physical/sexual IPV increased by a factor of 2.36 relative to females, holding other covariates constant. Higher educational attainment, in contrast, was associated with a decreased risk of physical/sexual IPV, OR = 0.65, 95% C.I. [0.45, 0.95]. No other demographic variables predicted IPV outcomes.

Single Mediation (Substance Use)

Results of the substance use mediation model are reported in Table 4. For both psychological and any IPV outcomes, higher levels of reported substance use during mean ages 20-23 years were associated with greater log odds of experiencing IPV. The direct effect of ETV on IPV was reduced to non-significance for any IPV, with a significant indirect effect through substance use indicating mediation, indirect effect OR = 1.06, 95% C.I. [1.00, 1.12], representing 36% of the total effect of ETV. The effect of ETV on psychological IPV was partially mediated by substance use during emerging adulthood, indirect effect OR = 1.07 , 95% C.I. [1.01, 1.14], representing 24% of the total effect of ETV. Demographic predictors were not associated with IPV outcomes after accounting for emerging adult substance use with the exception of highest education, which was still negatively associated with physical IPV OR = 0.67, 95% C.I. [0.46, 0.99].

Single Mediation (Mental Distress)

Results of the mediation model through mental distress are reported in Table 5. Higher levels of mental distress in emerging adulthood were associated with increased odds of reporting physical/sexual, psychological, and any IPV. The effect of adolescent ETV on any IPV was fully mediated by mental distress at mean ages 20-23 years, with the indirect effect OR=1.11, 95% C.I. [1.04, 1.16] accounting for 56% of the total effect of ETV. The effect on psychological IPV was partially mediated by mental distress with the indirect effect OR = 1.11, 95% C.I. [1.04, 1.18] accounting for 35% of the total effect of ETV. An indirect effect of ETV on physical IPV through mental distress also emerged OR = 1.09, 95% C.I. [1.03, 1.17], accounting for 55% of the total effect despite the non-significant direct effect noted in Table 3. The indirect coefficients indicate that adolescent ETV is associated with increased risk for experience of IPV through higher levels of depression and anxiety in emerging adulthood. Sex re-emerged as a significant predictor in both the physical/sexual IPV and any IPV models, with males again reporting more experience of partner violence relative to females (Table 5). Higher levels of education were also associated with a lower log odds of physical IPV.

Parallel Mediation

The results of the parallel mediation model including both emerging adult mental distress and substance use are reported in Table 6. The direct and indirect effects of mental distress during emerging adulthood remained significant in the parallel model, but after accounting for mental distress, the direct and indirect effects of substance use during emerging adulthood were no longer significant. Overall, the model explained 13%, 12% and 10% of the variability in physical IPV, psychological IPV, and any IPV, respectively.

Analyses with Imputed Data

Results from imputed data analyses revealed mostly minor deviations from the complete case analyses. Ranges of the direct and indirect effects for the imputed parallel mediation models across all three outcomes are reported in Table 7. The direct effects of ETV, substance use, and mental distress were similar in magnitude and significance tests across analyses to those of the observed data. As with the complete case analyses, the direct effect of ETV on each IPV outcome after including mediators was non-significant across 90% or more of the imputation samples. Direct effect estimates for physical IPV varied evenly around 0 but were more often positive for psychological IPV and any IPV. The indirect effect of ETV through mental distress was replicated consistently across imputations (80-100% of draws), with relatively small ranges of point estimates across all three IPV outcomes. Each interval of replications included the observed indirect effect for mental distress. Notably, the indirect effect of ETV through substance use in the imputed parallel mediation models varied between significant and non-significant depending on the sample drawn (approximately 70% of draws). Close examination of the point estimates and confidence bands for the substance use direct and indirect effects in the complete case analysis, as well as considering the significant results from the substance use single mediation model, suggests that substance use may very well be a contributing factor in how ETV affects IPV outcomes, albeit of a smaller magnitude than mental distress.

Discussion

Our results demonstrate that individuals who are exposed to higher levels of violence in adolescence are at a higher risk for IPV exposure later in life. These findings are particularly important given that exposure to violence in adolescence predicted IPV over 15 years later. We found that ETV, a notable adolescent stressor, was consistently associated with mental distress in emerging adulthood, which aligns with predictions from developmental psychopathology theory as well as the Transactional Model of Stress (Lazarus & Folkman, 1984). According to psychopathology theory, stressful and traumatic experiences precipitate a sequelae of maladaptive coping behaviors and increase risk for negative health outcomes (Cox et al., 2010). Similarly, the Transactional Model of Stress suggests persistent stress environments are interpreted by individuals as threats and prompt an appraisal of coping resources. (Lazarus & Folkman, 1984; Wenzel et al., 2002). We build on previous studies which found associations between ETV and higher levels of anxiety and/or depression, but demonstrate how the effect of ETV on mental distress in turn increased the likelihood of reporting both physical and psychological IPV victimization (Gorman–Smith & Tolan, 1998; Heinze et al., 2017; Howell, 2011; Vu et al., 2016). Young adults with a history of ETV, who are managing depression and anxiety, may have access to fewer resources or perceived alternatives to violence as a means of communication than young adults without such a history, thus increasing the likelihood of future incidences of IPV victimization. Yet, the developmental timing of the increases in mental distress also points to a period for intervention given that most emerging adults are still forming schemas related to intimate relationships in emerging adulthood (Desmarais et al., 2012). Our hypothesis that substance use would also manifest as a contributing factor of ETV-IPV mechanisms was only partially supported. Researchers have suggested that youth use alcohol and marijuana as a way of self-medication to cope with emotional distress (Repetto et al., 2004; Repetto, Zimmerman, & Caldwell, 2008). Substance use, however, is one of many possible coping mechanisms which may explain why substance use does not operate as consistently as mental distress in our study as a mediator that predicts subsequent IPV experiences. Further, a study among young adults found that African American women reporting marijuana use had decreased odds of IPV victimization but increased odds through binge drinking, suggesting problematic substance use may function differently in predicting IPV outcomes depending on use behavior (Nowotny & Graves, 2013). The mixed evidence suggests further research into understanding substance use as a coping behavior in relation to ETV in adolescence and adult violence outcomes may be warranted.

Incorporating nine measurement occasions spanning 17 years, our study addresses a limitation of cross-sectional studies examining connections between ETV and later IPV experience (Voith et al., 2016). Our ETV measure captures four years of data collection which preceded the measurement of both the intermediate (substance use and mental distress mediators) and distal (IPV) outcomes addressing concerns of recall bias commonly introduced by retrospective reports of ETV in childhood and adolescence. Further, including adolescent ETV experiences that were temporally prior to the mediating influences during emerging adulthood, in addition to controlling for baseline levels of both substance use and mental distress, adds confidence in the identified indirect effects of ETV. An implication of

our findings is that adolescent ETV can influence later IPV risk through multiple pathways. Full or partial mediation of ETV was present in both single mediation models, although the indirect effects for substance use attenuated in the parallel mediation model. Yet our test of two theoretically driven mechanisms that are associated with both ETV and IPV yielded generally expected results. Although across outcomes these mediators accounted for between 35-55% of the total effect, ETV is known to influence myriad emerging- and young-adulthood outcomes with emotional, social, and physiological ramifications. This suggests that more longitudinal testing of mediating mechanisms, such as negative peer influence or sexual risk behavior, can further inform how ETV contributes to IPV victimization (Hope et al., 2019; Voisin, Jenkins, & Takahashi, 2011).

The findings add to research on ETV by including a multi-faceted measure of exposure, combining family violence, victimization, and observed violence experiences. Researchers note the deleterious effects of such cumulative exposure, as well as the disproportionate burden of cumulative ETV on African American populations (Finkelhor et al., 2015; Voith et al., 2016). Critically, our multifaceted, cumulative measure of adolescent victimization was predictive of reported IPV, despite not including measures of dating or other relationship violence in adolescence. The effects of violence exposure on future violent experience, therefore, may not be specific to a particular domain of violence exposure (e.g., peer violence leading to more peer violence). Victims of peer or observed violence in adolescence, for example, may still be at higher risk for IPV later in life even though such experiences are not related to intimate or dating relationships. Consistent with Social Learning Theory, this may be the result of the normalization of violence as an acceptable method for handling family/partner discord (Patterson, 2016). Researchers have found that attitudes regarding violence as a way to solve problems mediates exposure to violence and violent behavior (Stoddard, Heinze, Choe, & Zimmerman, 2015). Considering participant conflict resolution strategies or endorsement of violence as a way to solve problems may be an additional mechanism through which ETV affects later IPV victimization.

The findings of the present study support a developmentally-informed conceptualization of risk and suggest that it may be important to assess violence exposures outside of the household during adolescence, as these may be particularly salient at this age and shape behavior (Desmarais et al., 2012; Johnson, Giordano, Manning, & Longmore, 2015). Other researchers have examined trajectories of risk across childhood and adolescence, finding relationships between early childhood exposures such as child abuse to be predictive of dating violence during youth and IPV in adulthood (Capaldi et al., 2012). Still others suggested that risk related to adverse childhood experiences fluctuates across time relative to developmental periods during childhood, preadolescence, and adolescence (Thulin, Heinze, & Zimmerman, 2020). Risk during childhood may be more dependent upon family experiences and relationships, but the increased autonomy across preadolescence and adolescence may confer developmentally-specific risks, with later implications for relationship functioning in adulthood. For example, youth often have their first romantic relationship during preadolescence or adolescence. As such, exposure to violence in different contexts may inform youth perceptions of interpersonal interactions, including respect for partners or the use of coercion or force.

The finding that being male was predictive of physical IPV victimization was not expected. In tradition with feminist theory, male victimization is often described as reactionary perpetration by a woman to a male partner (Carney, Buttell, & Dutton, 2007). While this may explain some of the male victimization in the present study, another potential explanation may be situational couples violence (Johnson, 1995; 2006). Researchers have found that situational couples violence is the predominant form of IPV in population-level studies (Graham-Kevan & Archer, 2003; Kelly & Johnson, 2008). In situational couples violence, male victimization is not abnormal, nor is it conceptualized as being the result of reactionary violence. Situational couples violence occurs due to poor interaction norms within a couple, which might be aggravated by stressful situations. ETV is an example of a persistent stressor disproportionately experienced by African-Americans, which can lead to differential experience of mental distress for African American men as compared with African American women (Paradies et al., 2015; Williams & Williams-Morris, 2000). This study gives support that persistent stress as a result of cumulative ETV increases both negative mental health outcomes and heightens the impact of contextual risk factors for IPV, when conceptualized as situational couples violence.

Our results suggest that future research that continues to expand the conceptualization of ETV experiences across ecological levels and over vital developmental periods would be useful for informing preventive interventions. In addressing adolescent populations more broadly, these exposures may include cultural norms around the use of violence which is portrayed in media, with a potential focus on the difference between general portrayal of interpersonal violence in non-romantic relationships and the portrayal of violence or coercion in intimate or sexual relationships. Additionally, future research on the relationship between adolescent ETV and subsequent experience of IPV may also benefit by including protective effects of factors like community engagement and social support, which have been identified as particularly relevant measures of resilience among vulnerable populations (Dumont & Provost, 1999; Eisman et al., 2015; Howell, 2011). In a systematic review of risk factors for IPV, Capaldi and colleagues (2012) identified mixed evidence of an association between community-level measures like collective efficacy, social cohesion, and social control and IPV. Thulin, Heinze, Kusunoki, and colleagues (2020) examined various types of community-level risk factors and found that the measurement of community-level risk factors is often constrained to factors derived from social disorganization theories like the Broken Windows Theory, which focuses on the association between the decay of the built environment and social risks like crime and violence (Sampson, Raudenbush, & Earls, 1997). Expanding our understanding of ETV from a developmental perspective, expanding Social Learning Theory to account for exposures across ecological levels, and examining both risk and protective factors are important future directions which would add nuance to our understanding of the relationship between ETV, mental health and coping behaviors, and IPV.

Limitations

Over the life of the study, our participant sample had substantial attrition (55.4%). Our intermediate and primary outcomes (mental distress, substance use, and IPV) may each contribute to disengagement with research studies, suggesting the portion of the sample that

remained may have experienced fewer of these issues. Yet, assuming those with the highest levels of each were the most likely to discontinue their participation, we still identified associations in expected directions. Moreover, our attrition analysis demonstrated that study participants who remained in the sample showed few differences from their peers at baseline. Although mental health could certainly influence participants' willingness to continue study participation, baseline levels of both anxiety and depression were higher among respondents who remained in the study. Second, our sample was drawn from a particularly violent mid-size city, with rates of violence exceeding both state and national averages and may not be representative of the broader population (Federal Bureau of Investigation, 2013). Nevertheless, higher rates of violence are common in many similar Midwestern cities as local deindustrialized economies contend with falling revenues, declining populations, and blight. Additionally, other researchers have called for research with minority populations who may be disproportionately impacted by violence, as this population is not well represented in the literature and may be at greater risk of violence due to structural and community factors. Third, we note two measurement concerns including the low alpha for the direct victimization measure and that the measure of cumulative exposure to violence in adolescence did not include childhood exposure to violence, an important background predictor of adolescent ETV and other negative sequelae. Moreover, observed parental IPV was not measured in adolescence and thus not included in our measure of exposure. Both child abuse and prior IPV victimization have each been identified as risk factors for later IPV victimization (Capaldi et al., 2012; Heyman & Slep, 2002; Widom et al., 2014) and would be important additions to a comprehensive ETV measure but were not collected from participants. Additionally, the sensitive nature of the primary independent and dependent variables (and IPV, in particular) may lead to underreporting. This sample, however, has reported comparable rates of substance use, depression, and other risk factors in our previous work (Heinze et al., 2017; Repetto et al, 2004; 2008). Moreover, like higher rates of attrition, under-reporting overall, and by sex specifically, would likely bias IPV estimates downward (i.e., fewer reports), making associations more difficult to identify (Archer, 1999). More comprehensive measures of victimization both in early childhood and adolescence could provide additional insight while addressing current study limitations. These limitations notwithstanding, our study makes a significant contribution to the understanding of the negative ramifications of adolescent ETV and provides initial evidence of pathways through which prior victimization contributes to later IPV victimization.

Conclusion

Our study provides a new understanding of the progression of victimization experienced by youth and young adults in a disproportionately vulnerable population. Our results indicate that exposure to violence is a persistent reality with multiple negative sequelae that extend well beyond adolescence. Practically, mental health professionals should consider complete histories of victimization, including community contexts and events resulting in persistent stress exposure that may contribute to future anxiety or depression. Prevention of adult IPV may begin with early detection of violence exposure among youth and monitoring for associated consequences such as depression, anxiety, and relationship conflict.

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- Youth exposed to violence are at higher risk for adult intimate partner violence
- Mental distress mediates this association, even when controlling for substance use
- Substance use is not a significant mediator when accounting for mental distress
- These findings have implications for intimate partner violence intervention work

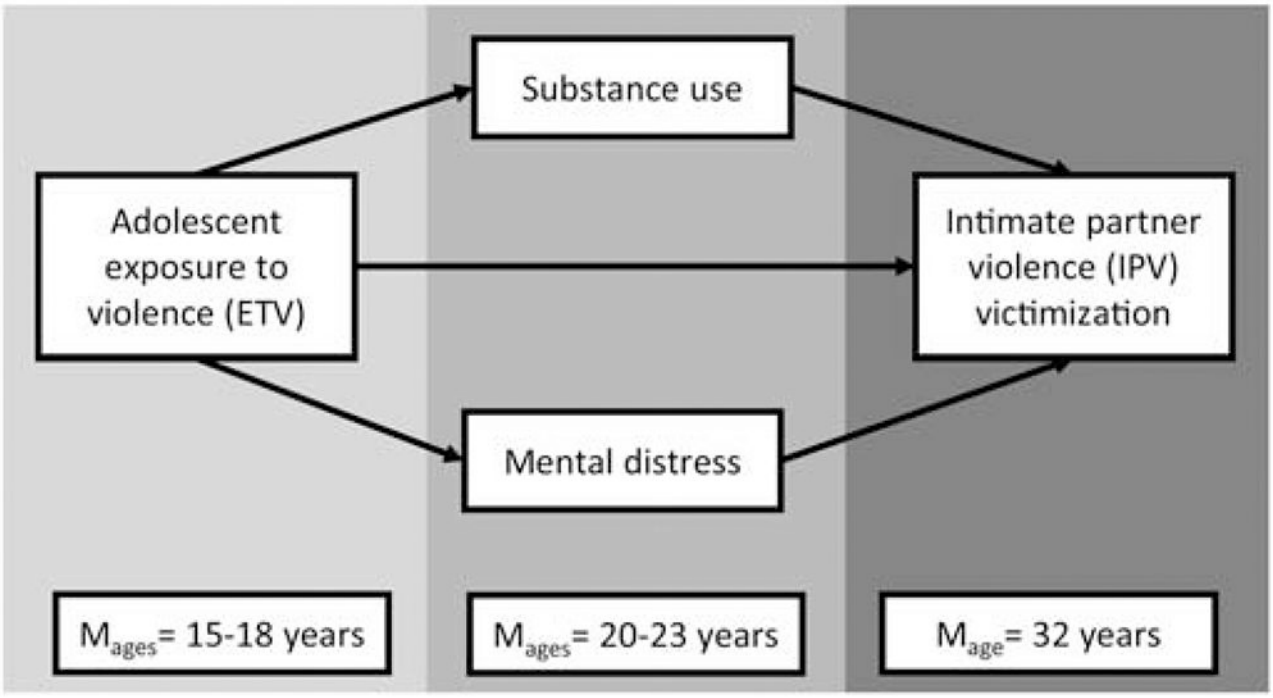

Figure 1.
Conceptual Model of the Hypothesized Parallel Mediation

Table 1

Correlation Matrix (Wave 12; N=376)

	1	2	3	4	5	6	7	8	9	10	11	12
1. W1-4 ETV	--											
2. W1 Dep/Anx	0.32*	--										
3. W1 Alc/Mar	0.36*	0.22*	--									
4. W5-8 Alc/Mar	0.30*	0.13*	0.41*	--								
5. W5-8 Dep/Anx	0.26*	0.40*	0.16*	0.26*	--							
6.W12 Phys. IPV	0.11*	0.05	0.12*	0.17*	0.18*	--						
7. W12 Psych. IPV	0.19*	0.10	0.10	.18*	0.23*	.052*	--					
8. W12 Any IPV	0.12*	0.06	0.09	0.19*	0.22	0.79*	0.84*	--				
9. Age	0.14*	0.05	0.24*	−0.03	−0.02	0.07	0.07	0.05	--			
10. Sex	0.12*	−0.20*	0.05	0.23*	−0.13*	0.12*	0.01	0.08	0.03	--		
11. Race	−0.13*	−0.04	0.02	0.19*	0.06	0.06	0.02	0.05	0.02	−0.01	--	
12.Employment	0.05	0.01	−0.01	0.06	0.05	0.01	0.04	0.03	0.05	0.11*	−0.04	--
13. Highest Edu	−0.10*	−0.10	−0.15*	−0.14*	−0.07	−0.14*	−0.04	−0.10	−0.28*	−0.05	0.04	−0.17*

Note. ETV: Exposure to Violence. Phys.: Physical. IPV: Intimate Partner Violence. Psych.: Psychological. Alc.: Alcohol. Mar.: Marijuana. Correlations between continuous variables are Pearson correlations. Correlations between continuous variables and dichotomous variables are point-biserial. Correlations between dichotomous variables are tetrachoric.

* $p < .05$

Table 2

Sample Characteristics of Participants Who Responded to IPV Victimization Questions (Wave 12; N=376)

Demographics	**Total *n* (%)**	**Physical/sexual IPV Victimization *n* (%)**	**Psychological IPV Victimization *n* (%)**	**Any type of IPV Victimization *n* (%)**
Sex				
Male	159 (42.3%)	20 (62.5%)	16 (44.4%)	26 (53.1%)
Race				
Black/Multiracial	311 (82.7%)	24 (75.0%)	29 (80.6%)	38 (77.6%)
Employment				
Unemployed	66 (17.6%)	6 (18.8%)	8 (22.2%)	10 (20.4%)
Education				
None	36 (9.6%)	4 (12.5%)	4 (11.1%)	6 (12.2%)
High school/GED	185 (49.2%)	21 (65.6%)	16 (44.4%)	26 (53.1%)
Training certificate	49 (13.0%)	4 (12.5%)	8 (22.2%)	8 (16.3%)
Associate degree	46 (12.2%)	3 (9.4%)	6 (16.7%)	7 (14.3%)
Bachelor’s degree/higher	60 (16.0%)	--	2 (5.6%)	2 (4.1%)
Total	376	32 (8.5%)	36 (9.6%)	49 (13.0%)

Note. IPV: Intimate Partner Violence.

Table 3

Direct Effect of Cumulative Adolescent ETV on Adult IPV by Domain (N=379)

Cumulative ETV and covariates	Physical/sexual IPV Log odds [95% CI]	Psychological IPV Log odds [95% CI]	Any type of IPV Log odds [95% CI]
Cumulative ETV	0.58 [−0.04, 1.21]	0.96 [0.40, 1.52] *	0.56 [0.04, 1.08] *
Sex			
Male	0.86 [0.09, 1.63] *	0.005 [−0.71, 0.72]	0.44 [−0.17, 1.06]
Race			
White	0.67 [−0.22, 1.56]	0.35 [−0.55, 1.25]	0.51 [−0.24, 1.26]
Employment status			
Unemployed	−0.24 [−1.21, 0.73]	0.32 [−0.56, 1.19]	0.04 [−0.74, 0.82]
Age	0.12 [−0.45, 0.70]	0.22 [−0.34, 0.79]	0.06 [−0.43, 0.55]
Highest education	−0.43 [−0.80, −0.05] *	−0.01 [−0.31, 0.29]	−0.20 [−0.48, 0.07]
Constant	−4.18 [−12.95, 4.60]	−5.81 [−14.38, 2.77]	−2.8 [−10.27, 4.60]
Model Fit			
Log likelihood	−100.14	−112.13	−139.72
χ^2	18.61 *	13.10 *	11.58
Pseudo R^2	0.09	0.06	0.04

Note. ETV: Exposure to Violence. IPV: Intimate Partner Violence; Coefficients are log odds of reporting IPV

* $p < .05$

Table 4

Logistic Regression: Cumulative ETV and IPV by Domain, Mediated by Alcohol and Marijuana Use (N=376)

Cumulative ETV, Alcohol and marijuana use, and covariates	**Physical/sexual IPV Log odds [95% CI]**	**Psychological IPV Log odds [95% CI]**	**Any type of IPV Log odds [95% CI]**
Cumulative ETV	0.38 [−0.31, 1.07]	0.77 [0.17, 1.37] *	0.35 [−0.21, 0.92]
Alcohol and marijuana use			
Direct effect	0.12 [−0.01, 0.24]	0.15 [0.04, 0.27] *	0.13 [0.02, 0.23] *
Indirect effect	0.05 [−0.003, 0.11]	0.07 [0.01, 0.13] *	0.06 [0.004, 0.11] *
Race			
White	0.46 [−0.47, 1.38]	0.09 [−0.84, 1.02]	0.28 [−0.50, 1.06]
Sex			
Male	0.68 [−0.11, 1.48]	−0.26 [−1.02, 0.50]	0.26 [−0.38, 0.90]
Employment status			
Unemployed	−0.26 [−1.23, 0.72]	0.29 [−0.60, 1.17]	0.02 [−0.78, 0.81]
Age	0.19 [−0.41, 0.79]	0.34 [−0.25, 0.93]	0.14 [−0.37, 0.65]
Highest education	−0.40 [−0.78, −0.01] *	0.06 [−0.26, 0.37]	−0.16 [−0.44, 0.12]
Constant	−5.70 [−14.87, 3.48]	−8.36 [−17.50, .78]	−4.66 [−12.45, 3.13]
Model Fit			
Log Likelihood	−98.58	−108.95	−136.96
χ^2	21.73 *	19.46 *	17.10 *
Pseudo R^2	0.10	0.08	0.06

Note. ETV: Exposure to Violence. IPV: Intimate Partner Violence; Coefficients are log odds of reporting IPV

* $p < .05$

Table 5

Logistic Regression: Cumulative ETV and IPV by Domain, Mediated by Depression and Anxiety (N=376)

Cumulative ETV, depression/anxiety and covariates	**Physical/sexual IPV Log odds [95% CI]**	**Psychological IPV Log odds [95% CI]**	**Any type of IPV Log odds [95% CI]**
Cumulative ETV	0.27 [−0.41, 0.96]	0.67 [0.05, 1.29] *	0.25 [−0.33, 0.82]
Depression and Anxiety			
Direct effect	1.00 [0.34, 1.66] *	1.08 [0.47, 1.70] *	1.02 [−0.47, 1.58] *
Indirect effect	0.09 [0.03, 0.16] *	0.10 [0.04, 0.16] *	0.10 [0.04, 0.15] *
Race			
White	0.47 [−0.46, 1.41]	0.11 [−0.83, 1.06]	0.33 [−0.45, 1.12]
Sex			
Male	1.08 [0.28, 1.89] *	0.22 [−0.52, 0.97]	0.66 [0.02, 1.31] *
Employment status			
Unemployed	−0.45 [−1.47, 0.57]	0.17 [−0.75, 1.08]	−0.11 [−0.93, 0.71]
Age	0.18 [−0.42, 0.78]	0.31 [−0.28, 0.90]	0.13 [−0.37, 0.65]
Highest education	−0.42 [−0.81, −0.02] *	0.04 [−0.27, 0.36]	−0.17 [−0.46, 0.11]
Constant	−6.97 [−16.35, 2.40]	−9.25 [−18.47, −0.04] *	−5.92 [−13.86, 2.02
Model Fit			
Log likelihood	−95.59	−105.95	−132.89
χ^2	27.71 *	25.45 *	25.25 *
Pseudo R^2	0.13	0.11	0.09

Note. ETV: Exposure to Violence. IPV: Intimate Partner Violence; Coefficients are log odds of reporting IPV

* $p < .05$

Table 6

Mediated Logistic Regression: Cumulative ETV and IPV by Domain, Mediated by Depression/Anxiety, and Alcohol/Marijuana Use (N=376)

Cumulative ETV, mediators and covariates	**Physical/sexual IPV Log odds [95% CI]**	**Psychological IPV Log odds [95% CI]**	**Any type of IPV Log odds [95% CI]**
Cumulative ETV	0.17 [−0.57, 0.89]	0.55 [−0.09, 1.20]	0.13 [−0.48, 0.73]
Depression and anxiety			
Direct effect	0.92 [0.24, 1.60] *	0.97 [0.34, 1.60] *	0.93 [0.36, 1.50] *
Indirect effect	0.09 [0.02, 0.15] *	0.09 [0.03, 0.15] *	0.09 [0.02, 0.15] *
Marijuana and alcohol use			
Direct effect	0.08 [−0.06, .21]	0.12 [−0.01, 1.20]	0.09 [−0.02, 0.20]
Indirect effect	0.03 [−0.03, 0.10]	0.05 [−0.004, 0.11]	0.04 [−0.01, 0.10]
Race			
White	0.34 [−0.62, 1.30]	−0.09 [−1.07, 0.89]	0.17 [−0.64, 0.98]
Sex			
Male	0.94 [0.10, 1.78] *	−0.03 [−0.82, 0.77]	0.50 [−0.17, 1.18]
Employment status			
Unemployed	−0.44 [−1.47, 0.58]	0.18 [−0.74, 1.10]	−0.10 [−0.93, 0.72]
Age	0.22 [−0.39, 0.84]	0.40 [−0.21, 1.01]	0.19 [−0.33, 0.72]
Highest education	−0.40 [−0.80, −0.004] *	0.09 [−0.24, 0.42]	−0.15 [−0.44, 0.14]
Constant	−7.81 [−17.41, 1.80]	−11.05 [−20.68, −1.41] *	−7.08 [−15.27, 1.11]
Model Fit			
Log likelihood	−94.97	−104.21	−131.58
χ^2	28.95 *	28.93 *	27.85 *
Pseudo R^2	0.13	0.12	0.10

Note. ETV: Exposure to Violence. IPV: Intimate Partner Violence; Coefficients are log odds of reporting IPV

* $p < .05$

Table 7

Comparison of Parallel Mediation with Complete Case (N=376) and Imputed Data (N=850)

	Physical/sexual IPV Log odds [95% CI]	**Psychological IPV Log odds [95% CI]**	**Any type of IPV Log odds [95% CI]**
Complete Case Results€			
Cumulative ETV	0.17 [−0.57, 0.89]	0.55 [−0.09, 1.20]	0.13 [−0.48, 0.73]
Depression and anxiety			
Direct effect	0.92 [0.24, 1.60]*	0.97 [0.34, 1.60]*	0.93 [0.36, 1.50]*
Indirect effect	0.09 [0.02, 0.15]*	0.09 [0.03, 0.15]*	0.09 [0.02, 0.15]*
Marijuana and alcohol use			
Direct effect	0.08 [−0.06, 0.21]	0.12 [−0.01, 1.20]	0.09 [−0.02, 0.20]
Indirect effect	0.03 [−0.03, 0.10]	0.05 [−0.004, 0.11]	0.04 [−0.01, 0.10]
Imputed Results¥			
Cumulative ETV	−0.31 – 0.31 (0%)	0.07 – 0.61 (10%)	−0.17 – 0.38 (10%)
Depression and anxiety			
Direct effect	0.29 – 1.23(90%)	0.46– 1.38 (100%)	0.67 – 1.32 (100%)
Indirect effect	0.03 – 0.11 (80%)	0.04 – 0.13 (90%)	0.05 – 0.11 (100%)
Marijuana and alcohol use			
Direct effect	0.03 – 0.17 (60%)	0.03 – 0.19 (90%)	0.04 – 0.17 (70%)
Indirect effect	0.02 – .08 (70%)	0.01 – 0.07 (80%)	0.02 – 0.07 (70%)

Note. ETV: Exposure to Violence. IPV: Intimate Partner Violence; Coefficients are log odds of reporting IPV.

*$p < .05$

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¥Range of point estimate across 10 imputations. Percentage of rejected null hypotheses ($H_0=0$, $p < .05$) in parentheses.