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ORIGINAL ARTICLE

Childhood Maltreatment and Intimate Partner Violence Perpetration in Adulthood: An Investigation into Proximal and Distal Risk Factors across the Life Course

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Abstract

Purpose Early experiences of childhood maltreatment have been linked to intimate partner violence (IPV) later in adulthood. Few studies, however, have examined the prospective relationship between child maltreatment and IPV perpetration in the context of proximal and distal risk factors for violence, such as depression and alcohol misuse.

Method Data from 370 adult respondents are from the Lehigh Longitudinal Study. Child maltreatment was measured prospectively at preschool ages and school-ages. Proximal and distal risk factors for adult IPV perpetration were measured in adolescence and at two time points in adulthood (age 36 and 46 years of age, on average). Hierarchical regression models were used to examine the prediction of IPV perpetration from earlier time points.

Results Results indicate that exposure to child maltreatment, frequent alcohol use in adolescence, adolescent depression, frequent alcohol use at age 36, and adult depression at age 36 are predictive of IPV perpetration at age 36. Adolescent aggression and frequent alcohol use at age 46 were significantly predictive of IPV perpetration at age 46.

Conclusions Findings identify multiple points across the life course for intervention. Interventions targeting adolescent and adult mental health and alcohol use may lessen the risk for adult IPV perpetration.

Keywords Intimate Partner Violence Perpetration · Child Maltreatment · Youth Aggression · Depression · Alcohol · Mental Health

Introduction

It is estimated that 1 in 4 women and 1 in 9 men have experienced physical, sexual, or psychological violence and/or stalking victimization by a romantic or intimate partner at some point in their lifetime (Smith et al., 2018). Often referred to as the cycle of violence, research suggests that individuals exposed to early forms of abuse in childhood will be more likely to repeat the same or closely related abusive behaviors in their own romantic relationships (Herrenkohl et al., 2021). Children who experience abuse are also more likely to experience behavior problems, suffer from depression, and to misuse drugs and alcohol, all of which can further elevate their risk for IPV perpetration (Capaldi et al., 2012; Johnson et al., 2015; Smith et al., 2015; Spencer et al., 2019). While the evidence is compelling, longitudinal analyses are needed to examine the unique effects of these risk influences later in adulthood and during midlife. Understanding which are the most salient risk factors for IPV perpetration will help to direct limited resources for prevention to the most viable intervention targets. This study investigates prospective associations between distal and more proximal risk factors for IPV perpetration in adulthood. Analyses of proximal influences account for earlier risk factors to avoid misattributing causality to later occurring influences.

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Review of Research on Child Maltreatment and Adolescent Risk Factors

Existing literature includes a constellation of risk factors for IPV perpetration, including a history of child maltreatment (Brennan et al., 2020; Capaldi et al., 2012; Fang & Corso, 2008; Godbout et al., 2019; Okuda et al., 2015). Recent data on the prevalence of IPV perpetration among adults with maltreatment histories is lacking, though a 2014 study by Widom and colleagues found that 75% of adults with child maltreatment histories reported some form of IPV perpetration in the past year with their current partner. Although these data suggest high rates of IPV perpetration among samples of formerly maltreated adults, other studies indicate weak relationships between maltreatment and IPV perpetration, particularly after accounting for other factors. For example, a recent meta-analysis of cross-sectional and longitudinal studies found a positive relationship between child maltreatment (i.e., physical, sexual, and emotional child maltreatment) and IPV perpetration; however, the overall effect size across the study samples was small ($r = 0.016$) (Li et al., 2020).

In addition to child maltreatment, studies on adolescent and young adult samples have linked several key early risk factors to IPV perpetration in adulthood (e.g., Brennan et al., 2020; Johnson et al., 2014; Smith et al., 2015). These risk factors include adolescent aggressive behavior, delinquency, substance abuse (particularly alcohol misuse), and mental health problems (e.g., depression) present during both adolescence and in young adulthood. For example, Smith and colleagues (2015) found that adolescent delinquency, problem alcohol use, and aggression, each increased the likelihood of IPV perpetration among adults in their 20 s. In this same study, researchers found that the effects of adolescent risk factors on IPV perpetration weakened with age; that is, the effects of adolescent risk factors on IPV perpetration at ages 29–30, although still significant, were less strong than at ages 20–22 (Smith et al., 2015). Notably, substantiated reports of child maltreatment were not significantly predictive of IPV perpetration at either time point after accounting for the adolescent risk factors of aggression, problem alcohol use, and mental health (Smith et al., 2015). These findings suggests that other adolescent risk factors may be more strongly tied to IPV perpetration in early adulthood than child maltreatment, particularly aggression.In a systematic review of 228 studies involving both adult and adolescent samples, Capaldi and colleagues (2012) examined a range of developmental risk factors associated with IPV perpetration (e.g., youth antisocial behavior, depression, alcohol use) and found strong evidence of an association between antisocial behavior and conduct problems in adolescence and IPV perpetration in adulthood (Capaldi et al., 2012). Relatedly, another systematic review found that psychopathy is among the strongest predictors of IPV perpetration in adulthood, with medium effect sizes (Robertson et al., 2020). Studies on the association between depression, alcohol use, and IPV perpetration present mixed findings. The systematic review by Capaldi and colleagues (2012) found evidence of an association between depression and IPV perpetration, but overall effects were not as strong as antisocial behavior in multivariate analyses (Capaldi et al., 2012). Further, Capaldi et al. (2012) found mixed results for alcohol use and IPV risk. Here, they determined that the strength of association with IPV perpetration likely depends on the chronicity and frequency of alcohol use at current and prior life stages (Capaldi et al., 2012). Notably, studies with clinical samples were more likely to find significant associations between alcohol use and aggressive behaviors (Cafferky et al., 2018; Foran & O'Leary, 2008). Given mixed findings across studies, further investigation is needed to better understand how depressive symptoms in adulthood, as well as the frequency or chronicity of alcohol use across the life course, is related to IPV perpetration later in life.

Developmental Psychopathology Perspective

The developmental psychopathology perspective has been used to understand the causes and consequences of child maltreatment across developmental stages and to study pathways toward risk and resilience later in life (Cicchetti & Toth, 1995; Howell, 2011; Toth & Cicchetti, 2013). Although many adults who were maltreated as children will not go on to perpetrate IPV later in life, the developmental psychopathology model identifies key factors related to mental health, substance use, and aggressive behavior that often increase the likelihood or propensity to use violence within intimate relationships (Crittenden & Claussen, 2002). These factors, which include frequent alcohol use, depression, and aggressive behaviors, are often comorbid outcomes of child maltreatment (Crittenden & Claussen, 2002; Toth & Cicchetti; Howell, 2011). Without intervention, problems with aggression, mental health, and substance misuse can continue throughout the life course, and subsequently contribute to a cycle of violence (Herrenkohl et al., 2021).

Gaps in Research and Knowledge

Reviews of risk factors for IPV perpetration, such as those conducted by Capaldi and colleagues (2012) and Foran and O'Leary, (2008) highlight a set of risk factors for IPV perpetration discussed above, yet the unique,

developmental effects of known risk factors are less well established. Methodological limitations in prior studies have not allowed for a comprehensive exploration of investigating both distal, adolescent risk factors for IPV perpetration, nor for more proximal risk factors in adulthood. Neither have methodological limitations considered how risks in early childhood (particularly childhood maltreatment), adolescence, and adulthood are linked to IPV perpetration later in mid-adulthood. Overall, the extant literature on distal risk factors for IPV perpetration highlight associations between child maltreatment and IPV perpetration, however youth conduct problems or adolescent aggression may be more strongly linked to IPV perpetration in adulthood. Studies have not comprehensively and prospectively assessed these factors at distal and proximal time points to investigate the relationship between child maltreatment IPV perpetration in middle-aged adults. This would result in a better understanding of the interplay among key risk factors, including those identified from the developmental psychopathology perspective, and how these factors at varying time points throughout the life course contribute to IPV perpetration. Further, examining how these factors contribute to perpetration of IPV is important for prevention and intervention programs that can break the cycle of violence leading to aggression later in life. In this study, we draw on data collected over several decades to further explore the connections between child maltreatment and other established risk factors for IPV perpetration in adulthood. Results add to the growing body of work on life course processes and life course risk factors underlying IPV, which can guide prevention and intervention strategies that are tailored to developmental stage.

Current Study

Drawing on the developmental psychopathology framework, the current study investigates associations between hypothesized distal (i.e., childhood maltreatment exposure, adolescent aggression, adolescent depression, adolescent frequent alcohol use) and proximal (i.e., adult depression, adult frequent alcohol use) risk factors and IPV perpetration at two ages in mid-adulthood assessed in the study: age 36 and age 46. Based on prior studies establishing externalizing, antisocial, and aggressive behaviors as the strongest predictors of IPV perpetration (Capaldi et al., 2012; Robertson et al., 2020), we hypothesized that youth aggression would be a distal risk factor for IPV perpetration at both timepoints in adulthood. The current literature presents mixed findings related to alcohol use and depression as proximal risk factors for IPV perpetration, child maltreatment as a distal risk factor, and studies have not yet explored these factors in conjunction with other well-established risk factors (i.e., youth aggression), and across transitions throughout adulthood. As such, it was unclear whether childhood maltreatment would be predictive of later IPV perpetration, particularly after accounting for youth aggression and the proximal risk factors of alcohol use and depression in adulthood. Thus, no formal hypothesis is advanced for this exploratory component of the study.

Method

Study Sample and Procedures

Data are from the Lehigh Longitudinal Study – a study of 457 children recruited from childcare facilities and child welfare system caseloads beginning in 1976–1977 (see Herrenkohl et al., 1997; Herrenkohl & Herrenkohl, 2007; Herrenkohl et al., 2013, 2016). The original sample was predominately white (80.7%), gender-balanced (54% male), and economically diverse. Around 60% of families in the study were at or below the federal poverty level when the study began.

The first "preschool" wave of the study took place in 1976–1977, where children were on average born in 1972. A second "school-age" assessment was conducted in 1980–1982 when children were approximately between 8 and 11 years of age (M = 8 years) and mostly in third to fifth grade. After the school-age assessment, children were re-assessed in adolescence with an average age of 18-years (1990–1991) and adulthood with an average age of 36-years (2008–2010). A second adult assessment was collected during 2020–2021, when participants were 46 years of age on average (see Fig. 1). Trained interviewers administered surveys to parents in the preschool- and school-age waves and participants themselves were surveyed in the adolescent and both adult waves. Retention at all subsequent time points was very good; 91% ($n = 416$) of respondents were interviewed in the adolescent wave and 80% ($n = 357$) of those still living in the first adult wave (age = 36). In the second adult assessment, 99% were located for the assessment and 70% of the sample was retained. A greater number of maltreated children were lost to attrition across study waves, yet there were no significant differences regarding sample demographics, such as sex and race, between those lost and retained. Study procedures were approved by the Institutional Review Board at affiliated universities. The current study sample included participants with data on the outcome variable of IPV perpetration for at least one time point in adulthood, resulting in a final sample size of 370 for the current study.

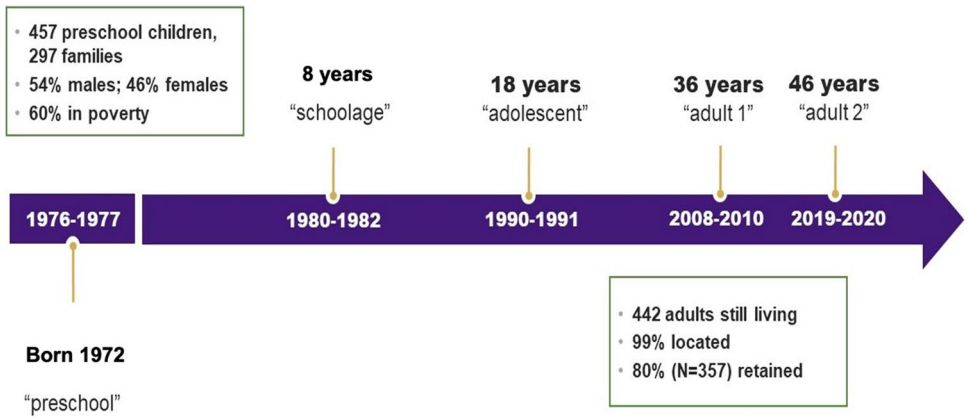

Fig. 1 Lehigh Longitudinal Study. Timeline of data collection. Child maltreatment was assessed during the "preschool" (mean birth year = 1972; mode birth year = 1971; range = 1968 – 1979) and "school-age" waves (approximate age was 8 years old when most participants were in 3rd to 5th grade). Distal risk factors were assessed at the "adolescent" wave (mean age 18; SD = 1.80; range = 14–23). Proximal risk factors and IPV perpetration were assessed at "adult 1" (mean age = 36; SD = 2.09; range = 31–41) and "adult 2" (mean age 46; SD = 1.95; range = 40–51). The current study sample included participants with data on IPV perpetration for at least one time point in Adult Time 1 (age 36) or Adult Time 2 (age 46) resulting in a sample size of 370

Measures

Dependent Variable

Adult IPV Perpetration Adult IPV perpetration was assessed at two time points in the adult waves of the study (at a mean age of 36 and mean age of 46) using items from the Conflict Tactics Scale (CTS2). The CTS2 is found as a valid and reliable measure to assess IPV among diverse participants from different cultures (Chapman & Gillespie, 2019; Straus et al., 1996). The original CTS2 included 39 items measuring victimization and perpetration of physical violence, psychological aggression, and sexual coercion behaviors in the past year (Straus et al., 1996). A total of 26 items assessed perpetration at in the first adult wave. The number of CTS2 items were reduced to 12 in the second adult wave survey, as the base rate for most IPV items (particularly physical and sexual violence) were very low and for many items 0% in the first adult wave. For the current analysis, we selected the IPV perpetration items that were assessed at both time points ($n = 7$) to ensure consistency in IPV measures at each time point. Two items assessed physical abuse: "I threatened to hit or throw something at my partner" and "I pushed or shoved my partner." Four items assessed psychological abuse: "I insulted or swore at my partner;" "I called my partner fat or ugly;" "I destroyed something belonging to my partner;" and "I shouted or yelled at my partner." One item assessed sexual abuse: "I insisted on sex when my partner did not want to (but did not use physical force)."

Respondents were asked to indicate how frequently they engaged in each behavior in the past year using a 5-point scale (0 = none in past year, 1 = once, 2 = twice, 3 = three to five, and 4 = more than five times), which was shortened from the original 8-point scale used in the CTS2. The response set was shortened for the purposes of this survey to be consistent with other sections of the interview. IPV items were summed and averaged into a single continuous measure (possible score of 28) of IPV perpetration behaviors in the past year for the first adult wave of data collection at age 36 (M = 4.76; SD = 4.70; range = 0 – 24) and the second adult wave of data collection at age 46 (M = 4.28; SD = 4.10; range = 0 – 19, respectively). Cronbach alpha values for the modified CTS2 measures included 0.62 and 0.67 for the first and second adult waves, respectively.

Independent Variables

Child Maltreatment Child maltreatment was assessed with a severity index measure of parent and other caregivers' self-reports of physical and emotional abuse practices which were assessed at preschool and school-age time points. These measures included reports of physically abusive practices (12 items) by any caregiver during the last 3 months, prior to the last 3 months in preschool and, and in the past year in school-age. Additionally, the measure included reports of emotionally abusive practices (7 items) by any caregiver during the last 3 months in preschool and in the past year in school-age. Original survey items on parenting practices were developed by the investigators of the study and by a panel of experts, who assigned a severity rating (5-point scale) for each item: 5 = abusive; 4 = severely punishing; 3 = mildly punishing; 2 = mildly rewarding; and 1 = highly rewarding. Those with severe practices with ratings ranging from 4.0 to 5.0 (severely punishing to abusive)

were included in the measure. These scores were aggregated and summed to indicate any reports of physical or emotional abuse from any parent or other caregiver during preschool and school-age waves.

Adolescent and Adult Depression Depression was measured at three time points, including during adolescence, the first adult wave (mean age = 36), and the second adult wave (mean age = 46). Depression in adolescence was measured using the Beck Depression Inventory-II (BDI-II; Beck et al., 1996). The BDI-II is one of the most widely used measures of depression and has high reliability and validity across studies and populations. Individual depression scores reflect a sum across the 21 items, with higher scores indicating greater levels of depression. Each item is asked through the 4-point scale (0 indicating no symptoms and 3 indicating a severe level of symptoms)—total possible scores for the measurement range from 0 to 63. Reliability for the study sample was excellent ($\alpha = 0.90$).

Depression at both adulthood waves was measured using the Patient Health Questionnaire (PHQ-9), which is another widely used measure of adult clinical depression (Kroenke et al., 2001). Individual depression scores reflect a sum across the 8 items, with higher scores indicating greater levels of depression. Each item is asked through the 4-point scale (0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day). Our study only included the first eight items and did not use the last item related to suicidality. Total possible scores for the measurement range from 0 to 24. Reliability for the study sample was excellent for both adult time points ($\alpha = 0.86$; $\alpha = 0.90$).

Adolescent and Adult Alcohol Use The frequency of alcohol use was measured at three time points, including during adolescence, at age 36, and at age 46 using the following question: How frequently in the past year (on average) have you drunk alcoholic beverages including beer, wine, or hard liquor? (0 = never, 1 = less than once a month, 2 = once a month, 3 = every 2–3 weeks, 4 = once a week, 5 = 2–3 times a week, 6 = once a day, and 7 = 2 + times a day). We are looking for number of times rather than number of drinks, so please count multiple drinks in one sitting as one time."

Adolescent Aggression Items from the Youth Self-Report (YSR) were used to measure youth aggression at a one-time point during adolescence. The YSR is a widely used measure of child and adolescent emotional and conduct behaviors (ages 11–18), including aggressive behaviors (Achenbach et al., 2001). Individual scores reflect a sum across the 20 items, with higher scores indicating greater levels of aggression. Each item is asked through the 3-point scale (0 = not true, 1 = somewhat true, and 2 = very true). Total possible scores for the measurement range from 0 to 40. Reliability for the study sample was excellent ($\alpha = 0.85$).

Covariates Demographic covariates included age (birth year), sex, race, current marital status, and childhood socioeconomic status. For age, respondents were asked to report their birthday. Age (birth year) was treated as a continuous variable (mean = 1972, SD = 1.92). Sex was measured with the respondent's self-report of their sex: male or female (female = 47.3% or male = 52.7%). Respondents were asked what identity best describes their racial background: American Indian/Alaska Native, Asian, Black/African American, Native Hawaiian or Pacific Islander, other race (please specify), more than one race or white. The majority of respondents identified as white (78.9%) and as such, respondents were coded as white or non-white (21.1%) for analyses due to small sample sizes of racial/ethnic minority participants. Respondents were asked to indicate their current marital status: married, separated, divorced, widowed, never been married, or don't know. Marital status was recoded into a dichotomous variable to indicate married (42.7%) or not currently married (57.3%). Childhood socioeconomic status was computed using a standardized composite score based on parental employment status, parental education level, and family household income.

Statistical Analyses

First, bivariate relationships between independent variables (i.e., risk factors at preschool and school-age, adolescence, and adulthood), covariates, and IPV perpetration in adulthood at age 36 and age 46 were assessed. Second, two stepwise hierarchical multiple regression analyses were used to examine the relationship between risk factors at each developmental stage and IPV perpetration in adulthood at age 36 and 46. Variables were entered across three steps in the model predicting IPV perpetration at age 36 and across four steps in the model predicting IPV perpetration at age 46: Step 1) demographic covariates (current age, race, childhood SES, marital status); Step 2) preschool, school-age, and adolescent risk factors (child maltreatment, aggression, alcohol use, and depression); Step 3) adult risk factors at age 36 (alcohol use, depression); and Step 4) adult risk factors at age 46 (alcohol use, depression). Cases with the IPV perpetration outcome variable available for at least one adult assessment were included in the analysis ($N = 370$). Missing data were handled using Full Information Maximum Likelihood (FIML), which produces unbiased and efficient parameter estimates (Kline, 2015). Analyses were conducted using R statistical software (R Core Team, 2021).

Table 1 Sample Description ($N = 370$)

	N	% (n)	Min	Max	Mean	SD
Mean IPV Perpetration at Age 36	317		0	24	4.76	4.69
Mean IPV Perpetration at Age 46	263		0	19	4.26	4.10
Any IPV Perpetration at Age 36	235					
Any IPV Perpetration at Age 46	107					
Current Age (birth year)	370		1968	1979	1972	1.92
Sex (female)	370	47.30 (175)				
Race (white)	363	78.90 (292)				
Childhood SES	370		-5.43	9.18	0.14	3.33
Marital Status (married)	294	42.7 (158)				
Childhood Maltreatment	295		0	158.57	50.03	36.71
Adolescent Aggression	343		0	33	10.84	6.22
Adolescent Alcohol Use	344		1	9	4.15	2.02
Adolescent Depression	343		0	43	10.54	8.04
Alcohol Use at Age 36	340		0	7	2.59	1.96
Depression at Age 36	341		1	4	1.65	0.62
Alcohol Use at Age 46	293		0	7	2.62	2.15
Depression at Age 46	294		1	4	1.66	0.71

Results

Sample Description and Bivariate Correlations

Sample descriptive statistics for all study variables are presented in Tables 1 and 2. A total of a total of 74.1% ($n = 235$) of participants reported at least one type of IPV perpetration at age 36 and 74.9% ($n = 197$) reported at least type of IPV at age 46. IPV perpetration at age 36 was significantly correlated with sex ($r = 0.123$, $p < 0.05$), childhood maltreatment ($r = 0.162$, $p < 0.01$), youth aggression ($r = 0.129$, $p < 0.05$), frequent alcohol use in adolescence ($r = 0.134$, $p < 0.05$), depression in adolescence ($r = 0.239$, $p < 0.01$), and depression at age 36 ($r = 0.235$, $p < 0.01$). Significant correlations were not noted between IPV perpetration at age 36 and current age, race, childhood SES, marital status, or frequent alcohol use at age 36. IPV perpetration at age 46 was significantly correlated with sex ($r = 0.218$, $p < 0.01$), youth aggression ($r = 0.248$, $p < 0.01$), depression at age 36 ($r = 0.199$, $p < 0.01$), frequent alcohol use at age 46 ($r = 0.164$, $p < 0.01$), and depression at age 46 ($r = 0.227$, $p < 0.01$). There were not significant correlations found between IPV perpetration at age 46 and current age, race, childhood SES, marital status, frequent alcohol use in adolescence, adolescent depression, or frequent alcohol use at age 36.

Multivariate Regression Results Predicting IPV Perpetration at Age 36

Results for the model predicting IPV perpetration at age 36 are presented in Table 3. In the multivariate model predicting IPV perpetration at age 36, significant covariates in Step 1 included sex, such that male sex was associated with greater levels of IPV perpetration ($b = 1.38$, $p < 0.05$). Age, race, childhood SES, and marital status were not significant in Step 1. In Step 2, child maltreatment ($b = 2.07$, $p < 0.01$), adolescent frequent alcohol use ($b = 0.36$, $p < 0.05$), and adolescent depression ($b = 0.22$, $p < 0.01$) were each significantly and positively associated with increased IPV perpetration at age 36. Sex remained significant in the model at Step 2 ($b = 1.488$, $p < 0.01$). Adolescent aggression was not significant in Step 2. In Step 3, adult depression at age 36 was significant in the model, such that higher levels of adult depression ($b = 1.06$, $p < 0.05$) were associated with increased levels of IPV perpetration. Sex ($b = 1.37$, $p < 0.05$), child maltreatment ($b = 1.99$, $p < 0.05$), and adolescent depression ($b = 0.11$, $p < 0.01$) all remained significant in the model at Step 3.

Multivariate Regression Results Predicting IPV Perpetration at Age 46

Results for the model predicting IPV perpetration at age 46 are presented in Table 4. In the model predicting IPV perpetration in adulthood at age 46, significant covariates in Step 1 included sex, such that male sex was associated with greater levels of IPV perpetration ($b = 1.76$, $p < 0.0001$). Age, race, childhood SES, and marital status were not significant in Step 1. In Step 2, adolescent aggression ($b = 0.18$, $p < 0.0001$) was associated with increased IPV perpetration at age 46. Sex remained significant in Step 2 ($b = 2.26$, $p < 0.0001$). Child maltreatment, adolescent frequent alcohol use, and adolescent depression were not significant in the model at Step 2. In Step 3, adult depression at age 36 ($b = 0.91$, $p < 0.05$) was significant in the model. Adolescent aggression ($b = 0.17$, $p < 0.0001$) remained significant in the model at Step 3, in addition to sex

Table 2 Bivariate Pearson Correlations

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	IPV Perpetration at Age 36	1	.313**	-0.038	.123*	-0.023	-0.089	-0.058	.162**	.129*	.134*	.239**	0.042	.235**	-0.055	0.113
2	IPV Perpetration at Age 46		1	-0.075	.218**	-0.104	-0.105	-0.041	0.118	.248**	0.100	0.069	0.046	.199**	.164**	.227**
3	Current Age			1	-0.026	.107*	.470**	.142*	-.145*	-0.050	-.278**	-.145**	.156**	-.190**	.154**	-.133*
4	Sex (ref = female)				1	-0.047	-0.002	-0.045	-0.089	-0.089	-.222**	0.045	-.193**	.116*	-.149*	.146*
5	Race (ref = non-white)					1	.178**	.154**	-0.105	-0.093	-0.096	-.114*	.141**	0.026	0.083	.122*
6	Childhood SES						1	.286**	-.207**	-0.090	-0.082	-.354**	.285**	-.167**	.219**	-.183**
7	Marital Status							1	-.150*	-.145*	-0.075	-.242**	0.115	-.191**	0.095	-.231**
8	Childhood Maltreatment								1	0.109	0.069	0.084	-.122*	0.113	-0.127	0.058
9	Adolescent Aggression									1	.255**	.408**	-0.032	.186**	0.011	.268**
10	Adolescent Frequent Alcohol Use										1	.114*	.163**	.112*	.153*	0.035
11	Adolescent Depression											1	-.174**	.332**	-0.109	.310**
12	Frequent Alcohol Use at Age 36												1	0.022	.542**	-0.010
13	Depression at Age 36													1	-0.083	.501**
14	Frequent Alcohol Use at Age 46														1	0.029
15	Depression at Age 46															1

$N = 370$ ** $p < 0.01$, * $p < 0.05$, ref = reference group

($b = 2.32$, $p < 0.001$). Child maltreatment, adolescent frequent alcohol use, adolescent depression, and frequent alcohol use at age 36 were not significant in the model at Step 3. Finally, in Step 4, frequent alcohol use at 46 ($b = 0.41$, $p < 0.01$) was significantly associated with increased IPV perpetration at age 46. Adolescent aggression ($b = 0.15$, $p < 0.01$) and sex ($b = 2.23$, $p < 0.001$) remained significant in the model at Step 4. Race ($b = -1.28$, $p < 0.05$) became significant in the model at Step 4, such that white participants reported lower levels of IPV perpetration at age 46 than non-white participants. Child maltreatment, adolescent frequent alcohol use, adolescent depression, frequent alcohol use at age 36, adult depression at age 36, and adult depression at age 46 were not significantly associated with IPV perpetration in Step 4.

Discussion

This study explored the relationship between childhood and adolescent (distal) risk factors and adult (proximal) risk factors for IPV perpetration at two time points in mid-adulthood (age 36 and age 46). Our study extends the extant literature by examining the developmental effects of other known risk factors for IPV perpetration (e.g., depression, youth aggression, frequent alcohol use) across stages and transitions throughout the life course. In this study, differential associations emerged in predictors of IPV perpetration at age 36 (i.e., child maltreatment and depression) and age 46 (youth aggression and frequent alcohol use), indicating that interventions aimed at reducing IPV perpetration may need to be tailored to address the most salient risk factors at transitions in adulthood.

Prior studies have linked childhood maltreatment to later IPV perpetration young adulthood and midlife; however, the effects of these associations have been small (Li et al., 2020). We did not advance formal hypotheses for this aspect of the study, given the mixed picture of findings on the relationship between childhood maltreatment and IPV in adulthood particularly after accounting for established predictors including youth aggression and proximal alcohol and mental health risk factors. Our findings revealed that childhood maltreatment was in fact a significant predictor in all steps for IPV perpetration in adulthood at age 36, even after controlling for risk factors in adolescence and proximal risk factors in adulthood. This finding lends support for theories on the intergenerational transmission of trauma (also referred to as the "cycle of violence" (Li et al., 2020), at least up until certain transitions in adulthood. Unlike IPV perpetration at age 36, childhood maltreatment was not predictive of IPV perpetration at age 46. There may be several possible explanations for this differential association. First, studies on the developmental psychopathology of child maltreatment have not comprehensively studied the effects of maltreatment

Table 3 Stepwise Hierarchical Multiple Regression Predicting IPV Perpetration at Age 36

IPV Perpetration at Age 36	Step 1			Step 2			Step 3		
	b	se	β	b	se	β	b	se	β
Step 1: Covariates									
Current Age	0.019	0.157	0.008	0.130	0.158	0.053	0.161	0.157	0.066
Sex (ref = female)	1.138*	0.524	0.121	1.488**	0.521	0.159	1.367*	0.528	0.147
Race (ref = non-white)	0.011	0.687	0.001	0.463	0.666	0.039	0.102	0.666	0.009
Childhood SES	-0.122	0.091	-0.087	-0.014	0.094	-0.010	-0.048	0.094	-0.034
Marital Status	-0.091	0.642	-0.010	0.436	0.628	0.046	0.457	0.618	0.049
Step 2: Childhood and Adolescence									
Child Maltreatment				2.078**	0.782	0.163	1.990*	0.776	0.156
Adolescent Aggression				0.005	0.047	0.007	0.000	0.047	0.001
Adolescent Frequent Alcohol Use				0.361*	0.141	0.156	0.278	0.142	0.120
Adolescent Depression				0.122**	0.038	0.207	0.107**	0.039	0.182
Step 3: Age 36									
Frequent Alcohol Use							0.243	0.142	0.102
Depression							1.067*	0.459	0.141
R^2		0.022			0.109			0.131	

N = 370 *p < 0.05, **p < 0.01, ***p < .001, ref = reference group

exposure beyond young adult adulthood and into midlife and have been methodologically limited in assessing distal and proximal risk factors across the life course. Our study findings suggest that the effects of child maltreatment on IPV perpetration may last up until a certain period in adulthood, until other proximal risk factors (i.e., depression, frequent alcohol use) begin to have greater effects on IPV perpetration.

Additionally, adolescent depression and depression at age 36 were associated with IPV perpetration at age 36. Depression during adolescence may, in part, result from childhood maltreatment (Costa et al., 2015). Previous prospective

Table 4 Stepwise Hierarchical Multiple Regression Predicting IPV Perpetration at Age 46

IPV Perpetration at Age 46	Step 1			Step 2			Step 3			Step 4		
	b	se	β	b	se	β	b	se	β	b	se	β
Step 1: Covariates												
Current Age	-0.057	0.145	-0.027	0.032	0.146	0.015	0.048	0.146	0.022	0.031	0.142	0.014
Sex (ref = female)	1.760***	0.489	0.215	2.261***	0.489	0.274	2.321***	0.494	0.282	2.258***	0.487	0.275
Race (ref = non-white)	-0.894	0.680	-0.087	-0.794	0.652	-0.077	-0.989	0.645	-0.095	-1.275*	0.641	-0.123
Childhood SES	-0.102	0.086	-0.083	-0.112	0.087	-0.090	-0.139	0.087	-0.111	-0.145	0.085	-0.116
Marital Status	0.133	0.528	0.016	0.437	0.515	0.053	0.551	0.509	0.066	0.728	0.503	0.088
Step 2: Childhood and Adolescence												
Child Maltreatment				1.095	0.814	0.098	1.111	0.813	0.099	1.222	0.775	0.109
Adolescent Aggression				0.177***	0.044	0.267	0.174***	0.043	0.260	0.155***	0.043	0.232
Adolescent Frequent Alcohol Use				0.225	0.134	0.120	0.182	0.135	0.089	0.156	0.133	0.077
Adolescent Depression				-0.049	0.034	-0.095	-0.061	0.036	-0.118	-0.065	0.035	-0.125
Step 3: Age 36												
Alcohol Use							0.240	0.140	0.114	0.003	0.155	-0.001
Depression							0.914*	0.458	0.136	0.669	0.495	0.100
Step 4: Age 46												
Alcohol Use										0.410**	0.129	0.213
Depression										0.581	0.400	0.100
R^2		0.064			0.165			0.199			0.235	

N = 370 *p < 0.05, **p < 0.01, ***p < .001, ref = reference group

studies conducted with young adult samples have found similar patterns between adolescent depression and young adult IPV perpetration (Kerr & Calpadi, 2011; Melander et al., 2010). Our findings extend knowledge of depression as a risk factor for IPV perpetration beyond young adulthood to include mid-adulthood. If left untreated, depression in adolescence may continue into adulthood and subsequently elevate risks for IPV perpetration later in life.

We hypothesized that adolescent aggression would be associated with IPV perpetration at both time points in adulthood (age 36 and age 46); however, adolescent aggression was only associated with IPV perpetration at age 46, and not age 36. Adolescent aggression was positively and significantly correlated with IPV perpetration at age 36 in bivariate analyses; however, these effects were no longer significant after accounting for other risk factors in the model. Additionally, we did not find that frequent alcohol use during adolescence or in adulthood (assessed at age 36) was associated with IPV perpetration at age 36. These results suggest that the most salient predictors of IPV perpetration at this stage in adulthood include the distal risk factors of childhood maltreatment and adolescent depression and the proximal risk factor of adult depression (at age 36). These findings highlight the need for mental health interventions, particularly early on in adolescence and for those with histories of childhood maltreatment. Early mental health interventions in adolescence can prevent mental health symptoms from continuing into adulthood and may reduce potential risks for later IPV perpetration.

We did not find that childhood maltreatment or depression (at adolescence or either time point in adulthood) predicted IPV perpetration later in midlife at age 46. However, the proximal risk factor of frequent alcohol use at age 46 were significantly predictive of IPV perpetration at age 46. Studies on IPV perpetration have generally identified alcohol misuse as a risk factor for perpetration; however, systematic reviews suggest mixed findings across studies, where associations between alcohol and IPV perpetration range from weak to strong (Capaldi et al., 2012) or were not significantly predictive of IPV perpetration (Costa et al., 2015). For example, in a cross-sectional study design, Rhodes et al (2009) found high levels of alcohol use and adverse mental health symptoms in adult clinical samples of male perpetrators of IPV and that alcohol use and mental health symptoms had a cumulative impact on IPV-related outcomes. Theobald and Farrington (2012) conducted a prospective study that followed males over a 40-year period in London and assessed a range of child and adolescent risk factors associated with IPV perpetration later in life. While they did not assess adolescent alcohol use, they did not find that alcohol-related aggression in adolescence was significant in predicting IPV perpetration in midlife (Theobald & Farrington, 2012). Another study of a young adult cohort sample in New Zealand did find significant associations between alcohol abuse at age 15–18 and IPV perpetration at age 25 (Fergusson et al., 2008). Methodological differences in the measurement of alcohol use (e.g., frequency of alcohol use, quantity of alcohol use, problematic drinking behavior) as well as limitations in study designs (e.g., cross-sectional associations; follow up periods through young adulthood only) likely contribute to the mixed evidence on the relationship between alcohol and IPV perpetration.

In addition to the proximal risk factor of frequent alcohol use at age 46, we also found that the distal risk factor of adolescent aggression was significantly predictive of IPV perpetration at age 46. Childhood behavior problems, including externalizing/aggressive behaviors and conduct problems, are among the most common childhood mental health concerns in the U.S. (Centers for Disease Control & Prevention, 2013; Merikangas et al., 2010) and are also among the most common reasons for referrals to child mental health providers (Connor et al., 2006). Aggressive behaviors beginning in adolescence may evolve into more serious aggression and acts of violence into young adulthood as documented in studies of young adult samples (Cui et al., 2013). However, a significant number of children with behavioral problems do not receive intervention (Martini et al., 2012), despite empirical evidence for effective interventions (Connor et al., 2006). While a constellation of other distal (e.g., childhood maltreatment) and proximal (e.g., alcohol and depression) risk factors can contribute to IPV perpetration, prior systematic reviews and meta-analyses have consistently identified aggression as the strongest predictor (with medium to large effect sizes) of IPV perpetration later in life (Capaldi et al., 2012; Robertson et al., 2020). Given our findings, directing efforts and resources to prevent and reduce aggressive behaviors in adolescence may have the potential to prevent IPV perpetration later in life.

Study Limitations and Strengths

This study's results should be considered in light of several limitations. First, the measure of child maltreatment is based on self-reports from parents and caregivers and may be susceptible to recall bias and social desirability given the nature of these stigmatizing behaviors. This is also a potential limitation for the IPV perpetration measures, as they included self-reported assessments at two time points in adulthood. Additionally, some variability exists in age among participants, and age assessed at the school-age wave was an approximation based on that participants were mostly in third to fifth grade. Still, findings highlight important transitions at various time points and ages assessed in this study. There are also limitations to the sample in that the sample assessed sex and not gender identity, in addition to the sample being predominately white and heterosexual. Future

longitudinal studies are needed with more racially diverse and gender diverse samples and samples with participants in same-sex and queer relationships, to better understand potential differences in proximal and distal risk factors for IPV perpetration across sub-groups. Notably, we found that the covariates of sex (male) and race (non-white) were significantly associated with increased IPV perpetration. More diverse sampling is needed given that ethnic, sexual, and gender minority communities are disproportionately impacted by IPV and its social, economic, and health consequences (Breiding et al., 2013; Lacey et al., 2021; Peitzmeier et al., 2020; Rosay, 2016). Despite these limitations, our study uses prospective data from a large sample of adults followed across the life course starting at preschool age through midlife. We comprehensively assess well-known risk factors for IPV perpetration during childhood, adolescence, and during transitions into mid-adulthood at two time points. The results from this study identify unique risk factors, including differential associations that emerged in predicting IPV perpetration at two different timepoints in midlife, which may be indicative that differential strategies for intervention and prevention of IPV are needed throughout the life course.

Implications for Practice and Policy

Interventions targeting alcohol use and comorbid mental health conditions in adulthood, particularly among those with child maltreatment histories, may prevent IPV perpetration in midlife. Given that significant predictors of IPV perpetration at age 36 in this study included childhood maltreatment, adolescent depression, and depression at age 36, interventions aimed at improving mental health and reducing depressive symptoms in both adolescence and in adulthood may reduce the likelihood of subsequently perpetrating IPV at midlife. Interventions targeting IPV cessation later in adulthood should address alcohol misuse, as this appeared to be a salient proximal risk factor in predicting IPV perpetration at age 46, and has been found to accelerate violence in situational contexts (Reingle et al., 2014). Practitioners working with individuals and families experiencing IPV should screen, treat, and provide appropriate referrals for mental health and substance misuse, and consider these factors when engaging in safety planning with victims. Relatedly, practitioners working with children should also be cognizant of distal risk factors including child maltreatment exposure and adolescent aggression on the potential for later IPV perpetration as this study suggests, which may provide opportunities to disrupt the cycle of violence and perpetration of IPV later in life.

Given that depression and alcohol use often stem from childhood exposure to trauma and maltreatment (e.g., Costa et al., 2015), primary prevention of child maltreatment and its behavioral and mental health consequences may prevent the onset of depression and alcohol misuse during adolescence and throughout mid-adulthood, which may in turn prevent IPV perpetration in mid-adulthood. Evidence for primary prevention strategies that disrupt pathways to IPV perpetration can include allocating funding to support programs for families during early childhood (e.g., home visitation programs, parent skill and family relationship programs, trauma-informed treatment of families experiencing child maltreatment) which have been shown to reduce depressive symptoms, alcohol and substance misuse, child maltreatment, teen dating violence and IPV, among other positive outcomes (Niolon et al., 2017). Child maltreatment and IPV tend to co-occur within families (Brown et al., 2021; Hamby et al., 2010; Hazen et al., 2004; Herrenkohl et al., 2008, 2021; Little & Kaufman Kantor, 2002). As such, policy prevention approaches aimed at reducing IPV and child maltreatment may have mutual benefits that prevents both forms of violence simultaneously and prevents adolescents and young adults from using violence in their intimate relationships into mid-adulthood. Finally, interventions targeting adolescent behavioral health problems, including youth aggression and externalizing behaviors, can have implications for IPV perpetration in midlife. Expanding access to evidenced-based treatments for childhood behavior problems can disrupt aggressive patterns, improve conflict resolution and relationship skills early on in life, and potentially prevent the use of violence and aggression in interpersonal relationships in adulthood.

Conclusions

Our comprehensive approach to assessing distal and proximal risk factors across multiple age transitions highlights salient risk across the life course in predicting IPV perpetration. The effects of child maltreatment on IPV perpetration continue beyond childhood, adolescence, and young adulthood as prior studies have shown (e.g., Li et al., 2020) and into mid-adulthood up to a certain point (approximately age 36), before other risk factors become salient. Depression during adolescence, which may result from childhood maltreatment, can extend into mid-adulthood and increase risk for IPV perpetration, but potentially only up to a certain age; when youth aggression and frequent alcohol use later in mid-adulthood appears to become a more salient predictor. While the primary and secondary prevention of child maltreatment may reduce risks for IPV perpetration in midlife, findings from this study highlight specific mental and behavioral health intervention targets during mid-adulthood (i.e., depression, frequent alcohol use) that may reduce IPV perpetration at these transition periods in adulthood.

Future Research

This study assessed IPV perpetration at the ages in which data were collected in the Lehigh Longitudinal Study. Future research is needed to examine these relationships to widen age ranges and explore age-specific developmental effects of distal and proximal risk factors. Additionally, compelling evidence points to the importance of both youth aggression and adult antisocial behavior (Capaldi et al., 2012; Reingle et al., 2014; Robinson et al., 2020) in predicting IPV perpetration. Future studies capturing aggressive and antisocial behaviors in adulthood is needed to understand trajectories between youth aggression and conduct problems and adult antisocial behaviors, and their contribution to IPV perpetration while accounting for other key factors related to psychopathology (i.e., mental health, substance misuse). This research can inform interventions with adult perpetrators of IPV and help prevent or disrupt aggressive behaviors early on in childhood and adolescence. Finally, future prospective studies are needed to better understand situational and cultural contexts that distinguish developmental pathways to IPV perpetration across racial, ethnic, gender, and sexual orientation sub-populations. Further research with larger sample sizes that can adequately account for potential differences by gender, racial, and sexual orientation are needed to inform culturally relevant interventions with individuals and families.

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

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