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Adverse Adolescent Experiences (A-ACES) and Risk of Adult Intimate Partner Violence

Elyse J. Thulin, MS¹, Justin E. Heinze, PhD¹, Marc A. Zimmerman, PhD^{1,2}

¹Department of Health Behavior and Health Education, University of Michigan School of Public Health, Ann Arbor, Michigan

²Combined Program in Education and Psychology, University of Michigan, Ann Arbor, Michigan

Abstract

Introduction: Exposure to adverse experiences during adolescence may have significant implications for intimate partner violence during adulthood because it is during this developmental stage when many youth begin to have romantic relationships. Yet, few prospective longitudinal analyses on this topic exist. This study aims to fill a gap in the literature by examining adverse childhood experiences during adolescence and intimate partner violence 15 years later during adulthood.

Methods: Multilevel negative binomial regression was used to examine the relationship between adolescent adverse childhood experiences (age 13–19 years) and adult intimate partner violence (age 28–34 years) in 499 participants over 5 waves of data from a 24-year longitudinal study (Wave 1: 1994) based in Flint, Michigan. Adolescent adverse childhood experiences included being a victim of violence, observed family conflict, parental intoxication, parental divorce, and observed community violence. Data analysis was conducted between 2019 and 2020.

Results: First, investigators modeled the adverse childhood experience variables as a summary score to predict intimate partner violence during adulthood while controlling for known risk factors and individual random effects. Secondly, this study examined individual adverse childhood experiences iteratively to understand which adverse experiences predicted intimate partner violence in adulthood and found observed community violence remained significant when accounting for all other adverse childhood experiences ($\beta=0.276$, $p<0.05$).

Conclusions: The findings support the negative effects of community violence in adolescence on later risk of intimate partner violence. Prevention interventions that focus on community health and violence prevention with a focus on healthy adolescent development may be pertinent in lowering intimate partner violence victimization in adulthood.

Address correspondence to: Elyse J. Thulin, MS, Department of Health Behavior and Health Education, University of Michigan School of Public Health, 1415 Washington Heights, Ann Arbor MI 48109. ethulin@umich.edu.

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INTRODUCTION

The long-term consequences of adverse childhood experiences (ACEs) such as child abuse, maltreatment, substance abuse in the household, incarceration of household members, and emotional or physical neglect are well documented.^{1–5} Researchers have reported poorer physical,^{4,6–9} mental,^{10,11} individual behavioral,^{12,13} and social/interactional¹⁴ outcomes for youth experiencing ACEs. ACEs disproportionately affect individuals who report lower SES, less education, and individuals who identify as African American.⁵ ACEs are often inter-related, and experiencing one increases the risk of exposure to additional adverse experiences.^{2,15} Researchers have also found that the larger number of childhood ACEs experienced, the higher the odds of poorer physical and mental health outcomes, including heart disease, stroke, asthma, diabetes, and mental distress.⁸ Though often studied in an additive nature, delving into nuanced differences between exposure types is useful for understanding what types of exposures might be most consequential for subsequent outcomes. One area of emerging research is examining individual ACEs and the varying risk level among ACEs.^{16,17}

Generally, ACEs are studied relative to outcomes in adolescence or emerging adulthood. 18–20 ACEs experienced before adolescence have been associated with greater and earlier adolescent drinking,^{13,21} smoking tobacco,¹² and poorer physical health including more frequent visits to see a physician.²² Few researchers have conducted prospective longitudinal studies examining the effects of ACEs exposure during adolescence on adult outcomes. In a study of adolescent maltreatment and emerging adulthood (e.g., age 20–22 years) outcomes, researchers found maltreatment to be associated with a higher risk of arrest, violent offenses, and illicit drug use.²³ Adolescence is a critical developmental period characterized by puberty, changes in social relationships in part due to greater autonomy from parents, and often the beginning of romantic relationships. As ACEs are inter-related, studying them in adolescence may be useful to understanding their cumulative effects and the relationship of exposure in adolescence with longer-term adult outcomes including interpersonal relationships.

Researchers have become interested in understanding the links between ACEs and intimate partner violence (IPV) outcomes in early adulthood. Although not always framed as ACEs, child sexual abuse, child physical abuse, and witnessing parental IPV during childhood are predictive of future IPV.^{24,25} The risk of specific adverse experiences may be influenced by developmental stage; for example, increased autonomy in adolescence may lead to more time spent outside of the home and increase the probability or frequency of witnessing community violence. Prospective longitudinal research on adolescent ACE exposure and adult IPV is novel and useful in expanding understanding of how ACEs in adolescence may affect long-term adult outcomes related to violence within romantic intimate partnerships. This study fills this gap by examining ACEs experienced at age 13–19 years relative to experiences of IPV victimization 15 years later.

METHODS

Study Sample

This study used data from the longitudinal Flint Adolescent Study (Wave 1 [W1]: 1994; Wave 16: 2018; <http://prc.sph.umich.edu/projects/flint-adolescent-study/>). In the initial wave, 9th graders were recruited from the 4 largest high schools in the second-largest school district in Michigan (Flint). The original study was designed to follow youth who were considered to be at higher risk of dropping out of school, defined as having a grade point average <3.0.²⁶ At that time, the composition of students in Flint schools was 17% Caucasian, 80% African American, and 3% other (i.e., Asian, Native American). Given the composition of students in the district, the original study was designed to include only Caucasian, African American, or biracial youth, operationalized with a screening question that asked youth to self-identify their race. Of the 910 youth who were eligible to participate, 93% ($n=850$) enrolled. Of the initial sample (W1, $n=850$), 50% were female, 80% self-identified as African American, 17% as Caucasian, and 3% as biracial. This analysis used data from W1–4 (1994–1997) and 9–12 (2008–2011). These data represent adolescence (W1 median age=14.9 years, range=13.9–16.9 years) and early adulthood (W9 mean age=29.3 years). Of the initial 850 participants, 15 years after the first wave of data collection, 523 participants (61.5%) participated in at least 1 wave of data collection between W9 and W12. Of the 523 participants, 499 had data for all covariates. The authors examined attrition relative to the dependent variable of IPV.

Adolescent data were collected through in-person interviews followed by self-administered paper and pencil questionnaires on sensitive information including substance use and IPV. Data collected 15 years later also included telephone interviews if a respondent moved >100 miles from the Flint area. Interviews were conducted by trained interviewers in the school setting and later in the home or a private setting in a community organization.

All procedures were reviewed and overseen by the IRB at the University of Michigan.

Measures

This study evaluated IPV victimization at W9, W10, W11, and W12 when respondents were between age 28 and 34 years. The 5 items assessing how many types of violence a romantic partner had used against the participant in the prior year were: *slapped, kicked, pushed, choked or punched, forced or coerced you to have sex, threatened you with a knife or gun to scare or hurt you, made you afraid that you could be physically hurt, and repeatedly used words, yelled, or screamed in a way that frightened you, put you down or made you feel rejected*. For each wave of data collection (W9–W12), a count of experiences was calculated from 0, indicating no experiences in the prior year, to 5, indicating all 5 experiences.

Investigators identified 5 potential adverse experiences that occurred during adolescence, and examined the adverse experiences separately and as a combined summary score. The 5 ACES collected in W1–W4 were: being a victim of violent behaviors (enacted by anyone, including but not limited to caregivers, friends, and strangers), witnessing family conflict, primary caregiver use of alcohol, the divorce/separated status of youth's biological parents, and violence observed by the youth.

Being a victim of the violent behavior of others was evaluated with 3 items. Youth were asked to indicate on a 5-point frequency scale from *0 times* to *4+ times* how frequently they had been a victim of violence behavior in the past 12 months. The items were: *had someone physical assault or hurt you*, *had someone threaten to hurt you*, and *had someone take something from you using physical force*. Cronbach's α ranged from 0.54 to 0.62.

Family conflict was assessed at W1, W2, W3, W4 with 5 items at each wave from the Family Environment Scale.²⁷ The items were: *we fight in our family*, *family members throw things at each other*, *family members lose their tempers*, *family members criticize each other*, and *family members hit each other in anger*. The items used a 4-point frequency scale (1=*hardly ever*, 4=*often*). An average across the 4 waves was calculated ($\alpha_{\text{range}}=0.77-0.82$).

Youth were asked to respond to the frequency of their primary caregiver's use of alcohol (i.e., *does he/she get drunk*). Participants responded using a 5-point frequency scale from *never* to *very often*.

Parental divorce was assessed as a binary variable (1=divorced), determined from a question that asked about the youth's biological parent's marital status at each wave. If the youth indicated that their parent was divorced or separated between W1 and W4, the variable for divorce was 1. Thus, this variable accounts for separation or divorce that occurred during the study period, when the youth is an adolescent.

Two items evaluated if the youth had observed violent behaviors of others in their community behavior in the past 12 months ($\alpha_{\text{range}}=0.69-0.83$). Youth responded on a 5-point frequency scale from *never* (1) to *very often* (5). Items included if the youth had *seen someone commit a violent crime where person was hurt* or had *seen someone get shot, stabbed, or beaten up*.

The authors created a summary ACE variable to represent the number of ACEs experienced in W1–W4. If the participant reported experience of an ACE at any wave, the ACE was coded as 1. Experience across ACEs was summed, ranging from 0, meaning no report of any ACE across time, to 5, meaning the participant experienced each ACE at least once during their adolescence.

The ACE variables were selected because they either are existing ACEs (i.e., parental divorce) or are adverse experiences that highlight the risk related to increased autonomy of adolescence (i.e., more frequent exposure to community violence²⁸) that makes their experience unique as compared with children who may spend less unsupervised time in the community. Investigators created an unstandardized mean across waves for each ACE (except divorce which was dichotomous), and a standardized mean ACE score across all waves.

The authors controlled for a set of covariates when the participant was an adolescent (W1) and a set of covariates measured when the participant was an adult (W9–W12). Covariates measured in adolescence were participant sex, participant race, and mother's level of education. Participants' sex was assessed at W1 as either male (1) or female (0). Race was a self-reported variable of either Black, White, or biracial collected at W1. Mother's education

was evaluated at W1 with an item asking how much education the participant's mother had completed ranging from completed grade school (1) to completed graduate or professional school (7). Covariates measured in adulthood were participant's alcohol consumption and participant's economic need in adulthood. Alcohol consumption of the participant was evaluated at W9, W10, W11, and W12 with an item asking about the frequency in which they consumed alcohol in the last 30 days. Respondents indicated their consumption on a 7-point frequency scale from *0 times* to *40+ times*. Participant economic need was evaluated at W9, W10, W11, and W12. Participants responded to the item: *How often do you have problems paying for basic necessities, like food, clothing and rent?* Responses were on a 3-point frequency scale from *hardly ever* (1) to *often* (3).

Statistical Analysis

First, authors conducted attrition analysis (completed in 2020) comparing means for all independent and control variables relative to W9–W12 loss to follow-up. For all covariates and control variables, no differences were found between those who were lost to follow-up in W9–W12 and those who participated in 1 wave of data collection in W9–W12. Given these findings, investigators did not impute missing data.

Next, based on the count nature and distribution of IPV ($\bar{x}=0.274$, variance=0.596), negative binomial mixed-effects were used to model the experience of ACEs during adolescence as predictors of individual experiences of IPV at age 28–33 years. Individual random effects were significant; thus, all models accounted for the random effects of the individual. The first set of models evaluated if the ACEs summary score predicted IPV while accounting for other known risk covariates and random effects of individual. Two models were built iteratively, starting with a base model examining covariates relative to IPV accounting for individual random effects, then adding the ACE summary score. The second set of models examined ACEs as individual risk factors to study if some ACEs were more predictive of IPV outcomes than others. First, bivariate random-effects models were used to evaluate each ACE factor relative to IPV. Then, ACE factors were added iteratively into a multivariate model.

RESULTS

Five hundred and twenty-three individuals had at least one data point for IPV between W9 and W12. Of these, 24 were missing data for 1 covariate variable. Table 1 reflects the demographics of the sample.

Participants reported relatively constant levels of IPV experience over time ($\beta_{\text{intercept}} = -0.913$, 95% CI= -2.502, 0.677; $\beta_{\text{slope}} = -0.102$, 95% CI= -0.254, 0.050). However respondents started at different levels of IPV experience ($\mu_0 = 1.676$, 95% CI=0.987, 2.847). Thus, variability in the intercept was accounted for as individual random effects in all models.

The first set of models examined summative ACEs and IPV. Concurrent factors of participant's use of alcohol (incidence rate ratio [IRR]=1.270, 95% CI=1.1486, 1.4043) and participant's economic need during adulthood (IRR=1.479, 95% CI=1.1616, 1.8841) were

associated with IPV (Table 2). The summative ACEs score experienced during adolescence was positively associated (IRRs of 2.856–5.595) with increased IPV, although this finding was not significant at $p < 0.05$.

The second set of models examined individual ACEs and IPV. First, risk factors were examined individually while controlling for covariates (Table 3). Being a victim of violent behavior, exposure to family conflict, and observing violence in the community at adolescence were all significantly associated with more reported IPV in adulthood. Parental use of alcohol (i.e., drunkenness) and experiencing parental divorce did not predict IPV exposure in adulthood.

The multivariate mixed-effects models examined individual risk factors in relation to one another, controlling for covariates (Table 4). In the first model, being a victim of violent behavior during adolescence predicted IPV experiences in adulthood. In the second through fourth models, violent behavior victimization remained significant, family conflict trended toward significance, but primary caregiver use of alcohol and parental divorce remained non-significant when modeled with violence behavior victimization and covariates. The fifth model incorporated observed community violence, which was predictive of adult IPV, and washed out all other ACEs variables. In the full model, observed community violence (IRR=1.330, 95% CI=1.049, 1.687) was the only ACE that predicted adult IPV. The control variables of alcohol use during adulthood (IRR=1.262, 95% CI=1.141, 1.391) and economic status during adulthood (IRR=1.409, 95% CI=1.109, 1.791) were both associated with IPV across all models.

DISCUSSION

The primary finding of our study is that experience of ACEs in adolescence is predictive of interpersonal violence 15 years later. Expanding the conceptualization of ACEs to consider developmental timing at which the ACE occurred may be important in understanding risk factors for adult IPV. The lag of 15 years between the measures of exposure and outcome is unique in the ACEs and IPV literature. This study provides support for: (1) examining individual ACEs in addition to cumulative ACEs,²⁹ (2) considering specific developmental periods relative to ACE exposures, and (3) identifying IPV risk factors across socioecological levels.^{30,31}

The findings give support to evaluating ACEs in different ways. The bivariate results support the hypothesis that violence-related ACE exposures in adolescence are associated with exposure to violence in adulthood. In particular, the findings extend those of other researchers that being a victim of violence and witnessing family conflict is predictive of future IPV, 15 years later.³⁰ Although the summary ACEs score only trended in the expected direction, examination of the individual exposures indicated that greater risk of IPV in adulthood was predicted by exposure to community violence in the full model. Within the multivariate analyses using individual ACEs, witnessing community violence accounted for so much of the variation that individual victimization and witnessing family violence were no longer predictive. Despite occurring 15 years prior, the risk ratio effect size of exposure to violence in the community in adolescence is larger than the effect size of a known

concurrent predictor of adult IPV (i.e., participant's own alcohol consumption in adulthood).
30

These findings on adolescent exposures to adversity suggest both the importance of understanding the contextual factors that affect individual development and supports the notion that neighborhood-level factors influence IPV.^{32–35} Adolescence is an important developmental period, with the increase of autonomy in interpersonal relationships, romantic relationships, and dating. Adolescents generally spend more time outside of the home either at school or with friends or other peers than their younger counterparts. Greater amounts of time outside the home increase the likelihood of witnessing community norms, which may influence adolescent development. In contexts that have higher rates of violence, accounting for these community exposures may be an important adverse event that negatively impacts development. Although this study focused on neighborhood violence exposure, other potential adversities in adolescence that require attention might include exposure to bullying or other school-related violence and potential adverse exposures from older individuals when youth take on jobs after school or participate in other extracurricular activities.

These findings suggest broadening attention to include community violence prevention as a complementary strategy for IPV prevention. Researchers have found evidence that community-level factors such as neighborhood disadvantage, violence within one's social network, and living in a community that is slower to recover from economic downturns (such as Flint, Michigan) increase the risk of IPV in adult samples.^{32,33,36} The present findings expand these, with exposure to violence in adolescence being a significant predictor of IPV in adulthood 15 years later. Given that African Americans are disproportionately more likely to reside in high-risk communities than Whites, structural influences (e.g., racism, discrimination) are also likely affecting IPV outcomes. Interventions, then, must consider multilevel approaches that take into account both earlier influences like adverse experiences and community influences, and how they interact with one another.

Limitations

Several limitations should be noted. First, the authors were not able to examine childhood exposure to ACEs relative to adolescent exposure. Although some of the measures do overlap with childhood ACEs (e.g., divorce, parent alcohol use) and could have begun during childhood, and a new ACE exposure was added that may also be more developmentally relevant for adolescents than younger children, not being able to control for exposures that began in childhood is a limitation. Future work examining both childhood and adolescent adverse experiences would help to further tease apart different effects of adversity through vital developmental periods. Second, although this study examined several adolescent ACEs, the data used for this study did not include several traditionally key components of ACEs that are related to IPV, including physical, emotional, or sexual abuse of the child by the parent. Future research that incorporates this information while also examining exposures during adolescence would be useful. Despite the limitations, the results suggest that different kinds of adverse experiences such as witnessing violence in the community may be particularly relevant for adolescent development and adult trajectories.

CONCLUSIONS

Experience of ACEs in adolescence is predictive of experiences of interpersonal violence 15 years later. This study adds to the growing body of research that enlarges the notion of adversity beyond families into the neighborhood context. The findings also point to the need to expand the understanding of adolescent-specific adversities as this is a largely untapped area of research. The findings also give support to the investigation and development of multilevel interventions that address individual and community factors. Further investigation of ACE exposure trajectories and other social outcomes in adulthood would help expand the understanding of the arc of risk relative to youth developmental periods.

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Table 1.

Demographics of Participants (N=499)

Demographic variable	n (%)
Wave 1	
Parent's marriage status	
Married	142 (28.29)
Separated	31 (6.18)
Divorced	131 (26.10)
Never married	195 (38.84)
Mom's level of education	
Completed grade school	9 (1.79)
Some high school	53 (10.56)
Completed high school	204 (40.64)
Vocational/Training school	10 (1.99)
Some college	143 (28.49)
Completed college	71 (14.14)
Graduate/Professional school	12 (2.39)
Participant is male	219 (43.89)
Race	
Participant is African American	359 (71.51)
Participant is White	95 (18.92)
Participant is Biracial	14 (2.79)
Waves 9–12	
Participant's average alcohol use, SD [range]	1.57 1.23 [0–6]
Participant's average SES, SD [range]	1.62 0.60 [1–3]

Notes: Wave 1 indicates that the variable was measured at the first wave of data collection, when the participant was an adolescent. Waves 9–12 indicates that the variable was measured at Waves 9–12, when the participant was an adult. N represents participants included in analyses who had data for IPV and covariates. Differential attrition was not observed between the full sample and the sample used in analyses.

Table 2.

Negative-binomial Regression of Adolescent Aces Summary Score Predicting Adult Intimate Partner Violence, Presented as RRs (95% CI)

Variable	Model	
	1	2
0 ACEs	–	ref
1 ACEs	–	3.833 (0.2831, 51.9106)
2 ACEs	–	2.856 (0.2256, 36.1564)
3 ACEs	–	5.077 (0.4114, 62.6509)
4 ACEs	–	5.595 (0.4560, 68.6582)
5 ACEs	–	5.085 (0.4060, 63.6773)
Covariates		
Participant sex (male)	1.056 (0.7086, 1.5739)	1.096 (0.7345, 1.6347)
Race (Black ref)	–	–
White	1.488 (0.9197, 2.4067)	1.431 (0.8879, 2.3082)
Biracial	2.535 (0.9054, 7.0986)	2.321 (0.8310, 6.4846)
Participant's use of alcohol as an adult	1.274 (1.1522, 1.4095)**	1.270 (1.1486, 1.4043)**
Participant's economic status	1.500 (1.1787, 1.9100)**	1.479 (1.1616, 1.8841)**
Mom's level of education	1.069 (0.9293, 1.2294)	1.091 (0.9488, 1.2557)
Random-effects		
Participant	1.278 (0.7128, 2.2924)**	1.218 (0.6681, 2.2190)**

Notes: Boldface indicates statistical significance

* ($p < 0.05$;

** $p < 0.005$). Negative-binomial, mixed-effects modeling used. Results presented as incident-rate ratios.

Table 3.

Negative-binomial Bivariate Mixed-effects Regression of Individual Adolescent Exposure to Adverse Events and Adult Experience of Intimate Partner Violence,^a Presented as RRs (95% CIs)

Independent variables	IRR (95% CI)	<i>p</i>-value
Violent behavior victimization	1.969 (1.319, 2.939)	0.001
Family conflict	1.820 (1.235, 2.681)	0.002
Primary caregiver alcohol use	1.212 (0.882, 1.666)	0.235
Observed violence	1.491 (1.191, 1.867)	0.001
Divorce	0.649 (0.187, 2.251)	0.496

Notes: Boldface indicates statistical significance ($p < 0.05$). Negative-binomial, mixed-effects modeling used. Results presented as incident-rate ratios.

^aWhen controlling for the fixed effects of: participant sex, race, participant's use of alcohol as an adult, participant's economic status as an adult, participant's mom's level of education at baseline, and the random-effect of person.

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Table 4.

Negative-binomial Mixed-Effects Model of Adolescent Exposure to Adverse Events and Adult Experience of Intimate Partner Violence, Presented as Risk Ratios (95% CIs)

Variable	1	2	3	4	5
Violent behavior victimization	1.931** (1.287, 2.899)	1.626* (1.045, 2.530)	1.618* (1.039, 2.520)	1.614* (1.037, 2.512)	1.365 (0.861, 2.164)
Family conflict		1.485*** (0.974, 2.265)	1.444*** (0.939, 2.223)	1.443*** (0.939, 2.219)	1.391 (0.907, 2.134)
Primary caregiver alcohol use			1.111 (0.806, 1.530)	1.103 (0.800, 1.521)	1.092 (0.794, 1.503)
Divorce				0.969 (0.214, 2.444)	0.698 (0.206, 2.362)
Observed community violence					1.330* (1.049, 1.687)
Covariates					
Participant sex (male)	1.068 (0.725, 1.575)	0.977 (0.657, 1.453)	0.985 (0.661, 1.466)	0.969 (0.648, 1.448)	1.052 (0.701, 1.578)
Race (Black ref)	–	–	–	–	–
White	1.369 (0.857, 2.187)	1.316 (0.824, 2.101)	1.296 (0.810, 2.074)	1.302 (0.814, 2.083)	1.528*** (0.939, 2.486)
Mixed-race	2.115 (0.771, 5.802)	1.998 (0.736, 5.428)	2.024 (0.744, 5.505)	2.072 (0.760, 5.649)	1.956 (0.721, 5.307)
Participant's use of alcohol as an adult	1.271** (1.150, 1.404)	1.272** (1.152, 1.410)	1.272** (1.151, 1.404)	1.271** (1.151, 1.404)	1.260** (1.141, 1.391)
Participant's economic status	1.428** (1.125, 1.813)	1.389* (1.094, 1.765)	1.386* (1.091, 1.761)	1.379* (1.085, 1.752)	1.409* (1.109, 1.791)
Mom's level of education	1.082 (0.944, 1.240)	1.071 (0.935, 1.227)	1.072 (0.936, 1.229)	1.073 (0.937, 1.229)	1.059 (0.925, 1.213)
Random-effects					
Participant	1.100** (0.560, 2.161)	1.065** (0.537, 2.113)	1.068** (0.542, 2.108)	1.063** (0.537, 2.106)	1.030** (0.515, 2.059)

Notes: Boldface indicates statistical significance

* $p < 0.05$;

** $p < 0.005$;

*** $p < 0.10$). Negative-binomial, mixed-effects modeling used. Results presented as incident-rate ratios.