

Trajectories of Binge Drinking Differentially Mediate Associations Between Adolescent Violence Exposure and Subsequent Adjustment in Young Adulthood

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Violence exposure in adolescence can disrupt ongoing adjustment, yet few studies have examined potential mechanisms that can explain these effects. Using data from the National Longitudinal Study of Adolescent to Adult Health, we examined associations among adolescent violence exposure and indicators of adjustment in young adulthood, and tested whether maladaptive trajectories of binge drinking could mediate these associations. Adolescents ($N = 3,342$; $Mage = 16.09$) reported on their violence exposure and binge drinking in an initial assessment (Wave 1). Adolescents were subsequently reassessed for binge drinking at 1 (Wave 2) and 6 years (Wave 3) post, and completed measures of adjustment (education, physical health, life satisfaction, depression, and delinquency) at 6 years post (Wave 3). Latent growth mixture modeling revealed 4 binge drinking trajectories: *High Increasers* (low baseline, large positive slope), *Adolescence Elevated* (high baseline, negative slope), *Mid-Tier Stable* (midlevel baseline, flat slope), and *Slight Increasers* (low baseline, small positive slope). Violence exposure was indirectly associated with (a) lower educational attainment and greater delinquency through an increased likelihood of being in the *Adolescence Elevated* binge drinking class, (b) lower life satisfaction through an increased likelihood of being in the *High Increasers* binge drinking class, and (c) worse physical health through an increased likelihood of being in the *Mid-Tier Stable* binge drinking class. Violence-exposed adolescents may exhibit varying trajectories of binge drinking that carry differential risks for adverse outcomes, and disrupt adjustment during the transition to young adulthood. Implications for intervention and theory are discussed.

Keywords: binge drinking, developmental trajectories, longitudinal design, risky behavior, violence exposure

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Exposure to potentially traumatic events, including interpersonal violence, is common among adolescents, with some studies reporting that nearly 61% teenagers experience or witness

some type of physical assault each year (Finckelhor, Turner, Ormrod, & Hamby, 2009). Being the victim of interpersonal violence may be particularly pernicious during adolescence—a

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highly consequential developmental period when youth typically move toward greater independence and are expected to successfully navigate academic, health, and behavioral choices. Additionally, violence-exposed adolescents may be at increased susceptibility for engaging in substance use, such as binge drinking, as a means of coping with psychological distress. Persistent binge drinking throughout adolescence may carry important implications for subsequent health, adjustment, and life attainments. Nevertheless, scant research has investigated whether binge drinking trajectories explain the effects of violence exposure on later adjustment. Using data from the National Longitudinal Study of Adolescent to Adult Health, we examined whether adolescent violence exposure predicted multiple indicators of adjustment in young adulthood (education, physical health, life satisfaction, depression, delinquency), and tested whether these links were explained by differing trajectories of binge drinking.

A large body of research has documented the adverse sequelae of violence exposure on adolescent physical, social, and psychological adjustment (e.g., Kaplow & Widom, 2007). Exposure to interpersonal violence during adolescence is linked to worse academic performance (Bowen & Bowen, 1999), depression (Kaplow & Widom, 2007), worse physical health (Shin & Miller, 2012), and behavioral problems (Layne et al., 2014). The Adverse Child Experiences (ACE) model posits that exposure to violence and other life stressors in childhood and adolescence may result in impaired physical, social, and psychological functioning throughout adulthood (Felitti et al., 1998)—propositions that have been supported by longitudinal research (Turanovic & Pratt, 2015). Adolescent violence exposure and its associated risks and vulnerabilities may thus accumulate during this developmental transition and contribute to poor adjustment throughout the life span (Layne, Briggs, & Courtois, 2014). Despite the long-term implications of adolescent violence exposure, little is known about factors that can explain why these life events may lead to poor adjustment. Identifying mechanisms through which violence exposure in adolescence may influence ongoing adjustment can inform intervention efforts to enhance ado-

lescent resilience and improve long-term well-being.

One potential explanatory link between violence exposure during adolescence and subsequent adjustment is through an increased risk for binge drinking, presumably as a means of coping with distress. According to the stress and coping hypothesis (Cohen & Wills, 1985), experiencing distressing or disturbing events may lead to maladaptive coping strategies that help to satisfy short-term emotional needs at the cost of longer-term personal goals. Binge drinking is one form of maladaptive coping that may arise among adolescents exposed to violence. Adolescents often report using binge drinking as a way of momentarily reducing the thoughts and emotions accompanying traumatic and distressful events (Rothman, Edwards, Heeren, & Hingson, 2008). Binge drinking also poses important social, emotional, and physical health consequences (Oesterle et al., 2004). Binge drinking during adolescence is linked to lower educational attainment and academic motivation (Oesterle et al., 2004), worse health (Oesterle et al., 2004), and delinquency (Tucker, Ellickson, Orlando, Martino, Klein, & 2005). A conceptual framework of mediated effects would thus propose that (a) violence exposure in adolescence increases the risk for (b) engaging in binge drinking to cope with associated distress reactions, which in turn increases the risk for (c) poor adjustment in young adulthood.

Efforts to examine the intersection between adolescent violence exposure, binge drinking, and adjustment call for several conceptual considerations. Prior research suggests substantial heterogeneity in the onset, frequency, and trajectory of binge drinking across adolescence (e.g., Oesterle et al., 2004). Consistent with models focusing on the developmental implications of marijuana use (Epstein et al., 2015), varying trajectories of binge drinking characterized by continuity, discontinuity, and elevated peaks at specific points in adolescence may carry different risks for subsequent adjustment. For instance, adolescents who engage in elevated levels of binge drinking during the high school years may be less successful in school and have a greater propensity to engage in other forms of problem behavior, such as delinquency. Further, early disengagement from school and engagement in delinquency may place adolescents at continued risk for social

and behavioral problems throughout young adulthood, even if the elevated binge drinking subsides. Thus, examining *trajectories* of binge drinking across adolescence may help elucidate potential mechanisms that explain links between violence exposure and adjustment.

Study Aims and Hypotheses

This study had three aims. The first aim was to examine associations among adolescent violence exposure and indicators of adjustment in young adulthood, including education, physical health, life satisfaction, depression, and delinquency. Based on research using the Add Health database (Shin & Miller, 2012; Thompson, Sims, Kingree, & Windle, 2008; Turanovic & Pratt, 2015), we hypothesized that higher levels of adolescent violence exposure would predict worse adjustment across domains in young adulthood. The second aim was to examine whether adolescent violence exposure was associated with trajectories of binge drinking across adolescence and young adulthood. Consistent with prior research (Shin & Miller, 2012; Thompson et al., 2008), we hypothesized that greater adolescent violence exposure would be associated with maladaptive trajectories of binge drinking. The third aim was to examine whether the effects of adolescent violence exposure on subsequent adjustment was mediated through trajectories of binge drinking. We hypothesized that greater violence exposure in adolescence would be indirectly associated with worse adjustment in young adulthood through various trajectories of elevated binge drinking. To more accurately estimate the link between adolescent violence exposure and adjustment, all analyses accounted for potential risk markers of interpersonal violence, including gender, race, parents' education, income, neighborhood safety, and childhood maltreatment (e.g., Hatch & Dohrenwend, 2007).

Method

Participants

Our sample was drawn from the National Longitudinal Study of Adolescent to Adult Health (Add Health) database. Details regarding the Add Health database are available elsewhere (Harris, 2013). This study utilizes the public use dataset, which included

responses for $n = 6,054$ adolescents at Wave 1 (1994–1995), with $n = 4,834$ adolescents reassessed 1 year later (1996; Wave 2) and $n = 4,882$ assessed 6 years later (2001–2002; Wave 3). A total of $n = 3,843$ youth completed assessments at all three waves. Consistent with guidelines for Add Health data users (Chantala & Tabor, 1999), we limited our analyses to $n = 3,342$ (Wave 1 $M_{\text{age}} = 16.09$, $SD = 1.61$, range 13–20; Wave 2 $M_{\text{age}} = 16.02$, $SD = 1.50$, range 14–22; Wave 3 $M_{\text{age}} = 21.84$, $SD = 1.55$, range 18–26) adolescents who completed measures of violence exposure at Wave 1, measures of binge drinking at Waves 1, 2, and 3, adjustment at Wave 3, and had available sampling weights and cluster information.¹ Participants (54.0% female) were primarily White (64.0%), African American/Black (21.4%), Asian (3.2%), Native American (1.2%), other (5.2%), or biracial (5.2%). The median household income was \$40,000 (range: \$0 - \$900,000). Regarding parent education, 14.2% of parent respondents (15.4% of spouses) did not complete high school, 39.4% completed high school without college training (37.2% spouses), 18.9% completed some college (16.7% spouses), and 24.4% obtained a college degree or higher (20.5% of spouses).

Measures

Adolescent violence exposure (Wave 1). Participants reported the number of times they were exposed to six types of violent events during the past 12 months. These events included witnessing a shooting/stabbing, being held at knife/gunpoint, being shot, being stabbed, being jumped, or being in a physical fight that resulted in a serious injury. Responses for the physical fight item were given on a frequency-based scale, whereas responses for the remaining five items were given on a 3-point scale comprised of 0 (*never*), 1 (*once*), and 2 (*more than once*). Because of low frequencies, all items were dichotomized (0 = *event did not occur*; 1 = *event occurred at least once*) and summed, with higher total scores indicating a greater breadth of violence exposure.

¹ Participants who were assessed at all three waves but were excluded because of missing data on key variables ($n = 501$) did not significantly differ from those included on any constructs of interest.

Binge drinking (Waves 1, 2, and 3). Binge drinking was assessed with a single item that measured the number of times the individual consumed five or more drinks in one sitting and was recorded on a 7-point scale from 0 (*never*) to 6 (*everyday/almost everyday*).

Physical health (Wave 3). Physical health was assessed with a single item that measured participants rating of their general health on a 5-point scale ranging from 1 (*poor*) to 5 (*excellent*). Higher values indicated greater physical health.

Education (Wave 3). Education was assessed with a single item that measured participants' report of the highest year of regular school they have completed. Response options ranged from 6 (*6th grade*) to 22 (*5 or more years of graduate school*).

Delinquency (Wave 3). Delinquency was assessed with 9 items ($\alpha = .65$) measuring the frequency with which participants engaged in different problem behaviors (e.g., property damage) in the past 12 months. Responses were given on a 4-point scale from 0 (*never*) to 3 (*5 or more times*). Mean scores were calculated with higher values indicating greater delinquency.

Depression (Wave 3). Depression was assessed using a 9-item ($\alpha = .81$) scale adapted from the Center for Epidemiologic Studies Depression Scale (Radloff, 1977). Participants rated their agreement with 9 statements about how they have felt in the past 7 days (e.g., feeling bothered by things) on a 4-point scale ranging from 0 (*never/rarely*) to 3 (*most/all of the time*). Mean scores were calculated with higher values indicating more depressive symptoms.

Life satisfaction (Wave 3). Life satisfaction was measured with a single item that asked participants to rate "How satisfied with life are you as a whole?" Responses ranged from 1 (*very dissatisfied*) to 5 (*very satisfied*), with higher values indicating greater life satisfaction.

Demographics (Wave 1). Adolescents reported on demographic characteristics including age, race/ethnicity, and gender. Parents reported their total household income (in thousands of dollars), highest level of education, and their spouses' highest level of education on a scale from 0 (*never went to school*) to 9 (*professional training beyond a 4 year university*). Mean scores were calculated for parent/spouse educa-

tion; higher values indicated greater parental education.

Neighborhood safety (Wave 1). Neighborhood safety was measured by a single item asking participants to rate whether they usually feel safe in their neighborhood. Responses were coded 0 (*no*) or 1 (*yes*).

Childhood maltreatment (Wave 3). Retrospective reports of childhood maltreatment were measured with 3 items ($\alpha = .56$) asking participants to rate how often (prior to 6th grade) their adult caregivers had "not taken care of your basic needs, such as keeping you clean or providing food or clothing," "slapped, hit, or kicked you," or "touched you in a sexual way, forced you to touch him or her in a sexual way, or forced you to have sexual relations." Response options ranged from 0 (*this never happened*) to 5 (*more than 10 times*). Mean scores were calculated with higher values reflecting greater childhood maltreatment.

Analytic Procedure

Structural equation modeling (SEM) was used to test associations among adolescent violence exposure and adjustment in young adulthood. Violence exposure at Wave 1 was specified as an observed exogenous variable, and measures of adjustment in young adulthood (education, physical health, life satisfaction, depression, delinquency) at Wave 3 were specified as observed endogenous variables. Demographic characteristics (age, gender, race, parent education, household income), neighborhood safety, and childhood maltreatment were specified as observed covariates.

Latent growth mixture modeling (LGMM) was used to examine whether adolescent violence exposure is associated with trajectories of binge drinking. Similar to prior research (Chassin, Pitts, & Prost, 2002), we modeled trajectories of binge drinking as a function of age rather than measurement wave. We determined class enumeration based on prior research, analytic utility, and model fit from solutions that specified two to five classes. We used the sample size adjusted Bayesian Information Criterion (BIC), Akaike Information Criterion (AIC), log likelihood ratio (LLR) values, and Lo-Mendel-Rubin (LMR) adjusted LLR values to evaluate model fit.

Low BIC, AIC, and LLR and high LMR values indicate better model fit (Nylund, Asprouhov, & Muthén, 2007). A significant *p* value for the LMR indicated that the current class solution provided a better model fit than a solution with one less class. The smallest class size for each solution was used to evaluate the analytic utility. Once cluster membership was established, we estimated a multinomial logistic regression model in which violence exposure predicted the probability of cluster membership, accounting for demographic characteristics, neighborhood safety, and childhood maltreatment.

We estimated an additional SEM to examine whether violence exposure during adolescence was indirectly associated with adjustment in young adulthood through different trajectories of binge drinking. Adolescent violence exposure at Wave 1 was specified as an observed exogenous variable; education, physical health, life satisfaction, depression, and delinquency at Wave 3 were specified as observed endogenous variables; and probability of class membership was specified as observed mediating variables. Demographic characteristics, neighborhood safety, and childhood maltreatment were specified as observed covariates. To prevent singularity, we specified the lowest-level binge drinking trajectory as a referent group.

Missing Data

Some participants were missing data on covariates. Specifically, 20.8% of parents were missing data on their income, 10.5% of parents were missing data on education level, and 4.5% of adolescents were missing data on childhood maltreatment. To account for this missingness, we used multiple imputation with *N* = 10 imputed data sets.

Results

Table 1 presents frequencies of violence exposure and descriptive statistics for all dependent variables. Roughly 27.0% of adolescents (*N* = 1,036) reported experiencing at least one type of violence, and 11.0% (*N* = 422) reported experiencing multiple types of violence.

Table 1
Descriptive Statistics of Violence Exposure and All Dependent Variables

Wave 1 violence exposure	N	%
Type of exposure ^a		
Shot	41	1.1
Stabbed	171	4.9
Witness shooting/stabbing	401	10.1
Jumped	411	10.1
Serious injury from fight	307	8.0
Knife/gun pulled on you	426	11.1
Breadth of exposure		
No exposure	2805	73.0
One type	614	16.0
Two types	213	5.5
Three types	130	3.4
Four types	55	1.4
Five types	19	.5
Six types	5	.1
Wave 3 outcomes	<i>N</i> (<i>M</i>)	% (<i>SD</i>)
Education		
< 9th grade	22	.6
9th grade	81	2.1
10th grade	160	4.2
11th grade	250	6.5
12th grade	1209	31.5
1 year of college	645	16.8
2 years of college	604	15.7
3 years of college	364	9.5
4 years of college	371	9.7
More than 4 years of college	132	3.5
Physical health		
Poor	19	.5
Fair	166	4.3
Good	83.8	21.8
Very good	1554	40.5
Excellent	1264	32.9
Life satisfaction		
Very dissatisfied	25	.7
Dissatisfied	117	3.0
Neither satisfied nor dissatisfied	447	11.6
Satisfied	1791	46.6
Very satisfied	1459	38.0
Depression ^b	(.53)	(.48)
Delinquency ^b	(.13)	(.31)

^a Experienced at least once. ^b Range 0–3.

Adolescent Violence Exposure and Adjustment in Young Adulthood

We used a structural model to estimate associations among the violence exposure during adolescence and education, physical health, life satisfaction, depression, and delinquency in young adulthood after accounting for demo-

graphic characteristics, neighborhood safety, and childhood maltreatment. The model provided acceptable fit to the data, $\chi^2(42) = 594.97$, CFI = .97, RMSEA = .06. Table 2 presents the unstandardized estimates and standard errors for the structural paths. After accounting for demographic characteristics, neighborhood safety, and childhood maltreatment, adolescent violence exposure was associated with lower education, worse physical health, lower life satisfaction, greater depression, and higher delinquency.

Adolescent Violence Exposure and Binge Drinking Trajectories

We used LGMM to estimate trajectories of binge drinking across adolescence and young adulthood. Model fit indices for solutions estimating two to five classes are available in the supplemental material. All cluster solutions provided acceptable entropy levels (.91 to .93; Ny-lund et al., 2007), and no solution provided a significantly better fit to the data than the one before (LMR p 's > .05). Overall, the five-class solution provided the best fit to the data as measured by AIC, BIC, and LLR. However, the five-class solution also provided the smallest incremental improvement in model fit and returned a cluster with a relatively low sample size ($n = 104$, 3.0%). The four-class solution

provided the second best model fit, adding a fourth class provided a comparable improvement in model fit relative to adding a third class, and the four-class solution returned a smallest cluster of $n = 200$ (6.0%). Thus, consistent with prior research (e.g., Tucker et al., 2005), we retained a four-class solution for further analyses.

Figure 1a depicts the observed means in binge drinking for each class as a function of age. The four-class binge drinking solution was interpreted as comprising: (a) a *High Increases* ($n = 277$; 8.3%) group, characterized by a lower intercept and a high linear increase (Intercept $M = .20$, $SE = .10$, $p = .04$; Slope $M = .40$, $SE = .05$, $p < .001$) in binge drinking across adolescence; (b) an *Adolescence Elevated* group ($n = 228$; 6.8%), characterized by high binge drinking across the high school years followed by a decrease in late adolescence and young adulthood (Intercept $M = 5.21$, $SE = .14$, $p < .001$; Slope $M = -.33$, $SE = .05$, $p < .001$); (c) a *Mid-Tier Stable* group ($n = 220$; 6.6%), characterized by moderate and constant binge drinking across adolescence and into young adulthood (Intercept $M = 2.40$, $SE = .21$, $p < .001$; Slope $M = -.07$, $SE = .10$, $p = .50$); and (d) a *Slight Increases* group ($n = 2,617$; 78.3%), characterized by extremely low levels of binge drinking across early and middle

Table 2
Unstandardized Estimates and Standard Errors for Structural Model Predicting Adjustment Outcomes in Young Adulthood

	Adjustment in young adulthood									
	Education		Physical health		Life satisfaction		Depression		Delinquency	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Age (Wave 1)	.23***	.03	.01	<.01	.01	<.01	-.01	<.01	-.02***	<.01
Gender female	.23***	.05	-.20***	.01	-.01	.05	.14***	.02	-.13***	.02
Race White	.17	.09	.09	.16	.15**	.05	-.05	.05	-.01	.02
Race Black	.15	.20	.13	.16	.07**	.03	.01	.06	-.01	.02
Race Native American	.22*	.10	-.17	.23	.32**	.12	.13	.16	.01	.02
Race Asian	.48***	.10	.03	.17	.04	.08	.06	.06	-.07***	.01
Race other	.52*	.23	.03	.27	.22**	.03	-.01	.05	-.01	.05
Parents' education	.32***	.04	.02***	.01	.01	.01	-.01***	<.01	.01**	<.01
Household income	.01***	<.01	.01*	<.01	.01*	<.01	.01	<.01	.01	<.01
Neighborhood safety	.24***	.03	.09*	.04	.15*	.06	-.08	.05	.01	.02
Childhood maltreatment	-.10***	.02	-.10**	.04	-.12**	.03	.07**	.02	.05***	.01
Adolescent violence exposure	-.37***	.06	-.07***	.01	-.07***	.01	.04***	.01	.03***	.01

* $p < .05$. ** $p < .01$. *** $p < .001$.

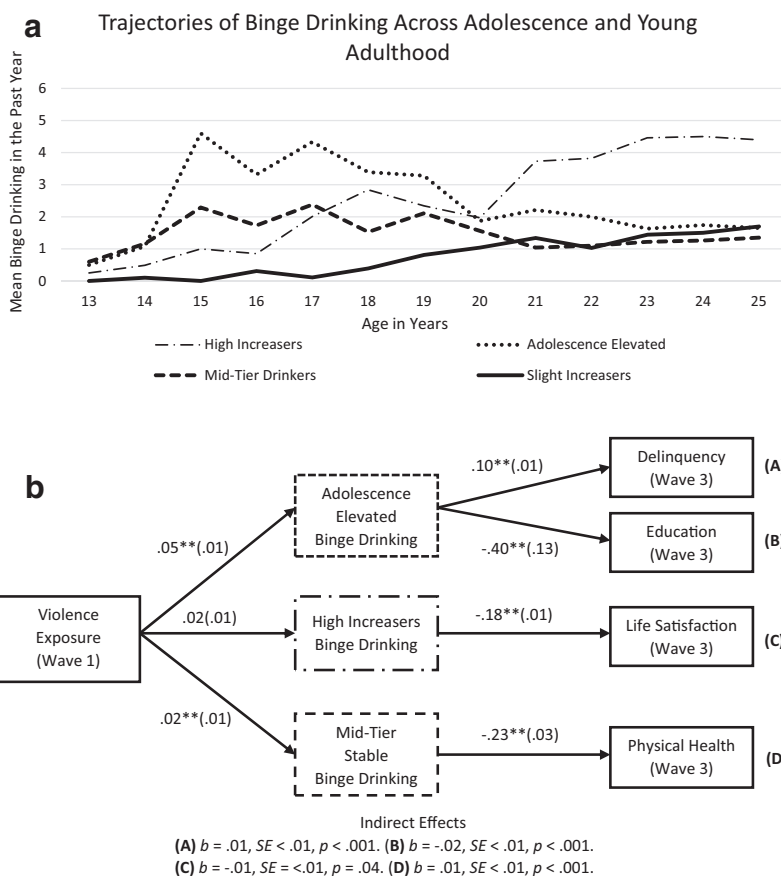


Figure 1. Figure 1a: Mean binge drinking from adolescence to young adulthood for 4-class solution. Figure 1b: Unstandardized estimates, standard errors (in parentheses), and indirect effects for structural model testing the mediating effects of binge drinking trajectories on the association between adolescent violence exposure and adjustment in young adulthood. Notes: ** $p < .01$. Estimates for all pathways in the full model are available in the supplemental material.

adolescence, with a slight increase in late adolescence and into young adulthood (Intercept $M = .00, SE = .02, p < .001$; Slope $M = .14, SE = .02, p < .001$).

We then used multinomial logistic regression to test whether trauma exposure during adolescence was associated with the probability of binge drinking trajectory class membership after accounting for demographic characteristics, neighborhood safety, and childhood maltreatment. Because the *Slight Increases* group composed the largest class, and slight increases in binge drinking across adolescence may be considered “normative” (Chassin et al., 2002), this class served as a referent. Greater adolescent trauma exposure was associated with an in-

creased likelihood of being a member of the *High Increases* ($b = .33, SE = .09, p < .001$), *Adolescence Elevated* ($b = .60, SE = .07, p < .001$), and *Mid-Tier Stable* group ($b = .34, SE = .09, p < .001$).²

The Indirect Effects of Adolescent Violence Exposure on Adjustment in Young Adulthood

We used SEM to estimate whether violence exposure during adolescence was indirectly

² Unstandardized estimates and standard errors for all parameters are available in the supplemental material.

associated with adjustment in young adulthood through trajectories of binge drinking. Figure 1b presents unstandardized estimates, standard errors, and indirect effects. The model provided good fit to the data, $\chi^2(52) = 340.58$, CFI = .93, RMSEA = .04. After accounting for demographic characteristics, neighborhood safety, and childhood maltreatment, greater adolescent violence exposure was associated with a higher likelihood of being a member of the *High Increasers*, *Adolescence Elevated*, and *Mid-Tier Stable* groups relative to the *Slight Increasers* group. Greater probability of membership in the *High Increasers* group was associated with lower life satisfaction, greater depression, and greater delinquency in young adulthood. Greater probability of membership in *Adolescence Elevated* group was associated with lower education and higher delinquency in young adulthood. Greater probability of membership in the *Mid-Tier Stable* group was associated with lower physical health in young adulthood. Additionally, greater violence exposure during adolescence was indirectly associated with worse physical health in young adulthood through a greater likelihood of being in the *Mid-Tier Stable* group. Greater adolescent violence exposure was indirectly associated with lower education and greater delinquency in young adulthood through an increased likelihood of being in the *Adolescence Elevated* group. Greater adolescent violence exposure was indirectly associated with lower life satisfaction in young adulthood through an increased likelihood of being a member of the *High Increasers* group.

Discussion

Experiencing interpersonal violence during adolescence can lead to poor physical, social, and psychological adjustment that persists throughout adulthood. Few longitudinal studies have empirically tested potential mechanisms that may explain these associations. The current study examined the intersection between adolescent violence exposure and indicators of adjustment in young adulthood, and tested whether these effects could be explained by trajectories of binge drinking. Our findings supported our hypotheses, in that ad-

olescent violence exposure predicts worse physical, social, and psychological adjustment in young adulthood. Additionally, adolescent violence exposure is differentially linked with maladaptive trajectories of adolescent binge drinking, and associations between violence exposure and poor adjustment are partially explained through patterns of elevated binge drinking during this pivotal developmental period.

Consistent with the ACE conceptual framework (Felitti et al., 1998) and prior research using the Add Health database (Turano & Pratt, 2015), experiencing a greater breadth of interpersonal violence in adolescence was associated with poor adjustment in multiple domains, including lower education, worse physical health, lower life-satisfaction, greater depression, and greater delinquency in young adulthood. Exposure to violence and other potentially traumatic events in adolescence may alter the formation of important developmental skills and competencies needed to successfully navigate a well-adjusted transition into young adulthood (Layne et al., 2014). These skills may include emotion regulation and adaptive coping strategies, moral and social reasoning abilities, academic abilities, and physical health habits (e.g., Courtois & Ford, 2009). Together, these findings point to the potentially persisting and pervasive effects of violence exposure within multiple developmentally salient domains of psychosocial adjustment across the transition from adolescence into young adulthood.

Consistent with the stress and coping hypothesis (Cohen & Wills, 1985), violence exposure was also associated with trajectories of maladaptive binge drinking across adolescence into young adulthood. Experiencing a greater breadth of violence was linked to a higher likelihood that adolescents would belong to three distinct trajectories of maladaptive binge drinking: *High Increasers*, *Adolescence Elevated*, and *Mid-Tier Stable*. One commonality among these trajectories is that each class had higher levels of binge drinking during adolescence relative to the *Slight Increasers* group. Further, the effect size between violence exposure and the probability of being in the *Adolescence Elevated* group was almost twice as large compared to the other maladaptive trajectories, which is con-

sistent with prior research suggesting that violence exposure places adolescents at risk for *early* engagement in binge drinking (Rothman et al., 2008). Potentially, the heightened stress that accompanies experiencing violence coupled with greater exposure to alcohol during adolescence may prompt some teenagers to engage in binge drinking as a means of temporarily reducing psychological distress (Layne et al., 2014).

Our findings also provide novel insight into processes that may help explain links between adolescent violence exposure and poor adjustment. Different trajectories of binge drinking across adolescence partially explained the predictive effect of violence exposure on adjustment measured in young adulthood. Specifically, violence exposure was indirectly associated with lower education and higher delinquency through a greater probability of being in the *Adolescence Elevated* binge drinking group. Although binge drinking may eventually decrease to normative levels in young adulthood for these adolescents, experiencing heightened levels of binge drinking *throughout adolescence*—a critical developmental window in which teens are expected to achieve academic milestones and avoid delinquent behavior—may have longstanding consequences that persist even after alcohol use subsides. Additionally, greater violence exposure was indirectly related to lower life satisfaction through an increased likelihood of membership in the *High Increasers* group and lower physical health through increased likelihood of membership in the *Mid-Tier Stable* group. The *High Increasers* group exhibited the highest level of binge drinking during the same wave in which life satisfaction was assessed. Potentially, ratings of life satisfaction may have been more contingent on elevated levels of *current* binge drinking rather than binge drinking that occurred earlier in adolescence. Further, adolescents who engage in constant, midlevel drinking may have had existing health disparities that limited their capacity to excessively binge drink throughout the teenage years.

Findings should be interpreted in light of certain limitations. Although we utilized nationally representative data, many constructs were measured using single-item indicators that may not have fully capture the breadth of

the construct. Future research is needed to replicate these findings using full measures. Sampling for this study began in the mid-1990s, which may limit generalizability to the current generation of adolescents. Although no specific cohort effects were anticipated, future research should replicate these findings using more recently collected data. Although analyses accounted for parent-initiated childhood maltreatment, nonparental childhood abuse was not assessed. Further, our models only included violence exposure during adolescence, and did not account for violence exposure during the transition to young adulthood. Future research should consider incorporating a wider range of childhood maltreatment and reoccurring victimization into their analytic models. Additionally, binge drinking was the only form of substance use assessed in this study, and future research is needed to examine the intersection between violence exposure and multiple forms of substance use across adolescence.

Despite these limitations, findings from this study have important implications for intervention and theory. Clinicians may view adolescent violence exposure as a risk marker of adolescent binge drinking behaviors, and assess violence exposure and binge drinking prior to initiating treatment (Pynoos et al., 2014). Interventions targeting various domains of adjustment in violence-exposed adolescents may be more effective if specific binge drinking treatment components are incorporated. These interventions may have the most substantial effect on education and social outcomes when implemented during the high school years when adolescents are building skills and establishing goals important for a healthy transition into young adulthood. Additionally, theorists seeking to explicate the developmental ramifications of violence exposure may benefit from incorporating *developmentally linked* risks (e.g., substance use) and potential consequences (e.g., academic achievement) that may be altered after experiencing a potentially traumatic event, and examine how these processes change over time (Layne et al., 2014). We hope that such efforts will promote developmentally informed theory, interventions, and policy.

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