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Exposure to Violence during Adolescence as a Predictor of Perceived Stress Trajectories in Emerging Adulthood

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Abstract

Early exposure to violence during adolescence is related to negative psycho-social outcomes later in life. In the present study, we examined the influence of cumulative exposure to violence during adolescence and trajectories of perceived stress in emerging adulthood in a sample of at-risk urban youth ($N = 850$; 80.1% African American; 50% female). Growth curve modeling indicated an overall decrease in reported stress as individuals aged. Baseline levels of violence exposure ($M_{\text{age}} = 14.9$) were associated with higher perceived stress levels in emerging adulthood ($M_{\text{age}} = 20.1$), but also slightly more negative perceived stress slopes from adolescence into emerging adulthood ($M_{\text{age}} = 15.9\text{--}22.1$). Individuals reporting increased violence exposure over time during adolescence also reported higher perceived stress levels in emerging adulthood ($M_{\text{age}} = 20.1$). Associations held after controlling for demographics and baseline functioning variables. The results suggest that violence exposure may disrupt normative adaptation to daily stressors in emerging adulthood.

Keywords

exposure to violence; transition to adulthood; perceived stress

Exposure to violence during adolescence has been tied to proviolence attitudes, violence perpetration, and negative mental health later in life (Boynnton-Jarrett, Ryan, Berkman, & Wright, 2008; Gorman-Smith, Henry, & Tolan, 2004; Schilling, Aseltine, & Gore, 2007). Adolescents who experience violence are often exposed to multiple forms (i.e., both victimization and witnessing in family or community settings; Dong et al, 2004). Consequently, cumulative exposures to violence are likely to be more detrimental than one isolated exposure (Fitzpatrick, Piko, Wright, & LaGory, 2005; Kitzmann, Gaylord, Holt, & Kenny, 2003; Turner, Finkelhor, & Ormrod, 2010). Furthermore, some subgroups of adolescents and emerging adults are more likely to be exposed to violence. Urban and African-American youth, for example, are disproportionately affected by violence exposure

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in adolescence compared with their rural and white counterparts (Berzin, 2010; Schwab-Stone et al., 1995). The effects of this exposure may be far reaching; violence exposure during adolescence may negatively influence other health risks, such as perceived stress. Yet, the long-term association between cumulative exposure to violence and perceived stress in at risk populations is not fully understood.

Emerging adulthood (generally considered ages 18–25) can be a period characterized by ambiguity and stress, particularly as many young individuals leave home and begin to take on increasingly adult roles and relationships (Arnett, 1999). Perceived stress during the transition to adulthood can be associated with negative mental health outcomes (Meadows, Brown, & Elder, 2006), substance use (Wills, Sandy, Yaeger, Cleary, & Shinar, 2001), physiological stress responses (Preussner et al., 2005), and impaired neurological development (Lupien, McEwen, Gunnar, & Heim, 2009). Thus, understanding predictors of stress trajectories is critical. In this study, we examined the cumulative effect of early exposure to violence on the ability to handle perceived stress in emerging adulthood in an urban, predominantly African American sample.

Violence Exposure and Cumulative Exposure

The deleterious effects of youths' exposure to violence (ETV) include anxiety and depression (Edleson, 1999), posttraumatic stress disorder (Kilpatrick, Litt, & Williams, 2010), aggression (Ozer, 2005; Sullivan, Farrell, & Kliewer, 2006), negative school outcomes (Ozer, 2005), substance use (Sullivan et al., 2006) and antisocial behaviors (Sousa et al., 2011). ETV is also related to perpetrating violence later in life (Feigelman, Howard, Li, & Cross, 2000; Flannery, Wester, & Singer, 2004). Compared to other age groups, youth are among the most at-risk for witnessing or experiencing violence (Finkelhor, Ormrod, Turner, & Hamby, 2005). Further, males, ethnic minorities and urban residents are disproportionately more likely to be affected by violence compared with females, whites and rural residents (Buka, Stichick, Birdthistle, & Earls, 2001; Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003).

Adolescents exposed to violence in one setting are also more likely to experience multiple sources of violence (e.g., community and family violence) as well as co-occurring violent events (e.g., simultaneously witnessing violence and being victimized; Finkelhor et al., 2005; O'Donnell, Schwab-Stone, & Muyeed, 2002; Saunders, 2003). Multiple exposures and sources of violence exposure suggest that youth could experience detrimental additive effects of such cumulative exposure (Fitzpatrick et al., 2005). Although researchers note that ETV is associated with negative psychosocial and health outcomes (Boynton-Jarrett et al., 2008; Schilling et al., 2007; Youngstrom, Weist, & Albus, 2003), fewer researchers have focused specifically on the effect of exposure from multiple sources. Preliminary evidence indicates, however, that exposure from multiple sources leads to poorer outcomes compared to a single source (Kitzmann et al., 2003). Youth in urban contexts, particularly minority youth, are also more likely to be exposed to repeated events from multiple sources of violence, compared to their white counterparts (Buka et al., 2001). Thus, research addressing exposure to violence in an urban context needs to consider both repeated exposures to violence as well as multiple sources of exposure (Turner et al., 2010).

Exposure to violence in childhood and adolescence can have latent effects which persist into young adulthood. Miller, Wasserman, Neugebauer, Gorman-Smith & Kamboukos (1999), for example, noted an association between witnessing community violence in adolescence and antisocial behavior 15 months later. Foster, Hagan and Brooks-Gunn (2008) found that violence exposure in childhood was associated with depressive symptoms in emerging adulthood. In a predominantly African American sample, Smith, Ireland, and Thornberry (2005) found that physical abuse in adolescence predicted criminal behavior and drug use in young adulthood. Previous exposure to assault and violent behavior by parents was also related to repeated victimization and depression, respectively, in young adulthood (Smith, White, & Holland, 2003; Brown, Cohen, Johnson, & Smailes, 1999). In addition, Aiyer, Heinze, Miller, Stoddard, and Zimmerman (2014) found that witnessing violence during adolescence and early adulthood predicted an attenuated cortisol response over time, suggesting that exposure to violence can affect physiological stress outcomes. MacMillan and colleagues (2009) noted a similar attenuated cortisol response in female adolescents exposed to violence.

ETV during the adolescent years may be particularly salient given that adolescents experience numerous physiological changes, in addition to forming their identity, developing and strengthening peer and significant other relationships, and increasing their independence from parents and caregivers. Violence exposure that disrupts or delays these critical tasks during adolescence may have a negative influence on later development. Supporting this idea, Johnson-Reid & Barth (2000) and Ireland, Smith, & Thornberry, (2002) demonstrated that violence exposure during adolescence, as compared to childhood exposure or non-exposure, lead to more negative outcomes (incarceration rates and drug use, respectively) at age 18. Thus, adolescents may be more vulnerable to the negative effects of ETV compared to youth at different stages of development. We extend this work by considering the distal consequences of adolescent violence exposure during the transition to adulthood as youth enter their twenties.

One notable consequence of violence exposure in general is increased reported stress (c.f. Tolin & Foa, 2006 and Kitzmann et al., 2003 for reviews). Despite previous studies focused on the associations between exposure to violence and future outcomes (including psychological distress), questions remain regarding the latent effect of adolescent exposure to violence on perceived stress in emerging adulthood. It is also unclear whether previous exposure is related to changes in perceived stress over time. Specifically, an unanswered question is whether ETV during adolescence is associated with more perceived stress over time during emerging adulthood.

Perceived Stress during the Transition to Adulthood

The transition from adolescence to adulthood is characterized by numerous role changes (Schulenberg, Sameroff, & Cichetti, 2004) presenting both challenges (Kessler & Walters, 1998) and opportunities (Masten, Obradovic, & Burt, 2006). Relative to adolescents, emerging adults demonstrate more civic engagement, social competence, social capital and general life satisfaction (Eccles, et al., 2003; O'Connor et al., 2011). The transition, however, can be stress-inducing as individuals also adopt new perspectives on relationships

and intimacy (Roisman, Masten, Coatsworth, & Tellegen, 2004), personal identity (Schwartz, Klimstra, Luyckx, Hale, & Meeus, 2012), family obligations (Fuligni & Pedersen, 2002) and work responsibilities (Roisman et al., 2004).

Daily stressors represent the irritating or frustrating demands that individuals meet in daily interaction with their environments (Kanner, Coyne, Schaefer, & Lazarus, 1981) and may be particularly challenging for emerging adults who are balancing new adult responsibilities. Daily stressors (e.g., traffic jams, lost items), as opposed to major life events (e.g., death of a loved one, divorce), are better predictors of negative mental health and behavioral outcomes in adults, including depression and violent behavior (Hussong & Chassin, 2004), as well as psychological distress (Pillow, Zautra, & Sandler, 1996).

Although emerging adults may be particularly vulnerable to stressors as they begin to adapt new roles, recent evidence suggests that emerging adults often have the ability to draw on both internal and external resources to cope with their changing environments and adapt to these new challenges ultimately reducing perceived stress over time (Hawkins et al., 2009; Masten et al., 2006; O'Connor et al., 2011). Even so, data from the National Longitudinal Survey of Youth indicate some young adults (e.g., high family risk; lower SES; minority status), are at greater risk of exposure to sources of daily stress (e.g. financial, work-related, neighborhood context) than their peers (Berzin, 2010), suggesting heightened risk for negative mental health outcomes for these populations.

Daily stressors may also interact with exposure to violence. Self-Brown, Leblanc, & Kelley (2004), for example, found that high, but not low, levels of daily stressors strengthened the associations between ETV and both internalizing and externalizing outcomes in a sample of urban adolescents. This finding is consistent with psychosocial-focused approaches to trauma exposure, which emphasize not only the direct experiences of violence, but also the ongoing environmental stressors that can exacerbate the negative effects of violence experiences (Miller & Rasmussen, 2010). As chronic stress conditions are more likely to prolong the negative effects of acute stress (Brosschot, Gerin, & Thayer, 2006; Sawyer, Major, Casad, Townsend, & Mendes, 2012), populations at risk for both violence exposure and high levels of daily stressors may be at particularly high risk for negative mental health outcomes. ETV may disrupt a natural stress adaptation process faced by emerging adults, affecting the acclimation process such that trajectories flatten or decrease less quickly.

In summary, emerging adults' perceptions of daily stressors, and their ability to handle them, may be indicators of future well-being. Further, understanding earlier life circumstances that are related to future stress and concerns over daily stressors may contribute to adjustment to adulthood and also mitigate the effects of stress. Given that ETV is associated with psychological duress, exposure during the critical period of adolescence may influence how transitioning young adults handle daily stressors.

Current Study

In the present study, we examined the effects of adolescent violence exposure on perceived stress levels during emerging adulthood in an urban sample of youth. We employed a

longitudinal design in order to capture how levels of stress varied both within and between individuals during the transition from adolescence to emerging adulthood, and to determine whether those patterns were influenced by previous violence exposure. Notably, we also considered how exposure to violence changed during adolescence and included multiple sources of violent exposure.

Based on previous research linking violence exposure in youth to negative outcomes in emerging adulthood (Miller et al., 1999; Smith et al., 2003), we hypothesized that greater cumulative exposure to violence in adolescence would be related to higher perceived stress at the start of emerging adulthood. We further expected that both initial and cumulative levels of violence exposure would predict changes in reported stress over time, such that higher levels of exposure would be associated with more positive stress trajectories (Berzin, 2010). Given a higher likelihood of violence exposure (Buka et al., 2001), we also expected that males and African Americans would report higher levels of stress and more positive stress trajectories relative to their non-African American and female counterparts.

Method

Sample

The sample for this study consisted of 850 urban youth participating in a longitudinal study from mid-adolescence to early adulthood. The sample was recruited from Flint, Michigan which is an economically disadvantaged environment, as reflected by high poverty and violence/crime rates. Flint is consistently rated among the most violent cities in the U.S., having the fifth highest crime rate among U.S. cities in 2008 and the second highest violent crime rate in 2011 (FBI Uniform Crime Report, 2011). From 1995–1997, corresponding to the sample's adolescent years, Flint had violent crime rates 1.5 times that national average. In 1997 alone, there were 4,366 violent crimes reported, 29 homicides and 3,024 aggravated assaults (FBI Uniform Crime Report, 1997). All participants attended one of the four largest public high schools and were identified as at risk for school dropout due to a GPA of 3.0 or lower at the end of eighth grade. Only students who were not diagnosed as emotionally or developmentally impaired were eligible to participate.

Data were collected annually at 7 time points. Waves 1 through 4 corresponded to participants' high school years ($M_{\text{age}} = 14.9, 15.9, 16.9, \text{ and } 17.8$, respectively). Waves 5 through 7 corresponded to the second, third, and fourth years post high school ($M_{\text{age}} = 20.1, 21.0, \text{ and } 22.1$, respectively). For ease of interpretation, we refer to mean ages (rounded) rather than waves when reporting results. Data were collected annually from 850 adolescents who met the eligibility criteria during their first year of high school (979 initial contacts; refusal rate = 13.2%). The sample was 50% female, and predominantly African American (African American = 681 (80.1%); White = 143 (16.8%); White and Black = 26 (3.1%); other = 0). Across the 7 waves of data collection, there were 337 (39.6%) complete cases, with missingness ranging from 0% (baseline demographic variables) to 34.2% (wave 5 daily stress; see Table 1). Missingness for exposure to violence and perceived stress variables ranged from .4–10.2% and 4.9–34.2%, respectively. Missingness for Wave 1 covariates ranged from .1–11.9%, although this missing data appeared to be missing at random (MCAR test $\chi^2(44) = 55.78, p = .11$). We used multiple imputation in MPLUS for each Wave

1 predictor variable with missing values. The method was Bayesian estimation, drawing random values from posterior distributions ($n = 10$) of missing values (Rubin, 1996). Missing data for the ETV and daily stress growth models were accounted for through full information maximum likelihood estimation (Preacher, Wichman, MacCallum, & Briggs, 2008).

Procedure

Participants completed a face-to-face interview at waves 1–4 with interviews held in schools or in a community setting. In waves 5–7, participants completed face-to-face or phone interviews depending on distance to the interviewers. Interview protocols did not differ by method of administration. Interviews averaged 60 minutes. Following the interview, participants completed a self-administered paper-and-pencil questionnaire that included items about their experience with violence in both their home and community, and their ability to handle the stressors currently in their lives.

Measures

Cumulative Exposure to Violence—Three scales were used to assess participants' observed or experienced violence in their home or community during adolescence (study waves 1–4; mean ages approximately 15–18): observed violence, victimization, and family conflict. Because the scales were on different metrics, we first created repeated measures variables for each violence indicator (i.e., long file), before standardizing each scale. To create a cumulative measure of exposure to violence, we summed all three subscales at each wave to create a cumulative exposure to violence score by wave for each participant. All bivariate correlations between scales were significant at each wave ranging between .14 and .33.

Observed Violence: Two items assessed exposure to violence through observations of violent behavior. Participants reported the number of times they had seen someone commit a violent crime where someone was hurt and the number of times they had seen someone get shot, stabbed, or beaten up in the last 12 months (Richters, 1990). The response options for the two items ranged from 1 = '0 times' to 5 = '4 or more times.'

Victimization: Three items represented exposure to violence through reported instances of being the victim of the violent behavior of others. Participants reported the number of times they had been threatened; physically assaulted; or had something taken from them by physical force in the 12 months prior to the questionnaire. The response options ranged from 1 = '0 times' to 5 = '4 or more times.'

Family Conflict: Two items assessed exposure to violence through reported levels of fighting and acting out in the individual's family (Moos & Moos, 1981). Participants indicated how often family members got so angry they threw things and how often family members hit each other in anger ($\alpha = .61-.71$). The response options included 1 = Hardly ever, 2 = Once in a While, 3 = Sometimes, 4 = Often.

Perceived Stress—Reported stress was assessed through eleven items representing participants' reported daily hassles during the previous month at each data collection (waves 2 through 7; mean ages approximately 16–22) (Cohen, Kamarck & Mermelstein, 1983). For example, participants reported how often they: had felt nervous or stressed out; felt they were able to handle important life changes (reverse coded); felt angered because of things that happened that were outside of their control; found that they could not deal with things they had to do; had been in control of the hassles in their lives (reverse coded); and felt they had so many problems that they could not deal with them. Response options included 1 = Never, 2 = Hardly Ever, 3 = Sometimes, 4 = Often, 5 = Very Often. Positive items were reversed coded such that higher values represent greater stress ($\alpha = .73-.81$).

Demographics—All additional covariates represent initial scores at baseline administration (Wave 1; mean age 15). Previous research has noted sex, race/ethnicity, and socioeconomic status differences in rates of violence exposure (Turner et al., 2010); we thus controlled for each in our analyses. Socio-economic status was assessed as the highest occupational prestige score for either parent (Nakao, Hodge, & Treas, 1990). Scores for participants in this study ranged from 29.28 (household work) to 64.38 (professional). The mean occupational prestige score was 39.78 ($SD = 10.7$), which represented blue-collar employment (e.g., automobile factory). Because older participants would have more time to accrue violent experiences, we also included age (based on birth month and year) at time 1 in our analyses. Additionally, we controlled for school attended in all analyses. Given the possibility of nesting effects related to participants' school, we also conducted an unconditional linear mixed effects model to determine the intraclass correlation coefficients for both exposure to violence and daily stressor outcomes. Less than 1% of the outcome variance for either exposure to violence or daily stressors was found at the school level, suggesting the observations of individuals attending the same schools were not correlated. Thus, we treated the data as a person-level analysis.

Baseline Functioning—In addition to demographic covariates, we included scale measures of baseline (Wave 1; age 15) functioning with known associations to perceived stress including: level of depression (6 items, $\alpha = .79$; Brief Symptom Inventory; Derogatis & Spencer, 1982); self-reported frequency of violent behavior (7 items, $\alpha = .73$; Zimmerman, Bingenheimer, & Notaro, 2002); relevance of school to the respondent (3 items, $\alpha = .52$); and general attitudes regarding school (7 items, $\alpha = .71$; Hawkins, Catalano, & Miller, 1992).

Data Analytic Strategy

To address the hypotheses of interest, univariate and multivariate latent growth curve models (LGCM) were used to investigate differences in stress levels at emerging adulthood (rescaled intercept to age 20) and stress trajectories (slope) during high school and the transition to adulthood (i.e., ages 15–22).

We first specified an unconditional exposure to violence model in adolescence (ages 15–18) to determine whether respondents differed in both their initial levels of violence exposure and their change in exposure over time. To examine the functional form of ETV change, we

first specified an intercept only model, followed by a model introducing a linear slope, and finally a model adding a non-linear (quadratic) slope.

To model changes in participant stress, we first specified an unconditional model with no predictors. To capture initial levels of perceived stress at the beginning of emerging adulthood, time was scaled such that the intercept corresponded to wave 5 in the study ($M_{\text{age}} = 20.06$, $SD = .65$). This allowed for the examination of perceived stress during emerging adulthood while still accounting for stress levels in high school. As with the ETV growth model, we first included an intercept only model, followed by one with a linear slope, and finally a model that added a non-linear slope. We then specified a model with demographic control variables predicting perceived stress intercept and slope (Model 1). Model 2 introduced baseline functioning covariates along with demographic control variables. Model 3 incorporated cumulative ETV, demographic and initial functioning covariates as predictors of both the perceived stress intercept and slope.

As a final falsification test, we re-ran the perceived stress growth Model 3 with growth curves of each exposure to violence predictor (family conflict, observed violence, victimization) independently included. This served to test whether a cumulative measure would be more informative than more discriminating individual measures of ETV.

Models were fit with maximum likelihood estimation using Mplus version 7.11 (Muthén & Muthén, 1998–2014). Fit indices and associated cutoffs indicating ‘good’ fit included the root mean squared error of approximation (RMSEA; values $.05$), the standardized root mean square residual (SRMR; values $.05$), the comparative fit index (CFI; values $.90$), and the Tucker-Lewis fit index (TLI; values $.90$; Kline, 2011). Model comparisons used Akaike Information Criterion (AIC) and Sample-adjusted Bayesian Information Criterion (BIC) where lower values indicated superior fit. Model selection was motivated by theoretical hypotheses and parsimony (Bentler, 1995).

Results

Descriptive statistics are reported in Table 1. Overall, reported stress was highest at age 16 ($M = 2.53$, $SD = .57$), before declining at later time points. We examined bivariate associations between all variables (not shown) for possible multi-collinearity. Correlations ranged from 0.00 – 0.61, with the highest correlations observed between stress measures in adjacent waves (e.g., age 17 and age 18 perceived stress; $r = .49-.61$). No other correlations exceeded (+/–).50. Cumulative exposure to violence was positively correlated with more perceived stress at each wave ($r = .17-.35$).

Cumulative Exposure to Violence—We tested an unconditional growth model examining changes in cumulative exposure to violence across ages 15–18. The unconditional intercept only model showed poor fit to the data (RMSEA = $.16$; SRMR = $.11$; CFI = $.80$; TLI = $.85$; AIC = 13037.11; BIC = 13046). The estimated intercept was not significant ($\beta_0 = -.04$, S.E. = $.06$; $p = ns$), although there was significant variability in starting values ($\tau_{00} = 2.13$, S.E. = $.14$; $p < .000$). Next, we specified a linear growth trend which resulted in a better fitting model (RMSEA = $.04$; SRMR = $.03$; CFI = $.99$; TLI = $.99$;

AIC = 12868.51; BIC = 12882.63). The estimated intercept was significant ($\beta_0 = 0.47$, S.E. = .07; $p < .000$) as was the estimated slope ($\beta_1 = -0.30$, S.E. = .03; $p < .000$). The negative slope coefficient indicated that, on average, violence exposure by year decreased as adolescents aged. We found, however, significant variability in both the baseline level of violence exposure ($\tau_{00} = 2.82$, S.E. = .24; $p < .000$) and the exposure slopes ($\tau_{11} = .18$, S.E. = .04; $p < .000$), indicating that adolescents in our sample had very different experiences with violence both at the start of data collection (approx. age 15) and over time. Adding a quadratic growth parameter resulted in roughly equivalent model fit to the linear model (RMSEA = .04; SRMR = .01; CFI = .99; TLI = .99; AIC = 12867.82; BIC = 12888.23). The quadratic term resulted in non-significant point estimates for both the quadratic slope fixed effect ($\beta_2 = 0.02$, S.E. = .03; $p = ns$) and the associated variance estimate ($\tau_{22} = .00$, S.E. = .05; $p = ns$). Given the non-significant estimates, we dropped the quadratic ETV growth parameter from future models.

To model the observed variation in adolescent ETV, we introduced the demographic and baseline functioning covariates as predictors of both ETV intercept (age 15) and slope. The conditional linear model showed good fit (RMSEA = .03; SRMR = .02; CFI = .98; TLI = .96), and had lower AIC (ETV_{unconditional} = 12868; ETV_{conditional} = 12498) and BIC (ETV_{unconditional} = 12882; ETV_{conditional} = 12546) values relative to the unconditional linear model. As seen in Table 2, being older, and reporting higher levels of depression and violent behavior were positively associated with exposure to violence at age 15. In contrast, more positive school relations and attitudes toward school were each associated with lower ETV at age 15. Only levels of depression and reported violent behavior were associated with the ETV slope. In each case, higher levels at baseline assessment were associated with larger decreases in ETV over time. Together, these predictors explained 56% of the variability in ETV at age 15 ($R^2 = .56$, S.E. = .04; $p < .000$) and 26% of the variability in the change in ETV over time ($R^2 = .26$, S.E. = .06; $p < .000$), though significant variability in both the ETV intercept ($\tau_{00} = .44$, S.E. = .04; $p < .000$) and slope ($\tau_{11} = .74$, S.E. = .06; $p < .000$) remained.

Perceived Stress—The unconditional intercept only model examining changes in perceived stress from Wave 2–Wave 7 had poor model fit (RMSEA = .12; SRMR = .12; CFI = .83; TLI = .87; AIC = 6063.34; BIC = 6075.77) and was not considered further other than to note significant variability around the intercept ($\tau_{00} = .16$, S.E. = .01; $p < .000$). Incorporating a linear slope term resulted in a model with improved model fit (RMSEA = .06; SRMR = .08; CFI = .96; TLI = .97; AIC = 5878.99; BIC = 5896.09). The predicted intercept at age 20 was similar to the intercept only model ($\beta_0 = 2.44$, S.E. = .02; $p < .000$). The growth parameter ($\beta_1 = -0.2$, S.E. = .00; $p < .000$) indicated that, on average, levels of stress were decreasing over time, although there was significant variability in individual slopes ($\tau_{11} = .01$, S.E. = .00; $p < .000$). Next, we added a quadratic growth parameter which resulted in overall good fit (RMSEA = .05; SRMR = .05; CFI = .98; TLI = .98) but slightly poorer fit relative to the linear model (AIC = 5894.23; BIC = 5917.54). The quadratic term resulted in a non-significant point estimate for the quadratic slope fixed effect ($\beta_2 = 0.00$, S.E. = .00; $p = ns$) and a significant, but nominally zero, associated variance estimate ($\tau_{22} = .$

00, S.E. = .00; $p < .000$). Given the non-significant growth estimate and the higher AIC and BIC values, we did not include the quadratic stress growth parameter in future models.

Perceived Stress and Cumulative Exposure to Violence—Model 1 introduced demographic variables as predictors of the perceived stress intercept and slope (Table 3). The model did not fit the data well on any measure of fit (RMSEA = .06; SRMR = .09; CFI = .88; TLI = .84). Model 2 included demographic variables and initial functioning covariates as predictors of perceived stress. The model showed better fit to the data (RMSEA = .05; SRMR = .05; CFI = .93; TLI = .91), had lower AIC and BIC values, and explained a greater percentage of perceived stress intercept and slope variance than Model 1. As seen in Table 3, females reported higher initial stress at age 20, but also more negative stress trajectories across time. This suggests that, while starting with higher rates of stress in emerging adulthood, females also experience a faster rate of decline in stress over time. Older respondents also reported higher initial stress, but age was not associated with stress trajectories. Higher levels of depression at age 15 were also associated with more stress at age 20, but were associated with more negative stress slopes over time, as well. Finally, more positive attitudes toward school at age 15 were associated with less stress at age 20.

Model 3 included ETV along with demographics and baseline functioning as predictors of both the perceived stress intercept and slope. The model again fit the data well (RMSEA = .04; SRMR = .03; CFI = .96; TLI = .94) and had the lowest AIC and BIC values across the three models. In addition to the associations found in Model 2, ETV at age 15 predicted both higher perceived stress at age 20, but also more negative stress slopes over time. Increasing ETV slopes in adolescence were associated with more positive stress at age 20, but were not associated with stress slopes over time. Interestingly, when including ETV predictors in the model, violent behavior at age 15 was also associated with higher stress slopes over time.

Independent Exposure Predictors—As a final test of our hypothesis, we specified models analogous to Model 3 above, however, we used separate exposure to violence growth curves (family conflict, victimization, observed violence), rather than a cumulative score. Model fit criteria and beta coefficients for the separate models largely paralleled the cumulative model reported above, but explained less overall variability in the stress intercept and slope. A ‘family conflict exposure only’ model was the most predictive, with family conflict at age 15 predicting both perceived stress at age 20 ($\beta_0 = .21$, SE = .08, $p < .01$) and overtime ($\beta_1 = 1.10$, SE = .16, $p < .001$). In the ‘victimization only’ model, victimization at age 15 predicted stress at age 20 ($\beta_0 = .31$, SE = .08, $p < .001$). The ‘observed violence only’ model had no significant associations between ETV and later stress, though results trended (i.e., significance values $p < .10$) similar to the results from Model 3, with both observed violence intercept and slope positively associated with stress at age 20. No separate ETV slopes were associated with stress outcomes. The results suggest that a cumulative measure better captures variability in perceived stress both at age 20 and over time.

Discussion

Overall, the results suggest a negative influence of ETV on future perceived stress, even after accounting for the effects of demographic and initial functioning predictors. Consistent

with previous research on early violence exposure (Miller et al., 1999; Smith et al., 2003), our results indicate that exposure to violence in adolescence has a lasting association with stress throughout early adulthood. The present findings supported our hypothesis that individuals reporting more cumulative violence exposure during mid-adolescence would report more perceived stress during early adulthood, compared with their counterparts with less exposure. Moreover, increasing violence exposure during adolescence was related to increases in perceived stress in emerging adulthood. Contrary to our hypotheses, women in the sample reported higher levels of initial stress in emerging adulthood, but more negative stress trajectories. Moreover, African Americans did not report higher levels of stress relative to members of other ethnicities. This study builds on previous research by focusing on an urban population from adolescence into emerging adulthood and incorporates a violence exposure measure sensitive to both the number of violent experiences and multiple sources of violence.

The findings contribute to previous research linking exposure to violence to psychological stress by incorporating repeated measures over eight years and spanning two developmental periods. Whereas previous work has examined ETV as a predictor of adolescent outcomes, we extend this work by considering the distal consequences of violence exposure into respondents' early twenties when individuals may be facing novel stressors associated with independence and adulthood. Overall, rates of exposure to violence tended to decline as individuals aged, although older students in 9th grade reported more baseline exposure. This result suggests that early adolescents may also be at high risk for violence exposure. Studies incorporating a longer span of adolescence (e.g., 6th–12th grade) may identify exposure trends that differ from our sample of middle adolescents. Nonetheless, the results show that research examining how emerging adults cope with daily stressors should not be confined solely to current influences, but consider previous experiences and history, as well.

Interestingly, reported stress also tended to decline as participants aged, with time points in emerging adulthood associated with lower perceived stress than in adolescence. This was surprising given that transitioning to adult roles and responsibilities has previously been shown to be stress-inducing. Arnett (2014) and others, however, have argued that a *storm and stress* model of emerging adulthood may be inconsistent with young peoples' experience and that, in many cases, transitioning adolescents report less stress as they age. Masten et al., (2006) also note the development of emerging adult resilience in the face of the many challenges facing emerging adults, suggesting an increasing capacity to cope with daily stressors over time. The overall findings provide some support for this developmental trending down of stress. We also find, however, that certain early risk factors like violence exposure, violent behavior, and depression may disrupt that trend and lead to a more reported stress during the transition. Given the numerous role changes and new responsibilities emerging adults can encounter during the transition to adulthood, preoccupation with, or sensitivity to, daily stressors could impede normal development. Young adults may devote more mental energy and time to managing their stress or self-medicating, as opposed to, e.g., identity exploration. Moreover, inability to cope with chronic daily stressors may eventually reduce individuals' capacity to contend with major traumatic events should they occur (Kubiak, 2005; Meadows et al., 2006).

Previous researchers examining the lasting influence of violence exposure reported positive associations between exposure and negative future outcomes (Foster et al., 2008; Miller et al., 1999; Smith et al., 2003). Moreover, exposure to multiple forms of violence was expected to have particularly negative effects because of the increased frequency and severity of the violence experienced (Margolin & Gordis, 2004). It seemed likely, then, that cumulative exposure to violence would be associated with more stress during emerging adulthood as individuals confront new stressors and responsibilities. A possible explanation for this effect is that exposure to violent events may over-tax individuals' stress response systems. Brosschot et al., 2006 found that chronic stress conditions as might be experienced in high violence areas may prolong the effects of acute stress. That is, individuals exposed to a significant violent event may be unable to recover if they remain in a continually stressful environment. Because chronic stress also strains cognitive resources (Major et al., 2014), emerging adults with previous violence exposure may view the same daily stressors as non-exposed youth as more stressful.

Despite previous research indicating males, particularly African American males, are at greater risk for ETV relative to their peers, we did not find ETV or stress differences by ethnicity. This result may speak to the uniformity of negative effects of ETV on perceived stress within a notably violent urban context. Moreover, although females in our sample did not report higher levels of ETV, females did have higher levels of stress at age 20, although also decreasing slopes. This finding is not unprecedented. Foster, Kuperminc, & Price (2004) found that, while exposed to less violence, a sample of urban minority females were more likely to report later depression and anxiety as a result of exposure. Additional research exploring sex differences in stress coping mechanisms in emerging adulthood may help to illuminate intervention strategies for female adolescents exposed to violent environments.

Finally, our results suggest that youth who are at risk of violence exposure will continue to be at risk (albeit for different factors) as they transition to adulthood. Emerging adulthood may also be a period when school and community support changes as individuals become more independent. Thus, it may be vital to identify and monitor youth who have been exposed to violence to provide tailored assistance to them in an effort to mitigate the effects of exposure and help them cope with stress associated with adult transitional tasks of more responsibility and independence. Our results suggest that resources should potentially be directed at developing adolescent and emerging adult resilience, in addition to working to limit exposure to factors that may disrupt this process. For example, Francois, Overstreet and Cunningham (2011) found that engaging a sample of urban youth in neighborhood structured activities buffered the effect of community violence exposure. Similarly, Masten et al., (2006) note the value of positive youth development activities in promoting resilience against negative influences in emerging adulthood.

Limitations and Future Directions

Notable strengths of our study include a longitudinal design, large sample size and the use of a cumulative exposure measure that includes multiple sources and multiple instances of violence, but limitations of our study also require attention. First, it is difficult to assess the

reliability of the observed violence and victimization scales comprising our exposure variable. It is notable, however, that internal consistency measures (i.e., Cronbach alpha) may not be appropriate for our exposure measures because the individual items that comprise the subscales may be considered independent events. In other words, exposure to one kind of event (e.g., being threatened) is not necessarily associated with exposure to another kind of event (e.g., being robbed). In addition, some of the exposure items were low frequency events (e.g., being assaulted, seeing someone get shot by a gun) even in violent contexts. Yet, our family conflict scale is a psychometrically sound measure that has been used in prior research (AUTHOR CITATION). Despite its psychometric properties, the family conflict scale may also raise questions given the inclusion of items that are not overtly violent. In the original conception of the scale, Moos and Moos (1981) capture conflict as ‘open expressions of anger, aggression and conflict.’ While the more violent item (e.g. family members hit each other in anger) draws more direct parallels to experiences of victimization, ‘family members get so angry they throw things’ may be closer to indirect exposure (witnessing violence). Notably, in a parallel analysis to determine if including only the overtly violent item would lead to different results, a one item family violence scale using ‘family members hit each other in anger’ did not appreciably change the findings (i.e., all paths remained significant and in the same direction) or model fit.

Nevertheless, future research that examines different types of exposure separately may provide more insights about the type of exposure that is most debilitating developmentally. A more discriminating measure of violence exposure (c.f., Finkelhor, Ormrod, Turner & Hamby, 2005) collected over time may add additional insight into what specific forms and locations of violence exposure (e.g., violent crime, intimate partner violence, physical and emotional bullying; school; home) contribute to perceived stress trajectories in emerging adulthood. Our research, however, suggests that more in-depth analysis of the long term effects of neighborhood and family violence is warranted.

Another study limitation is our reliance on self-report data. Respondents may have underreported instances of violence, particularly if they or family members were involved in the event(s). Further, given the scale prompts, some reports of victimization or observed violence could have been perpetrated by family members. This limitation, however, is likely to result in less variation for our exposure variable and reduce chances to find associations. Yet, we found support for our hypothesized associations that were also consistent with past research. Nevertheless, future research incorporating both multiple reports from different sources in the child’s life (e.g., parent; teacher), as well as information about the perpetrators would address our measurement limitations.

Another limitation is that our sample came from a particularly violent U.S. city and excluded youth with higher academic achievement (i.e., above 3.0 GPA); thus, results may not be generalizable to all urban African-American youth. Yet, the range of GPAs in our sample by their senior year in high school was more normally distributed (AUTHOR CITATION). In general, however, the use of a high-risk sample means caution should be exercised before generalizing to more representative populations.

These limitations notwithstanding, the results of the current study add to our understanding of the negatives consequences of exposure to violence. Our findings contribute to our understanding of adolescence and emerging adulthood by focusing on a high-risk population (urban, predominantly African-American youth) during a dynamic period in the life course. Emerging adulthood represents a significant transitory period for most youth and is typically accompanied by role changes that can lead to increased anxiety and stress. Adolescents with previous exposure to violence are seemingly at a disadvantage as exposure was associated with more perceived stress both at the start and across emerging adulthood. Our results also suggest that interventions to help youth cope with violence exposure during adolescence may help reduce its pernicious effects over time and that efforts to assist adolescents with the adult transition may need to also attend to the possible lingering effects of violence exposure.

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Research Highlights

- Overall, violence exposure by year decreased as adolescents aged.
- Overall, perceived stress decreased in emerging adulthood.
- Changes in violence and perceived stress varied between individuals.
- Baseline and increases in cumulative violence exposure predicted perceived stress at age 20 and over time.
- Females reported higher stress levels at the start of emerging adulthood, but also faster decreases over time.
- Perceived stress did not differ by race/ethnicity.

Table 1

Descriptive Statistics

	<i>N</i>	<i>M</i>	<i>SD</i>	Minimum	Maximum
CEV (Time 1)	846	.47	2.24	-.04	9.63
CEV (Time 2)	810	.18	2.17	-2.04	11.22
CEV (Time 3)	780	-.25	1.96	-2.04	10.08
CEV (Time 4)	763	-.45	1.91	-2.04	10.07
Stress (Time 2)	808	2.53	.57	1.00	4.82
Stress (Time 3)	782	2.49	.59	1.00	4.45
Stress (Time 4)	766	2.49	.62	1.00	4.82
Stress (Time 5)	559	2.38	.59	1.00	4.54
Stress (Time 6)	626	2.45	.58	1.00	3.92
Stress (Time 7)	571	2.42	.55	1.00	4.08
Time 1 Covariates					
Time 1 Age (years)	850	14.86	.64	13.87	16.88
SES	749	39.92	10.41	29.28	64.38
Depression	849	1.65	.69	1.00	4.83
Violent Behavior	846	1.34	.52	1.00	4.43
School Relevance	849	3.62	.80	1.00	5.00
School Attitudes	840	2.79	.64	1.00	4.00

Note: CEV: Cumulative Exposure to Violence. SES: highest parent occupational prestige score.

Table 2

Demographics and Baseline Functioning as Predictors of Exposure to Violence Trajectories in Adolescence

	Exposure to Violence	
	Age 15	Slope (age 15–18)
Sex	-.21 (.12)	-.02 (.05)
Age	.25 (.09)**	-.06 (.04)
SES	-.00 (.01)	.00 (.00)
Race	-.13 (.16)	-.04 (.07)
School: 1	.39 (.18)*	-.05 (.08)
2	.47 (.18)**	-.03 (.08)
3	.55 (.19)**	.00 (.08)
Depression	.86 (.09)***	-.18 (.04)***
Violent Behavior	1.51 (.12)***	-.25 (.06)***
School relations	-.29 (.08)***	.04 (.04)
School attitudes	-.21 (.10)*	.02 (.04)
	Fit Indices	
Log-Likelihood	-6218.01	
RMSEA/SRMR	.03/.02	
CFI/TLI	.98/.96	
AIC	12498.02	
BIC	12546.67	
R^2	.56***	.26*

Note: $N = 850$. Sex: Males are reference category. SES: highest parent occupational prestige score. Race: Non-African American are reference category. RMSEA: Root Mean Squared Error of Approximation; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; SRMR: Standardized Root Mean Squared Residual; AIC: Akaike Information Criterion; BIC: Sample-size adjusted Bayesian Information Criterion.

* $p < .05$,

** $p < .01$,

*** $p < .001$.

Table 3
Adolescent Cumulative Exposure to Violence as a Predictor of Stress Trajectories in Emerging Adulthood

	Model 1		Model 2		Model 3	
	Age 20	Slope	Age 20	Slope	Age 20	Slope
Sex	.19 (.03) ***	-.04 (.01) ***	.13 (.03) ***	-.03 (.01) **	.14 (.03) ***	-.03 (.01) **
Age	.10 (.02) ***	.01 (.01)	.08 (.02) **	.01 (.01)	.08 (.03) **	.02 (.01) †
SES	-.00 (.00)	.00 (.00)	-.00 (.00)	.00 (.00)	-.00 (.00)	.00 (.00)
Race	-.01 (.04)	.02 (.01)	-.00 (.04)	.02 (.01)	.02 (.04)	.02 (.01)
School: 1	-.02 (.05)	.01 (.02)	.02 (.04)	.01 (.02)	.00 (.05)	.02 (.02)
2	.03 (.05)	.02 (.02)	.09 (.04) *	.01 (.02)	.06 (.04)	.02 (.02)
3	.03 (.05)	.01 (.02)	.08 (.05)	.00 (.02)	.03 (.05)	.01 (.02)
Depression	-	-	.21 (.02) ***	-.02 (.01) *	.21 (.04) ***	.01 (.01)
Violent Behavior	-	-	.01 (.03)	.01 (.01)	-.03 (.06)	.04 (.02) *
School relations	-	-	-.03 (.02)	-.00 (.01)	-.02 (.02)	-.01 (.01)
School attitudes	-	-	-.11 (.03) ***	.01 (.01)	-.10 (.02) ***	.01 (.01)
ETV Age 15 †	-	-	-	-	.08 (.02) ***	-.02 (.01) *
ETV Slope †	-	-	-	-	.35 (.10) **	.05 (.03)
Fit Indices						
Log-Likelihood	-103.91		-9014.74		-8971.53	
RMSEA/SRMR	.06/.09		.05/.05		.04/.03	
CFI/TLI	.88/.84		.93/.91		.96/.94	
AIC	18317.82		18155.48		18077.06	
BIC	18404.14		18254.36		18182.22	
R ²	.08 ***	.05 *	.27 ***	.07 *	.39 ***	.12 *

Note: N = 850. ETV = Exposure to Violence. Sex: Males are reference category. SES: highest parent occupational prestige score. Race: Non-African American are reference category. RMSEA: Root Mean Squared Error of Approximation; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; SRMR: Standardized Root Mean Squared Residual; AIC: Akaike Information Criterion; BIC: Sample-size adjusted Bayesian Information Criterion.

† Conditional ETV intercept and slope controlling for sex, age, SES, race, school, depression, violent behavior, school relations, and school attitudes at age 15.

.100' $p < .001$

'10' $p < .01$
**
'50' $p < .05$
*
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