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Depressive Symptoms, Social Support and Violence Exposure Among Urban Youth: A Longitudinal Study of Resilience

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Abstract

Depression is a serious mental health concern among adolescents. Violence exposure is a potent risk factor for depression. Social support may help reduce depression risk, even when adolescents are exposed to violence. Using a compensatory model of resilience, we investigate the influence of violence exposure and social support on depression over time in a sample of urban youth during the high school years (N=824, 52% female, mean age year 1 = 14.9). We used growth curve modeling to examine depressive symptoms across adolescence and its association with violence exposure and social support, accounting for important sociodemographic characteristics (sex, socioeconomic status and race/ethnicity). Depressive symptoms on average increase from year one to two of high school and then are stable or decline from years two to four. Violence observation and conflict in the family were each associated with increased depressive symptoms during the high school years. Mother support was associated with decreased depressive symptoms over time. Our results support a compensatory model of resilience. Promoting positive parent-child communication among urban youth living in disadvantaged contexts may help reduce the probability that exposure to violence will result in depressive symptoms.

Keywords

adolescence; depression; resilience; violence exposure; social support

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Introduction

Depression has a significant influence on the health and well-being of adolescents. Depressive symptoms may increase risk of educational failure, poor social relationships, and harmful behaviors such as smoking, substance abuse, and suicide (Fletcher, 2010). Mental health issues such as depression generally first emerge during adolescence, likely due to post-pubertal physical, social, emotional, and cognitive changes (Rivara, Park, & Irwin, 2009). Lifetime prevalence of major depressive disorder (MDD) among adolescents is 1 to 5% and sub-threshold depression (also called minor depression) is between 10–25%, although estimates vary (Costello, Erkanli, & Angold, 2006; Lewinsohn, Shankman, Gau, & Klein, 2004). Thus, although MDD may be relatively uncommon, a notable proportion of adolescents experience some level of depressive symptoms. Depressive symptoms below the MDD threshold are associated with increased risk of MDD, other mental illnesses, and suicide later in life (Fergusson, Horwood, Ridder, & Beautrais, 2005). Researchers have found that adolescents experience higher rates of depression compared to adults (Ge, Natsuaki, & Conger, 2006) and trajectories of depression across adolescence are curvilinear. Depressive symptoms tend to rise during early to mid adolescence and decline during late adolescence (Adkins, Wang, & Elder, 2009). Thus, youth may be at heightened risk of depression compared to adults and this risk may vary during the high school years. Exposure to risk factors for depression during adolescence, such as violence exposure, may influence depressive symptom trajectories.

Violence Exposure

Violent contexts are a potent risk factor for mental health problems such as depression among adolescents (Kennedy, Bybee, Sullivan, & Greeson, 2010). Youth living in urban, disadvantaged areas are often exposed to violence daily, both within the home and the community (Foster, Kuperminc, & Price, 2004). Growing up in violent contexts may contribute toward feelings of distress, hopelessness, and ineffectiveness at managing one's environment; these negative perceptions of self and the world may manifest as symptoms of depression (Lynch & Cicchetti, 1998; Zona & Milan, 2011). Although researchers have found consistently that violence exposure is associated with increased risk of depression among adolescents, most of this research included only one form of violence exposure (e.g., only community violence) or aggregate measures (e.g., sum of family and community violence exposure (Olofsson, Lindqvist, Shaw, & Danielsson, 2012; Zona & Milan, 2011). Youth exposed to violence are often exposed to multiple forms of violence (Dong et al., 2004). Furthermore, the unique developmental features of adolescence suggest that violence exposure across ecological domains, including community and family, may each contribute toward depression risk.

Adolescents spend increasing time outside the home compared to late childhood and, as a result, must learn to manage influences from multiple social contexts, including community and family (Crosby, Santelli, & DiClemente, 2009). Thus, we expect that violence exposure within developmentally salient contexts such as family and community may have deleterious effects on youths' health and development. Schwartz and Gorman (2003), for example,

found that youth exposed to community violence were at increased risk of depressive symptoms and, consequently, detrimental outcomes such as poor academic achievement. Researchers have also found that youth exposed to violence within the family are at increased risk for negative outcomes, including depression (Repetti, Taylor, & Seeman, 2002). Yet, the independent contributions of different forms of violence exposure on depression have rarely been investigated in the same study. Furthermore, although several researchers have examined the influence of violence exposure at a single time point on depression trajectories among youth, few researchers have examined the influence of violence exposure over time on depression trajectories. Thus, more research is needed to investigate the relationship between multiple forms of violence exposure over time on depression trajectories of youth. Beyond only considering risk, however, resources expected to have a positive influence on development (i.e., promotive factors) may help reduce the likelihood of depression (Sameroff, 2000), One such promotive factor is social support.

Social Support

Social support may help support healthy development, even when young people are exposed to risks such as violence exposure (Ostaszewski & Zimmerman, 2006). Family and peer social support may be significant promotive factors for youth by helping them cope with difficult challenges and reducing depression risk, particularly for those living in high-risk environments (Rosenfeld, Richman, Bowen, & Wynns, 2006). Despite changes in family relationships during adolescence (Steinberg, 1999), parents continue to be a vital source of support for youth (Cobb, 2007). Researchers have found, for example, that among youth exposed to violence, mother support reduces risk of negative outcomes, including depressive symptoms (Rosenfeld et al., 2006). Peer support may also ameliorate the negative effects of violence exposure, though this relationship has been less studied. Peer groups become a primary focus during adolescence, as youth develop more mature peer relationships (Muuss, 1996; Youniss & Haynie, 1992). Friends can serve as a vital source of emotional support for youth, sharing concerns they may not otherwise share with adults (Cobb, 2007). Consequently, peer support may also help ameliorate the negative effects of violence exposure on depression risk. While some researchers have found that both peer and parental support play a role in adolescents' mental health (Laible, Carlo, & Raffaelli, 2000), many suggest that parental support is more robustly associated with reducing risk of depressive symptoms (Stice, Ragan, & Randall, 2004). Yet, few researchers have examined the effects of both peer and parental support over time on depressive symptom trajectories during adolescence. Furthermore, fewer researchers have investigated this temporal relationship while also considering risk factors such as violence exposure. In summary, multiple risk and promotive factors across relevant developmental contexts may influence depression risk among adolescents. Yet, few researchers have simultaneously examined multiple sources of support and violence exposure over time on depressive symptom trajectories among youth.

Sociodemograhic Factors

Any analysis of adolescent depression also requires attention to sociodemographic characteristics. Females, racial/ethnic minority youth and those from low socioeconomic status (SES) families may disproportionately experience depressive symptoms (Avenevoli, Knight, Kessler, & Merikangas, 2008). Female adolescents, for example, may experience

greater depression prevalence compared to males throughout high school (Adkins et al., 2009). Researchers have also found that this gender gap may narrow during adolescence. Females generally experience more depressive symptoms at the beginning of high school, but also report a greater reduction in symptoms over time compared to males, suggesting different trajectories of depression by sex during the high school years (Avenevoli et al., 2008; Peterson et al., 1993).

Researchers have reported mixed findings regarding racial/ethnic differences for depression among youth. Some researchers found that racial/ethnic minority youth have higher rates of depression (Garrison, Schluchter, Schoenbach, & Kaplan, 1989), but others have reported no differences by race/ethnicity (Byck, Bolland, Dick, Ashbeck, & Mustanski, 2013) or lower rates among African Americans and Whites compared to other racial/ethnic groups (Schraedley, Gotlib, & Hayward, 1999). Researchers have also reported equivocal findings in the relationship between SES and depression. In a meta-analysis, Twenge and Nolen-Hoekesma (2002) reported no differences in depression by SES among children and adolescents. More recently, in a nationally representative sample of youth, Kessler et al (2012) found lower SES was associated with higher rates of mental health disorders. Thus, adolescent depression varies by sociodemographic characteristics and these must be taken into account when examining depression trajectories.

The effect of violence exposure on depression may also vary by sociodemographic characteristics, particularly by sex. Some researchers have found, for example, that male adolescents are more likely to report aggressive or antisocial behavior as a result of violence exposure, whereas females may be more likely to report mental health symptoms such as depression (Zona & Milan, 2011). Thus, researchers examining the relationship between violence exposure and depressive symptoms need consider the potential differences in this relationship by sex.

Resilience

Adopting a resilience-based approach helps frame our understanding of adolescent depression in the context of promotive factors that may help reduce the effects of risks associated with depression (Zimmerman et al., 2013). Resilience “refers to the process of overcoming the negative effects of risk exposure, coping successfully with traumatic experiences and avoiding the negative trajectories associated with risk” (Fergus & Zimmerman, 2005, p. 399). Although both risk and promotive factors are considered when using a resilience framework, the emphasis is on promotive factors (Fergus & Zimmerman, 2005). A developmental model of resilience refines this concept to focus on factors that shape developmental pathways of youth, including influences from family, peers and community (Yates & Masten, 2004). Promotive factors can be resources external to the individual that support healthy development in the context of adversity; these factors help decrease the risk of a negative outcome and increase the likelihood of a positive outcome (Sameroff, 2000). Consequently, we may expect that important developmental promotive factors, such as social support, may help reduce the likelihood of negative outcomes such as depressive symptoms even when youth are exposed to violence (Chen, Voisin, & Jacobson, 2016).

One model of resilience that may explain how promotive factors operate to help reduce the likelihood of negative outcomes due to risk exposure is the compensatory model. A compensatory model suggests that risk and promotive factors operate independently and promotive factors influence outcomes in the opposite direction to counteract the effects of a risk (Fergus & Zimmerman, 2005). Thus, even in the context of risk factors such as violence exposure, promotive factors such as social support may help ameliorate the negative effects of violence on mental health. Consequently, resilience is a useful framework for studying the association of violence exposure, social support, and adolescent depression over time.

Current Study

In the current study, we expect that violence exposure across contexts, including within the family and community, will each independently increase risk of depressive symptoms among adolescents during the high school years. We also expect that parent and peer support will help reduce the risk of depressive symptoms over time, even in the face of violence exposure over the same period of time. Our study builds on previous research examining violence exposure and depression in the following ways. First, we examine the association between multiple forms of violence independently and over time. Second, we apply a resilience framework to examine risk (e.g., violence exposure) and promotive factors (e.g., social support) over time associated with depression trajectories. Third, we include risk and promotive factors within developmentally relevant contexts for youth. Fourth, we investigate these relationships among youth living in an urban, disadvantaged community at risk for violence.

Methods

Research Context

The current study includes participants from Flint, Michigan. The city of Flint is unique in that it has seen much economic prosperity and misfortune throughout the years. Transitioning from a manufacturing to service economy has had a strong effect on the life-circumstances of young people in Flint. At one time, because of high-paying manufacturing jobs, Flint and surrounding Genesee County was one of the most affluent metropolitan areas in the U.S. In the past 40 years, over 70,000 auto industry jobs have been lost, and the population has declined by half. Like many urban Michigan communities facing declining populations, the city faces extreme economic and health challenges, including high rates of crime and violence. Flint has been ranked as the most violent city over 100,000 in the U.S. (Weigley, Hess, & Sauter, 2013) and has suffered from higher unemployment levels compared to state and national averages for well over a decade (Bureau of Labor Statistics, 2014).

Participants

This study is based on 4 years of data collected as part of a longitudinal study of youth from mid-adolescence (i.e., high school years) to young adulthood. Data were collected from 850 adolescents at-risk for high school dropout at the beginning the ninth grade in four public high schools in a Flint, Michigan. Youth were eligible to participate in the initial study if they were in ninth grade, enrolled in one of Flint’s four main public high schools, and had an

eighth grade GPA of 3.0 or below and were not diagnosed as having developmental impairments (Zimmerman, Ramirez-Valles, Zapert, & Maton, 2000). The 3.0 GPA threshold was used because the original study was about high school dropout and substance use and GPA was used to ensure the sample was at somewhat higher risk for leaving school before graduation. Twenty-six participants were excluded due to limited power to detect potential racial/ethnic differences in the mixed race/other subgroup. Waves 1 through 4 correspond to the participants' high school years. The respondents were 50% female, 83% African-American, 17% White at Wave 1. Mean age at Wave 1 was 14.86 years (SD=0.64). Following institutional IRB approval we used passive parental consent and participant assent, data were collected during in-school interviews. The sample included 910 students in Wave 1, but over 40 of them were no longer enrolled in the Flint schools and were not eligible for the study. The others not participating in the study included parent or child refusal. Thus, our response rate for eligible youth was 98%.

Measures

Level-1 variables—Time-varying variables included depressive symptoms, violence observation, conflict in the family environment, mother support and friend support.

Depressive symptoms: We measured Depressive symptoms among participants using six items from the Brief Symptom Inventory (Derogatis & Spencer, 1982). Response options ranged from 1 (not at all uncomfortable) to 5 (extremely uncomfortable) according to how uncomfortable in the past week participants were due to loneliness, sadness, lack of interest, hopelessness about the future, thoughts about ending one's life and feeling worthless. We calculated the depression score as the mean of these six items for each wave (Cronbach α = 0.78–0.86).

Violence Observation: We measured violence observation using two items, asking participants how often in the past 12 months they saw a violent crime where someone was hurt or saw someone get shot, stabbed or beaten up. Response options ranged from 1 (None) to 5 (4 or more times). We calculated the violence observation score as the mean of these two items (Cronbach α = 0.68–0.83).

Conflict in the Family Environment: We measured conflict in the family environment with 5 items from the Family Environment Scale (Moos & Moos, 1986). Items ask how often family members fight, get so angry they throw things, lose their tempers, criticize each other and hit each other in anger from 1 (Hardly ever) to 4 (Often). We calculated the conflict in the family environment score as the mean of these five items (Cronbach α = 0.76–0.81).

Mother support: We measured mother support with 5 items from Procidano and Heller's (1983) Perceived Social Support- Family (PSS-Fa) scale. Participants were asked if their mother enjoyed hearing what they thought, if they relied on their mother for emotional support, if their mother helped them solve problems, if they had a caring relationship with their mother and if they rely on their mother for moral support. Response options ranged from 1 (Not true) to 5 (Very true). We calculated mother support as the mean of the five

items (Cronbach α = 0.80–0.92). In the first wave of data collection, support from parents was measured using a single set of items (i.e., parent support instead of mother/father support separately in later waves). Yet, the correlations between Wave 1 parent support and Wave 2–4 mother support (from 0.40–0.64) suggested that Wave 1 parent support is a reasonable proxy for mother support.

Friend support: We measured friend support with 5 items from Procidano and Heller's (1983) Perceived Social Support- Friend (PSS-Fr) scale. Participants were asked about relationships with friends, including relying on friends for emotional support, providing emotional support to friends, friends help with solving problems, helping friends solve problems and friends providing the moral support. Response options ranged from 1 (Not true) to 5 (Very true). We calculated friend support as the mean of the five items (Cronbach α = 0.82–0.90).

Level-2 variables—Time-invariant variables included sex, age and socio-economic status (SES) at Wave 1 and race/ethnicity. Sex was coded 0/1 (male/female). Age was included to control for youth who may be younger/older for their expected grade level. Age at wave 1 was calculated from DOB (MM/YY). The original questionnaire included multiple racial categories: African-American, White, and Mixed African-American and Other, but we excluded the mixed race youth (n=26) because they represented a small proportion of the sample and their race-based life experiences may be quite different than African-Americans or White. SES was based on the highest occupational prestige score for either of the participants' parents at Wave 1, ranging from 29.28 (private household worker) to 64.38 (professional) (Nakao & Treas, 1990).

Data Analytic Strategy

We created multilevel growth curve models (GCM) to examine participants' change in depressive symptoms from waves 1 to 4 (the high school years), investigate if violence exposure (risk factors) and peer and family support (promotive factors) influenced depressive symptoms over time and if trajectories varied by socio-demographic characteristics (Curran, Obeidat, & Losardo, 2010). In order to determine the optimal functional form of depression trajectories, we conducted descriptive analyses of depression and other time-varying predictors (Singer & Willett, 2003). Initial analyses of the temporal patterns of depression for descriptive purposes revealed that observed trajectories during high school may be non-linear. Descriptive analyses suggested that covariates of interest measured at each wave: violence observation, conflict in the family environment, mother support and friend support, did vary over time and thus were included in the model as time-varying predictors. We used HLM 7.01 (Scientific Software International) to model depression and associated covariates over time. Multilevel modeling allowed us to parcel the variance into within- (Level-1 model) and between-person components (Level-2 model) (Raudenbush & Bryk, 2002).

We adopted the modeling building strategy, similar to that used by Raudenbush and Bryk (2002), starting with a an unconditional growth model to estimate the intraclass correlation (proportion of variance between/within individuals), adding time (wave & wave squared),

including fixed then random effects for intercept and time. We next included level-2 variables to investigate if depression intercepts and growth differed systematically in this population by socio-demographic factors. We then examined our time-varying predictors of interest: violence observation and conflict in the family environment. We also wanted to examine developmentally relevant violence-related promotive factors, so we next included mother social support and friend social support. Although we retained all variables of interest in the final model due to their theoretical/substantive value, we used likelihood ratio tests to inform optimal model fit of level-2 variables on the intercept and slope; in other words, not all level-2 variables were included to model both intercept and slope. We allowed the violence exposure time-varying predictors to vary over time to see if the effects differed systematically by sex. Finally, we conducted model diagnostics, including distributions for the empirical best linear unbiased predictions (eblups) and conditional residuals (West, Welch, & Galecki, 2007).

Missing data

We used restricted maximum likelihood (REML) estimation to model trajectories. Maximum likelihood adjusts parameters using observed data to counter/address missing observations (level-1) (McKnight, 2007). Thus, HLM7 uses available data from participants across all time points to estimate trajectories. HLM7 uses listwise deletion of level-2 units with missing data. Researchers recommend imputing values for missing information at level-2 (Raudenbush, Bryk, Cheong, Congdon, & DuToit, 2011). Our only level-2 variable with missing data was SES, so we used multiple imputation to address missing values in order to avoid biases due to complete case analysis. Multiple imputation may result in less biased estimates of associations than using techniques such as complete case analyses and mean imputation (Raghunathan, 2004; Schenker et al., 2006). We used a single multiple imputation extraction for model comparison tests (LR tests) because HLM does not provide deviance statistics when using the multiple imputation function.

Results

Descriptive statistics for study variables are given in Table 1. Depressive symptom scores follow a non-linear pattern, generally declining, during the high school years (not shown). Although depressive symptoms remained relatively low throughout the four waves of data, we found a wide range of scores (see Table 1 mean/SD values). Violence observation and conflict in the family environment scores also decreased by Wave 4 compared to Wave 1. Social support of friends and mother support appear to increase from Waves 1 to 2, then remain relatively stable during Waves 3 and 4. We examined bivariate correlations of violence exposure variables to assess their co-occurrence. We found correlations of 0.18–0.22 between Waves 1–4. We also examined depression at each wave by race/ethnicity and sex. We found no differences in depression by race/ethnicity for each of the four Waves of data using a two-sample t-test with unequal variances (results not shown). We did find differences in depression by sex for each wave. Females reported higher depressive symptoms compared to males (W1 difference= 0.38, $t=6.05$, $p<0.0001$; W2 difference=0.38, $t=4.23$, $p<0.001$; W3 difference=0.37, $t=4.21$, $p<0.001$; W4 difference=1.83, $t=1.83$, $p=0.03$).

Retention rates for time-varying variables are as follows: violence observation was 96% in Wave 2, 92% in Wave 3 and 91% in Wave 4; conflict in the family was 96% in Wave 2, 92% in Wave 3 and 90% in Wave 4; mother support was 94% in Wave 2, 90% in Wave 3 and 88% in Wave 4; peer support was 96% in Wave 2, 92% in Wave 3 and 91% in Wave 4; depression: 96% in Wave 2, 92% in Wave 3 and 91% in Wave 4. We had 101 missing responses (11.9%) on the SES variable.

We modeled change in depression over time, with Wave 1 equivalent to the beginning of 9th grade. Mean age at each wave differed by 1 year and thus subsequent waves correspond to the beginning of 10th, 11th and 12th grades. We used grade as opposed to age among adolescents because grade is more of a social measure of time and thus developmentally appropriate for this age group (Coie, Terry, Lenox, Lochman, & Hyman, 1995). We controlled for age at time 1 when adding level-2 covariates. Results from the fully unconditional model (FUM) suggested variability in depressive symptoms during the high school years (X^2: 2340.19, *df*: 823, p<0.001). The intraclass correlation coefficient (ICC) was 32%, indicating that changes in depressive symptoms over time differed between individuals. Abbreviated results of model building are given in Table 2. Following the FUM, we modeled linear growth of depression and assessed if adding a quadratic term would improve model fit (Table 2, Model 1). We found support for nonlinear growth of depression during the high school years so we then added random effects for linear and then quadratic growth parameters. Results from variance components suggested the wave was not significant as a random parameter (X^2: 801.30, df: 768, p=0.20). These results indicated insufficient residual variation in linear growth to explain with additional predictors (Singer & Willett, 2003). In the interest of parsimony and to help facilitate a stable model fitting process (West et al., 2007), the random effect for wave was dropped. Thus, the model included the intercept and wave squared as random effects.

We next added level-2 variables to investigate if depression intercepts and quadratic growth differed systematically by socio-demographic factors. Model 2 (Table 2) includes all level-2 variables modeling the intercept and quadratic growth. Several level-2 variables did not predict growth and, in the interest of parsimony, were trimmed from the model. All level-2 predictors were retained in the model as predictors of the intercept due to their theoretical/ substantive value. Next we added violence exposure variables: violence observation and conflict in the family environment as time-varying predictors (level-1) (Model 3, Table 2). The likelihood ratio test comparing the model with and without violence exposure variables suggested that model fit improved with the addition of these predictors (X^2: 64.02, df: 2, p<0.001). Finally, we included time-varying promotive factors, mother and friend support (Model 4).

The final model results are shown in Table 2, Model 4. On average, participants reported a depression symptom score of 1.79 in 9th grade (t-ratio: 29.36, df: 819, p<0.001). Initial status of depressive symptom scores for males was 0.28 less compared to females (t-ratio: −6.29, df: 819, p<0.001). Results indicated that other socio-demographic factors (SES, age and race/ethnicity) did not predict the initial status. The mean linear growth coefficient (β =0.21, t-ratio:5.88, df: 1404, p<0.001) suggested that depressive symptoms increased during the high school years, but the negative quadratic term suggested that depressive symptom

rate of change in this sample decelerated over time (β= −0.08, t-ratio:−6.52, df: 821, p<0.001). Depressive symptoms on average increase from year one to two of high school and then are stable or decline from years two to four. The rate of quadratic change in depressive symptoms for African American participants during the high school years is higher than for Whites (t-ratio: 3.77, df: 821, p<0.001). The rate of change for males is higher than females (t-ratio: 2.14, df: 821, p=0.03). Thus, the rate of decline depressive symptom scores for males and African Americans is slower during the high school years compared to females and Whites.

Results for the time-varying predictors indicated that violence exposure (risk factors) and social support (promotive factors) were associated with depressive symptoms over time (Figure 1). Depressive symptoms were elevated across adolescence with higher levels of violence observation and conflict in the family environment. For each unit increase in violence observation score per wave, depressive symptoms increased by 0.03 (t-ratio: 2.06, df: 1404, p=0.04). Similarly, per wave, for every unit increase in conflict in the family environment score, depressive symptom score increased by 0.20 (t-ratio: 5.78, df: 1404, p<0.001), controlling for other covariates. We tested these time-varying predictors as random effects, to see if the influence of violence exposure over time differed systematically by sociodemographic factors (results not shown). We found no significant level-2 predictors of violence exposure variables; thus, results suggested that the effects of violence exposure on depression may not vary systematically across participants. Mother support was also associated with depression over time. For every unit increase in mother support per wave, depressive symptom scores decreased by 0.04 (t-ratio: -1.93, df: 1404, p=0.05). Friend support was not associated with depressive symptoms during high school.

Investigating variance components (Models 1–4, Table 2), the within-person variance ($\sigma^2\varepsilon$) decreases overall with the addition of level-1 time-varying predictors, but remains relatively stable in models 2–4. This suggests that additional level-1 predictors may explain within-person variation in depression during the high school years. Examining level-2 variance, $\sigma^2 r_0$ (intercept) and $\sigma^2 r_2$ (quadratic slope), the intercept variance increases slightly and the slope variance decreases with the addition of level-2 predictors. Yet, both $\sigma^2 r_0$ and $\sigma^2 r_2$ remain significant in the final model. This suggests that potentially explainable variation in initial status and quadratic growth remain (Singer & Willett, 2003).

Discussion

Overall, our results are consistent with a developmental model of resilience that emphasizes the dynamic nature of influences across contexts on adolescent depression risk. Specifically, our results support that violence within developmentally relevant contexts, including within community and the family environments each contributed to depression risk over time among the youth in this study. Furthermore, as most youth are exposed to multiple forms of violence (Dong et al., 2004), investigating the independent contribution of exposure across multiple contexts contributes to our understanding of how violence exposure may operate as a risk factor for depression. Our results support a compensatory model of resilience; a compensatory model suggests that risk and promotive factors operate independently, and the promotive factor has an opposite effect on the outcome than the risk (Fergus & Zimmerman,

2005). We found violence exposure was associated with increased depression, but that mother support had an opposite and direct effect on depression. Thus, mother support may help reduce the risk of depressive symptoms even when youth may be exposed to violence. These results are especially relevant for youth living in an urban, disadvantaged context because they may be at particular risk of depression due to the emotional distress from violence exposure (Garbarino, 2001).

Notably, we found that mother support over time remains a promotive factor associated with lower depressive symptoms over time among youth despite the increase in influence of friends during adolescence. These results are consistent with Helsen et al (2000) who reported that parents remain a key source of support during adolescence. This may be because youth rely on parents to process and cope with significant events such as violence, whereas they may be more likely to rely on friends to share daily hassles (Cobb, 2007). Our results suggest that parenting focused interventions for urban disadvantaged youth could help reduce the probability that their exposure to violence will result in depressive symptoms. Interventions that focus on parent-child communication or providing contexts for positive parent-youth and potentially parent-parent interactions may help adolescents and their parents maintain a close relationship that can be an especially useful resource for youth exposed to community and family violence (Matjasko, Vivolo-Kantor, Henry, Gorman-Smith, & Schoeny, 2013). Additionally, efforts to reduce the negative effects of violence exposure may benefit from considering other potential promotive factors for youth, including additional sources of adult support, such as non-familial adult mentors (Hurd & Zimmerman, 2010). Social support from adults within multiple contexts may help further reduce depression risk among youth.

We did not find a relationship between peer support and depression over time. This is consistent with what some other researchers have found examining the relationship between peer support and depressive symptoms (Helsen et al., 2000). This lack of association may be for several reasons. First, although peers and parents are important relationships for adolescents, peer relationships may serve different functions compared to parent-child relationships. Peer relationships, for example, may function to aid in adjustment and socialization, but may not have the same influence on mental health difficulties as parents (Cobb, 2007). Second, adolescents who seek greater peer support may be doing so as a result of low perceived parental support; these youth are more likely to affiliate with deviant peers (Scholte, Van Lieshout, & Van Aken, 2001) and relationships with deviant peers are associated with greater exposure to violence (Lambert, Bradshaw, Cammack, & Ialongo, 2011). Thus, adolescents adaptively seeking higher peer support may also be at higher risk of violence exposure and, ultimately, depression. Finally, addressing mental health issues may be more likely to be part of an adolescent-caregiver relationship than the typical peer relationship. Due to the stigma associated with mental health issues, young people may be more likely to discuss these concerns within the safety of a caregiver versus peer relationship.

Consistent with previous research, we found sociodemographic differences in depression initial status (9^{th} grade) and trajectory during the high school years, but we did not find differences in the effects of violence exposure on depression by sex, race or SES. Thus, our

results suggest that although systematic differences in depression may exist by race/ethnicity and sex, the effects of violence exposure are not moderated by sociodemographic factors. Although our results may not generalize to all youth, the youth in our sample are at risk for experiencing negative mental health outcomes as a result of violence exposure. This result, however, is consistent with others who have found that sociodemographic factors are less relevant in a high risk population like our sample (Singer & Willett, 2003). This is useful information for understanding how violence may influence depression among adolescents living in high-risk environments. Professionals working with youth in contexts at-risk for violence may consider difference in baseline risk and trajectories during adolescence by sociodemographics, but may need to consider additional risk conferred by violence exposure when designing and implementing interventions to reduce depression risk.

Limitations

Several limitations of the study should be noted. First, our study was conducted in one inner-city location so the results may not be generalizable to other community settings. Yet, this is a critical population to study as these youth may be at high risk for violence exposure and subsequent depression (Kennedy et al., 2010). Furthermore, few researchers have focused exclusively on depressive symptom trajectories and the independent effects of multiple forms of violence exposure over time within this subpopulation (Byck et al., 2013). Second, our sample excluded youth with grade point averages above 3.0. Zimmerman, et al. (2002) report, however, that by twelfth grade grades were normally distributed. In addition, one implication of a somewhat narrowly defined sample is that we would not have enough variation to find differences, but our hypotheses were supported so this is an unlikely explanation of the results. It is possible that our lack of findings for sociodemographic factors may be due to this issue, but are results are also consistent with past research examining demographic factors (Singer & Willett, 2003). Nevertheless, these factors were not the focus of our study and were only entered as control variables in the analysis. Third, our violence observation measure was somewhat limited. Although our measure has been used by others and did support our a priori hypothesis, the measure only included exposure to specific types of interpersonal violence. It did not include, for example, violence against animals, distinguish self-defense from being the aggressor, or the location of the violence. Future research with a broader measure of violence observation may help tease apart the specific types of violence that may be more or less detrimental to mental health outcomes. Fourth, we examined the compensatory model of how promotive factors may operate to influence the effects of risk exposure on negative outcomes, but other models of resilience may also operate to influence the risk-outcome relationship (Fergus & Zimmerman, 2005). Nevertheless, our study is vital first step in examining the influence of risk and promotive factors over time on trajectories of youth outcomes such as depressive symptoms. A useful direction for future research would be to investigate other models, including the protective model of resilience to examine how promotive factors over time may influence the association between risk and outcomes.

Study Contributions

These study limitations notwithstanding, our results contribute to our understanding of adolescent depression in several key ways. First, consistent with a developmental approach,

we examined the independent contribution of multiple forms of violence exposure across developmentally relevant contexts on depressive symptoms over time. Second, consistent with a resilience-based approach, we examine the direct effects of promotive factors on depression in addition to risk over time. Third, we examine depression during a critical developmental period among an understudied population subgroup of adolescents. Fourth, we account for multiple sociodemographic factors that may influence depression risk among adolescents, including sex, race/ethnicity, and SES. In the final analysis, this study supports the risk of internalizing symptoms among youth experiencing exposure to violence. Furthermore, our results suggest that violence exposure at home and within the community may each contribute to depression risk among all youth. Although some sociodemographic differences emerged, violence exposure may increase risk among all subgroups of youth in this sample. Finally, our longitudinal study provides useful insights into the factors that may help youth overcome the negative effects of violence exposure.

Conclusions

Depression is a concerning problem during adolescence with multiple short and long term consequences (Fergusson et al., 2005; Fletcher, 2010) and violence exposure is a potent risk factor for depression (Foster et al., 2004). Incorporating a developmental perspective and using a resilience framework provides a useful approach for identifying positive factors in adolescents' lives that help them overcome the negative effects of violence exposure. Our results provide a model for applying a resilience framework using a longitudinal design and support for the notion that parental support continues to play a vital role in supporting healthy youth development and reducing depression risk through late adolescence.

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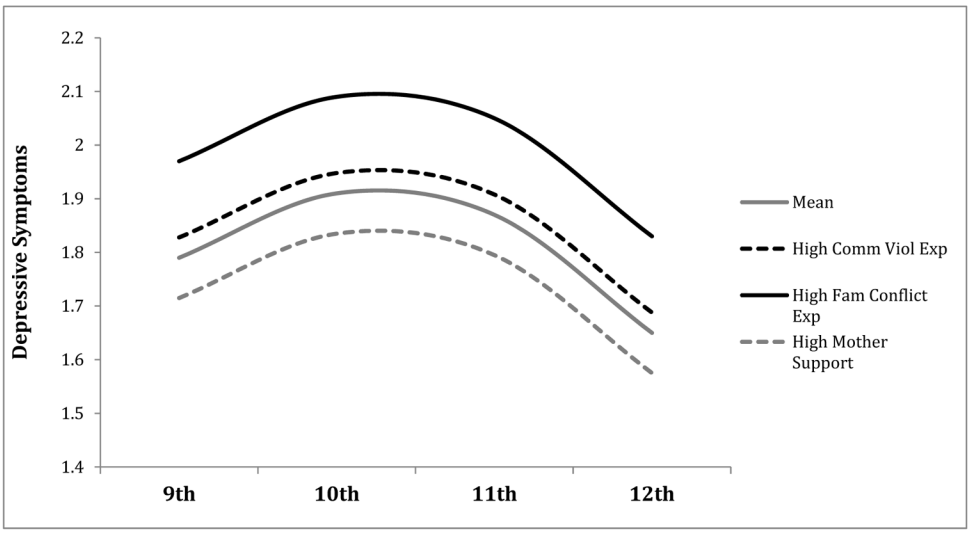

Figure 1.

Depression trajectories during the high school years. High community violence and family conflict exposure, and high mother support are 75th percentile values. For each trajectory, all other covariates in the model held constant at their mean centered values.

Table 1

Descriptive statistics for study variables

Time-Varying Variables				
Scale	**Wave 1 Mean(SD)**	**Wave 2 Mean(SD)**	**Wave 3 Mean(SD)**	**Wave 4 Mean(SD)**
Depressive symptoms	1.65(0.69)	1.84(0.86)	1.80(0.85)	1.76(0.90)
Violence exposure				
Family conflict	1.74(0.64)	1.67(0.63)	1.59(0.60)	1.58(0.60)
Violence observation	2.12(1.83)	2.15(1.21)	1.92(1.10)	1.74(1.04)
Social support				
Mother support	3.90(1.02)	3.97(0.95)	4.06(0.94)	3.98(0.98)
Friend support	3.14(0.95)	3.37(0.95)	3.34(0.93)	3.29(0.98)
Time-Invariant Variables				
Continuous (at Wave 1)	*Mean(SD)*			
Age	14.86(0.64)			
SES (Occupational				
Prestige score)	39.90(10.42)			
Categorical	*Proportion*			
African American	82.65			
Male	50.12			

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Table 2

Fixed and Random Effects Estimates for Predictors of Depression During the High School Years

Parameter	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Fixed Effects ▼				
Intercept, β_{00}	1.66(0.04)***	1.82(0.06)***	1.78(0.06)***	1.79 (.0.06)***
SES, β_{01}		−0.003(0.002)	−0.003(0.002)	−0.002(0.002)
Age, β_{02}		0.046(0.034)	0.025(0.03)	0.021(0.03)
Race/ethnicity[§], β_{03}		−0.012(0.058)	−0.011(0.06)	−0.014(0.06)
Sex[ℋ], β_{04}		−0.288(0.04)***	−0.280(0.04)***	−0.280(0.04)***
Wave, β_{10}	0.20(0.04)***	0.19(0.035)***	0.214(0.03)***	0.21(0.036)***
Wave^2, β_{20}	−0.05(0.01)***	−0.087(0.01)***	−0.086(0.01)***	−0.086(0.01)***
SES, β_{21}		0.0034(0.003)		
Age, β_{22}		−0.008(0.006)		
Race/ethnicity[§], β_{23}		0.027(0.007)***	0.027(0.007)***	0.028(0.007)***
Sex[ℋ], β_{24}		0.019(0.008)*	0.017(0.007)*	0.016(0.008)*
Violence observation			0.034(0.015)*	0.032(0.016)*
Conflict in family			0.213(0.034)***	0.20(0.035)***
Mother support				−0.05(0.02)*
Friend support				0.039(0.023)
Random effects		**Variance estimates (SD)**		
Intercept, r_0	0.14(0.38)***	0.197(0.44)***	0.0191(0.44)***	0.194(0.44)***
Wave, r_1	0.11(0.33)			
Wave^2, r_2	0.021(0.14)***	0.0025(0.05)***	0.0021(0.05)***	0.0023(0.05)***
Residual, *e*	0.39(0.62)	0.416(0.64)	0.411(0.64)	0.407(0.64)
Model fit (−2LL using iteration 5)	7245.95	7253.18	7181.08	7071.55

*** p≤0.001,

** p≤0.01,

* $p \leq 0.05$

▸ robust SE in parentheses

§ Whites: referent group,

⌘ Females: referent group