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Racial and ethnic comparison of ecological risk factors and youth outcomes: A test of the desensitization hypothesis

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Abstract

Minority youth, because of structural, ecological, and societal inequalities, are at heightened risk of reporting depression and experiencing negative sanctions associated with delinquency. Sociological theories suggest that greater exposure to ecological risk factors at the peer, family, school and community levels are associated with elevated rates of youth depression and delinquency. Desensitization theory posits that repeated exposures to ongoing stressors result in a numbing of psychological and behavioral responses. Thus, it remains unclear whether racial/ethnic differences exist with regards to how contextual stressors correlate with depression and delinquency. Using a sample of 616 Black, 687 Latinx, and 1,318 White youth, this study explores racial/ethnic differences across four ecological risk factors of risky peers, low family warmth, poor school engagement, and community violence as they relate to youth delinquency and depression. Data were collected through in-school survey of youth from 16 public schools surrounding a major city in the Midwest. Significant racial/ethnic differences provided partial support for the desensitization theory. Among Black youth, the magnitude of relationships between ecological risk factors and delinquency was significantly weaker for three of the four predictors and for all four predictors of depression in comparison to White youth. Among Latinx youth, the magnitude of relationships between ecological risk factors was significantly weaker for depression, but not delinquency, in comparison to White youth. Results indicate that ecological risk factors may have differential associations to youth depression and delinquency, which may call for culturally tailored intervention approaches.

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Keywords

racial/ethnic differences; ecological context; delinquency; depression

In the United States (US) racial/ethnic disparities in the prevalence of health-risk behaviors are marked and persistent (Morenoff, 2005). Prior literature suggests Black and Latinx youth report higher levels of externalizing and internalizing symptoms compared to their White counterparts due to disproportionate exposure to social disorganization, structural racism and economic disadvantage (Le & Stockdale, 2011; McNulty & Bellair 2003; Sampson, Morenoff & Raudenbush, 2005). Racial and ethnic minorities are more likely to experience negative sanctions in response to externalizing symptoms due to disproportionate surveillance and more aggressive enforcement by police compared to their white counterparts. Externalizing behaviors include aggression, delinquency and bullying (Youngstrom, Loeber, & Stouthamer-Loeber, 2000). In addition to externalizing behaviors, common internalizing symptoms include depression, anxiety, and social withdrawal. One common strategy of coping with severe adversity among youth includes desensitization which posits that repeated exposure to ongoing ecological and contextual stressors results in a numbing of psychological and behavioral responses (Bushman & Anderson, 2009). Black and Latinx youth may disproportionately experience desensitization due to greater exposure to adverse experiences (e.g., neighborhood violence) across a range of ecological and contextual levels relative to their White peers. However, few studies investigated how ecological stressors may shape disproportionate rates of internalizing and externalizing behaviors among Black and Latinx youth compared to their White peers. To address these gaps in the literature, this study expands on the growing research on the relationship between ecological factors and youth internalizing and externalizing factors. By testing the desensitization hypothesis, this study examines how the strength of those associations might vary across racial/ethnic groups.

Ecological Perspectives

Ecological perspectives are derived from systems theory and explain how various proximal and distal factors shape youth behaviors (Bronfenbrenner, 1977). Several ecological factors at the peer, individual, school and community levels influence youth problem behaviors. Microsystems are the direct interpersonal interactions between an individual and their environment (e.g., youth and teacher interacting). Mesosystems are interactions between two or more microsystems (e.g., communications between a youth, a father and teacher). Exosystems are settings that do not include the individual but affect them nevertheless (e.g., parents' working conditions or work schedules, which may affect the quality of parental warmth). Macrosystems reflect society's broader societal norms and practices (e.g., societal tolerance towards gun violence). Ecological perspectives place importance not only on how individuals are influenced by the interaction among these systems but also how individuals exert influence on their social environment.

Ecological Risk Factors and Youth Problem Behaviors

Systematic reviews of ecological factors associated with youth problem behaviors document that peer, family, school, and community level factors are consistently correlated with youth problem behaviors (Voisin, Hong, & King, 2012). Among these various system-level factors, peer norms, family warmth, school adversity, and community violence are among the most researched with regards to youth problem behaviors (DiClemente, Salazar, Crosby, & Rosenthal, 2005; McLeod & Nonnemaker, 2000; Wickrama, Noh, & Bryant, 2005). For instance, studies on kindergarten and elementary school students generally suggest that ecological risk factors from the family context, such as family poverty and physical discipline, have weaker influences on problem behavior for Black children than for their White counterparts (Deater-Deckard, Dodge, Bates, Pettit, 1996; Spieker, Larson, Lewis, Keller, Gilchrist, 2003). However, more research is needed to explore the extent to which racial/ethnic differences observed among younger children may be generalized among adolescents. Additionally, it is unclear whether similar desensitization patterns might exist with regards to relationships between ecological risks factors and depression and delinquency across different racial and ethnic minority groups.

Family ecological risk factors based on adolescent samples have found inconsistent patterns of racial/ethnic differences in the effects of ecological family risk factors on youth delinquency and depression. Family structural disadvantage, such as single parenthood and family structure instability, has weaker influences on externalizing and internalizing problems for Black than for White youth (Fomby, Mollborn, & Sennott 2010; Wickrama, Noh & Bryant, 2005). Findings on racial/ethnic differences in the effects of risky family processes have been mixed. Prior research has reported different patterns of racial/ethnic differences in effects of harsh parenting whereas other studies fail to find differences in associations between physical discipline and externalizing behavior among minority and non-minority youth (Emmon, 2002; Lansford et al., 2011). Specifically, prior researcher suggests physical discipline is associated with higher levels of externalizing behavior for White youth but lower levels of externalizing behavior for Black adolescents (Lansford et al., 2004). In contrast, other findings have provided evidence for stronger influences of punitive parenting on increased levels of internalizing symptoms for Black and Latinx youth than for White adolescents (Lau et al., 2006). Given these mixed findings, additional studies are warranted to examine further variations in influences of risky family processes on externalizing and internalizing problems between minority and non-minority youth.

Peer, school, and community ecological risk factors are also influential in the development of both externalizing and internalizing problems during adolescence (Deković, 1999; Perkins & Borden, 2003; Youngblade et al., 2007). To date, few empirical studies have examined racial/ethnic differences in the effects of extrafamilial risk factors on adolescent behaviors among Black, Latinx and White youth, with largely inconsistent findings. Some of these studies did not find differences between minority and non-minority youth in the effects of exposure to peer pressure, community poverty and community violence on youth internalizing and externalizing outcomes (Eamon, 2002; Mrug & Windle, 2009; Wickrama, Noh, & Bryant, 2005). Other studies found evidence supporting weaker effects of neighborhood disadvantages (i.e., lack of attachment to neighborhood, lack of opportunities

in neighborhood) (Choi, Harachi, & Catalano, 2006) and peer deviance (Deutsch, Crockett, Wolff, & Russell, 2012) on externalizing behavior for Black than for White youth. Results from one study indicated a stronger effect of school disengagement on internalizing symptoms for Latinx than for White adolescents yet the differences between Black and White youth were insignificant (Wickrama & Vazsonyi, 2011). Methodological variation among samples, precludes direct comparison of results across studies. Inconsistencies in observed patterns of racial/ethnic differences across previous studies may be due to several factors, including ecological levels of the risk factors and whether studies focused on externalizing or internalizing outcomes. Not all studies have included both Black and Latinx youth when comparing differences between minority and non-minority adolescents.

The Current Study

The current study used a large, multiethnic, socioeconomically diverse sample of urban and suburban middle-school youth to examine whether relationships between ecological risk factors and youth outcomes vary across racial/ethnic group. The narrow age range and large sample size allow for more precise estimation of how ecological risk factors might be implicated in youth depression and delinquency. The inclusion of large subgroups of both Black and Latinx youth and the analysis of both internalizing and externalizing outcomes enables us to examine the generalizability of the desensitization hypothesis. Our study also contributes to the growing, albeit inconsistent literature on racial/ethnic differences in relationships between ecological risk factors and youth outcomes by comparing patterns among risk factors measured at the family, peer, school and community levels. Low family warmth (Vandewater & Lansford 2005), peer deviance (Ary, Duncan, Duncan, & Hops, 1999) school adversity (Wickrama & Vazsonyi 2011) and community violence exposure (CVE) (Schwab-Stone, 1999) have been consistently identified as common ecological risk factors predicting increased levels of externalizing and internalizing problems in the general population. Consequently, the present study focused on these variables and their relationships to youth delinquency and depression for Black, Latinx, and White youth.

We hypothesized that greater exposure to risky peers, low family warmth, poor school engagement, and community violence would be associated with increased depression and delinquency. Based on the desensitization hypothesis, however, we also predict that the magnitude of the associations between ecological risk factors with depression and delinquency will be smaller among minority youth with higher risk exposures.

Methods

Participants and Procedure

The analytic sample for this study was obtained from the “Neighborhoods to Neurons and Beyond” (NNB) cohort, a sample of N=3,350 youth from 16 urban and suburban middle schools located within 25 miles of a major university in the Midwestern United States. The study aim was to collect self-report data on ecological factors at multiple levels of influence, including neighborhood and community effects, school effects and parent and peer effects in a large sample of 6th-8th graders in the Chicago area (Chen & Jacobson, 2013; Chen, Voisin, & Jacobson, 2013). The study used school-based recruitment and individual schools

were intentionally selected to maximize racial/ethnic and socioeconomic variation. Based on publicly available data from the schools, the percentage of minority students in the total student population during the study period ranged from 21% to 100% across schools ($M = 64.9\%$, $SD = 25.6\%$). The proportion of students eligible for the Federal free/reduced meals program (an indicator of school poverty) ranged from 7% to 80% ($M = 42.2\%$, $SD = 20.8\%$).

All youth in the NNB cohort participated in a 30-minute in-school, self-report survey, which obtained data on ecological and psychosocial factors related to youth problem behavior. The National Opinion Research Center (NORC) administered the in-school surveys. Permission was obtained from school administrators/school boards and both local university and NORC Institutional Review Boards (IRB) approved the study. Written parental consent and youth assent were obtained from all participants in the current study. Schools received an average compensation of \$2,500 for allowing the survey to take place in the school. Youth were not compensated for participation.

All 6th–8th-grade students in each school were targeted for recruitment; however, university IRB regulations necessitated active parental consent and prohibited investigators from directly contacting parents/guardians. Thus, consent forms were distributed to students in school to take home. The consent return rate across schools was 44.8% (range = 16.9–87.7) and 81.6% of those who returned consent forms agreed to participate. Youth also provided written assent for participation. Response rates across schools were not significantly correlated with school poverty rates ($r = .18$, $N = 16$, $p = .55$) or with the percentage of minority students in each school ($r = -.28$, $N = 16$, $p = .29$).

The present study was restricted to 2,845 youth who self-identified as Black, Latinx, or White (84.9% of the full NNB cohort). A small proportion (7.9%) of youth had missing data in one or more study predictors and were excluded from analyses, resulting in a final sample 616 Black, 687 Latinx and 1,318 White youth (total $N = 2,621$). The study sample was 42.4% male and ranged in age from 10 to 15 years old ($M_{\text{age}} = 12.47$, $SD = 0.98$).

Measures

Race/ethnicity.—Race/ethnicity was determined by response to a single question with the following options: 1) White; 2) Black or African American; 3) Hispanic/Latino (hereafter referred to as Latinx); 4) Asian or Pacific Islander; 5) American Indian or Native American; 6) Other. Youth were allowed to endorse more than one racial/ethnic category. This question was developed based on recognition of the race/ethnic composition of youth in the area where the research was conducted, as well as initial pilot testing of response choices among same-aged youth. The current study sample excluded youth with missing data on race and ethnicity ($N = 12$; 0.4% of the full NNB cohort), youth who identified as something other than White, Black or Latinx ($N = 250$; 7.5% of the full NNB cohort) and youth who indicated more than one racial/ethnic category ($N = 243$, 7.3% of the full NNB cohort).

Demographic controls.—Control variables included gender, age, and socioeconomic status. Survey questions asked youth whether they were male or female and age at the time of study. Pilot testing indicated that youth could not reliably report their family income or

their mother's and father's occupation and education history, so school-level poverty was used as a proxy for individual socioeconomic status. School-level poverty was defined as the proportion of students in each of the 16 schools who were eligible for the Federal free/reduced price meals program and was obtained from a publicly available database. Free school lunch is one of the most robust indicators of youth SES, given that families need to provide income eligibility to qualify, and this proxy for socioeconomic status (SES) has been used in several studies (Day et al., 2016; Marotta & Voisin, 2017; Voisin, Neilands, & Hunnicut, 2011).

Ecological risk variables.—Four measures were chosen *a priori* to represent risk factors across multiple levels of ecological context.

Low family warmth.: Low family warmth was measured using 5 items from the National Longitudinal Study of Adolescent Health (NLSAH) (e.g., how much do you feel that people in your family understand you) with a 5-point scale ranging from 1 = very much to 5 = not at all (Harris & Udry, 1998). A low family warmth composite score was created using the mean of the responses to the 5 items ($\alpha = .80$). The low family warmth score was negatively skewed (skewness = -1.20) and was transformed using a square root transformation for analyses.

Peer deviance.: Peer deviance was measured using 11 items adapted from similar measures used in previous research (Chung & Steinberg, 2006; Thornberry et al., 1994) assessing how many of their friends engaged in a broad range of delinquent (e.g., stealing things from stores) and substance use (e.g., smoking cigarettes) behaviors. Responses ranged from 1 = none to 4 = all. A composite score of peer deviance was created using the mean of the 11 items ($\alpha = .88$). The score of peer deviance was transformed using an inverse transformation as it was highly skewed (skewness = 2.52).

School adversity.: School adversity was measured using 4 items from the NLSAH assessing participants' negative experiences at school (e.g., how often do you have trouble getting along with teachers) (Harris & Udry, 1998). Responses were given on a 5-point scale, ranging from 1 = never to 5 = always, and were averaged to create a composite score of school adversity ($\alpha = .87$).

Community violence exposure (CVE).: Community violence exposure was measured using items from the NLSAH (Harris & Udry, 1998) including lifetime exposure to three violent events (witnessing someone being shot/stabbed, having someone pull a knife/gun on them, being jumped) and a fourth item assessing hearing gunshots during the past month. The prevalence of lifetime exposure to violent events in this sample ranged from 5.5% for having someone pull a knife/gun on them to 11.7% for being jumped, and 24.3% of youth reported hearing gunshots during the past month. Exposures to these four items were combined into a single yes/no index of CVE (1 = yes, 0 = no). Approximately 33.8% of youth exposed to community violence reported exposure to two or more events.

Dependent variables.

Delinquency.: Delinquency was measured using the NLSAH scale containing 16 items that assessed the frequency of a broad range of illegal (e.g., stealing something worth more than \$50), norm-violating (e.g., skipping school without permission), and aggressive (e.g., getting into a serious physical fight) behaviors within the past 12 months (Harris & Udry, 1998). Responses were given on a 3-point scale, ranging from 0 = never to 3 = 5 or more times, and each behavior was recorded into 0 = never and 1 = 1 or more times. A composite score of the number of delinquent behaviors endorsed was computed by summing the recorded responses to the 16 items ($\alpha = .78$). The composite delinquency score was positively skewed (skewness = 1.61) and was transformed using a square root transformation for analyses.

Depression.: Depression was assessed using the 10-item Center for Epidemiological Studies Depression Scale-Short Form (Andresen, Malmgren, Carter, & Patrick, 1994). Participants rated 10 items assessing their levels of depression during the past 7 days (e.g., How often were you bothered by things that usually don't bother you) using a 4-point scale ranging from 1 = never or rarely to 4 = most of the time or all of the time. A composite score of depression was created by averaging each participant's responses to the 10 items ($\alpha = .81$).

Statistical Analysis

The data analysis for this paper was generated using SAS software, version 9.3 for Windows © (2002–2010, SAS Institute Inc). For all analyses, race/ethnicity was coded as a 3-level categorical variable with White youth as the comparison. Gender was coded as 1 = male, 0 = female. Analyses tested for racial/ethnic differences in associations between ecological risk factors and youth delinquency and depression using separate models for each predictor and each outcome. Linear mixed effect regression models with school ID included as a random effect were used to adjust the standard errors of parameter estimates and significance tests for the clustering of students within schools. An unconstrained model without any predictors was first fitted to each outcome to estimate the proportion of variability in delinquency and depression that exists between individuals and between schools. The main effect of each risk factor on youth delinquency and depression was then tested while controlling for age, gender, school poverty, and race/ethnicity. Finally, interactions between race/ethnicity with each risk factor were tested to determine whether the association between ecological risk and youth delinquency and depression differed across the three racial/ethnic groups. Parameter estimates from the final models were used to estimate and plot the simple slopes and 95% confidence intervals representing associations between each risk factor and youth delinquency and depression for each of the three race/ethnic groups. All continuous variables, including outcomes, were standardized ($M = 0$, $SD = 1$) so that regression coefficients could be compared across race/ethnicity. All 2,621 youth in the current study had non-missing data on race/ethnicity, demographic factors, and all four ecological risk factors. However, small amounts of missing data in outcomes resulted in a sample $N = 2,616$ for delinquency and $N = 2,525$ for depression, precluding direct comparison of estimates across outcome variables.

Results

Racial/ethnic Differences in Mean Levels

Table 1 shows the demographic composition of study participants and descriptive statistics for the main study constructs, separately for each of the three racial/ethnic groups. Raw scores are presented for comparison with other studies, but analyses of delinquency, low family warmth, and peer deviance are based on transformed data. Chi-square tests were used to test for racial/ethnic differences in categorical variables, while linear mixed effects modeling was used for continuous measures. School ID was not included as a random effect for analysis of school poverty, as all youth in a given school had the same score.

Results revealed significant effects of race/ethnicity for all ecological risk predictors and outcomes. Black and Latinx adolescents reported significantly higher mean levels of delinquency, depression, low family warmth, peer deviance, school adversity, and community violence exposure than White youth. In comparison to Black youth, Latinx youth also reported significantly higher levels of peer deviance and significantly lower levels of school adversity and community violence exposure. There were no differences in the proportion of males or in average study age across racial/ethnic group. School poverty was significantly higher among Black and Latinx youth in comparison to White youth, and Latinx youth had significantly higher levels of school poverty in comparison to Black youth.

Results from Linear Mixed Effects Regression Models

Findings from the unconditional model revealed statistically significant variability in both delinquency and depression between individuals (delinquency: $\sigma^2 = .943, p < .001$; depression: $\sigma^2 = .964, p < .001$) and between schools (delinquency: $\tau_{00} = .064, p = .007$; depression: $\tau_{00} = .037, p = .011$), supporting the inclusion of school ID as a random effect to correct for sample non-independence. After controlling for age, gender, school poverty, and race/ethnicity, all risk factors examined had significant main effects on delinquency (low family warmth: $b = .40, SE = .02, p < .001$; peer deviance: $b = .60, SE = .02, p < .001$; school adversity: $b = .31, SE = .02, p < .001$; CVE: $b = .76, SE = .04, p < .001$) and depression (low family warmth: $b = .54, SE = .02, p < .001$; peer deviance: $b = .35, SE = .02, p < .001$; school adversity: $b = .30, SE = .02, p < .001$; CVE: $b = .60, SE = .04, p < .001$) in analysis of the full sample.

Table 2 presents standardized parameter estimates from models predicting delinquency with Whites as the comparison group, along with the estimated simple slopes for each of the three racial/ethnic groups. Tests of the interaction between race/ethnicity and risk factors were significant for low family warmth ($F[2,2593] = 6.51, p = .002$) and peer deviance ($F[2,2593] = 8.37, p < .001$), with a trend towards significance for school adversity ($F[2,2593] = 2.85, p = .058$). Slopes for all four risk factors were statistically significant for all racial/ethnic groups. However, there were significant differences in slopes between Black and White youth for all risk factors except CVE, with smaller slopes among Black youth. Slopes were also significantly smaller among Black youth in comparison to Latinx youth for low family warmth and peer deviance. Slopes did not differ significantly between Latinx and White youth.

Table 3 presents similar results for models predicting depression. There were significant interactions with race/ethnicity for all four ecological risk factors ($F[2,2522] = 8.85, p < .001$, for low family warmth; $F[2,2522] = 6.31, p = .002$, for peer deviance; $F[2,2522] = 9.74, p < .001$, for school adversity; $F[2,2522] = 5.93, p = .003$, for CVE). Similar to results for delinquency, all four ecological risk factors were significantly associated with depression for all racial/ethnic groups. However, all slopes were significantly smaller among Black youth in comparison to White youth, and the slope for low family warmth was also significantly smaller among Black youth in comparison to Latinx youth. Finally, slopes for peer deviance, school adversity, and CVE were significantly lower among Latinx youth in comparison to White youth, with a similar trend ($t_{2522} = 1.90, p = .058$) for low family warmth.

The parameter estimates shown in Tables 2 and 3 were used to plot predicted values (with 95% confidence intervals) of delinquency (Figure 1) and depression (Figure 2) at different levels of ecological risk for each of the three racial/ethnic groups. When risk factors are relatively low, predicted levels of delinquency and depression are consistently lower among White youth in comparison to Black and Latinx youth. However, as levels of risk increase, predicted rates of both depression and externalizing among White youth equal, and in some cases surpass, rates of internalizing and externalizing among minority youth.

Discussion

The present study examined racial/ethnic differences in ecological risk factors and their relationships to youth delinquency and depression in a large, socioeconomically diverse sample of urban and suburban middle school youth. Our study extends prior research by examining both internalizing and externalizing outcomes, by considering risk factors measured at different ecological levels and by including large subgroups of both Latinx and Black youth. Thus, the present study may shed light on inconsistencies in patterns of racial/ethnic differences observed in prior work. Minority youth reported higher levels of externalizing and internalizing problems and higher levels of ecological risk factors than White peers, consistent with an extensive body of previous research (McLaughlin, Hilt & Nolen-Hoeksema, 2007; McNulty & Bellair, 2003; Plant & Sachs-Ericsson, 2004; Sampson, Morenoff & Raudenbush, 2005). Additionally, all ecological risk factors examined were significantly associated with increased levels of delinquency and depression for youth in all three racial/ethnic groups.

The most relevant results from the current study, however, are findings of significant interactions between race/ethnicity and risk factors. In particular, the magnitude of the associations between ecological risk factors and youth delinquency and depression were consistently smaller among Black youth in comparison to White youth. Our results are consistent with patterns reported in previous research examining racial/ethnic differences in the effects of family risk factors on problem behavior using samples of younger children (McLeod & Nonnemaker, 2000; Spieke, Larson, Lewis, Keller & Gilchrist, 2003). Findings are also congruent with prior studies indicating weaker effects of community disadvantages and peer deviance on externalizing behavior for Black than for White adolescents (Choi, Harachi & Catalano, 2006; Deutsch, Crockett, Wolff & Russell, 2012). Because Black youth

also reported consistently higher levels of risk factors, these findings support the desensitizing hypothesis that common ecological risk factors are less strongly correlated with differences in internalizing and externalizing problems among racial and ethnic minority youth.

The desensitization hypothesis suggests that chronic exposure to high levels of stress may promote desensitization in minority youth, particularly among Blacks, leaving them less vulnerable to negative psychosocial sequelae over time. The desensitization hypothesis has been supported most frequently in studies of CVE and youth internalizing problems (Fitzpatrick & Boldizar, 1993; Ng-Mak, Salzinger, Feldman & Stueve 2004; Gaylord-Harden, Cunningham & Zelencik, 2011), although evidence has been mixed (Lynch, 2003; McCart et al., 2007; Mrug & Windle, 2009). A recent review and meta-analysis found that the effects of CVE on internalizing problems were weaker among studies with predominantly Black youth (Fowler et al., 2004), consistent with the pattern of racial/ethnic differences observed in the present study for effects of CVE on depression. The fact that other ecological risk factors examined in the present study also had weaker associations with externalizing and internalizing problems for minority than for non-minority youth suggests that the desensitization hypothesis may also be applied more broadly to understand racial/ethnic differences in effects of risk factors from the family, peer, and school contexts. Studies looking at the impact of exposures to risk factors measured at different ecological levels longitudinally or cross-sectional studies comparing multilevel risk effects at different developmental ages (e.g., comparisons between children, adolescents, and adults) could be used to test this hypothesis more thoroughly.

Our study also found that ecological risk factors on youth depression was also significantly weaker among Latinx youth compared to their White peers, indicating that the desensitization theory may be broadly generalizable to most youth with high levels of chronic risk exposure. However, while differences between Black and White youth in effects of ecological risk factors were observed across both forms of problem behavior examined, Latinx youth did not significantly differ from White youth in the importance of ecological risk factors for delinquency. These findings indicate that there may be important intervening processes, such as cultural factors or coping styles that were not assessed in this study, which could account for different patterns of findings for delinquency observed between Black and Latinx minorities. Moreover, it is possible that other factors related to delinquency, such as race-related stress, may be driving differences. In the U.S., Black people are more likely than Latinx people to have experienced systemic institutional racism and discrimination, and Black youth are more likely than youth from other racial/ethnic groups to experience harsh penalties (such as school suspension) for typical adolescent misbehavior. Future research identifying the mechanisms that account for the observed patterns of racial/ethnic differences in the present study would bring additional insight into these processes. Likewise, our results further highlight the importance of including Latinx youth when comparing differences in the effects of ecological risk factors between minority and non-minority youth, because observed differences between Black and White adolescents may not be generalized to comparisons between Latinx and White youth.

Finally, a potentially fruitful avenue for future research is empirical inquiry into measures that differentiate resilience from desensitization, as well as analyses that examine how desensitization may either undermine or enhance resilience among youth. Resilience is frequently put forth as a protective factor that reduces risk of depression and delinquency among youth exposed to high levels of risk, while desensitization to risk is typically conceptualized as problematic. In situations of chronic stress, desensitization may actually serve as a protective factor, as animal models suggest that prolonged exposure to stress has negative physiological and biological effects. In our study, predicted levels of delinquency and depression are consistently lower among White youth in comparison to Black and Latinx youth at low levels of risk. However, as levels of risk increase, predicted rates of both depression and externalizing among White youth equal, and in some cases surpass, rates of internalizing and externalizing among minority youth. At present, current research is yet to differentiate between resilience and desensitization or to examine how they may be interrelated. Likewise, greater research is needed that includes biological and physiological markers of stress responses to better understand why youth may respond differently to adversity.

Limitations

Several study limitations should be noted. First, our study used a cross-sectional design, and therefore, the causality and temporal relationships between study constructs cannot be determined. Although it is unclear how this could account for the different patterns of results across outcomes for Black and Latinx youth, racial/ethnic differences reported in the present study need to be further examined in future longitudinal studies. Secondly, our study focused on youth self-report of ecological risk factors, and we were not able to assess other potential contributing or confounding variables such as residential mobility, family structure, and community poverty. However, we note that subjective measures of ecological risk included in the current study were assessed with valid and reliable instruments used in other large-scale survey research, and furthermore, subjective reports of contextual risk have been found to mediate the effects of objective contextual measures on adolescent adjustment (Bass & Lambert, 2004). Thirdly, this study used a school level measure of the proportion of students enrolled in the Federal free/reduced meals program as a proxy indicator for poverty because youth could not reliably report other indices of family socioeconomic status. While there is evidence that school-based reports of enrollment in Federal free/reduced meals programs are more strongly associated with family-level income than poverty measures obtained through zip codes (Day et al., 2016), a small number of youth in schools may not be counted because of administrative reasons (i.e., did not meet deadline for benefits, did not apply for free school lunch).

Finally, while the present study suggests that minority youth are less susceptible to risk factors measured at multiple ecological levels, our results may not generalize to all measures of risk. For example, prior evidence of racial/ethnic differences in response to measures of physical punishment and harsh discipline is mixed. Likewise, studies identifying protective factors that may better promote resilience among minority youth are also needed. Despite these limitations, the results of the present study suggest robust differences between minority and non-minority youth in the effects of risk factors measured at a wide range of

ecological contexts on both externalizing and internalizing problems. Results highlight the importance of continuously clarifying and explaining these racial/ethnic differences to better understand the etiology of racial/ethnic disparities in behavioral and mental health among adolescents in the U.S.

Conclusion

It is well established that ecological risk factors are implicated in youth delinquency and depression. These analyses indicated that risk factors were less strongly associated with depression and delinquency among minority versus non-minority youth, despite higher exposures among Black and Latinx youth compared to White youth. Minority youth may be better able to adapt to harsher ecological contexts than their more privileged White peers, given that they are frequently confronted by ongoing structural and social disadvantage.

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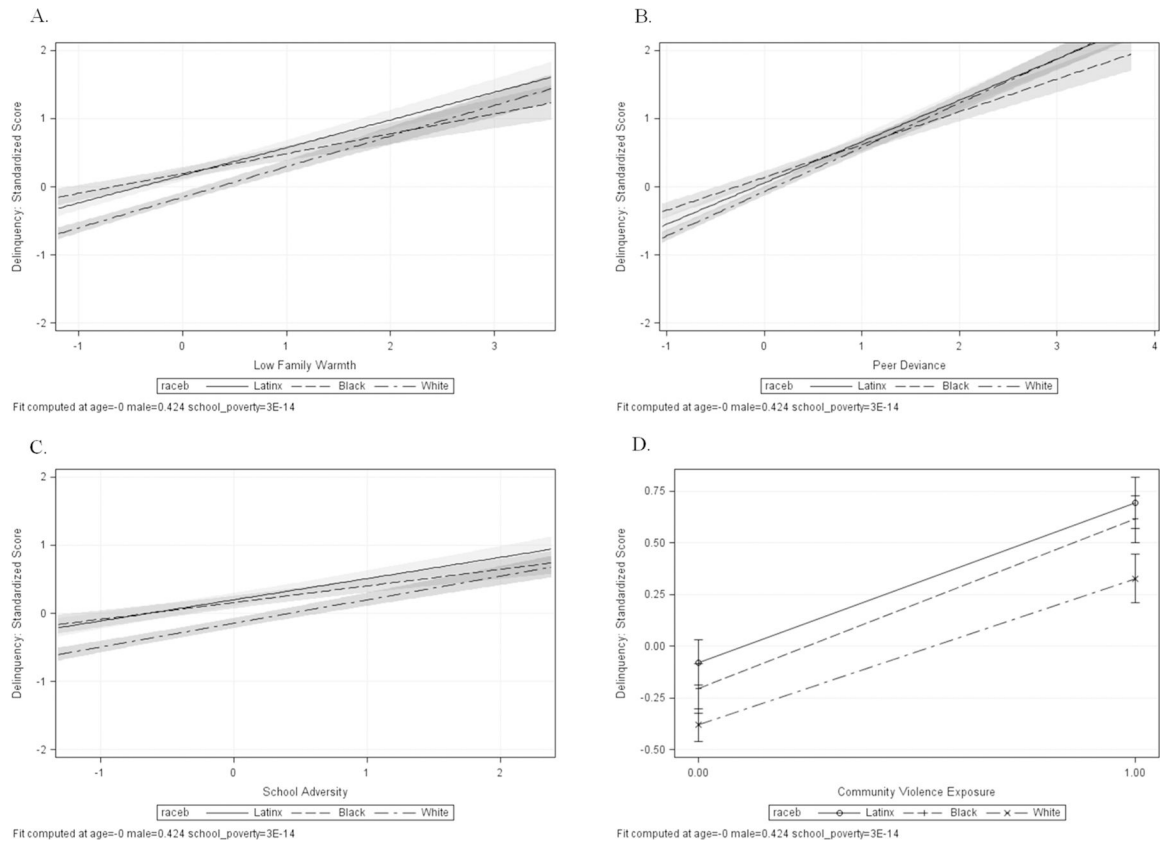


Fig 1. Predicted levels of delinquency by ecological risk across race/ethnicity
 Note. 95% Confidence Intervals are indicated by shading. Delinquency is predicted by low family warmth (Panel A), peer deviance (Panel B), school adversity (Panel C), and community violence exposure (Panel D). Predicted values are based on parameter estimates shown in Table 2. Predictors and outcomes have been standardized in the full study sample to Mean = 0, SD = 1.

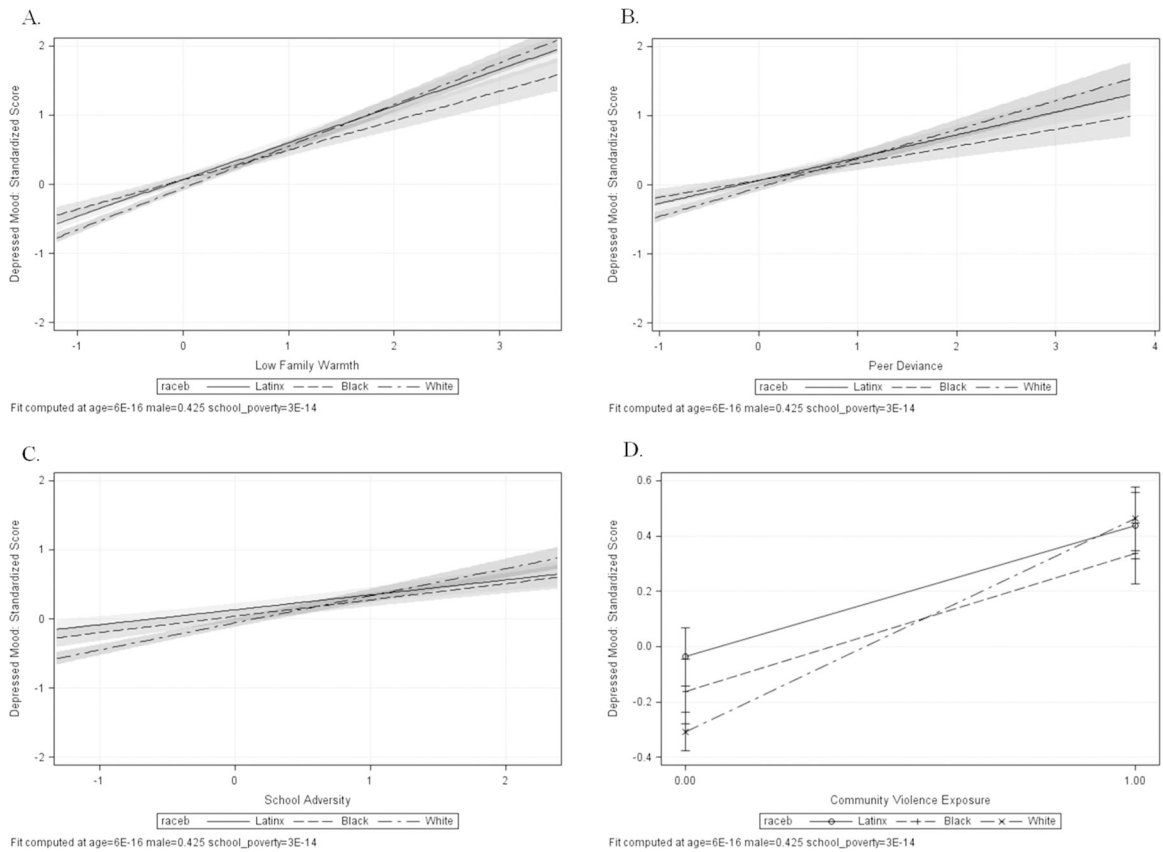


Fig 2.

Predicted levels of depression by ecological risk across race/ethnicity

Note. 95% Confidence Intervals are indicated by shading. Depression is predicted by low family warmth (Panel A), peer deviance (Panel B), school adversity (Panel C), and community violence exposure (Panel D). Predicted values are based on parameter estimates shown in Table 3. Predictors and outcomes have been standardized in the full study sample to Mean = 0, SD = 1.

Table 1.

Demographic and descriptive statistics

	Total Sample (N=2,621)		White (N=1,318)		Black (N=616)		Latinx (N=687)		Test of Group Differences Statistic, p-value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Outcomes and Predictors									
Delinquency ¹	1.95	2.35	1.39 ^a	1.99	2.37 ^b	2.35	2.64 ^b	2.70	F(2,2598) = 41.8, p < .001
Depression ²	1.75	0.50	1.66 ^a	0.49	1.81 ^b	0.48	1.86 ^b	0.50	F(2,2527) = 19.1, p < .001
Low Family Warmth	1.79	0.74	1.67 ^a	0.67	1.87 ^b	0.74	1.95 ^b	0.84	F(2,2603) = 12.4, p < .001
Peer Deviance	1.25	0.33	1.18 ^a	0.26	1.28 ^b	0.31	1.36 ^c	0.42	F(2,2603) = 42.8, p < .001
School Adversity	2.43	1.08	2.22 ^a	0.98	2.72 ^b	1.18	2.56 ^c	1.10	F(2,2603) = 29.3, p < .001
CVE (proportion exposed) ³	0.35	0.01	0.22 ^a	0.01	0.54 ^b	0.02	0.43 ^c	0.02	χ^2 (df = 2) = 219.0, p < .001
Demographic Statistics									
Sex (% male) ³	42.35	0.97	43.63	1.37	38.96	1.96	42.94	1.89	χ^2 (df = 2) = 3.9, p = .14
Age	12.47	0.98	12.50 ^a	0.94	12.37 ^b	1.04	12.53 ^a	0.99	F(2,2603) = 2.30, p = .10
School Poverty ⁴	39.14	21.28	28.04 ^a	16.57	44.84 ^b	18.27	55.31 ^c	19.38	F(2,2618) = 574.8, p < .001

Note. CVE: community violence exposure. Means with different letters are significantly different at $p < .05$.

¹ Delinquency analysis is based on N=2,616 (N=1,315 Whites, N=614 Black, N=687 Latinx).

² Depression analysis is based on N=2,545 (N=1,285 Whites, N=587 Black, N=673 Latinx).

³ SD calculated as standard error of proportion.

⁴ Percentage of students enrolled in the Federal free/reduced meal program in each youth's school.

Table 2. Standardized parameter estimates from linear mixed effects regression models predicting delinquency

<i>Parameter Estimates</i>	Low Family Warmth			Peer Deviance			School Adversity			CVE		
	B	SE	p-value	B	SE	p-value	B	SE	p-value	B	SE	p-value
Intercept	-0.250			-0.103			-0.195			-0.421		
Age	0.075	0.017	<.001	-0.007	0.016	0.681	0.118	0.018	<.001	0.111	0.018	<.001
Male	0.230	0.035	<.001	0.079	0.031	0.010	0.111	0.036	0.002	0.097	0.036	0.007
School Poverty	0.040	0.030	0.182	0.027	0.032	0.393	0.053	0.032	0.099	0.024	0.033	0.478
Latinx	0.322	0.051	<.001	0.127	0.047	0.007	0.347	0.053	<.001	0.302	0.061	<.001
Black	0.349	0.015	<.001	0.208	0.048	<.001	0.306	0.055	<.001	0.175	0.067	0.009
Risk Factor	0.449	0.026	<.001	0.649	0.025	<.001	0.348	0.028	<.001	0.708	0.060	<.001
Latinx*Risk Factor	-0.043	0.040	0.285	-0.042	0.036	0.239	-0.036	0.044	0.413	0.064	0.091	0.484
Black*Risk factor	-0.158	0.044	<.001	-0.167	0.041	<.001	-0.103	0.043	0.017	0.111	0.094	0.237
Estimated Simple Slopes												
Latinx	.406	.030	<.001	.607	.026	<.001	.312	.034	<.001	.771	.069	<.001
Black	.291	.035	<.001	.482	.033	<.001	.244	.033	<.001	.819	.073	<.001
White	.449	.026	<.001	.649	.025	<.001	.348	.028	<.001	.708	.060	<.001

Note. CVE: community violence exposure.

Table 3.

Standardized parameter estimates from linear mixed effects regression models predicting depression

Predictors	Low Family Warmth			Peer Deviance			School Adversity			CVE		
	B	SE	p-value	B	SE	p-value	B	SE	p-value	B	SE	p-value
Intercept	-0.002			0.063			0.048			-0.199		
Age	0.007	0.016	0.649	-0.008	0.019	0.661	0.064	0.019	<.001	0.062	0.019	0.001
Male	-0.117	0.033	<.001	-0.237	0.037	<.001	-0.248	0.038	<.001	-0.257	0.038	<.001
School Poverty	0.057	0.020	0.004	0.074	0.023	0.001	0.084	0.027	0.002	0.069	0.027	0.011
Latinx	0.123	0.047	0.009	0.101	0.054	0.061	0.190	0.054	<.001	0.270	0.064	<.001
Black	0.119	0.044	0.007	0.105	0.050	0.038	0.095	0.054	0.079	0.146	0.068	0.032
Risk Factor	0.603	0.025	<.001	0.418	0.030	<.001	0.393	0.029	<.001	0.770	0.064	<.001
Latinx*Risk Factor	-0.072	0.038	0.058	-0.088	0.043	0.040	-0.177	0.045	<.001	-0.294	0.096	0.002
Black*Risk factor	-0.176	0.042	<.001	-0.173	0.050	<.001	-0.156	0.045	<.001	-0.273	0.100	0.007
Estimated Simple Slopes												
Latinx	.530	.029	<.001	.330	.031	<.001	.216	.035	<.001	.476	.073	<.001
Black	.426	.034	<.001	.246	.040	<.001	.237	.035	<.001	.498	.078	<.001
White	.603	.025	<.001	.418	.030	<.001	.393	.029	<.001	.770	.064	<.001

Note. CVE: community violence exposure.