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Collective Efficacy and the Contingent Consequences of Exposure to Life-Threatening Violence[1]

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Abstract

Neighborhood research has increasingly emphasized the potential for contextual characteristics to moderate the effects of youths' experiences on their outcomes. Drawing on collective efficacy theory, we examine the variable consequences of youths' exposures to life threatening violence across neighborhoods. We argue that strong community normative orientations supporting the control of violence diminish the negative effect of exposure to severe violence on subsequent mental health among urban youth. We also consider the extent to which the consequences of exposure to violence vary by gender. Employing data from the Project on Human Development in Chicago Neighborhoods, we estimate a series of multivariate, multilevel linear models of internalizing and externalizing symptoms. Results indicate that, for girls, exposure to life threatening violence (witnessing someone being attacked with a weapon or shot) increases both internalizing and externalizing symptoms. However, this effect achieves statistical significance only for girls who reside in lower collective efficacy neighborhoods. For boys, our analyses offered weaker evidence of violence exposure effects on mental health. Implications for research on the social context of mental health are discussed.

Keywords

Exposure to violence; neighborhood; collective efficacy; multilevel

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Exposure to life threatening community violence is an all too common occurrence among urban children and adolescents (Buka, Stichick, Birdthistle, & Earls, 2001). Estimates of the percentage of urban youth exposed to potentially lethal violence vary widely, but even those at the low end of the spectrum suggest that a sizeable minority of urban youth have been exposed to shootings (9%) and stabbings (13%; Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). Even more concerning are the upper bound estimates, which suggest that well over half of urban youth have seen someone get shot (66%) or stabbed (56%; Stein et al., 2003). Studies consistently find that exposure to violence, at home or in the community, as a witness or victim, increases youths' risks for mental health problems (see Margolin & Gordis, 2000 for review). While one might reasonably hypothesize that witnessing life threatening violence places youth at particularly high risk for such problems, this is largely speculative, as most studies use measures that combine more and less severe acts of violence. Using a sample of urban pre- and early adolescents, the first goal of the present study was to explore the links between witnessing potentially lethal community violence and the development of internalizing and externalizing problems.

Second, we sought to explore contingencies in the associations between witnessing life threatening community violence and youths' mental health problems. If exposure to such severe violence is both relatively common and a risk factor for mental health problems, then it is important to identify factors that mitigate its impact. Drawing on ecological models of development that acknowledge the multiplicative effects of individual experience and social context (Bronfenbrenner, 1986), we considered whether protective conditions in youths' neighborhoods might attenuate associations between community violence exposure and youths' internalizing and externalizing problems. Neighborhoods become increasingly relevant sources of influence as children transition into adolescence and begin to spend less time at home under their parents' direct supervision (Aber, Gephart, Brooks-Gunn, & Connell, 2000). Neighborhoods may therefore be very salient dimensions of the developmental contexts of pre- and early adolescence. Moreover, since neighborhoods often provide the backdrop for severe community violence, they may play an important role in determining how youth experience exposure to such violence. Thus, we asked whether neighborhood collective efficacy – a construct that refers to the degree of social cohesion and control in residential neighborhoods (Sampson, Raudenbush, & Earls, 1997; Sampson & Wilson, 1995) – might buffer youth against the consequences of witnessing life threatening community violence. Further, in light of evidence that neighborhood conditions may be differentially relevant for boys and girls (Nicholson & Browning, 2011; Popkin, Leventhal, & Weismann, 2010; Schaefer et al., 2006), we asked whether the effects of witnessing violence and the buffering capacities of collective efficacy varied by gender. A full rationale for these questions is outlined below.

A Case for the Contingent Consequences of Exposure to Severe Community Violence

There is a vast literature on the mental health consequences of youths' exposure to violence. Research on the consequences of family violence is particularly voluminous and suggests, overall, that exposure is positively associated with internalizing and externalizing problems

(for reviews see Evans, Davies, & DiLillo, 2008; Trickett, Negriff, Ji, & Peckins, 2011). Though studies on family violence outnumber those on community violence, the latter has also been considered as a potentially independent determinant of compromised mental health. Theories on the consequences of stressful experiences suggest that exposure to community violence may lead to externalizing behaviors by shaping expectations about the use and control of violence in public space. Youth who witness violence may come to view violence as an acceptable response to challenges (Anderson, 1999; Wikstrom, 2007). The recognition that violence is expected or tolerated in one's neighborhood may also lead to heightened fear, anxiety, and helplessness (Lynch & Cicchetti, 1998). Accordingly, one meta-analysis found that witnessing community violence had small to moderate, but significant, effects on youths' internalizing problems (d = .32, respectively), and moderate to large effects on externalizing problems (d = .72; Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009).

Witnessing community violence – even life threatening violence – does not, however, always lead to internalizing and externalizing problems. Several studies have shown that the consequences of community violence exposure are mitigated by family support (see Proctor, 2006 for review). For example, a longitudinal study of low-income African-American 6th graders found that witnessing community violence was positively associated with anxiety among youth who reported low levels of maternal closeness, but not among youth who reported high levels of maternal closeness (Hammack, Richards, Luo, Edlynn, & Roy, 2004). Similarly, a longitudinal study of urban African American boys revealed that residence in an "exceptionally functioning" family (with high levels of cohesion and effective parenting), relative to a "struggling" family, decreased the strength of the positive association between exposure to community violence and violence perpetration (Gorman-Smith, Henry, & Tolan, 2004).

Less is known about whether protective resources at the neighborhood level moderate associations between witnessing community violence and youths' mental health. We identified a single study that pursued this question (Kliewer et al. [2004] asked whether neighborhood cohesion attenuated the impact of exposure to community violence but found no effect). This gap in the literature is striking given that youth are often exposed to community violence in their neighborhoods, and that there is growing consensus on the multiplicative effects of individual- and neighborhood-level factors (e.g., Beyers, Bates, Pettit, & Dodge, 2003; Brody et al., 2001, 2003; Cleveland, Gibbons, Gerrard, Pomery, & Brody, 2005). Thus, in the present study, we focused on the potential buffering capacities of collective efficacy, which refers both to levels of social cohesion (i.e., attachment and mutual trust among residents) and social control (i.e., the willingness to act against threats to residents' collective well-beings) in residential neighborhoods (Sampson et al., 1997; Sampson & Wilson, 1995).

The concept of collective efficacy extends social disorganization theory (Shaw & McKay, 1969), which suggests that neighborhood-level structural disadvantage – as indexed by economic disadvantage, residential instability, and ethnic heterogeneity – limits the economic and social resources that sustain strong communities. Social disorganization theory was originally developed to explain geographic patterns in crime, but contemporary

research suggests that youth who reside in disadvantaged neighborhoods are also at risk for a wide variety of behavioral and emotional problems (see Fauth and Brooks-Gunn, 2008, Leventhal and Brooks-Gunn, 2000 for reviews). Low levels of collective efficacy are thought to transmit some of the consequences of structural disadvantage to neighborhood residents (see Sampson et al., 1997; Sampson & Wilson, 1995).

Few studies, however, have investigated the link between collective efficacy and mental health during childhood and adolescence. Whether, and in what manner, collective efficacy impacts youths' mental health is unclear. We do not yet know whether collective efficacy has psychological benefits for all youth (i.e., plays a health promotive role), or whether it plays a more circumscribed, protective role in offsetting the disadvantages confronted only by youth exposed to adversity. If youths' routine observations of neighborhood social interactions feature consistent examples of both social cohesion (e.g., residents frequently engaging in friendly dialogue on neighborhood streets) and strong informal social controls (e.g., signs for neighborhood watch groups, adults intervening to prevent violent altercations), they may feel less anxious, they may be less likely to withdraw from social interactions, and they might be less likely to engage in problem behavior. To the extent that this is true, collective efficacy should be directly and inversely related to internalizing and externalizing problems for all youth. Accordingly, Xue and colleagues (2005) identified inverse associations between collective efficacy and internalizing problems among 5- to 11-year-olds. On the other hand, it is possible that collective efficacy, rather than promoting health among all youth, serves primarily as a protective buffer against the consequences of suboptimal or threatening conditions and experiences. Consistent with this view, Odgers et al. (2009) found that collective efficacy was inversely associated with antisocial behavior in children, but only in deprived neighborhoods.

While models in the present study allowed for the possibility of promotive effects, we were primarily interested in determining whether collective efficacy has a protective effect among youth exposed to life threatening community violence. Social contexts such as neighborhoods offer cues about the origins of violent events, influence their immediate unfolding, and shape the narratives that emerge in their aftermath. Violent events that occur in communities where trust is high and norms regarding the control of violence are strong may be interpreted as involving "outsiders" (either nonresidents or residents that do not share the community's values), and may also elicit overt bystander intervention efforts (Sampson et al., 1997). Collective responses to violent events within higher collective efficacy communities may also emphasize their aberrancy or, when such communities are faced with chronic violence, mobilize efforts to combat the proliferation of violence. Thus, higher collective efficacy communities may shape interpretive frames that mitigate the potential for severe community violence to provoke mental health problems in youth. This argument is consistent with recently articulated theory which suggests that the way a child copes with exposure to violence depends not just on features of the violence itself, but also on the context in which it is experienced (Boxer & Sloane-Power, 2013).

Gender and the Contingent Consequences of Exposure to Severe Community Violence

In an additional line of inquiry, we also considered the potential for gendered effects of both violence exposure and neighborhood social climate on youths' mental health outcomes. As argued by Popkin and colleagues (2010), neighborhoods characterized by high rates of violent crime are often also marked by high rates of sexual violence against women. For girls, but not boys, witnessing a violent incident may thus signal the possibility of both physical and sexual victimization (the so-called "female fear;" Gordon & Riger, 1989). Women, relative to men, also perceive themselves to be at higher risk of crime (Jackson, 2009), less able to defend themselves against victimization, and at greater risk of negative consequences from crime (Ferraro, 1996; Popkin et al., 2010). Exposure to severe violence may thus have more mental health consequences for girls than boys. Though contradictory evidence exists (see Dunn et al., 2012; Zona & Milan, 2011), some extant studies support this hypothesis. For example, analyses of data from the Moving to Opportunity study revealed that girls who moved to safer, lower poverty neighborhoods demonstrated improved mental health and less participation in risky behavior (Popkin et al., 2010). For boys, however, moving conferred no such benefits. Fowler and colleagues (2009) also found tentative evidence that the link between community violence exposure and internalizing problems is stronger for girls than for boys. To the extent that girls are more affected by crime, they might also be more acutely aware of local norms regarding violence and more likely to benefit from the psychosocial buffering potential of collective efficacy. This hypothesis is tested in the present study.

The Present Study

The present study aimed to answer three research questions using data from a longitudinal study of urban youth. First, we asked whether exposure to potentially lethal community violence is positively associated with both internalizing and externalizing problems among pre- and early adolescent children. Second, we tested the hypothesis that neighborhood collective efficacy buffers youth against the mental health consequences of exposure to life threatening community violence (while also allowing for the possibility that collective efficacy has direct effects on mental health outcomes). Third, we asked whether the effects of exposure to life threatening violence and any observed interactions between collective efficacy and exposure to life threatening violence varied by gender.

Methods

Data

Data for the present study were drawn from the Project on Human Development in Chicago Neighborhoods (PHDCN). Data on child and adolescent development were collected as part of a three-wave longitudinal cohort study (the PHDCN "Longitudinal Cohort Study" or LCS). Using a multi-stage sampling process, seven cohorts of children and adolescents (ages 0, 3, 6, 9, 12, 15, and 18 years) were recruited from 80 Chicago neighborhood clusters (NCs; aggregates of 2–3 census tracts each) between 1995 and 1996. These NCs were selected

from a larger sample of 343 NCs that were stratified by ethnic composition (7 categories) and SES (i.e., high, medium, and low). Nearly equal numbers of NCs were selected from the resulting 21 strata, yielding a representative sample of 80 NCs. Over 6,000 children and adolescents were recruited from these 80 NCs during the first wave of data collection. Extensive in-home interviews and assessments were conducted with these children and their primary caregivers at three points in time over a 7-year period, at roughly 2-year intervals (Wave 1 in 1995–1996; Wave 2 in 1998–1999; and Wave 3 in 2001–2002). Our sample includes respondents in the 9- and 12-year-old cohorts (who ranged in age from 7.9 to 13. 2 at Wave 1; N=1227[2]). Descriptive statistics on the demographic composition of this sample are provided in Table 1.

PHDCN investigators also conducted a Community Survey in 1995 to assess the social environments of residential neighborhoods. The survey was administered to an independent sample of adults not included in the above-described LCS. Participants were recruited using a three stage sampling strategy. First, city blocks within Chicago's 343 NCs were randomly selected. Second, households within these blocks were sampled randomly. Finally, within each household, one adult age 18 years or older was randomly selected to complete the survey questionnaire. On average, 25 cases per NC (N = 343 NCs) were included in the Community Survey sample. Within the 80 NCs that served as the sampling frame for the PHDCN LCS, however, larger samples of approximately 50 cases per NC were enrolled in the Community survey. Oversampling in these 80 NCs ensured the reliability of Community Survey-based neighborhood-level measures in the neighborhoods that were of greatest importance in the PHDCN. In the present study, we used data from the Community Survey to construct a measure of collective efficacy. We attached both Community Survey and 1990 Census data on neighborhood demographic characteristics to data from the PHDCN LCS in order to explore associations between exposure to life threatening violence, neighborhood collective efficacy, and adolescent psychological health. Census tract identifiers for each youth were used to match youth-level observations with the neighborhood-level data.

Measures

All youth- and neighborhood-level measures are described below and correlations between all key study variables are presented in Table 2.

Dependent measures—The Child Behavior Checklist (Achenbach, 1991) was used to assess youth internalizing (anxiety/ depression, somatic problems, and withdrawn behavior) and externalizing problems (aggression and delinquency). Each primary caregiver rated the accuracy of numerous descriptors (e.g., unhappy, sad, or depressed) of his or her child's recent behavior (0 = not true to 2 = very true). Primary caregivers completed the full CBCL for all children at wave 1. At wave 2 primary caregivers completed a reduced version of the CBCL. The reduced inventory included items that (1) were included in other frequently used symptom inventories (e.g., Behavior Problem Inventory; Zill, 1985), or (2) tapped problems measured by diagnostic interviews administered at prior waves. Scores on the wave 2

[2]The response rates for Waves 1 and 2 were 75.0% and 85.9 %, respectively.

internalizing (α = .89) and externalizing (α = .89) scales were used as dependent variables and scores on the internalizing (α = .85) and externalizing (α = .89) scales from wave 1 were used as controls.

Independent measures

Exposure to violence: The My Exposure to Violence scale (MyETV; Kindlon, Wright, Raudenbush, & Earls, 1996; Kuo, Mohler, Raudenbush, & Earls, 2000; Selner et al., 1998), which is a modified version of the Survey of Exposure to Community Violence (Richters & Martinez, 1993), was administered to youth at wave 1. Using data from this measure, we created a single binary measure of exposure to life threatening violence. Youth were assigned a score of 1 if they had ever witnessed one or both of two forms of potentially lethal violence (a shooting or someone being attacked with a weapon such as a knife or bat), and a score of 0 if they had not witnessed either of these two forms of violence. In our sample, 11% reported having witnessed someone attacked with a weapon and 8% reported having seen someone shot. The prevalence of witnessing either type of violence was 16%. Unfortunately, follow-up questions did not allow us to determine whether these exposures occurred within youths' own neighborhoods versus other neighborhoods. The implications of this limitation are discussed later.

Collective efficacy: Following Sampson, Raudenbush, and Earls (1997), we constructed a collective efficacy measure using information from two scales—social cohesion and informal social control—that were administered to participants enrolled in the Community Survey. The social cohesion scale measures respondents' level of agreement (on a 5-point scale) with the following statements: (1) "People around here are willing to help their neighbors," (2) "This is a close-knit neighborhood," (3) "People in this neighborhood can be trusted," (4) "People in this neighborhood generally don't get along with each other," and (5) "People in this neighborhood do not share the same values." We reverse coded the latter two items. The informal social control scale consists of respondents' assessments of the likelihood (*1 = very unlikely* to *5 = very likely*) that their neighbors could be counted on to intervene if (1) "Children were skipping school and hanging out on a street corner," (2) "Children were spray-painting graffiti on a local building," (3) Children were "showing disrespect to an adult," (4) "There was a fight in front of your house and someone was being beaten or threatened," or (5) "The fire station closest to your home was going to be closed down by the city" due to budget cuts.

The two scales were combined into a single 10-item neighborhood-level measure of collective efficacy using a three-level linear item response model; items were nested within Community Survey respondents, who were nested within census tracts. At the item level, the model adjusts for missing data and item "difficulty" (Sampson, Raudenbush, and Earls 1997). At the respondent level, we controlled for a number of social compositional features of Chicago neighborhoods by including a range of respondent-level demographic covariates. At the tract level, residual variability across neighborhoods was modeled with a random effect. The final scale score is the standardized empirical Bayes (EB) residual from the level-three model (EB residuals adjust scores toward the scale grand mean by a factor proportional to the unreliability with which they have been estimated). The three-level

reliability of the combined scale was 0.63. Reliability in three-level models is a function of the intra-tract correlation for respondent-level collective efficacy scores, as well as the number of individuals sampled within the tract, the number of scale items, and the item-specific coefficients (see Raudenbush and Sampson 1999 for a discussion of reliability in three-level models).

Control variables—Exposure to violence is correlated with several other risk factors for poor mental health, including poverty and family dysfunction, and, as noted above, collective efficacy is associated with neighborhood disadvantage. To isolate the effects of exposure to violence and collective efficacy we controlled for these constructs and other demographic characteristics in all analyses.

Family background and demographic characteristics: All models controlled for each youth's gender, age (in years), immigrant generation (first, second, third or greater), and race/ethnicity. Race/ethnicity was represented by three dummy variables for African American, Latino, and Other; European American youth served as the omitted reference group. We also controlled for youths' SES (the first principle component of parental income, education and occupational status), primary caregivers' marital status, primary caregivers' employment status, household size, number of years of residence at current address, and family history of mental health problems (1=any biological relative ever experienced depression; 0=no history).

Family processes: Family attachment and support is a consistent predictor of adolescent mental health. Thus, we controlled for scores on a six-item scale from the Provision of Social Relations (PSR) instrument (Turner, Frankel, & Levin, 1983) administered to youth at wave 1. Responses to each item, scored 1 to 3 (*1 = not true* and *3 = very true*), reflect the extent to which youths' family members provide emotional and social support. Scores were averaged across all six items ($\alpha = .72$). Because family violence both co-occurs with community violence (Margolin & Gordis, 2000) and predicts youths' mental health problems (Evans et al., 2008; Trickett et al., 2011), our models also controlled for child maltreatment and primary caregiver involvement in intimate partner violence. Both types of violence were assessed via the parent/child Conflict Tactics Scale (CTS; Strauss, 1979), which was completed by primary caregivers at wave 1. The fourteen-item child maltreatment scale ($\alpha = .79$) assessed the frequency of both physical maltreatment (e.g., slapping or hitting the youth) and psychological maltreatment. (e.g., insulting or swearing at the youth?). The nineteen-item intimate partner violence scale ($\alpha = .90$) also captured the frequency of both physical and psychological violence maltreatment. Responses to items on both scales ranged from 1 to 7 (*1 = never* to *7 = more than 20 times*). For each scale, responses were averaged to yield final scores. Both scale scores were logged due to skewness.

Neighborhood-level structural indicators: Measures of neighborhood structure were constructed via principal components analysis with oblique rotation of 1990 Decennial Census data. Our analyses controlled for scores on the three factors identified in these analyses: *Concentrated disadvantage*, which is defined by the percentage of residents below

the poverty line, the percentage of residents receiving public assistance, the percentage of residents who are unemployed, and the percentage of households headed by a female; *immigrant concentration*, which is defined by the percentage of Latino and foreign-born residents; and, *residential stability*, which is defined by the percentage of residents living in the same house in both 1990 and 1985, and by the percentage of housing occupied by owners.

Analytic Strategy

We employed three-level multivariate linear models with robust standard errors to test the effects of exposure to violence, neighborhood collective efficacy, and their interaction on the mental health of boys and girls. These multivariate multilevel models incorporated internalizing and externalizing scales at level one, person-level covariates at level two, and neighborhood level characteristics at level three. The advantage of this approach (relative to building separate models for internalizing and externalizing outcomes) is that it allows the analyst to estimate person and neighborhood-level random effects for both outcomes in the same model and to perform hypothesis tests on coefficient differences across models of the two outcomes. We also fit separate intercepts for boys and girls at level two (i.e., the person level) in order to allow for random person and neighborhood-level variation in the outcomes by gender.

The multivariate multilevel model of internalizing and externalizing linear raw scores takes the following form:

$$Y_{ij}=\pi_{1ij}+\pi_{2ij}$$

At level one (within person), Y_{ij} are the internalizing and externalizing scores for each respondent (with two records per case where information is available for both outcomes), π_{1ij} and π_{2ij} are dummy variables taking on a value of 1 if the response is to the internalizing or externalizing scales, respectively, and 0 otherwise. At level two (between persons), the internalizing and externalizing scores for each respondent are modeled separately as a function of the effects of gender-specific intercepts ($(\beta^{M}_{10j},\beta^{F}_{10j},\beta^{M}_{20j}\text{and}\beta^{F}_{20j})$), gender-specific exposure to life threatening violence coefficients ($(\beta^{M}_{11j},\beta^{F}_{11j},\beta^{M}_{21j}\text{and}\beta^{F}_{21j})$), Q covariates X and associated regression coefficients β_q , and random effects r_{1ij} and r_{2ij}:

$$\pi_{1ij}=\beta^{M}_{10j}+\beta^{F}_{10j}+\beta^{M}_{11j}(ETV)+\beta^{F}_{11j}(ETV)+\sum_{q=2}^{Q}\beta_{1qj}X_{qij}+r_{1ij}$$

$$\pi_{2ij}=\beta^{M}_{20j}+\beta^{F}_{20j}+\beta^{M}_{21j}(ETV)+\beta^{F}_{21j}(ETV)+\sum_{q=2}^{Q}\beta_{2qj}X_{qij}+r_{2ij}$$

Finally, at level three, adjusted gender-specific intercepts $\beta^{M}_{10j},\beta^{F}_{10j},\beta^{M}_{20j},\text{and}\beta^{F}_{20j}$, are modeled as a function of the effects of neighborhood structural covariates, collective

efficacy, and random effects. Tests of the hypothesis that collective efficacy modifies the impact of exposure to life threatening violence on both outcomes for both genders are captured by models of $\beta_{11j}^{M}, \beta_{11j}^{F}, \beta_{21j}^{M}, \text{and} \beta_{21j}^{F}$ as well as randomly varying slopes for the effects of violence exposure across neighborhoods. For instance, for internalizing, the level three model is as follows:

$$\beta_{10j}^{M}=\gamma_{100}^{M}+\gamma_{101}^{M}(ConDis)_{j}+\gamma_{102}^{M}(RStab)_{j}+\gamma_{103}^{M}(IConc)_{j}+\gamma_{104}^{M}(CollEff)_{j}+u_{10j}^{M}$$

$$\beta_{11j}^{M}=\gamma_{110}^{M}+\gamma_{111}^{M}(CollEff)_{j}+u_{11j}^{M}$$

$$\beta_{10j}^{F}=\gamma_{100}^{F}+\gamma_{101}^{F}(ConPov)_{j}+\gamma_{102}^{F}(RStab)_{j}+\gamma_{103}^{F}(IConc)_{j}+\gamma_{104}^{M}(CollEff)_{j}+u_{10j}^{F}$$

$$\beta_{11j}^{F}=\gamma_{110}^{F}+\gamma_{111}^{F}(CollEff)_{j}+u_{11j}^{F}$$

In the first two equations of this level-three model γ_{104}^{M} represents the main effect of collective efficacy on internalizing problems for boys, and γ_{111}^{M} represents the cross-level interactive effects of collective efficacy and violence exposure on boys' internalizing problems. Likewise, in the second two equations, γ_{104}^{F} represents the main effect of collective efficacy on internalizing problems for girls, and γ_{111}^{F} represents the cross-level interactive effects of collective efficacy and violence exposure on girls' internalizing problems. A comparable set of level 3 models is simultaneously fit for externalizing as well. Significant coefficients estimating the cross-level interaction between collective efficacy and exposure to violence indicate that collective efficacy moderates the impact of exposure to life threatening violence on youth psychological well-being.

To address missing data, we used multiple imputation (Allison, 2001). We imputed 10 datasets using all cases for which any data were available on any independent or dependent variables in the analysis. We subsequently estimated multiply imputed multilevel models using HLM 7.0 (Tables 3 and 4 report averaged results), dropping cases with imputed values on the dependent variable (von Hippel, 2009). We accounted for cases lost between waves 1 and 2 by weighting our analyses by the inverse probability of attrition (Robins, 1986; Robins, 1999).

Results

Table 3 presents the results of models estimating the effects of individual-level covariates and exposure to life threatening violence on CBCL internalizing and externalizing scores. Model results are presented by model number for each scale. Model 1 includes individual demographic and family background measures, gender-specific covariates for life threatening violence exposure, and wave 1 measures of the dependent variable. Among the

controls, wave 1 internalizing and having a family history of depression were the only significant predictors of internalizing problems at wave 2. For girls, but not for boys, exposure to life threatening violence was also significantly associated with internalizing problems ($p < .05$; we did not, however, find statistically significant difference in the magnitude of girls' versus boys' violence exposure coefficients). In the model of externalizing, first and second generation immigrant status (vs. third or more), residential tenure, having married parents, and primary caregiver employment were all negatively associated with the outcome. In addition, both boys and girls who had (versus had not) experienced exposure to life threatening violence scored significantly higher on externalizing symptoms ($p < .05$). Comparing the magnitudes of the boys' and girls' intercepts in each Model 1 revealed no differences in internalizing or externalizing problems as a function of gender.

In Model 2 (see Table 3) we added controls for family process measures to the baseline models to examine the robustness of the effects of violence exposure to potentially confounded family violence and support processes. Family support and child maltreatment were associated with internalizing, while child maltreatment and exposure to intimate partner violence were associated with externalizing. The effect of life threatening violence exposure on girls' internalizing problems remained significant despite adding these controls. Moreover, although including the family process measures eliminated the significant effect of violence exposure on externalizing for boys, the effects of violence exposure on externalizing were reduced only modestly for girls and remained significant at $p < .05$.

Table 4 reports results from analyses examining the effects of collective efficacy, and the effects of the cross-level interaction between collective efficacy and violence exposure. Although these models controlled for all of the aforementioned individual-level covariates and measures of neighborhood structural characteristics, coefficients for these controls are omitted from Table 4 for the sake of parsimony (available upon request).[3] Model 1 shows the main effects of neighborhood collective efficacy and violence exposure. The average effect of collective efficacy is not a significant predictor of either outcome for either gender in Model 1 of Table 4. However, Model 2 includes the cross-level interaction between collective efficacy and violence exposure. For girls, we found a statistically significant negative interaction term ($p < .05$) in models of both internalizing and externalizing. The interaction terms for girls indicate that the positive impact of severe violence exposure on both outcomes is reduced as neighborhood collective efficacy increases. Figures 1 and 2 plot regions of significance for the effects of violence exposure across levels of collective efficacy. For internalizing, the effect of life threatening violence is significant at or below -.33 on the collective efficacy scale; for externalizing, the effect of violence exposure is significant at or below -.44 on the collective efficacy scale. Computing the slopes for the effect of violence exposure at the low end of the collective efficacy scale is also revealing. At 1.5 standard deviations below the mean on the collective efficacy scale, the experience of life-threatening violence leads to a 3.9 increase in internalizing; for externalizing, the increase is 3.5. Thus, for girls, witnessing life threatening violence exhibits non-trivial

[3]Neighborhood structural characteristics were not significantly associated with either internalizing or externalizing symptoms in either model with the exception of residential stability, which was negatively associated with internalizing for boys ($p < .05$).

effects on both outcomes at lower levels of collective efficacy. However, above the -.44 (externalizing) and -.33 (internalizing) thresholds on the collective efficacy scale, exposure to potentially lethal violence exerts no significant influence on girls' mental health.

Importantly, while the cross level interaction between collective efficacy and exposure to violence is significant for girls, we found no significant interactions between collective efficacy and exposure to life threatening violence among boys. The magnitudes of the coefficients for the interactions between collective efficacy and violence exposure for boys were not, however, significantly different from those for girls.

Sensitivity analyses

Additional analyses examining the robustness of the effects observed in Table 4 were conducted. Models including additional interactions between violence exposure and family support, partner violence, and child maltreatment were fit to investigate whether including these level-1 interactions altered the magnitude or significance of the interactions between collective efficacy and violence exposure. These tests draw on the hypothesis that residing in a high collective efficacy community may be confounded with family processes that could also modify the effects of violence exposure. None of the family process/ violence measures significantly moderated the effect of violence exposure, however. Moreover, for girls, the cross-level interactions between violence exposure and collective efficacy remained essentially unchanged for both outcomes.[4]

Discussion

Extant research indicates that the consequences of stressful events during childhood may be substantial, wide-ranging, and extend well into adulthood (Dube, Felitti, Dong, Giles, & Anda, 2003). The impact of stressors varies substantially across individuals (Norris et al., 2009), however, highlighting the importance of understanding the factors that may buffer or exacerbate the effects of stress. Thus, in the foregoing analysis of a sample of pre- and early adolescent children, we examined the mental health consequences of an all too common stressor for urban youth -- exposure to life threatening community violence. Further, we tested the hypothesis that residence in neighborhoods characterized by high levels of collective efficacy would mitigate the psychological impact of exposure to life threatening violence.

Using two waves of data collected over a period of approximately two and a half years, our analyses revealed that exposure to life threatening community violence does indeed exert a non-trivial impact on girls' internalizing and externalizing problems. The consequences of exposure to potentially lethal violence varied across neighborhoods, however. Violence

[4]An additional concern is the lack of control for the experience of victimization in the community at Wave 1. The observed effects of exposure to severe violence may be biased due to the correlation between exposure to violence and the respondent's experience of direct violent victimization (not captured by the parental maltreatment variable). Although we did not have a measure of victimization at Wave 1, we included a measure of ever having experienced being "hit, slapped, punched, or beaten up" or "attacked with a weapon," measured at Wave 2. We ran additional analyses of Wave 2 mental health outcomes (internalizing and externalizing raw scores). Both victimization measures were significant predictors of internalizing and externalizing for girls; however, the cross-level interactions between collective efficacy and exposure to severe violence remained significant even after controlling Wave 2 victimization.

exposure in communities characterized by high collective efficacy was not significantly associated with diminished mental health at Wave 2. In contrast, violence exposure in low collective efficacy communities resulted in substantial negative effects on girls' subsequent mental health. Exposure to life threatening violence for pre- and early adolescent girls may typically occur in or near home neighborhoods; accordingly, neighborhood characteristics are likely to shape the unfolding of, and interpretive response to, these violent events. Just as the characteristics of the parent and parent-child relationship are thought to influence a child's interpretation of witnessed violence between caregivers (Graham-Bermann, De Voe, Mattis, Lynch, & Thomas, 2006; Holt et al., 2008; Martinez-Torteya et al., 2009), so too may community normative orientations and expectations help define the meaning of violence in neighborhood public space. Norms experienced within residential communities may also have consequences for the experience of stressors beyond neighborhood borders. For children and younger adolescents, neighborhood normative orientations may constitute a default set of expectations that are applied both within and beyond the borders of their own neighborhoods.

Interestingly, we failed to find evidence that collective efficacy plays a more general role in promoting good mental health among the girls in our sample. That is, while collective efficacy served as a buffer against the mental health consequences of girls' exposure to life threatening violence, collective efficacy did not have main effects on their mental health. The effects of collective efficacy (a relatively distal force in youth's lives, relative to parents, friends, and schools) may recede into the background unless and until youth witness an event – in our case, a violent event – that requires them to reevaluate their assumptions about the safety of their communities.

Also of note, after including a robust set of controls, we found no evidence that exposure to potentially lethal violence was associated with internalizing or externalizing problems among boys, regardless of whether or not they lived in neighborhoods with high or low levels of collective efficacy. Findings on the gendered effects of violence exposure on child and adolescent mental health are equivocal in the extant literature (Kennedy et al., 2010). The amplified effect of exposure to violence for girls in the current analysis may be a function of our focus on *life threatening* violence. Girls' heightened fears of victimization, concerns about the capacity for self-defense, and concerns about the potential for sexual victimization (Ferraro, 1996; Popkin, et al., 2010) may result in particularly acute reactions when confronting extreme forms of community violence.

Limitations and Future Directions

Although we rely on some of the best available data for examining the neighborhood context of developmentally relevant experiences, our analyses were limited in some respects. First, while our measure of collective efficacy reflects conditions within youths' home neighborhoods, our measure of exposure to life threatening violence did not explicitly limit youths' reported exposures to those that occurred in their neighborhoods. Thus, some experiences of violence exposure reported in this study might have occurred outside of youths' residential neighborhood. Although the activity spaces of pre- and early adolescents, relative to older adolescents, may be more confined to their own neighborhoods, we were

unable to locate incidents of exposure to violence events. However, similar to the manner in which children's secure attachments to their parents may positively influence their expectations in later relationships (Shaver & Hazan, 1988), the potential protective benefits of neighborhood collective efficacy may extend to violence observed beyond the boundaries of younger adolescents' own residential neighborhoods (particularly in proximate neighborhood settings). That is, younger adolescents who reside in high collective efficacy communities may export assumptions and expectations regarding community responses to violence to other activity spaces that are not located within their own neighborhoods. Geocoded data on the locations of witnessed violence, however, are necessary to address such questions.

Second, a more nuanced measure of exposure to lethal violence in future research may yield even more informative findings. Our measure was a simple binary indicator of exposure to a shooting and/or an attack with another type of deadly weapon. This approach neglects other potentially consequential dimensions of exposure to life threatening violence. In a recent paper, Boxer and Sloan-Power (2013) outlined "a four-dimensional framework for understanding violence exposure" (p. 211) which highlights the importance of context (the location of the exposure), content (the severity of violence observed), channel (the mode of exposure), and chronicity (the frequency of exposure). While our measure isolated the context of the violence observed (the community), the content of the exposure (life threatening violence), and the channel through which the exposure occurred (first person visual witnessing), we did not assess chronicity. Chronic exposure to severe violence may have more dire consequences for mental health (see Margolin & Gordis, 2000), and may therefore be less susceptible to the buffering effects of neighborhood collective efficacy. Additionally, our measure of exposure did not allow for direct assessments of youths' interpretations of the witnessed violent events—a key mechanism through which we hypothesize that collective efficacy moderates the impact of violence exposure. Subsequent tests of the interactive effect of contextual characteristics and violence exposure may benefit from more extensive data on the interpretive process involved in the response to witnessing violence.

A third limitation is that our measure of collective efficacy reflects adult perceptions of collective efficacy; we did not have a measure of youths' perceptions of collective efficacy in their neighborhoods. Our interpretation of our findings – that high levels of perceived collective efficacy alter the cognitive frames through which youth interpret potentially lethal acts of violence – relies on the assumption that adult perceptions of collective efficacy are good proxies for youth perceptions of collective efficacy. Without a youth-report measure of collective efficacy, we were unable to test this assumption. Nonetheless, our collective efficacy measure was based on adult responses to some questions regarding the behavior of neighborhood residents in response to situations that *involve children and adolescents*. Youth perceptions are likely to coincide with adult perceptions of adult attempts to regulate youth behavior. Our findings should, however, be replicated with a youth-report measure of collective efficacy.

Future studies should also explore the extent to which the effects identified in these analyses are replicable across different age groups. The protective effects of collective efficacy

observed among pre- and early adolescent girls in the present study may not extent to younger children or older adolescents. As previously noted, neighborhoods are thought to become increasingly relevant sources of influence as children transition into adolescence and have more direct contact with their communities (Aber et al., 2000). Young children who spend more time at home under their parents' direct supervision, and who may have less fully developed perceptions of neighborhoods norms, may not reap the benefits of collective efficacy to the same degree that older children do. Higher levels of collective efficacy may also afford less protection to older adolescents, who may traverse the boundaries of their neighborhoods more often than younger adolescents, and whose interpretations of violent events may therefore be shaped to a greater degree by community-level influences outside of their neighborhoods. The data necessary to adequately address these questions were not available for the present study, and extant studies have not, to our knowledge, explored the possibility of age group differences in the effects of neighborhood collective efficacy. Future studies examining developmental differences in the buffering capacities of collective efficacy would make a valuable contribution to our understanding of the way in which neighborhood social climates influence development over the lifespan.

Finally, continuous measures of internalizing and externalizing symptoms were used as indicators of mental health outcomes in the present study. While our analyses suggest that neighborhood collective efficacy has the potential to attenuate associations between life-threatening violence exposure and internalizing and externalizing symptomatology, our findings do not speak to the issue of whether collective efficacy has the potential to make clinically significant differences in the expression of diagnosable psychological disorders following exposure to life threatening violence. Future studies should therefore consider whether residence in a neighborhood with high levels of collective efficacy might differentiate between youth who do and do not develop psychological disorders (e.g., post-traumatic stress disorder, major depression, conduct disorder) after witnessing severe community violence.

Conclusion

Despite the aforementioned limitations, our findings carry implications both for theory and research on the impact of stressful experiences and for policies aimed at managing the prevalence and impact of violence exposure. Theoretical models of responses to stress have largely neglected the broader community context of adaptation to stress, despite the emergence of ecological approaches to investigating the impact of childhood experiences (e.g., Cummings, Goeke-Morey, Schermerhorn, Merrilees, & Cairns, 2009; Graham-Bermann et al., 2006; Overstreet & Mazza, 2003; Salzinger, Feldman, Stockhammer, & Hood, 2002). Our findings suggest that protective neighborhood social climates may indeed moderate the impact of severe, even life threatening stress on pre- and early adolescent children. Moreover, results from this study offer further evidence that interventions at the community level to support strong norms and the capacity for collective mobilization against violence may have broad-based benefits.

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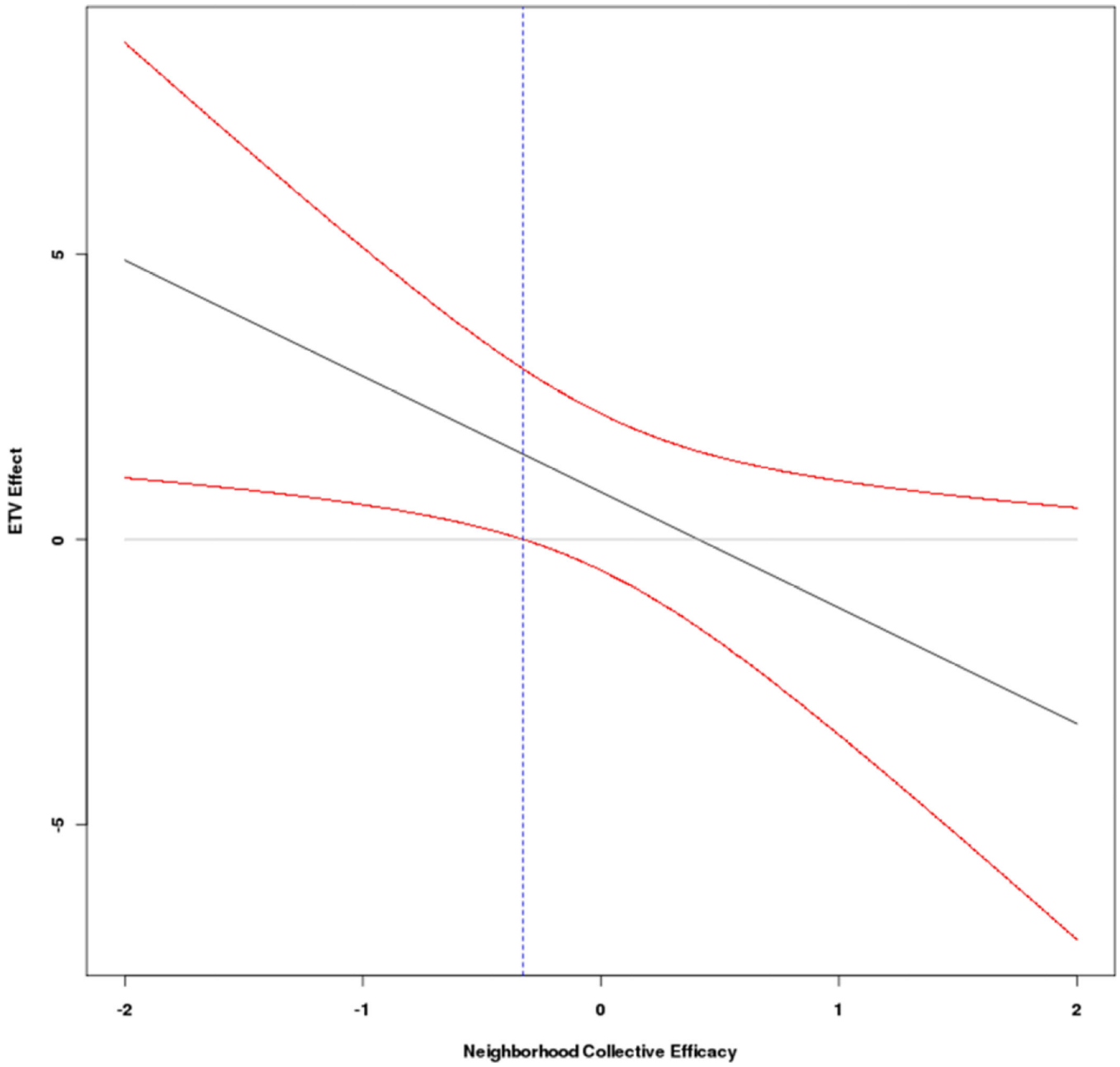

Figure 1.

Effect of Life-Threatening ETV (Wave 1) on Internalizing (Wave 2) by Neighborhood Collective Efficacy - with 95% Confidence Bands and Region of Significance for the ETV Effect. ETV slopes at Collective Efficacy < −.33 (to the left of the vertical dashed line) are statistically significant ($p < .05$).

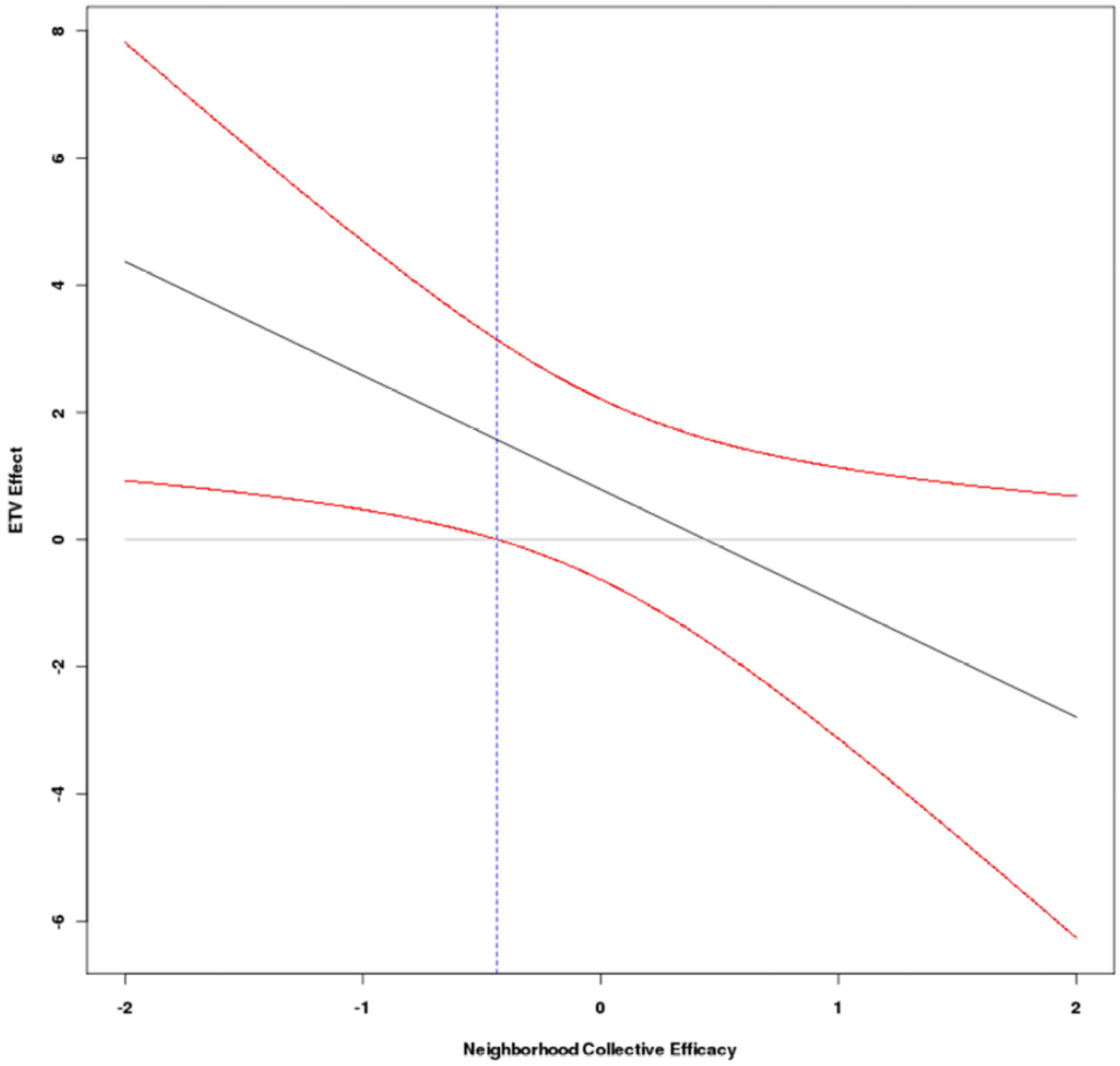

Figure 2.

Effect of Life-Threatening ETV (Wave 1) on Externalizing (Wave 2) by Neighborhood Collective Efficacy – with 95% Confidence Bands and Region of Significance for the ETV Effect. ETV slopes at Collective Efficacy < −.44 (to the left of the vertical dashed line) are statistically significant ($p < .05$).

Table 1

Descriptive Statistics for Variables in the Analysis

Independent Variables	Descriptive Statistics	
	Mean	Std Dev
Individual/family level		
Race/ethnicity		
White	.14	-
African american	.33	-
Latino	.50	-
Other	.03	-
Immigrant generation		
First	.12	-
Second	.36	-
Third plus	.52	-
Age	10.66	1.53
Male	.51	-
Family socioeconomic status	-.19	1.41
PC married	.60	-
PC employed	.60	-
Household size	5.48	2.03
Number years current address	6.17	6.83
Family history of depression	.22	-
Exposure to life-threatening violence	.16	-
PC family support	−.63	.37
Partner violence (log)	−.39	.83
Child maltreatment (log)	.69	.30
Wave 1 internalizing	7.86	6.89
Wave 2 internalizing	8.76	7.70
Wave 1 externalizing	10.76	8.68
Wave 2 externalizing	7.62	7.62
Neighborhood level		
Concentrated disadvantage	−.05	.84
Residential stability	−.08	.91
Concentrated immigration	.39	1.16
Collective efficacy	−.01	.99

[a] Neighborhood level $N = 169$; Person level $N = 1227$.

Table 2

Correlations Among Key Variables in the Analysis

	1	2	3	4	5	6	7	8	9	10	11	12
1. Family support												
2. Partner violence	−.192 **											
3. Child maltreatment	−.149 **	.283 **										
4. Wave 1 internalizing	−.179 **	.085 **	.310 **									
5. Wave 1 externalizing	−.255 **	.252 **	.484 **	.631 **								
6. Wave 2 internalizing	−.173 **	.116 **	.265 **	.585 **	.477 **							
7. Wave 2 externalizing	−.200 **	.258 **	.348 **	.392 **	.654 **	.633 **						
8. ETV (severe) boys	−.106 **	.090 *	.066	.043	.114 **	.100 *	.157 **					
9. ETV (severe) girls	−.162 **	.052	.010	.020	.132 **	.108 **	.169 **	−				
10. Neigh concentrated disadv	−.148 **	.073 *	.048	−.006	.115 **	.014	.123 **	.172 **	.174 **			
11. Neigh residential stability	.038	.045	−.028	−.061 *	−.061 *	−.100 **	−.055	−.077	−.082 *	−.075		
12. Neigh immigrant conc	.003	−.213 **	−.018	.132 **	−.019	.123 **	−.076 **	−.041	−.029	−.080	−.127	
13. Neigh co lective efficacy	.083 **	.061 **	−.014	−.086 **	−.068 *	−.095 **]	−.045	−.114 **	−.126 **	−.356 **	.278 **	−.239 **

Note: Correlations for ETV (severe) are based on gender-specific samples (males: N=629; females: N=598). Correlations among all other level one variables based on the full individual level sample (N=1227). Correlations among neighborhood level variables based on the tract-level sample (N=169)

Table 3

Multivariate Multilevel Models of Internalizing/Externalizing Raw Scores (with Robust Standard Errors) -- Individual/Family Characteristics and Exposure to Life-Threatening Violence

	Model			
	Internalizing		Externalizing	
Independent variables	**1**	**2**	**1**	**2**
Individual/family level				
Race/ethnicity				
African american	.07 (.52)	−.21 (.51)	.12 (.45)	−.01 (.44)
Latino	.89 (.55)	.87 (.56)	.39 (.51)	.41 (.52)
Other	−.16 (.76)	−.27 (.77)	−.81 (.67)	−.87 (.67)
Age	.19 (.11)	.23 (.12)	.13 (.09)	.14 (.09)
Immigrant generation (vs. 3+)				
First	.72 (.67)	1.00 (.66)	−1.49 * (.59)	−1.23 * (.59)
Second	−.21 (.49)	.04 (.52)	−.88 * (.38)	−.67 (.40)
Household size	−.18 (.10)	−.21 * (.10)	.00 (.07)	−.02 *** (.07)
Number years current address	−.03 (.03)	−.01 (.03)	−.05 * (.02)	−.03 (.02)
Family socioeconomic status	−.05 (.16)	−.07 (.16)	.21 (.13)	.20 (.13)
PC married	−.09 (.40)	−.06 (.40)	−.87 * (.38)	−.79 * (.38)
PC employed	−.74 (.40)	−.63 (.40)	−.68 * (.32)	−.63 * (.32)
Family history of depression	.90 * (.46)	.65 (.44)	.37 (.35)	.20 (.34)
Exposure to severe violence				
Boys	1.16 (.68)	.96 (.67)	1.23 * (.61)	1.13 (.59)
Girls	1.99 * (.78)	1.82 * (.76)	1.57 * (.74)	1.53 * (.74)
Family support	–	−1.04 * (.52)	–	−.34 (.37)
Partner violence (log)	–	.45 (.24)	–	.47 * (.20)
Child maltreatment (log)	–	2.40 *** (.70)	–	1.39 * (.57)
Wave 1 internalizing	.61 *** (.03)	.57 *** (.03)	–	–

Independent variables	Model			
	Internalizing		Externalizing	
	1	2	1	2
Wave 1 externalizing	–	–	.43 *** (.02)	.41 *** (.02)
Boys intercept	8.48 *** (.23)	8.45 *** (.23)	7.50 *** (.22)	7.49 *** (.22)
Girls intercept	8.53 *** (.28)	8.64 *** (.28)	7.28 *** (.23)	7.32 *** (.23)

[a] Neighborhood level $N = 169$; Person level $N = 1227$; variance components omitted.

* $p < .05$

** $p < .01$

*** $p < .001$

Table 4

Multivariate Multilevel Models of Internalizing/Externalizing Raw Scores (with Robust Standard Errors) -- Collective Efficacy and Exposure to Life-Threatening Violence[a]

Independent	Model			
	Internalizing		Externalizing	
Variables	**1**	**2**	**1**	**2**
Boys				
Collective efficacy	−.09 (.27)	.11 (.29)	−.13 (.32)	−.18 (.33)
Exposure to life-threatening violence	.92 (.67)	.65 (.72)	1.04 (.60)	1.07 (.60)
Collective efficacy * Exposure to life-threatening violence	–	−.91 (.90)	–	.12 (.72)
Girls				
Collective efficacy	−.07 (.34)	.23 (.36)	−.08 (.29)	.17 (.27)
Exposure to life-threatening violence	1.67 * (.76)	.83 (.75)	1.45 * (.74)	.77 (.75)
Collective efficacy * Exposure to life-threatening violence	–	−2.04 * (.92)	–	−1.79 * (.84)
Boys intercept	8.41 *** (.23)	8.44 *** (.23)	7.57 *** (.23)	7.57 *** (.23)
Girls intercept	8.64 *** (.31)	8.67 *** (.31)	7.36 *** (.25)	7.36 *** (.24)

[a]Neighborhood level $N = 169$; Person level $N = 1277$. Variance components omitted. Models control all individual/family characteristics included in Table 2 models. Controls for neighborhood concentrated poverty, immigrant concentration, and residential stability are also included (separately estimated for boys and girls). Coefficients for control variables available upon request.

*$p < .05$

**$p < .01$

***$p < .001$