# Posttraumatic Stress Disorder in Maltreated Children Grown Up: The Influence of Neighborhood

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## Abstract

In this study, we examined the effects of childhood neighborhood characteristics on the development of posttraumatic stress disorder (PTSD) in a sample of abused and neglected individuals and matched controls followed into adulthood ($N = 1,132$). Using generalized linear models (GLM), the results indicated that growing up in more advantaged neighborhoods (middle- and upper-class) was associated with the development of fewer PTSD symptoms, $R^2 = .09$, $p < .001$. In contrast, growing up in more economically disadvantaged areas was associated with more PTSD symptoms, but only for nonmaltreated controls, $R^2 = .09$, $p < .001$. We did not find that neighborhood characteristics were associated with PTSD in terms of the number of traumatic events reported, $R^2 = .60$, $p < .001$, or being the victim of more than one type of maltreatment, pseudo $R^2 = .11$, $p < .001$. The results generally supported the premise that characteristics of one's residential environment in childhood, especially factors reflecting social and economic advantage and disadvantage, have an influence on mental health functioning later in life. Future research should examine the mechanisms that might explain the impact of childhood neighborhood on PTSD outcomes and the aggravating effects of pretrauma vulnerabilities associated with neighborhood disadvantage.

Child maltreatment is a significant risk factor for the development of posttraumatic stress disorder (PTSD; Copeland, Keeler, Angold, & Costello, 2007; De Bellis, Hooper, Woolley, & Shenk, 2010; Kaplow, Dodge, Amaya-Jackson, & Saxe, 2005; Scott, Smith, & Ellis, 2010; Sugaya et al., 2012; Wechsler-Zimring & Kearney, 2011; Widom, 1999). Studies of abused and neglected children have estimated that between 21–50% of those victimized will develop PTSD over their lifetimes (Kearney, Wechsler, Kaur, & Lemos-Miller, 2010; Molnar, Buka, & Kessler, 2001; Sugaya et al., 2012; Widom, 1999) compared to rates of 6–11% reported in the general population (Kessler et al., 2005; Kilpatrick et al., 2013). Posttraumatic stress disorder is not an inevitable consequence of childhood victimization, and the resilience of many abused and neglected individuals indicates that there are other important factors that may explain the association between child maltreatment and PTSD.

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The majority of the literature on the effects of exposure to trauma has focused on individual factors, such as sex, age, family functioning, social support, and peritraumatic psychological processes (Kearney et al., 2010; Ozer, Best, Lipsey, & Weiss, 2003). However, there is increasing evidence that neighborhoods also play an important role in explanations of negative mental health outcomes (Hill & Maimon, 2013; Hoffman, Aschengrau, Webster, Bartell, & Vieira, 2015). The aim of this study was to examine the effects of childhood neighborhood characteristics on the development of PTSD in a sample of individuals with documented histories of childhood abuse and/or neglect and matched controls who were followed prospectively from childhood to adulthood.

Although there is no one universal definition, the term "neighborhood" is generally used to identify a geographic area in which citizens interact and seek to actualize common values, exercise social control, and socialize youth (Hunter & Riger, 1986; Schuck & Rosenbaum, 2006). Social disorganization theory (Sampson & Groves, 1989) and the ecological– transactional model (Lynch & Cicchetti, 1998) are two useful models that may help explain how neighborhood characteristics affect victims of child maltreatment over their lifetime (Coulton, Crampton, Irwin, Spilsbury, & Korbin, 2007). In the first model, objective structural characteristics of the community, such as poverty, residential instability, segregation, and immigration, are hypothesized to disrupt the social organization of the neighborhood and lead to a residential environment with less social cohesion, informal social control, and collective efficacy (Sampson, Raudenbush, & Earls, 1997), and more physical disorder (Ross & Mirowsky, 1999; Skogan, 1990). In the second model, disrupted neighborhood processes are stressors that negatively affect transactions among community members, including those between parents and children as well as those between residents and representatives of traditional social institutions, such as public officials and service providers (Coulton et al., 2007; Leventhal & Brooks-Gunn, 2000; LaFree, 1999; Lynch & Cicchetti, 2002). As a result, these neighborhoods have higher rates of violent behavior and lower levels of social cohesion and informal social control. In addition, the effectiveness of institutions to provide services to residents is diminished.

Drawing from these models, neighborhood characteristics may influence the development of PTSD both directly and indirectly. Neighborhood characteristics may directly affect PTSD by increasing the likelihood that children will witness or experience multiple traumatic events or events that are repeated over a prolonged period of time (Carlson & Dalenberg, 2000; Gapen et al., 2011; Johns et al., 2012). Research has suggested that the probability of PTSD increases with event exposure (Kilpatrick et al., 2013; Suliman et al., 2009; Walsh et al., 2012). There is also an extensive body of research that has linked neighborhood characteristics, such as poverty, to a range of qualifying traumatic events, including violent victimization (Sampson et al., 1997; Leventhal & Brooks-Gunn, 2000), residential fires and fire-related injuries (Jennings, 2013), and injuries associated with motor vehicle accidents (Morency, Gauvin, Plante, Fournier, & Morency, 2012; Yiannakoulias & Scott, 2013). In addition, there is evidence of a bidirectional association between PTSD and event exposure; that is, traumatic events are associated with the development of PTSD, and, in turn, the manifestation of PTSD symptoms is associated with the increased risk of exposure to new traumatic events (Cougle, Resnick, & Kilpatrick, 2009). Abused and neglected children who live in socially disorganized, disordered, and economically disadvantaged neighborhoods

may experience more traumatic events than those who do not, and the cumulative effect of these experiences may be one reason that these children are at greater risk for PTSD symptoms.

Neighborhood characteristics may also affect PTSD differentially, depending on characteristics of the individual or the abusive and neglectful experiences. For example, the risk of PTSD is greater for women compared to men (Koenen & Widom, 2009) and for individuals with lower socioeconomic status (Ozer et al., 2003; Tolin & Foa, 2006). The risk of PTSD is also higher for individuals who experience multiple forms of childhood maltreatment, especially a combination of physical and sexual abuse, and more severe victimization (Kearney et al., 2010). The literature on childhood maltreatment highlights different associations between neighborhood conditions and abuse and neglect characteristics (Coulton et al., 2007; Doidge et al., 2017; Drake & Pandey, 1996). Baglivio, Wolff, Epps, and Nelson (2017) found that concentrated neighborhood affluence was strongly associated with significantly fewer adverse childhood experiences whereas concentrated neighborhood disadvantage was associated with more adverse events in a statewide sample of 59,000 juveniles from Florida.

The neighborhood environment may also have an indirect effect on PTSD for victims of childhood maltreatment. Stressors in the community may increase individuals' pretrauma vulnerabilities (Carlson & Dalenberg, 2000; Monson, Paquet, Daniel, Brunet, & Caron, 2016). Fear of crime and feelings of a lack of control related to neighborhood characteristics such as physical disorder, conflict with other community members, and inadequate public services may influence an individual's physiological arousal, psychological state, and coping mechanisms. All of these factors are associated in the literature with an increased risk of developing PTSD after exposure to a traumatic event (DiGangi et al., 2013). For example, in a community sample of respondents from five neighborhoods in Montreal, Canada, Monson et al. (2016) found that among participants who had experienced trauma, neighborhood disorder increased the odds of having a lifetime PTSD diagnosis.

The neighborhood environment may also indirectly affect PTSD among abused and neglected individuals by providing trauma-buffering resources to victims (Carlson & Dalenberg, 2000; Gapen et al., 2011; Johns et al., 2012). Although fewer studies have examined the effects of neighborhood affluence compared to disadvantage, on health-related outcomes, in theory, socioeconomic heterogeneity is important because more affluent neighbors are associated with the resources necessary to maintain traditional social institutions, such as families, schools, churches, and health facilities (Wilson, 1987). In a study of self-rated health, Browning and Cagney (2003) found that individuals who lived in stable, affluent neighborhoods were much less likely to rate their health as fair or poor than individuals from other types of neighborhoods.

The purpose of this study was to examine the effects of neighborhood characteristics on the development of PTSD in a sample of maltreated children and matched controls who were followed-up with and assessed in adulthood. We had three hypotheses: (a) Abused and neglected children who resided in disadvantaged neighborhoods that are more socioeconomically homogeneous would experience a greater number of traumatic events

and have an increased likelihood of developing PTSD symptoms in adulthood than those who lived in more affluent communities; (b) Childhood residence in a socioeconomically affluent neighborhood would buffer the negative consequences of early child abuse and neglect and result in the manifestation of fewer PTSD symptoms; and (c) The association between childhood neighborhood and adult PTSD symptoms for victims of abuse and neglect would be mediated by the characteristics of the maltreatment.

# Method

## Participants and Procedure

The data presented herein comes from a prospective cohort–design study in which abused and neglected children with court-substantiated histories of maltreatment that occurred between 1967 and 1971 from one metropolitan area in the Midwestern United States were matched with nonmaltreated children and followed into adulthood. Cases of child maltreatment were collected from court records and were restricted to individuals who were 11 years of age or younger at the time of the incident ($M = 6.3$, $SD = 3.3$ years). Physical abuse cases included injuries such as bruises, welts, burns, abrasions, lacerations, wounds, cuts, bone and skull fractures, as well as other evidence of physical injury. Sexual abuse included felony sexual assault, fondling or touching, sodomy, rape, and incest. Neglect cases reflected a judgment that the parents' deficiencies in childcare were beyond those found acceptable by community and professional standards at the time. These cases represented extreme failure to provide adequate food, clothing, shelter, and medical attention to children.

The selection of controls was an important aspect of the study design. Controls were matched on age, sex, race/ethnicity, and approximate family social class at the time of the original study. School records were used to find matches for school-aged (5 years of age or older) children (i.e., same sex, race, elementary school grade, and a date of birth within 6 months) whereas county hospital records were used to find matches for children who were under school age (i.e., same sex, race, hospital of birth, and date of birth within 1 week). The matching procedure for social class was based on a broad definition of the construct and included the neighborhoods in which children grew up and schools at which they attended class. Shadish, Cook, and Campbell (2002) recommended using neighborhoods and hospitals to match on variables that are related to relevant outcomes when random assignment is not possible. Analogous procedures, with regard to neighborhood school matches, have been used in studies of individuals with schizophrenia (e.g., Watt, 1972). Matches were found for 73.7% of the maltreated children. For more information on subject selection criteria and study design, see Widom (1989a, 1989b).

The second phase of the study took place between 1989 and 1995 and involved tracing, locating, and interviewing the participants approximately 22.3 years ($SD = 2.1$) after the age of the petition (i.e., court case). The participants were interviewed in person, usually at home or in another appropriate location of their choosing. The interviewers were blind to the purpose of the study and to the participant's history of victimization. Participants were also blind to the purpose of the study and informed that they were selected to participate in a study of individuals who grew up in the late 1960s and early 1970s. Before beginning the interview, respondents were asked to sign a consent form that indicated they understood the

conditions of their participation and were participating voluntarily. For individuals with limited reading abilities, the consent form was read to the respondent and, if necessary, explained verbally. The study was approved by the Institutional Review Board at the University of Albany.

Of the original 1,575 participants, 1,307 (83.0%) were located and 1,196 (75.9%) were interviewed in the second phase of the study. Of those not interviewed, 43 were deceased prior to the interview, eight were incapable of being interviewed, 268 were not found, and 66 refused to participate. The sample was about half (48.7%) female, two-thirds (62.9%) White non-Hispanic, and the average age at the time of the follow-up interview was 28.7 years ($SD$ = 3.8). When comparing the 1,196 individuals in the follow-up sample to the original sample of 1,575, there were no differences in terms of sex, race, abuse and/or neglected status, poverty level of the census tract in which in the participant resided in childhood, or average age. In general, the sample was skewed toward the lower end of the socioeconomic spectrum. The average highest grade of school completed for the group was 11.47 ($SD$ = 2.19) and the median occupation level was semiskilled workers, with less than 7% of the sample working in managerial or professional occupations. Of the 1,196 participants, information about childhood neighborhood was missing for 64 (5.4%). Thus, the analyses were based on the 1,132 individuals (649 abused and/or neglected and 483 controls) with complete information.

### Measures

**PTSD.—**Posttraumatic stress disorder was measured using the National Institute of Mental Health Diagnostic Interview Schedule, Version III–Revised (NIMH-DIS-III-R; Robins, Helzer, Cottler & Golding, 1988). The DIS-III-R is a highly structured protocol designed to be implemented by lay interviewers. A survey company was hired to conduct the interviews that used these methods as part of the Epidemiological Catchment Area Studies (Eaton, Regier, Locke, & Taube, 1981). Before beginning the study, interviewers received a week of training and had to successfully complete practice interviews. A random sample of 10% of participants was recontacted by field supervisors to ensure that procedures were appropriately implemented by staff. Supervisors were also in regular contact with field interviewers in order to provide feedback, prevent program drift, and monitor quality. Diagnoses based on criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., text rev.; *DSM-III-R*; American Psychiatric Association [APA], 1987) were determined using a computer program designed specifically for scoring the DIS-III-R according to guidelines of the *DSM-III-R.*

The PTSD section began by presenting several potentially traumatic events (PTEs) and asking participants if they had ever experienced any of these events. Some examples of PTEs include a serious threat to one's life, a serious threat to a family member, physical assault, rape, disaster, sudden injury or accident, military combat, and seeing someone else killed or injured. Information about PTEs for the participants with documented cases of abuse and/or neglect was collected along with the maltreatment experience upon which selection into the original study was based. If a respondent reported a qualifying PTE, he or she was asked a series of questions regarding the occurrence of PTSD symptoms after the event. For up to

three qualifying events, data on PTSD sequelae were collected. When compared to a diagnosis made by an experienced psychiatrist, an earlier version of the DIS PTSD module demonstrated adequate reliability, Cohen's $k = 0.67$, and construct validity (Breslau & Davis, 1987; Sutker, Uddo-Crane, & Allain, 1991). For this study, we used data collected on PTEs ($M = 0.36$, $SD = 0.68$, range: 0–3; 18 right-censored observations), PTSD symptoms ($M = 5.19$, $SD = 5.73$, range: 0–17), and lifetime PTSD diagnosis (26.3% of participants had a lifetime diagnosis). Compared to the controls, the abused/neglected respondents reported more PTEs ($M = 0.46$ vs. $M = 0.24$), $F(1, 1,130) = 30.42$, $p < .001$; more PTSD symptoms ($M = 5.97$ vs. $M = 4.16$), $F(1, 1,130) = 28.34$, $p < .001$; and were more likely to have a PTSD lifetime diagnosis (30.8% vs. 20.3%) $\chi^2 (1, N = 1,132) = 15.82$, $p < .001$.

**Neighborhood characteristics.—**Residential addresses for the participants during the original phase of the study (1967–1971) were geocoded to 1970 census tracts. Ten variables were collected from the 1970 decennial census to measure differences in childhood neighborhood social organization. A factor analysis with varimax rotation was conducted to determine if a smaller number of variables composed of multiple indicators better described the metropolitan area. Poverty and working-class measures were highly correlated and loaded high on the first factor we extracted, which we labeled "disadvantage," eigenvalue = 5.72 (factor loading in parentheses): percentage of residents in poverty (0.87), percentage of residents receiving public assistance (0.87), percentage of residents employed (0.77), percentage of female-headed households (0.89), percentage of Black residents (0.83), percentage of owner occupied units (–0.60), and percentage of residents working in professional or managerial occupations (–0.42). Poverty thresholds for the 1970s were weighted based on the sex of the head of the household, size of the family, number of related children under 18 years of age, and farm or nonfarm residence. For a family with a male head of household with two children and another adult in the house who were living in a nonfarm residence, the poverty threshold income was $3,937 (USD) per year (U.S. Census Bureau, 2018). The second dimension captured economic affluence and the presence of middle-and upper-middle class neighbors and was labeled "advantage," eigenvalue = 2.05 (factor loading in parentheses): percentage of residents with 4 or more years of college (0.91); percentage of residents working in professional or managerial occupations (0.84), percentage of families with income levels between $25,000 and $49,000 (USD; 0.91), and percentage of families with incomes greater than $50,000 (USD; 0.84). Finally, the third dimension represented stability and homeownership and was labeled "residential stability," eigenvalue = 1.30 (factor loading in parentheses): percentage of residents in same house for past 5 years (0.95) and percentage of owner-occupied units (0.64). These results were consistent with those reported in other studies that have examined the effects of neighborhood structural characteristics (Coulton et al., 2007; Leventhal & Brooks-Gunn, 2000; Sampson et al., 1997).

To represent these three dimensions of neighborhood, we calculated factor regression scores that weighted each variable by the factor loading produced from the procedure. The descriptive statistics for the neighborhood measures were as follows: Disadvantage, $M = .66$, $SD = 1.18$, range: –1.03–4.00; Advantage, $M = –0.33$, $SD = 0.49$, range: –0.96––4.01; and Residential Stability, $M = –0.14$, $SD = .94$, range: –4.09–2.77.

**Childhood maltreatment.—**Information about childhood maltreatment was obtained from the files of the juvenile (family) and adult criminal courts. The maltreatment variable was coded dichotomously with 0 (control) or 1 (abuse and/or neglect); 57.3% of participants were in the abuse/neglect group. Of the 649 maltreated individuals, the records indicated that 67 (10.3%) had experienced multiple types of maltreatment.

**Control variables.—**Other measures were included as control variables because they were identified in prior research as important risk factors (Widom, 1999). Socioeconomic and family background measures were collected as part of the follow-up interview. Control variables included sex (0 = male and 1= female; 49.5% women), minority (0 = White, non-Hispanic and 1 = non-White including Black, Hispanic, or other; 39.7% minority), age at time of interview that assessed PTSD ($M$ = 29.23 years, $SD$ = 3.84, range: 18.95–40.71 years), welfare in childhood (0 = no and 1 = yes; 49.3% received welfare), parents' criminal history (0 = no history and 1 = history; 45.3% had a history), parents' drug/alcohol history (0 = no history and 1= history; 49.7% had a history), and being from a large family with five or more children (0 = no and 1 = *yes*; 57.4% were from a big family).

### Data Analysis

Data were analyzed using STATA (Version 14.2; StataCorp, 2015). Our hypotheses were tested using the generalized linear model (GLM) procedure with maximum likelihood estimation and clustered robust standard errors in order to correct for the clustering of cases within census tracts. The PTSD diagnosis models were tested using the binominal distribution and logit link functions. The PTSD symptom models were tested using the Gaussian distribution and identity link functions. Because the number of PTEs was capped at three events, Tobit regression models with right-censoring were used to evaluate the hypotheses regarding multiple traumatic events. All models included controls for sex, race, age, parents' criminal and substance abuse history, receipt of welfare in childhood, and being a member of a family with four or more siblings. The analyses of multiple types of abuse were restricted to the maltreated respondents only. The data were screened for problems using the procedures outlines by Tabachnick and Fidell (2013, pp. 61–91). Bivariate associations were examined, paying particular attention to potential nonlinear associations between neighborhood measures and PTSD symptoms. Regarding the neighborhood and control variables, the strongest bivariate correlation was between race and neighborhood disadvantage, $r(1,130)$ = .62, $p$ < .001. The second strongest correlation was between race and neighborhood advantage, $r(1,130)$ = .30, $p$ < .001. Although these findings appear contradictory, they were the result of the matching process in a community area that was highly racially segregated. None of the bivariate correlations exceeded the .70 level (Tabachnick & Fidell, 2013; p. 90). No problems were found, and no cases were excluded.

### Results

The first step in the analysis was to estimate the main effects for child maltreatment and neighborhood characteristics on PTSD symptoms and PTSD lifetime diagnosis. The results indicated that abused and neglected individuals reported more PTSD symptoms than nonmaltreated respondents, $B$ = 1.27, $SE$ = 0.37, $p$ = .001; and were at a greater risk for a

lifetime PTSD diagnosis, odds ratio (*OR*) = 1.45, 95% CI [1.06, 1.99], *p* = .019. The main effects for the neighborhood factors on lifetime diagnosis were not significant: Disadvantage, *OR* = 1.04, 95% CI [0.87, 1.24], *p* = .699; Advantage, *OR* = 0.88, 95% CI [0.64, 1.22], *p* = .455; and Residential Stability, *OR* = 0.99, 95% CI [0.87, 1.14], *p* = .924. The main effects for neighborhood disadvantage and residential stability on PTSD symptoms were also not significant: disadvantage, *B* = 0.13, *SE* = 0.20, *p* = .509; and residential stability, *B* = 0.02, *SE* = 0.16, *p* = .914. The main effect for neighborhood advantage on PTSD symptoms was significant, which indicates that respondents from more advantaged neighborhoods reported fewer symptoms than those from less advantaged areas, *B* = −0.78, *SE* = 0.27, *p* = .004. The pseudo $R^2$ for lifetime diagnosis was .06, $\chi^2(11, N = 1,132) = 103.92$, *p* < .001; and the $R^2$ for symptoms was .09, $F(11, 147) = 12.43$, *p* < .001.

The second step in the analysis was to estimate the two-way interactions between child maltreatment and neighborhood characteristics. The two-way interaction for maltreatment and neighborhood disadvantage on a lifetime PTSD diagnosis was on the border of statistical significance, *OR* = 0.80, 95% CI [0.64, 1.00], *p* = .055. The other two-way interactions were not significant: Maltreatment x Advantage, *OR* = 1.13, 95% CI [0.60, 2.13], *p* = .712; and Maltreatment x Residential Stability, *OR* = 0.77, 95% CI [0.55, 1.07], *p* = .121. Regarding the number of PTSD symptoms, the two-way interaction between maltreatment and advantage was not significant, *B* = −0.50, *SE* = 0.56, *p* = .373. The interaction between maltreatment and residential stability was also not significant, *B* = −0.31, *SE* = 0.39, *p* = .418. However, the interaction between maltreatment and neighborhood disadvantage was significant. The nonsignificant interactions were removed from the models and the final results are presented in Table 1.

The significant interaction for PTSD symptoms is plotted in Figure 1 (whiskers represent 95% confidence intervals). The results suggest nonmaltreated respondents who grew up in neighborhoods with low levels of disadvantage reported significantly fewer symptoms than maltreated respondents who grew up in highly disadvantage areas. However, nonmaltreated individuals (controls) who grew up in more disadvantaged communities reported a similar number of PTSD symptoms as abused and neglected individuals. The findings indicate that the number of symptoms between the two groups becomes similar around about the mean plus one-half standard deviation of disadvantage. The main effect for neighborhood advantage was still significant, which indicates that growing up in neighborhoods with more middle-class and affluent neighbors was associated with fewer symptoms for both maltreated and nonmaltreated respondents. The $R^2$ for the symptoms model was .09, $F(12, 147) = 12.34$, *p* < .001.

Regarding a lifetime PTSD diagnosis, the two-way interaction between child maltreatment and neighborhood disadvantage was nonsignificant (see Figure 2). The main effect for neighborhood disadvantage was also nonsignificant. The pseudo $R^2$ for the lifetime diagnosis model was .07, $\chi^2(12, N = 1,132) = 102.96$, *p* < .001.

The next step was to examine the effects of neighborhood characteristics on PTEs. Childhood maltreatment was significantly associated with the number of PTEs, *B* = 0.16, *SE* = 0.04, *p* < .001, pseudo $R^2$ = .04, $\chi^2(11, N = 1,132) = 107.35$, *p* < .001. None of the

neighborhood characteristics were associated with the number of PTEs: disadvantage, $B = -0.01$, $SE = 0.03$, $p = .632$; advantage, $B = -0.04$, $SE = 0.03$, $p = .212$; and residential stability, $B = -0.01$, $SE = 0.02$, $p = .788$. Similar to the results presented in Table 1, neighborhood advantage, $B = -0.51$, $SE = 0.17$, $p = .003$; and the interaction between maltreatment and neighborhood disadvantage, $B = -0.37$, $SE = 0.18$, $p = .036$, were still associated with PTSD symptoms even after accounting for the number of PTEs, $B = 6.31$, $SE = 0.24$, $p < .001$, $R^2 = .60$, $F(13, 147) = 99.43$, $p < .001$. The two-way interactions between maltreatment and neighborhood characteristics on PTEs were also examined. None of the interactions were significant: Maltreatment x Disadvantage, $B = -0.04$, $SE = 0.03$, $p = .215$; Maltreatment x Advantage, $B = -0.11$, $SE = 0.08$, $p = .193$; and Maltreatment x Residential Stability, $B = -0.07$, $SE = 0.05$, $p = .174$.

The final step in the analyses was to examine the association between neighborhood factors and the characteristics of victims of child maltreatment. These analyses were restricted to the sample of maltreated respondents ($n = 649$). Consistent with what has been reported in the literature, victims of multiple types of maltreatment reported more PTSD symptoms, $B = 2.19$, $SE = 0.63$, $p = .001$, than those who experienced only one type of abuse or neglect, $R^2 = .11$, $F(11, 122) = 9.35$, $p < .001$. However, they were not at a greater risk for the development of a lifetime PTSD diagnosis, $OR = 1.47$, 95% CI [0.84, 2.56], $p = .174$, pseudo $R^2 = .06$, $\chi^2(10, N = 649) = 41.85$, $p < .001$, compared to those who only experienced one type of child abuse or neglect. None of the neighborhood factors were associated with the measure of multiple types of abuse: disadvantage, $OR = 0.66$, 95% CI [0.38, 1.14], $p = .134$; advantage, $OR = 0.80$, 95% CI [0.39, 1.66], $p = .556$; and residential stability, $OR = 0.82$, 95% CI [0.49, 1.38], $p = .458$, pseudo $R^2 = .11$, $\chi^2(10, N = 649) = 45.87$, $p < .001$.

## Discussion

In this study, we examined the extent to which childhood neighborhood influences the development of PTSD in individuals with documented cases of childhood abuse and neglect and matched controls followed into adulthood. The results generally supported the hypothesis that characteristics of one's residential environment in childhood, especially factors that reflect social and economic advantage and disadvantage, have an influence on mental health functioning later in life. We found that growing up in areas of neighborhood advantage with more middle- and upper-class neighbors was related to fewer PTSD symptoms, and the impact of neighborhood advantage was similar for both the abuse/neglect and control groups. The model indicates that growing up in highly affluent areas (i.e., at the maximum value of advantage) is associated with 66% fewer symptoms compared to growing up in nonaffluent areas (i.e., at the minimum value of advantage). It is noteworthy that the buffering effect of neighborhood advantage continued to be significant even after we accounted for the number of PTEs individuals reported having experienced.

These findings highlight the importance of neighborhood affluence on PTSD outcomes, independent of neighborhood disadvantage. Instead of relying on the theoretical mechanisms of relative deprivation or social contagion, the affluence perspective emphasizes the importance of middle- and upper-class neighbors and their relationship to resources that can

be mobilized on behalf of residents, such as social support, access to quality services, and the management of hazards and psychosocial processes (Browning & Cagney, 2002; Kawachi & Berkman, 2000; Wilson, 1987). Neighborhood affluence reduced the likelihood that these adverse childhood experiences had lasting negative effects on mental health functioning.

Turning to neighborhood disadvantage, our findings suggest that growing up in impoverished, socially disorganized areas was associated with the development of more PTSD symptoms, but only for the nonmaltreated control group. Neighborhood disadvantage was not associated with more symptoms for victims of child maltreatment. These findings suggest that both childhood victimization and neighborhood disadvantage are risk factors for developing PTSD symptoms, but neighborhood disadvantage is not a risk factor over-and-above being victimized in childhood. The interaction between child maltreatment and disadvantage was not significant for the number of PTEs, which suggests that the increased risk for PTSD symptoms for nonmaltreated respondents was not a function of having experienced more PTEs.

Our findings did not support the hypothesis that neighborhood characteristics are associated with the number of PTEs. Although child maltreatment was associated with a higher number of PTEs, and a higher number of PTEs was associated with more PTSD symptoms, none of the neighborhood factors—disadvantage, advantage, or residential stability—were associated with the number of PTEs. One possible explanation may be that where an individual lives in childhood is less important in terms of PTE risk than where he or she lives in adolescence or adulthood. In general, young children spend less time in the community compared to adolescents or adults, and, as such, they may be less likely to experience a PTE, especially an event that is associated with the environmental context. Furthermore, parents may shield their young children from neighborhood PTEs; for example, they might send their children to stay with a relative when faced with a natural disaster. In more dangerous communities, parents may limit their children's outdoor activities and more closely regulate who is in their child's play group (Furstenberg, Cook, Eccles, Elder, & Sameroff, 1999).

Finally, the results did not support the hypothesis that neighborhood context was related to multiple types of maltreatment. Experiencing multiple types of abuse increased the risk for more PTSD symptoms. However, none of the neighborhood factors were related to the multiple types of abuse indicator. Consistent with the results discussed earlier, the idea that neighborhood characteristics are related to PTSD by way of "increased risks" was not supported in this study.

As with all research, this study was not without limitations. We relied on the DIS-III-R to assess PTSD. Although it was widely used at the time the data was collected, some researchers have criticized the DIS-III-R for underestimating the prevalence of lifetime diagnoses (Kulka et al., 1991). However, in the case of the present sample, the PTSD diagnosis rates were quite high (26.5% had a lifetime diagnosis). Low sensitivity would only bias the hypothesis tests if it was related to neighborhood characteristics. However, we are unaware of any evidence of this type of misclassification. In 2013, the APA revised the PTSD diagnosis criteria by adding a new subtype for children aged 6 years and under, and it

also narrowed the number of PTEs and added symptoms (APA, 2013). Thus, these results from this study may not generalize to other samples that use criteria from the fifth edition of the *DSM* for diagnosing PTSD.

Because the cases of maltreatment were drawn from official records, they most likely represented extreme forms of abuse and neglect; therefore, the findings from this study may not be generalizable to less severe incidents or circumstances in which the victimization was not reported to authorities or substantiated by officials. Research has suggested that there is a stronger association between child maltreatment and PTSD for substantiated cases compared to self-reported measures of abuse and neglect (Scott et al., 2010). In general, individuals with indicators of lower socioeconomic status are more likely to be represented in official cases of maltreatment. The results from this study may not generalize to victims of childhood maltreatment from middle- or upper-class families. Finally, the findings of this study represent the experiences of young children (under the age of 11 years at the time of the abuse and/or neglect) from the Midwestern part of the United States who grew up in the late 1960s and early 1970s. Our conclusions may not generalize to individuals who were abused or neglected in adolescence, victimized during another period in history, or grew up in another part of the country.

Despite these limitations, this study adds to the growing body of literature that has documented the association between neighborhood economic and social characteristics and PTSD outcomes. Few studies have examined the effect of neighborhood context on PTSD and even fewer have examined how the residential environment affects PTSD for victims of childhood maltreatment. The present results are based on a strong prospective longitudinal study design. Scholars should continue to examine the pathways through which neighborhood characteristics influence the development of PTSD. Our findings suggest that the buffering effects of middle- and upper-class neighbors and the pretrauma vulnerabilities of socioeconomic disadvantage are important avenues for future research. Better understanding these pathways can help in designing programs that are more effective in reducing the likelihood that PTSD symptoms develop after a critical event and managing PTSD symptoms after they occur.

More research is needed to elucidate the pathways by which socioeconomic heterogeneity among neighbors affects the development of PTSD symptoms. One possible avenue for future research is the cumulative effect of social support. In a meta-analysis, Ozer et al. (2003) found that the association between social support and PTSD was stronger in studies in which there was more time between the PTE and the assessment of symptoms. The authors suggested that social support may be more important after PTSD symptoms have already developed and may accumulate over time. In line with these findings, affluent neighborhoods may have resources that are better at identifying residents suffering from PTSD symptoms and mobilizing effective social support services.

Another possible avenue for future exploration is the association between neighborhood disadvantage and pretrauma vulnerabilities. There is a growing body of research that connects neighborhood physical disorder to negative mental health outcomes, including depression and PTSD (Gapen et al., 2011; Johns et al., 2012; Monson et al., 2016; Ross &

Mirowsky, 1999). In theory, the physical disorder caused by neighborhood disadvantage may increase the likelihood an individual will develop PTSD symptoms, by affecting his or her pretrauma vulnerabilities, including physiological arousal related to fear and mistrust, feelings of helplessness, and depressed mood (Gapen et al., 2011).

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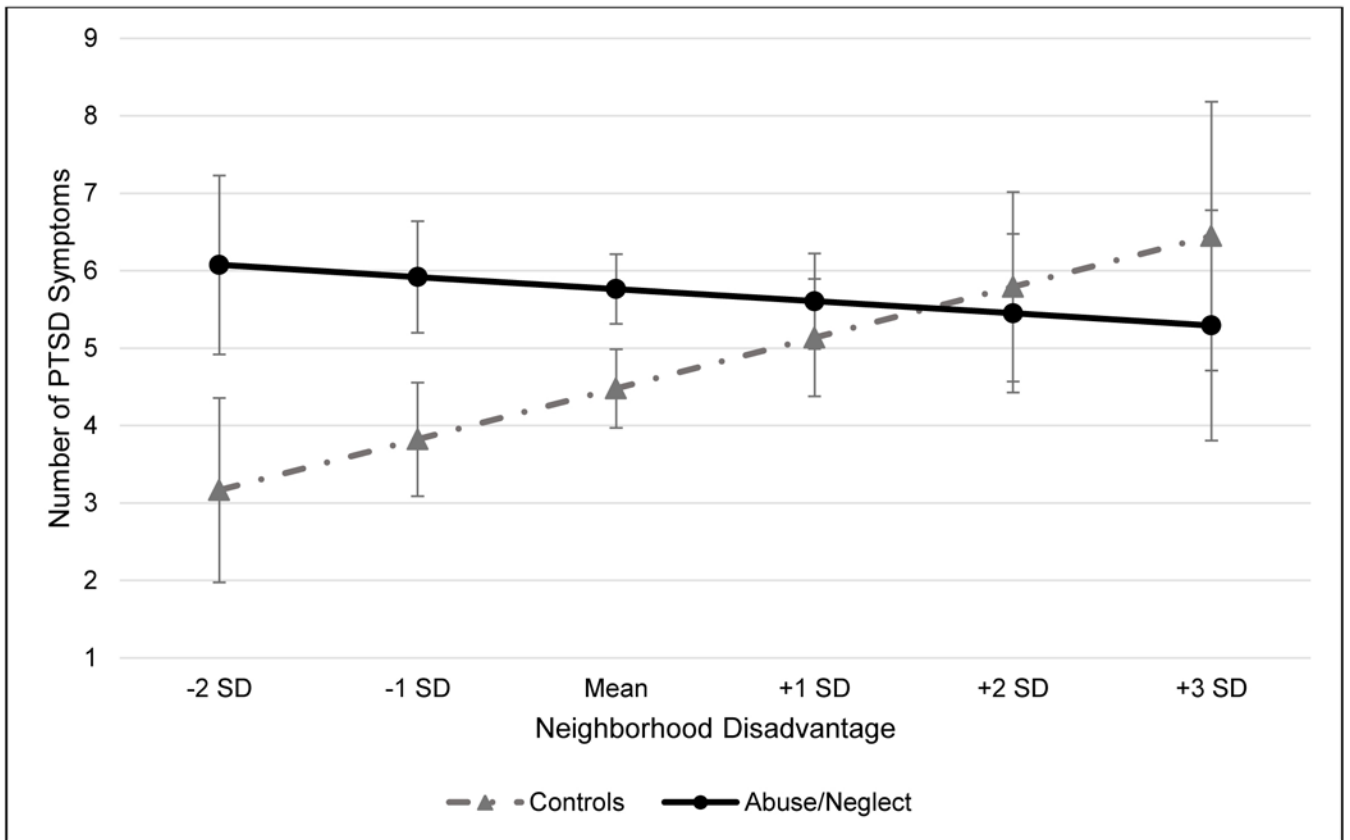
**Figure 1.**
Predicted marginal means with 95% confidence intervals for abused/neglected and control
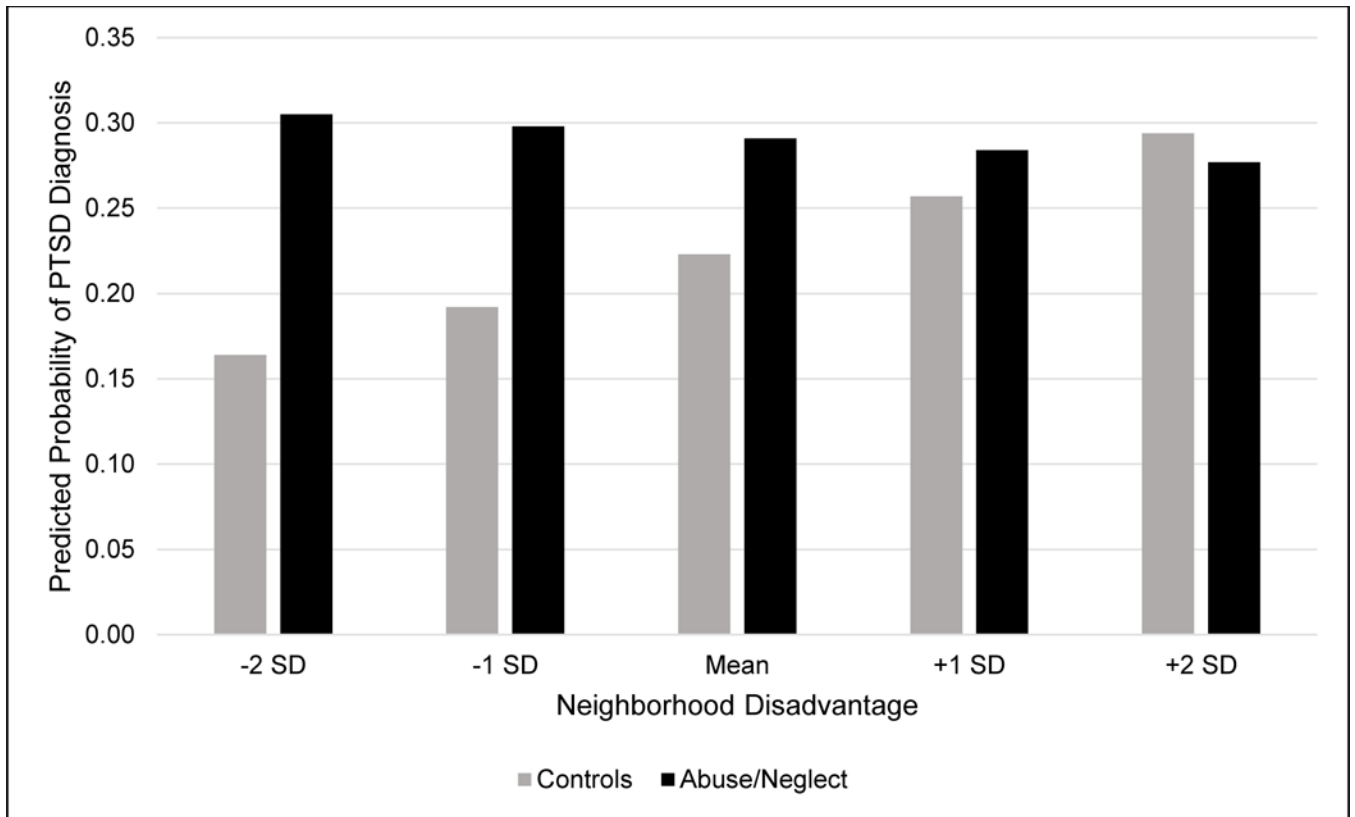respondents. PTSD = posttraumatic stress disorder.

**Figure 2.**
Predicted probabilities for a lifetime posttraumatic stress disorder (PTSD) diagnosis for abused/neglected and control respondents.

**Table 1**

Generalized Linear Modeling Results for Lifetime Posttraumatic Stress Disorder (PTSD) Diagnosis and Number of PTSD Symptoms

| Variable | PTSD Lifetime Diagnosis | | PTSD Symptoms | |
|---|---|---|---|---|
| | *OR* | 95% CI | *B* | *SE* |
| Maltreatment | 1.67 | [1.16, 2.41]** | 1.74*** | 0.39 |
| Sex | 2.56 | [1.98, 3.32]*** | 1.93*** | 0.28 |
| Non-White | 0.87 | [0.59, 1.30] | −0.27 | 0.49 |
| Age at interview | 1.01 | [0.97, 1.05] | 0.08 | 0.04 |
| Parents' criminal history | 1.56 | [1.25, 1.95]*** | 1.16*** | 0.31 |
| Parents' drug/alcohol history | 1.24 | [0.88, 1.74] | 0.92* | 0.39 |
| Welfare as a child | 1.15 | [0.87, 1.52] | 0.14 | 0.32 |
| Large family | 1.11 | [0.83, 1.49] | −0.15 | 0.33 |
| Neighborhood disadvantage | 1.18 | [0.93, 1.50] | 0.56* | 0.24 |
| Neighborhood advantage | 0.89 | [0.65, 1.22] | −0.75** | 0.26 |
| Neighborhood residential stability | 1.00 | [0.87, 1.14] | 0.03 | 0.15 |
| Maltreatment x Neighborhood Disadvantage | 0.82 | [0.66, 1.02] | −0.69** | 0.24 |

*Note.* $N = 1,132$. Robust standard errors adjusted for 148 census tracts are reported.

*
$p < .05$.

**
$p < .01$.

***
$p < .001$.