*Journal of Pediatric Psychology*, 41(9), 2016, 952–960
doi: 10.1093/jpepsy/jsw012
Advance Access Publication Date: 19 March 2016
Original Research Article

OXFORD

# Neighborhood Stress, Depressive Symptoms, and Asthma Morbidity in Youth

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Received July 22, 2015; revisions received January 27, 2016; accepted February 5, 2016

## Abstract

**Objective** Living in a dangerous and disadvantaged neighborhood is consistently linked with poor health outcomes; however, few studies have investigated psychosocial mechanisms of this relationship. We hypothesized that a specific facet of depression—anhedonia—would partially explain the relationship between stressful neighborhoods and poor health in youth with asthma. **Method** 156 youths provided reports on their depressive symptoms, daily asthma symptoms, and peak expiratory flow rate (PEFR). Caregivers provided reports on neighborhood characteristics. **Results** Youth residing in more at-risk neighborhoods experienced more symptoms of depression, greater asthma symptoms (both during the day and night), and marginally lower PEFR. Indirect effect analyses revealed that the relationship between neighborhood stress and youth asthma symptoms was partially explained by a key symptom of depression, anhedonia. **Conclusions** These findings suggest that the neighborhood-health link is partially explained by symptoms of depression tapping into difficulties experiencing pleasure and motivation.

**Key words**: asthma; depression; health; neighborhoods; stress.

Research has consistently linked living in a dangerous and disadvantaged neighborhood with a number of poor health outcomes, including poor self-rated health (Santos, Chor, Werneck, & Coutinho, 2007), greater obesity (Chaix et al., 2008), diabetes (Cox, Boyle, Davey, Feng, & Morris, 2007), and increased mortality (Haan, Kaplan, & Camacho, 1987). Health disparities across neighborhoods have been explained in terms of the physical and social disadvantages typical of poor neighborhoods, including limited access to medical care, higher exposure to hazardous toxicants and pollutants, exposure to violence, and impoverished social capital (Ewart & Suchday, 2002). Social and physical neighborhood characteristics not only impact health outcomes directly (e.g., air pollution), but also indirectly by influencing an individual's health behaviors and psychological functioning. However, despite the recent calls for the evaluation of psychosocial factors that may broaden the understanding of the relationship between neighborhoods and health, few studies have investigated psychosocial mechanisms that might explain the neighborhood–health link (Chen & Miller, 2013). The present study seeks to build on the proposed theories pointing to links between stressful neighborhoods and poor health to further clarify the relationship between disadvantaged neighborhoods and youth health—specifically asthma symptoms—and identify specific facets of depression that may explain this this relationship.

As a complex chronic illness resulting from the interaction of genetic and environmental factors, asthma provides an ideal context to explore the neighborhood–health relationship (Wood et al., 2006). Asthma is characterized by inflammation and hyperresponsiveness of the airways and currently affects over 10 million youth (Akinbami, 2006).

Disadvantaged neighborhoods found in sections of large American cities such as Detroit—where the current study was conducted—are at especially high risk for asthma morbidity and mortality (Center for Disease Control and Prevention, 2011; Division for Vital Records and Health Statistics, 2007). Neighborhood characteristics, such as greater exposure to violence or experiencing violence, air pollution, and living in a lower socio-demographic community, have been implicated in increased asthma symptoms (for review see Chen, Schreier, & Chan, 2012). Overall, there is strong support for a link between neighborhood and environmental characteristics and asthma morbidity.

Depression is a key affective state that researchers have linked with lower socio-demographic neighborhoods and stressful family environments (Mair, Roux, & Galea, 2008). Depression is characterized by clinically significant emotional distress expressed by sadness and/or anhedonia accompanied by functional deficits (e.g., interpersonal difficulties, isolation) and somatic complaints (e.g., fatigue, sleep disturbance). A clear link exists between symptoms of depression and asthma, such that youth with asthma are at a twofold greater risk for developing an anxiety or depressive disorder than otherwise healthy youth (Katon et al., 2007). Additionally, depressive symptoms in youth with asthma have been associated with greater asthma symptoms (Richardson et al., 2006).

A meta-analysis pointed to a modest effect that diminishes overtime for psychotherapy interventions targeting depression in physically healthy (Weisz, McCarty, & Valeri, 2006). However, children with chronic illnesses, such as asthma, are often excluded from these trials owing to the complexity of their presentation, and research with medically complex youth with depression has demonstrated inconsistent effects of antidepressant medications or psychotherapy (Shemesh, Bartell, & Newcorn, 2002). By highlighting the relationship between neighborhood stress, depressive symptoms, and physical health, the current study intends to inform interventions that would include broad ecological factors with potentially lasting effects on mood and health of youth with a chronic illness. Further, most studies investigating depressive symptoms in relation to neighborhoods or asthma use a total score of depressive symptoms or categorize individuals as either depressed or not, overlooking the unique contribution of specific facets of the multidimensional construct of depression, such as negative mood, anhedonia, interpersonal challenges, and negative self-esteem (Mair et al., 2008; Matheson et al., 2006). Thus, an approach that examines these unique features of depression may provide more insight into the relationship between neighborhoods and depression.

The neighborhood in which an individual resides shapes one's daily interactions and experiences with the social world, with implications for the different facets of depression. Motivational deficits and lack of responsiveness to pleasurable stimuli are fundamental features of anhedonia (Cook, Spring, McChargue, & Doran, 2010). We propose that anhedonia may play a unique role in the relationship between neighborhoods and health such that individuals living in impoverished or disadvantaged neighborhoods may be less motivated to engage in their environment because of to a lack of pleasure or interest in opportunities available to them, thus influencing their health. Research has pointed to anhedonia—a core feature of Major Depression Disorder—as a prevalent challenging symptom to treat that can exist outside of depressive episodes, an indicator of poor treatment adherence, and symptom with poorly understood neurobiological mechanisms (American Psychiatric Association, 2000; Spijker, Bijl, De Graaf, & Nolen, 2001; Treadway & Zald, 2011). Despite the motivational deficits underlying the symptom of anhedonia, it remains unexplored as an avenue through which disadvantaged neighborhoods influence health. Alternatively, individuals living in impoverished or disadvantaged neighborhoods have limited opportunities to form and cultivate responsive social networks, therefore lacking chances to experience the positive effects on mental health associated with social support (Chen & Miller, 2013; Cohen, 2004). It is possible that lack of, or poor, interpersonal relationships also has powerful effects on the neighborhood–health relationship. Additionally, given the research identifying psychosocial factors (e.g., family relationships) and biological processes (e.g., autonomic dysregulation) as mediators of the relationship between stress and asthma morbidity (Chen, Chim, Strunk, & Miller, 2007; Wood et al., 2006), this work aims to build on the current literature by understanding the unique contributions of symptoms of depression to the neighborhood–asthma link. No studies to the authors' knowledge have investigated whether specific symptoms of depression may be an indirect pathway through which risky neighborhoods are associated with youth asthma morbidity.

Thus, the goal of the current study was to investigate whether dangerous and stressful neighborhoods are associated with greater asthma morbidity in youth, and further, to determine whether symptoms of depression provide a mechanistic explanation of the associations between disadvantaged neighborhoods and greater asthma morbidity. We expected that greater neighborhood stress would be linked with greater asthma morbidity. We also expected to find an indirect effect of stressful neighborhoods on asthma morbidity via depressive symptoms, specifically those depressive symptoms addressing motivation and

difficulties experiencing pleasure (e.g., anhedonia) and potentially interpersonal problems.

## Method

### Participants

Youth and their primary caregivers were recruited through the Allergy, Immunology, and Rheumatology Clinic at Children's Hospital of Michigan, Grosse Pointe Allergy & Asthma Center, and Metro-Detroit area schools. A total of 596 primary caregivers were screened as part of the current study with 355 meeting the inclusion criteria. Of those meeting inclusion criteria, 196 youth and their primary caregivers consented and enrolled to be part of the current study. Due to missing data (described below) and attrition following consent, 156 children and adolescents aged 10–17 years with asthma and their primary caregivers took part in the study as part of the Asthma in the Lives of Families Today (ALOFT) project (see Table I for sample demographics).[1] Primary caregivers included 144 mothers, 8 fathers, 3 grandmothers, and 1 aunt. Families were informed that the purpose of the study was to better understand the relationship between family life and asthma. Families were eligible for the study if the youth was aged 10–17 years with a diagnosis of mild intermittent to severe persistent asthma as confirmed by their medical records. Families were excluded if the participating youth was currently using oral steroid medication(s), diagnosed with a chronic condition other than asthma (e.g., endocrine disorders, immunodeficiency, and cardiovascular disease), or diagnosed with a medical condition that may interfere with immune system function (e.g., pregnancy, chemotherapy, or radiotherapy in the past year) at the time of consent. Written assent and consent were obtained from the participating youth and their caregiver(s), respectively.

### Procedure

The participating youth and caregiver visited the laboratory, where they completed a number of questionnaires (including neighborhood stress and symptoms of depression) on a laboratory computer and individual interviews. Youth and caregivers were provided with detailed instructions on how to complete daily diaries, use a peak flow meter, and document peak flow values. Youth then completed 4 days of daily diaries, which included daily ratings of asthma symptoms from the youth participant completed in the morning on waking and in the evening before bed, and peak flow assessments in the morning and evening. Youth and caregivers were compensated for their time. The project was approved by the Wayne State University institutional review board.

### Measures

#### Neighborhood Stress

The City Stress Inventory (CSI; Ewart &, Suchday, 2002) was used to assess perceived neighborhood stress and exposure to violence. The CSI is an 18-item self-report questionnaire assessing the stress experienced as a function of physical and social environment characteristics unique to city living ($M = 1.57$, $SD = 0.50$, $\alpha = .90$). Youth caregivers responded to items on a 4-point scale with greater numbers indicating greater neighborhood stress. The CSI also assesses the number of neighbors that receive financial assistance and the number of vacant homes or buildings in the neighborhood. CSI scores have demonstrated adequate reliability across a year testing period ($r = .82$) and have been linked with census indices of social disadvantage, including neighborhood income, unemployment rates, and education levels (Ewart & Suchday, 2002).

#### Youth Depressive Symptoms

Youth depressive symptoms were assessed via the Children's Depression Inventory (CDI; Kovacs, 1984). The CDI is a 27-item self-rated assessment of depressive symptoms with well-documented reliability and validity in children and adolescents (Finch, Saylor, & Edwards, 1985; Saylor, Finch, Spirito, & Bennett, 1984). Items are rated on a 0–2 scale, with greater scores indicating a greater presence of the symptom of depression. The five-factor structure proposed by Kovacs (1992) was used in the present study where individual items within the five factors where summed: negative mood ($M = 2.08$, $SD = 2.10$, $\alpha = .70$), interpersonal problems ($M = 0.88$, $SD = 1.34$, $\alpha = .70$), ineffectiveness ($M = 1.51$, $SD = 1.61$, $\alpha = .61$), anhedonia ($M = 3.05$, $SD = 2.85$, $\alpha = .75$), and negative self-esteem ($M = 1.11$, $SD = 1.50$, $\alpha = .72$).

#### Asthma-Related Health

Youth asthma-related health was assessed via daily diary reports of asthma symptoms completed in the morning after awakening and in the evening before bed, as well as via peak expiratory flow rate (PEFR) assessments.

*Asthma Symptoms*. In the diary report completed on waking, youth were asked to rate individual asthma symptoms experienced that night, including wheezing, chest pain, chest tightness, and shortness of breath, and an overall item regarding asthma control that night on a 5-point scale with high scores indicating

1 Results reported in other papers from the ALOFT study use the pilot sample and do not overlap with the present analyses (Imami et al., 2015; Tobin et al., 2015a, 2015b). These papers investigate the effects of family conflict, socioeconomic status, and maternal responsiveness on daily behaviors, daily affect, and health among youth with asthma.

**Table I.** Descriptive Statistics for Study Sample (n = 156)

| Variable | *M* or % | SEM | *SD* |
|---|---|---|---|
| Female | 39.7% | – | – |
| Non-White | 78.9% | – | – |
| Black | 76.9% | – | – |
| White | 21.2% | – | – |
| Asian Indian | 0.6% | – | – |
| Mulitracial | 1.3% | – | – |
| Parental education: some college (at least 1 year) | 60.3% | – | – |
| Medication | 64.1% | – | – |
| Beta-agonist | 9.6% | – | – |
| Inhaled glucocorticoid | 23.7% | – | – |
| Beta-agonist and inhaled glucocorticoid | 14.1% | – | – |
| Oral corticosteroid | 1.3% | – | – |
| Luekotriene modifying agents | 10.3% | – | – |
| Age | 12.68 | 0.13 | 1.68 |
| Height (cm) | 158.07 | 0.96 | 11.98 |
| CSI neighborhood stress | 1.57 | 0.04 | 0.50 |
| CDI depression | 8.63 | 0.62 | 7.81 |
| CDI negative mood | 2.08 | 0.17 | 2.10 |
| CDI interpersonal problems | 0.88 | 0.11 | 1.34 |
| CDI ineffectiveness | 1.51 | 0.13 | 1.61 |
| CDI anhedonia | 3.05 | 0.23 | 2.85 |
| CDI negative self-esteem | 1.11 | 0.12 | 1.50 |
| Asthma symptoms (day) | 1.34 | 0.03 | 0.36 |
| Asthma symptoms (night) | 1.26 | 0.02 | 0.31 |
| Peak flow | 337.53 | 6.83 | 85.26 |

*Note.* CSI = City Stress Inventory, CDI = Children's Depression Inventory, Percentages for specific medications were based on non-EM imputed data ($N = 122$).

more severe symptoms. All items were averaged across the 4-day sleep diary period ($M = 1.26$, $SD = 0.31$). In the diary report completed before bed, youth were asked to rate asthma symptoms experienced during that day and an overall item regarding asthma control that day on a 5-point scale with high scores indicating more severe symptoms. Items were adapted from a validated interview format for youth participants with asthma (Chen et al., 2007). Items were averaged across the 4-day daily diary period. Symptoms included wheezing, chest pain, chest tightness, and shortness of breath ($M = 1.34$, $SD = 0.36$).

*Peak Expiratory Flow Rate.* PEFR assessments were provided by the youth participants. Participants were given a small, portable device called a peak flow meter (AsthmaCheck, Respironics), instructed how to use it and document their values in the morning on waking and at night before bed during the daily diary period. They were also provided with a handout describing step-by-step instructions on how to use the device. PEFR was measured by inhaling as deeply as possible then exhaling as hard and fast as possible. Participants with at least 1 day of PEFR values were included in the current analyses. For each morning and evening assessment, participants provided three readings in accordance with the American Thoracic Society guidelines (1995). The highest (i.e., "best") of these readings at each time point was used in the analyses. The morning and night PEFR were highly correlated ($r = .91$, $p < .001$). As research has pointed to higher PEFR in the afternoon/evening hours, night PEFR values were used in the current analyses (Smyth, Stone, Hurewitz, & Kaell, 1999) and averaged across the 4 days ($M = 337.53$, $SD = 85.26$).

### Covariates

Age, gender, height, ethnicity of the youth participants, parental education, and medication use were assessed as potential covariates. Medication use was assessed via self-report across the 4-day daily diary period. Responses were coded 1 for youth who reported beta-agonist, inhaled corticosteroid, oral corticosteroid, and/or luekotriene modifying agent use during the 4-day period, and 0 if these medications were not reported. Covariates were included in the present analyses based on prior theory and empirical work, as well as if they correlated ($p < .10$) with the outcome variables in this study (Hernan, Hernandez-Diaz, Werler, & Mitchell, 2002).

## Statistical Analyses

Participants with missing values on all the CDI scales were excluded, leaving a total sample size of 156 individuals (39.7% females) of the initial 196 youth enrolled in the study (41.8% females). This approach reduced the amount of missing data from 13.40% to

5.2%. No differences between excluded subsample and the sample used in the analyses emerged in any demographic variables (lowest $p = .135$). Given the small portion of missing values and the fact that our data were missing completely at random (Little's MCAR test, $\chi^2(370) = 362.066$, $p = .61$), we used the expectation maximization (EM) algorithm to replace missing values for the 156 participants in our subsample. EM provides unbiased parameter estimates, reduces the bias associated with pairwise or listwise deletion of missing data, and improves statistical power of analyses (Enders, 2001; Scheffer, 2002). All variables with missing data were continuous except for medication and education. Because the EM algorithm does not allow value replacement for categorical data, mode replacement was used to replace missing values on these two variables. The presented means and standard deviations of study variables in Table I reflect the values after the EM replacement. Additionally, the distribution of residuals was strongly skewed for analyses including night asthma symptoms. The winsorization of three observations associated with large standardized residuals significantly reduced skewness for analyses with night symptoms only. Unless otherwise specified, all results were the same with regular or winsorized outliers.

Bivariate correlations were conducted to examine the relationships among study variables. Indirect effect analyses using a bootstrapping approach with 20,000 iterations (Preacher & Hayes, 2008) were run to test whether anhedonia and interpersonal problems mediated the hypothesized link between neighborhood stress and asthma symptomatology. To facilitate interpretation, all continuous predictors and potential covariates were standardized, while dichotomous variables were coded as 0 and 1 (i.e., 0 = less than at least 1 year of college, 1 = 1 year of college or more). In each model, covariates that correlated with the outcome variables were included ($p < .10$).

## Results

Increased neighborhood stress was significantly related to experiences with anhedonia ($r = .20$, $p = .01$), marginally with interpersonal problems ($r = .14$, $p = .07$) as well as greater night asthma symptoms ($r = .24$, $p < .01$), daily asthma symptoms ($r = .16$, $p = .04$), and marginally lower PEFR ($r = -.15$, $p = .06$). The total depression symptoms score from the CDI was significantly related to greater daily asthma symptoms ($r = .31$, $p < .01$) and night asthma symptoms ($r = .25$, $p < .01$), but not PEFR ($r = -.09$, $p = .24$).

First, we tested whether neighborhood stress assessed was indirectly associated with asthma-related health via total depressive symptoms from the CDI (Table II). Analyses predicting daily asthma symptoms were run controlling for age, gender, and height. Bootstrap analyses revealed no significant indirect effects of CSI on daily asthma symptoms via total depressive symptoms (95% CI: −0.0007, 0.0374). Similarly, analyses predicting night asthma symptoms, which were run controlling for ethnicity, revealed no indirect effect of total depressive symptoms (95% CI: −0.0028, 0.0255) on the link between CSI and night asthma symptoms. Finally, we tested whether total depressive symptoms mediated the link between CSI and evening PEFR. Analyses involving PEFR were run controlling for age, height, and ethnicity. Bootstrap analyses revealed no significant indirect effects of CSI on evening PEFR via total depressive symptoms (95% CI: −4.3821, 0.0681).

Next, we investigated indirect effect models for anhedonia and interpersonal problems, subscales of the CDI, and their effect on the relationship between the CSI and asthma-related health (Table II). Anhedonia and interpersonal problems were both entered as predictors to explain the CSI and asthma-related health link. There was a significant total indirect effect of CSI on daily reported asthma symptoms via anhedonia and interpersonal problems (95% CI: 0.0051, 0.0527). When inspecting the individual effects, anhedonia demonstrated a significant effect (95% CI: 0.0046, 0.0549), whereas interpersonal problems did not (95% CI: −0.0080, 0.0163). A similar pattern was found when investigating the effect of the subscales on CSI and night asthma symptoms. There was a total indirect effect CSI on night asthma symptoms of anhedonia and interpersonal problems (95% CI: 0.0006, 0.0324); when examining the individual mediators, anhedonia (95% CI: 0.0009, 0.0335) and not interpersonal problems (95% CI: −0.0046, 0.0143), was significant. Neither anhedonia (95% CI: −5.1043, 0.4930) nor interpersonal problems (95% CI: −3.3627, 0.4850), individually, served as an indirect link between CSI and PEFR.

## Discussion

The aim of this study was to investigate whether general depressive symptoms—as well as specific facets of depression—would act as psychological mechanisms by which neighborhood stressors exacerbate asthma symptoms among youth. We found that children living in high-stress neighborhoods reported more daily asthma symptoms, greater night asthma symptoms, and lower evening PEFR; however, total symptoms of depression did not significantly influence these relationships. On further examination of the depression subscales, we found that anhedonia uniquely linked greater neighborhood stress with greater daily and night asthma symptoms. Although studies have found

**Table II.** Association of Neighborhood Stress With Asthma-Related Health Mediated by the CDI

| Model 1 | | | | Model 2 | | | |
|---|---|---|---|---|---|---|---|
| | b | SE | 95% CI | | b | SE | 95% CI |
| Daily asthma symptoms | | | | | | | |
| Effect of CSI on daily asthma symptoms through: | | | | Effect of CSI on daily asthma symptoms through: | | | |
| CDI total score | 0.01 | 0.01 | −0.0007, 0.0374 | Interpersonal problems | 0.001 | 0.01 | −0.0080, 0.0163 |
| | | | | Anhedonia | 0.02 | 0.01 | 0.0046, 0.0549 |
| Age | 0.002 | 0.03 | | Age | 0.004 | 0.03 | |
| Height | 0.06 | 0.03 | | Height | 0.06 | 0.03 | |
| Female | 0.14 | 0.05 | | Female | 0.14 | 0.05 | |
| | | | | Total indirect effect | | | 0.0051, 0.0527 |
| Night asthma symptoms | | | | | | | |
| Effect of CSI on night asthma symptoms through: | | | | Effect of CSI on night asthma symptoms through: | | | |
| CDI total score | 0.01 | 0.01 | −0.0028, 0.0255 | Interpersonal problems | 0.001 | 0.004 | −0.0046, 0.0143 |
| | | | | Anhedonia | 0.01 | 0.01 | 0.0009, 0.0335 |
| Ethnicity | 0.05 | 0.06 | | Ethnicity | 0.05 | 0.06 | |
| | | | | Total indirect effect | | | 0.0006, 0.0324 |
| PEFR | | | | | | | |
| Effect of CSI on PEFR through | | | | Effect of CSI on PEFR through | | | |
| CDI total score | −1.33 | 1.04 | −4.3821, 0.0681 | Interpersonal problems | −0.51 | 1.39 | −3.3627, 0.4850 |
| | | | | Anhedonia | −1.51 | 1.37 | −5.1043, 0.4930 |
| Age | 40.14 | 6.67 | | Age | 39.83 | 6.66 | |
| Height | 17.99 | 6.53 | | Height | 18.01 | 6.54 | |
| Non-white | −8.15 | 14.15 | | Non-White | −7.26 | 14.23 | |
| | | | | Total indirect effect | | | −5.9268, 0.0161 |

*Note.* CDI = Children's Depression Inventory; CSI = City Stress Inventory; PEFR = peak expiratory flow rate.

youth self-report measures to be less sensitive to depressive symptoms (Emslie et al., 1997) and despite the small variability in the CDI scores in the current study, these results identified anhedonia, a key symptom of depression, as a link between stressful neighborhoods and poor asthma outcomes.

The current findings contribute to the growing literature regarding environmental factors that are related to asthma morbidity. Previous work has looked at community factors, like exposure to violence and trauma, as key aspects of the social environment that are related to poor asthma outcomes, which also may be contributing to the relationships observed in the current study. Our work, along with that of others (Chen et al., 2007), points to perceived neighborhood violence, safety, and stress as additional neighborhood problems that can have detrimental consequences for asthma symptoms. Chen et al. (2007) identified behavioral pathways (e.g., use of cigarettes and exposure to smoking) as a pathway between neighborhood problems and health; a key advance that this study provides is identifying the unique contribution of psychological factors to the relationship between environment characteristics and asthma morbidity in youth. It is also important to note that the relationships observed in the current study may be bidirectional, such that changes in management of a chronic illness may precede changes in mood.

The most novel contribution of the current work resides in showing that some of the detrimental effects on markers of asthma symptoms associated with residing in a stressful neighborhood can be partially explained by symptoms of depression, specifically anhedonia. Previous work has linked living in impoverished neighborhoods accompanied by social disorder (e.g., delinquency, drug use) with the onset of major depressive disorder (Cutrona et al., 2005). One explanation for this relationship has to do with the lowered sense of safety leading individuals to isolate themselves and withdraw from harmful social activities, such as gang violence or altercations with police, which would jeopardize their immediate physical health. Moreover, youth living in dangerous and impoverished neighborhoods may internalize maladaptive thoughts regarding their community and apply these negative attitudes, beliefs, or assumptions to themselves, reducing pleasure or interest in activities that previously where rewarding.

Alternatively, research has demonstrated that individuals reporting anhedonia display hypo-function within the mesolimbic dopamine system (Heinz, Schmidt, & Reischies, 1994). The mesolimbic dopamine pathway is often linked with rewarding effects of drugs of abuse but also depression-like symptoms in animal models (Nestler & Carlezon, 2006). Given the stability of anhedonia outside of depressive episodes, it is possible that inherent dysfunction within the mesolimbic reward pathway coupled with living in a stressful neighborhood leads to lasting changes within the motivational system (Cook et al., 2010; Hasler, Drevets, Manji, & Charney, 2004). These biopsychosocial aspects of anhedonia and added symptoms of

depression can then influence youth health behaviors and ultimately their physical health as research has consistently identified a relationship between depressive symptoms and poor health behaviors (Allgöwer, Wardle, & Steptoe, 2001; Whooley et al., 2008). For instance, youth experiencing anhedonia may be less motivated to adhere to their medication regimen or be proactive in management of their chronic illness, leading to poor health outcomes.

Although our findings suggest empirical evidence of neighborhood→anhedonia→health links, they do not identify biological processes that may explain these links. Miller and Wood (1997) proposed an autonomic dysregulation model of asthma, which points to emotional states, such as depression, as contributors to autonomic dysregulation found in individuals affected by this chronic disease. For example, airway constriction by vagus nerve innervations has been identified as a key contributor to exacerbations of asthma symptoms associated with powerful emotional states (Wood et al., 2006). Complementary work has demonstrated lower levels of family support linked to greater asthma symptoms and poor pulmonary function via allergic inflammatory pathways (Chen et al., 2007). Future research would benefit from clarifying the contribution of these inflammatory and immune pathways to the neighborhood–health relationship but also the emotion–health link.

As many researchers are proposing multilevel approaches to clarify the contributions of environmental and psychobiological factors on asthma, this method, coupled with the small to modest effects found in the present study, lead to a larger question regarding what type of intervention would best mitigate or prevent such relationships from occurring. Others have proposed neighborhood-level interventions within low-income minority communities aimed at increasing asthma awareness and providing education regarding asthma management. This work demonstrated decreases in acute care needs and improvement in asthma attitudes for youth (Fisher, Strunk, Sussman, Sykes, & Walker, 2004). However, research is needed to determine whether these community-level interventions also improve psychological well-being. Given that recent research has highlighted the potential benefits of antidepressant treatment for both depressive and asthma symptoms in youth and adults with asthma, perhaps a multisystemic approach—including psychotherapy and antidepressants with family and community-based factors—would best suit the physical health and well-being of youth with asthma (Brown et al., 2005). Perhaps strategies like behavioral activation combined with family and community aspects would provide the needed boosts in engagement and motivation. Additional evidence for this hypothesis comes from a randomized control trial pointing to a combination treatment with psychotherapy and antidepressants as superior to either treatment alone in treating youth depressive symptoms (March et al., 2004).

The current study has a number of limitations. The analyses are cross-sectional, which limits the causal inferences that can be made. It is possible that management of a chronic illness is the factor that explains the link between neighborhood stress and depressive symptoms in youth. Although this is a plausible hypothesis, given the multimethod assessment used in the study, depressive symptoms were assessed before the daily diary report of asthma symptoms, giving confidence to the tested model. As the current sample is being followed longitudinally across 3 years, we will be able to assess these associations using a prospective design with multiple assessments of these variables overtime. Additionally, the youth participants were not clinically diagnosed with a mood disorder, and the depressive symptom data used in the present study relies on a self-report measure, which can introduce aspects of bias or lack of insight, particularly when requesting youth participants to report on emotional experiences. However, the current study used a multimethod multi-informant approach that relies not only on the youth report but also includes ratings of neighborhood stress from caregivers, daily reports of asthma symptoms, and an objective measure of asthma symptoms reducing the potential for shared method variance.

In sum, the findings from this study support the idea that neighborhood stress has the potential to influence emotional experiences and physical health in children and adolescents. Our data point to a plausible psychological mechanism regarding the way in which neighborhood characteristics can influence youth health, such that dangerous and stressful neighborhoods, through lack of interest or engagement in the environment, may lead to poor health outcomes. This work helps to provide a more comprehensive understanding of how neighborhood and depressive symptoms influence youth health.

## Acknowledgments

Both E.T.T. and S.Z. contributed equally to this work.

## Funding

This work has been supported by funding from the National Institutes of Health Grant (RO1HL114097) and a Wayne State University Junior Faculty Grant in the Social and Behavioral Sciences. These data come from a larger longitudinal study investigating the effects of family environment on youth health.

*Conflicts of interest*: None declared.

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