

Examining the joint contribution of trauma and adverse neighborhood characteristics to paranoid ideation

Imani A. Todd^{a,*}, Ryan D. Orth^a, Christina L.G. Savage^a, Arianna M. Gard^a,
Melanie E. Bennett^b, Jack J. Blanchard^a

^a Department of Psychology, University of Maryland, College Park, MD 20742, USA

^b Department of Psychiatry, University of Maryland School of Medicine, Baltimore, MD 21201, USA

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ABSTRACT

It has been proposed that paranoid ideation may, in part, be a consequence of experiencing trauma and exposure to adverse environments. However, few studies have examined the joint contribution of these factors to paranoid ideation. Additionally, it is unclear if these associations are unique to paranoid ideation or if these factors are more broadly related to increases in symptomatology. In this study, we examined the association between paranoid ideation and other symptom dimensions with individual-level (i.e., personal trauma) and system-level (i.e., neighborhood) factors in a transdiagnostic sample, including individuals with psychosis spectrum disorders and community participants ($N = 120$). The study benefited from subjective self-report assessments and geocoded administrative metrics of neighborhood characteristics. Regression analyses indicated that trauma and perceptions of neighborhood crime were jointly related to both paranoid ideation and affective symptoms, even after controlling for income and education (accounting for over 33 % and 27 % of the variance in paranoid ideation and 37 % and 22 % of the variance in affective symptoms, respectively). Non-paranoid positive symptoms were also related to trauma, but were not related to neighborhood characteristics. Negative symptoms were unrelated to either trauma or neighborhood crime. These findings point to the need to assess both past trauma and current perceptions of neighborhood contextual factors to better understand and treat symptoms within the psychosis spectrum.

1. Introduction

Paranoid ideation involves the unfounded belief that others intentionally try to cause harm (Freeman, 2007; Freeman et al., 2005b). It is viewed as a dimensional construct that varies in severity and is common in psychosis spectrum disorders (Huppert and Smith, 2005; Taylor and Stopa, 2013). This form of thinking also appears in other clinical conditions (Freeman, 2007) and among community samples (Freeman et al., 2005b). Those with greater paranoid ideation experience significant social impairment (Fett et al., 2022; Hajduk et al., 2019), higher unemployment, and unstable housing (Bhavsar et al., 2014; Vargas et al., 2020). Given its prevalence and clinical impact, it is important to better understand factors contributing to paranoid ideation.

Multiple cognitive and affective factors influence paranoid ideation. Paranoid ideation can develop from threat beliefs that are maintained by cognitive processes, including worry, negative self-beliefs, and reasoning biases (Freeman, 2016; Freeman and Garety, 2014), as well as

social cognitive biases such as hostile attribution bias and reduced perceptions of trustworthiness (Pinkham et al., 2016). In addition to these cognitive factors, negative affect has been consistently linked to paranoid ideation (Ben-Zeev et al., 2011; Hartley et al., 2013; Myin-Germeys and van Os, 2007). A critical issue is determining what factors maintain these cognitive and affective factors. Freeman and Garety (2014) propose that trauma and ongoing stress serve as triggers that cascade into increased negative affect and cognitive biases (also see Howes and Murray, 2014).

In studies examining trauma and psychosis, traumatic life events (TLE) have been defined in various ways, from physical, sexual, emotional, or psychological abuse, neglect, bullying, crime victimization, natural disasters, bad accidents, parental loss, and serious injury or illness (Gibson et al., 2016). In individuals with psychotic disorders, childhood maltreatment and other TLEs, such as bullying, are associated with paranoid ideation (Hardy et al., 2016; Quide et al., 2018; Sloan et al., 2024; Wickham and Bentall, 2016). Loewy et al. (2019) found that

* Corresponding author at: 4094 Campus Dr, College Park, MD 20742, USA.
E-mail address: itodd@umd.edu (I.A. Todd).

in ultra-high-risk (UHR) individuals, more interpersonal traumas were uniquely associated with more severe suspiciousness. Within a longitudinal study, [Farris et al. \(2022\)](#) found that in UHR individuals, at baseline (but not follow-up), trauma history was associated with greater suspiciousness/persecutory ideas. Finally, in non-clinical samples, childhood trauma is associated with more severe paranoid ideation ([Moffa et al., 2017](#); [Quide et al., 2018](#); [Wickham and Bentall, 2016](#)).

One limitation of this literature is that TLEs are often examined in isolation without regard to system-level factors that may also serve as sources of ongoing stress and contribute to psychotic symptoms such as paranoid ideation. Specifically, adverse community characteristics are associated with higher rates of psychosis-spectrum disorders and more severe symptoms ([Anglin et al., 2021](#); [Baranyi et al., 2021](#); [Fusar-Poli et al., 2017](#); [Karcher et al., 2021](#); [Ku et al., 2020](#); [March et al., 2008](#); [Newbury et al., 2018](#); [Werner et al., 2007](#)). Importantly, research indicates that the impact of exposure to adverse neighborhood factors is not merely secondary to individual-level characteristics such as family socio-economic status ([Bhavsar et al., 2014](#); [Newbury et al., 2018](#); [Solmi et al., 2020](#)). There are two facets of the environment to consider in association with paranoid ideation: neighborhood deprivation and crime.

Neighborhood deprivation is multifaceted but broadly reflects a lack of physical, social, and economic resources ([Hyde et al., 2020](#); [Karcher et al., 2021](#); [Taylor et al., 2020](#)) and found to be associated with psychotic disorders and symptoms ([Becares et al., 2018](#); [Hastings et al., 2020](#); [Karcher et al., 2021a](#); [Newbury et al., 2016](#)). In a community survey, [Wickham et al. \(2014\)](#) found that neighborhood deprivation was associated with more severe paranoid ideation but not hallucinations or hypomania. In a community sample, [McElroy et al. \(2019\)](#) found that suspiciousness served as a crucial link between the neighborhood social environment (characterized by low social cohesion and social disorder) and other mental health symptoms ([McElroy et al., 2019](#)). This finding was viewed by [McElroy et al. \(2019\)](#) as consistent with the conceptualization that an adverse neighborhood environment can lead to increased perceptions of threat and hostility with possible bidirectional effects.

Beyond neighborhood adversity, area-level crime (based on administrative state and national crime statistics) is related to the prevalence of psychotic disorders and psychotic symptomatology ([Baranyi et al., 2021](#); [Bhavsar et al., 2014](#); [Karcher et al., 2021](#); [Veling et al., 2015](#)). Fewer studies have explored the relation between crime statistics and paranoid ideation, although in studies that have, neighborhood crime is associated with greater paranoid ideation in UHR individuals ([Vargas et al., 2020](#); [Wilson et al., 2016](#)). In addition to crime statistics, subjective perceptions of neighborhood crime and safety may be important to consider. [Karcher et al. \(2021\)](#) found that both parental perceptions of neighborhood safety and administrative crime statistics were associated with psychotic-like experiences in adolescents. Similarly, [Newbury et al. \(2017\)](#) found that personal perceptions of neighborhood disorder (including crime) remained significantly associated with psychotic experiences even after controlling for crime statistics.

Although trauma and neighborhood factors are associated with psychosis, few studies have examined how trauma and neighborhood factors may jointly impact psychosis and, more specifically, paranoid ideation. Personal crime victimization and adverse neighborhood conditions have been found to jointly contribute to psychotic experiences in non-psychotic adolescence ([Newbury et al., 2018](#)). This suggests the value of examining both TLE and neighborhood factors and how they jointly contribute to paranoid ideation. As a final consideration, it is crucial to investigate whether TLE and neighborhood factors are unique to paranoid ideation or whether these are general risk factors for other psychotic, affective, or negative symptoms. For example, previous investigations suggest that trauma ([Solmi et al., 2020](#)) and neighborhood characteristics ([Pruessner et al., 2021](#)) can have impacts on both negative symptoms and broader positive symptoms.

1.1. Current study

The current study sought to examine the association between individual-level (i.e., TLEs) and system-level (i.e., neighborhood deprivation and crime) factors and paranoid ideation as well as other symptom domains. Adopting a Research Domain Criteria ([Kozak and Cuthbert, 2016](#); RDoC; [Cuthbert, 2014](#)) approach, this study examined paranoid ideation from a dimensional perspective in a mixed transdiagnostic sample, including individuals with psychosis spectrum disorders and non-clinical participants.

We hypothesized that the experience of more trauma and exposure to adverse neighborhood features, as assessed both subjectively and objectively, would be related to greater paranoid ideation. Furthermore, we hypothesized that these relationships would persist even after controlling for relevant demographic characteristics, such as income and education. We also sought to determine if trauma and neighborhood factors were uniquely related to paranoid ideation by examining if these factors were also associated with non-paranoid psychotic symptoms, affective symptoms, and negative symptoms ([Blanchard et al., 2020](#); [Kring et al., 2013](#)).

2. Methods

This research, supported by the National Institute of Mental Health, MH110462 (Blanchard), enrolled participants ($N = 120$) in a recently completed grant-funded neuroimaging study (National Institutes of Health grant R01MH110462; [Shackman et al., 2025](#); [Savage, et al., 2020, 2020](#); [Savage et al., 2024](#)). We recruited a transdiagnostic mixed sample including 98 clinical participants with a psychotic disorder (e.g., schizophrenia, schizoaffective disorder, bipolar disorder with psychosis, major depressive disorder with psychosis) and 22 community-dwelling controls. Participants were recruited from outpatient mental health programs in the Baltimore and Washington D.C., areas or from online community posting websites (e.g., Craigslist). Neighborhood variables were derived from participants' addresses provided during assessment and measured at the census block group level. Approximately 76 % of participants lived in different block groups, covering up to 96 distinct block groups. These block groups were then linked with neighborhood variables, such as area-level deprivation and crime.

Inclusion criteria for all participants consisted of (1) aged 18–60 and (2) fluency in English. Clinical participants were checked for (1) lifetime history of a psychotic disorder, and (2) clinical stability (i.e., no inpatient hospitalizations for 3 months before enrollment, no changes in psychoactive medication four weeks before enrollment) as indicated by clinicians and medical record review. Community controls were screened for (1) no current clinical disorder or psychiatric medications, (2) no lifetime history of a psychotic or mood disorder, and (3) no avoidant, paranoid, schizotypal, or schizoid personality disorder. Exclusion criteria for all participants included (1) current substance use disorder, (2) neurological conditions (e.g., epilepsy, multiple sclerosis), (3) evidence of intellectual disability as determined by medical history or cognitive testing, (4) any history of serious head injury, (5) any MRI contraindications (e.g., MRI unsafe metal in body, weight that exceeds the limitations of MRI machine), and (6) unwillingness to have study assessments videotaped.

2.1. Procedures

The University of Maryland, Baltimore Institutional Review Board approved the study procedures. All participants completed a standardized informed consent process with trained research staff. Research staff administered a brief questionnaire to verify that participants understood the informed consent document and were competent to consent. Study procedures were implemented by trained study staff.

2.2. Measures

The Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (SCID-5) screener and SCID-5 clinical interview (First, 2015) were administered to determine psychiatric diagnoses. Healthy controls were administered the SCID-5 screener and any corresponding SCID-5 module related to items endorsed on the screener.

The Brief Psychiatric Rating Scale-Expanded version (BPRS) is a 24-item semi-structured clinical interview that assesses psychiatric symptoms over the previous week (Overall and Gorham, 1962; Ventura et al., 1993). The current study used two symptom factor scores based on factor analyses computed by Dazzi et al. (2016): positive symptoms (excluding suspiciousness) and affective symptoms.

The Revised-Green et al., Paranoid Thoughts Scale (R-GPTS, Freeman et al., 2021; Green et al., 2008) is an 18-item self-report measure assessing paranoid ideation over the past month. A total score was used to assess paranoid ideation, including subscales related to social reference and persecution. Higher scores indicate more severe paranoid ideation.

The CAINS (Kring et al., 2013) is a 13-item measure of negative symptoms that includes two subscales: expression (4 items) and motivation and pleasure (9 items). For the current study, we used a total score to assess negative symptoms.

The Trauma History Questionnaire (THQ, Hooper et al., 2011) consists of 24 yes/no questions addressing a range of trauma events in three areas: (a) crime-related events (e.g., robbery, mugging), (b) general disaster and trauma (e.g., injury, disaster, witnessing death), and (c) unwanted physical and sexual experiences. Using total types of traumatic events has shown good test-retest reliability and is the most common scoring convention compared to total instances (Hooper et al., 2011). The three trauma types were significantly related to each other ($r_s = 0.19 - 0.34$, $p_s < 0.05$). Thus, the total types of traumatic events were used in the current study to measure trauma.

The Area Deprivation Index (ADI, Kind and Buckingham, 2018) is a publicly available composite measure of neighborhood socioeconomic disadvantage in the United States, assessed at the census block group level. This composite index is based on 17 different Census indicators that are strongly and coherently associated with socioeconomic disadvantage. These indicators include factors such as poverty, income, education, housing, employment, family structure, access to resources, language, and demographics, all assessed at the census block group level (Kind et al., 2014). Scores from these indicators are weighted, summed, and converted into a standardized format. Standardized scores are then averaged and transformed into percentiles based on the level of adverse social exposure, either at the state or national level (Kind et al., 2014; Singh, 2003). These percentiles are then grouped into deciles, where higher scores signify greater area deprivation. (Kind et al., 2014). The ADI has been used to examine neighborhood deprivation and psychotic-like experiences in a nationally representative adolescent sample (Vargas et al., 2021). The current study employs state deciles to represent socioeconomic disadvantage specifically in the Maryland and Washington, D.C. area.

The Neighborhood Environment Scale (NES, Mujahid et al., 2007) is a 19-item self-report scale that covers perceptions of neighborhood safety, violence, social cohesion, and activities with neighbors. Participants were instructed to consider their perceptions of their neighborhood in relation to their current residences over the past six months. The NES has been used to examine neighborhood correlates of psychotic-like experiences in a nationally representative adolescent sample (Vargas et al., 2021). The 4-item perceptions of violence subscale of the NES was used for the present study as it focuses on reports of specific neighborhood violence (fights, sexual assault, robbery, or mugging). To aid with interpretability, the NES was reverse-scored so that higher scores reflected more violence/crime.

The Applied Geographic Solutions (AGS) CrimeRisk index was used

to measure neighborhood-level crime. The AGS CrimeRisk index uses data at the census block group level, consistent with geographical units used for the ADI, from the 2014–2020 Federal Bureau of Investigation's (FBI) Uniform Crime Report (UCR). This index provides information on the relative risk of a crime in that area, including murder, rape, robbery, assault, burglary, theft, and motor vehicle theft, but excluding arson (Nau et al., 2020). Higher scores indicate greater area-level crime. The current study used a total score capturing all indicators to evaluate crime statistics at the census block group level.

2.3. Data analytics plan

All analyses were completed using SPSS 27. Descriptive statistics for income and education, and all clinical, trauma, and neighborhood characteristics were calculated. Subsequently, zero-order correlations were conducted to determine the relation between clinical symptoms and measures of trauma, neighborhood deprivation, and crime. A series of hierarchical regressions was then conducted to determine both the unique and additive impact of self-reported trauma, neighborhood deprivation, and crime on each of the major clinical symptom domains (Paranoid ideation, non-paranoid psychotic symptoms, affective symptoms, and negative symptoms). To maintain the integrity of the research, missing data were handled through listwise deletion, guaranteeing that all participant data remains complete and reliable.

Hierarchical regressions were used to compute the variance accounted for by each predictor. To determine the order of entry for each predictor, the current study followed steps from research examining cumulative trauma exposure in a large community-dwelling sample (Ogle et al., 2014). Covariates were entered first, which included participants' education and income (step 1). Given that race (i.e., minority status) has been found to be associated with exposure to neighborhood characteristics such as poverty and crime (Browning et al., 2017), and similar to other studies of psychosis and environmental factors (Karcher et al., 2021; Newbury et al., 2018; Vargas et al., 2020), we did not control for race/ethnicity in our analyses. Karcher et al., 2021). Minority status was associated with living in neighborhoods characterized by both greater area deprivation ($r = 0.37$, $p < .001$) and higher area-level crime ($r = 0.23$, $p < .05$) – minority status was not related to trauma or perceptions of neighborhood violence ($p_s > 0.05$). Self-reported trauma (THQ) was entered next (step 2). Neighborhood deprivation deciles (ADI scores), perceptions of crime (NES), and crime index scores (CrimeRisk) followed (step 3). Additionally, a series of multiple regressions predicting non-paranoid psychotic symptoms, affective symptoms, and negative symptoms was calculated using the above predictors.

3. Results

Sample demographic information, including income and education, is presented in Table 1. Descriptive statistics for symptoms, trauma, and neighborhood variables are presented in Table 2. As shown in Fig. 1, participant ADI scores fell across all deciles. Prior to hypothesis testing, bivariate correlations were conducted to analyze the relation between symptoms, income, and education (Table 3). These correlations indicated that lower income was associated with more severe paranoid ideation ($r = -0.22$, $p < .05$) and more severe negative symptoms ($r = -0.28$, $p < .01$). Fewer years of education were associated with greater negative symptoms ($r = -0.26$, $p < .01$) but not with other symptom domains. These results demonstrate that individual-level characteristics, such as income and education, are related to symptomatology; therefore, income and education were included in the regression analyses. Additionally, a visual representation of the relationship between paranoid ideation, trauma, and neighborhood variables is provided in the supplemental materials (Figure S1).

Correlations between symptoms, trauma, and neighborhood characteristics are presented in Table 4. Paranoid ideation was correlated

Table 1
Demographic variables ($N = 120$).

	Mean (SD) or n (percent)
Age (years)	43.53 (12.19)
Sex	
Male	74 (61.7 %)
Female	46 (38.3 %)
Race	
Black/African American	81 (67.5 %)
White	28 (23.3 %)
Asian	4 (3.3 %)
More than one race	6 (5 %)
Prefer not to answer	1 (0.8 %)
Ethnicity	
Non-Hispanic or Latino	109 (90.8 %)
Hispanic or Latino	10 (8.3 %)
Unknown	1 (0.8 %)
Education (years)	12.97 (2.43)
Marital Status	
Never married/single	92 (76.7 %)
Divorced/separated	19 (15.8 %)
Married	9 (7.5 %)
Current Employment	
No	82 (68.3 %)
Yes	38 (31.7 %)
Diagnosis	
Schizophrenia	39 (32.5 %)
Schizoaffective Bipolar Type	16 (13.3 %)
Schizoaffective Depressive Type	19 (15.8 %)
Bipolar I with psychotic features	13 (10.8 %)
Major Depressive Disorder with psychotic features	10 (8.3 %)
Delusional Disorder	1 (0.8 %)
No Diagnosis (Healthy control)	22 (18.3 %)
Antipsychotic Medication	
Typical	11 (9.2 %)
Atypical	64 (53.3 %)
Combined (typical and atypical)	10 (8.3 %)
None	12 (10.0 %)
Unknown	1 (0.8 %)

Table 2
Descriptive statistics for symptom, trauma, and neighborhood variables.

	N	Mean (SD)	Range
R_GPTS-Paranoia	120	12.43 (15.37)	0.00–66.00
BPRS- Non-Paranoid Positive Symptoms Average	120	4.78 (3.22)	3.00–18.00
BPRS – Affect Symptoms	120	7.98 (4.12)	4.00–19.00
CAINS- Negative Symptoms	119	17.34 (9.13)	1.00–46.00
THQ-Total Types	119	3.45 (2.79)	0.00–13.54
NES-Violence	120	1.43 (0.64)	1.00–4.00
ADI-State Decile	119	5.77 (3.25)	1.00–10.00

Note: GPTS = Green Paranoid Thought Scale; BPRS = Brief Psychiatric Rating Scale; CAINS = Clinical Assessment Interview for Negative Symptoms; THQ = Trauma History Questionnaire; NES = Neighborhood Environment Scale; ADI = Neighborhood Area Deprivation Index.

with positive symptoms ($r = 0.45, p < .001$) and affective symptoms ($r = 0.46, p < .001$) but not with negative symptoms. Greater trauma was related to more severe paranoid ideation ($r = 0.33, p < .001$), positive symptoms ($r = 0.25, p < .001$), and affective symptoms ($r = 0.34, p < .001$). However, trauma was unrelated to negative symptoms. Trauma was not correlated with any of the neighborhood variables.

Pearson correlations revealed significant relations between perceptions of greater neighborhood violence and greater paranoid ideation ($r = 0.29, p < .001$). However, perceived neighborhood violence was not associated with other symptom domains. As expected, administrative indicators of greater area deprivation and more severe neighborhood crime risk were related ($r = 0.39, p < .001$). Unexpectedly, greater area deprivation was related to less severe affective symptoms ($r = -0.26, p < .01$). Area deprivation and neighborhood crime risk were unrelated to

paranoid ideation. Inconsistent with hypotheses, neighborhood crime statistics were unrelated to symptomatology or trauma.

3.1. Regression

As summarized in Table 5, regression results indicated that income and education, overall, accounted for 7 % of the variance in paranoid ideation. Next, trauma was associated with a significant increment of variance explained (10 %) above and beyond income and education ($\beta = 0.33, p < .01$). Finally, neighborhood variables led to another 8 % increase in variance explained in paranoid ideation. Of the neighborhood variables, only perceptions of neighborhood violence significantly contributed to paranoid ideation ($\beta = 0.27, p < .01$). These findings indicate that greater trauma and greater perceptions of neighborhood violence are jointly associated with greater paranoid ideation, and these associations hold above and beyond income and education. Model stability is measured by examining the variance inflation factor (VIF), which is a measure of multicollinearity between two or more variables, and is the reciprocal of Tolerance scores (i.e., $1/\text{Tolerance}$). Scores greater than 10 (or Tolerance scores < 0.1) indicate possible collinearity between variables. Across the regression models, a VIF range of 1.11–1.71, corresponding to a tolerance range of 0.58–0.90, indicates no substantial collinearity.

Hierarchical multiple regressions were conducted to evaluate the associations between trauma and neighborhood factors with other symptom domains (Table 5). After controlling for income and education, trauma was significantly associated with both positive symptoms and affective symptoms (12 % and 14 % of explained variance in symptoms, respectively), but unrelated to negative symptoms. This result indicates that trauma broadly contributes to multiple symptom domains beyond paranoid ideation.

Greater perceptions of neighborhood violence were related to greater affective symptoms ($\beta = 0.22, p < .05$) but not to non-paranoid positive or negative symptoms. Thus, perceived neighborhood violence is associated with both paranoid ideation and affective symptoms. Contrary to hypotheses, area deprivation was unrelated to paranoid ideation and positive symptoms. Unexpectedly, greater area deprivation was related to less severe affective ($\beta = -0.23, p < .05$).

3.2. Exploratory analyses

Since findings indicated that neighborhood perceptions of crime, but not administrative crime statistics, were related to paranoid ideation, we conducted post hoc correlations to determine how neighborhood perceptions were related to more granular metrics of crime (see Supplement Table S1). Results indicated that although the overall crime statistics were not correlated with perceptions of neighborhood violence, sub-components of specific crime statistics were related to perceived crime (e.g., person crime, murder).

Given the use of a mixed transdiagnostic sample, we sought to determine whether the above obtained associations held when controlling for clinical status (healthy controls versus those with clinical diagnoses). Group means for symptom domains and predictor variables are presented in Supplement Tables S2 and S3. Results (see Supplement Table S4) replicated associations between trauma and neighborhood perceptions of crime with each symptom domain. One inconsistency is that the unexpected association between area deprivation and affective symptoms was no longer significant.

Consistent with prior findings that depression, as well as anxiety and worry, are significant correlates of paranoid ideation (e.g., Freeman, Garety et al., 2002, 2012; Vorontsova et al., 2013), we found that paranoid ideation and affective symptoms were significantly correlated. We ran the above regression analyses for paranoid ideation, but first controlled for affective symptoms. Results indicated that paranoid ideation was no longer related to trauma and perceptions of neighborhood violence ($ps > 0.05$). This suggests that affective symptoms may, in

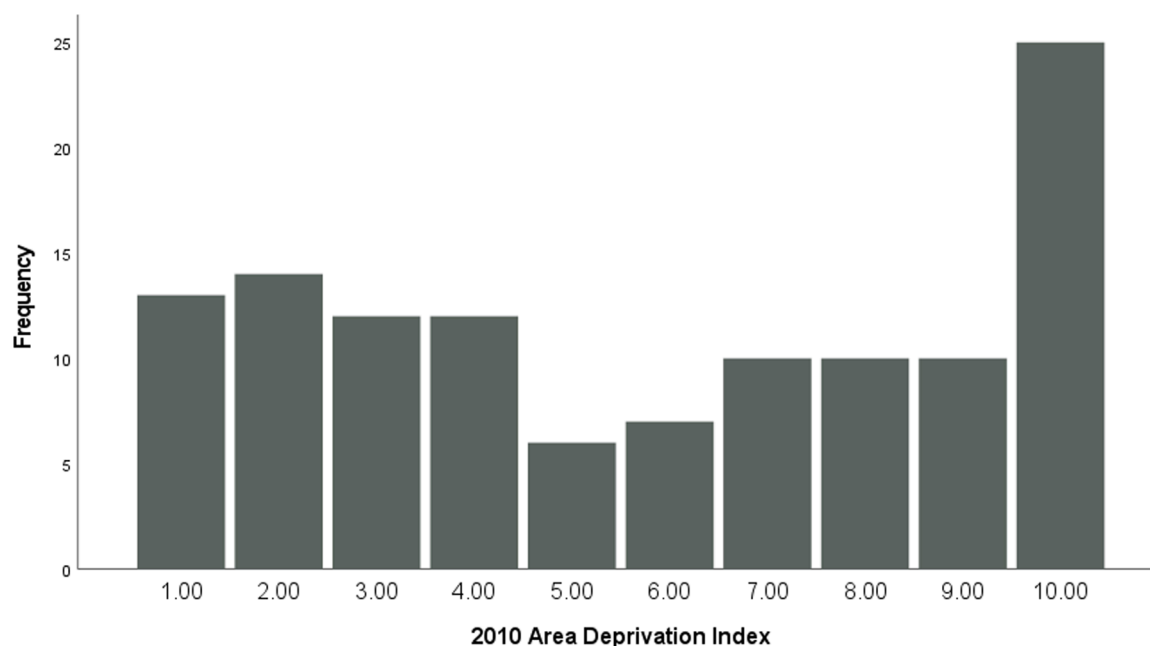


Fig. 1. Distribution of area deprivation index (ADI) Source.

Table 3

Pearson correlations between symptoms and covariates.

Symptom	Income ^a	Education
Paranoid Thought Scale (R-GPTS)	−0.22*	−0.17
Non-Paranoid Positive Symptoms (BPRS)	−0.07	.01
Affect Symptoms (BPRS)	−0.11	−0.05
Negative Symptoms (CAINS)	−0.28**	−0.26**

Note. $N = 120$. R-GPTS = Revised Green et al. Paranoid Thought Scale; CAINS = Clinical Assessment Interview for Negative Symptoms; BPRS = Brief Psychiatric Rating Scale

^a $N = 114$

* $p < .05$, ** $p < .01$

part, account for the impact of these variables on paranoid symptomatology (Vorontsova et al., 2013).

4. Discussion

This study sought to explore the additive and unique contributions of trauma history, perceptions of neighborhood violence, neighborhood deprivation, and crime on paranoid ideation. The study also examined whether individual and area-level characteristics held unique associations with paranoid ideation or if similar relations were identified with other symptom domains, including non-paranoid positive symptoms, affective symptoms, and negative symptoms.

Bivariate correlations revealed that greater paranoid ideation was

Table 4

Pearson correlations between independent and dependent measures.

	Paranoid Ideation (R-GPTS)	Non-Paranoid Positive Symptoms (BPRS)	Affective Symptoms (BPRS)	Negative Symptoms (CAINS)	Trauma – Total Types (THQ) ^c	Neighborhood Violence Perceptions (NES)	Area Deprivation-State (ADI) ^b	Crime-Total (CrimeRisk) ^a
Paranoid Ideation (R-GPTS)	—							
Non-Paranoid Positive Symptoms (BPRS)	0.45***	—						
Affective Symptoms (BPRS)	0.46***	0.11	—					
Negative Symptoms (CAINS)	0.12	0.11	0.21*	—				
Trauma – Total Types (THQ) ^c	0.33***	0.25**	0.34***	0.02	—			
Neighborhood Violence Perceptions (NES)	0.29***	0.12	0.14	0.01	0.05	—		
Area Deprivation-State (ADI) ^b	−0.08	−0.15	−0.26**	−0.08	−0.11	0.15	—	
Crime-Total (CrimeRisk) ^a	−0.04	−0.03	−0.18	−0.12	−0.04	0.12	0.39***	—

* $p < .05$, ** $p < .01$, *** $p < .001$.

Note. $N = 120$. ADI = Area Deprivation Index; NES = Neighborhood Environment Scale; THQ = Trauma History Questionnaire.

^a $N = 109$.

^b $N = 114$.

^c $N = 119$.

Table 5

Model with income, education, total trauma types, neighborhood violence perceptions, ADI, and crime total as predictors of each symptom domain.

Independent Variables	Model 1 Paranoid Ideation	Model 2 Non-Paranoid Positive Symptoms	Model 3 Affective Symptoms	Model 4 Negative Symptoms
Step 1: Demographic Variables				
Income	−0.14	−0.04	−0.06	−0.24*
Education	−0.19	−0.13	−0.01	−0.22*
R ²	0.08	0.02	0.00	0.14
F	3.98*	1.01	0.18	8.17***
Step 2: Trauma Variable				
Total Trauma Types	0.33***	0.35***	0.37***	−0.02
R ²	0.18	0.14	0.14	0.14
ΔR ²	0.10	0.12	0.14	0.00
ΔF	12.16***	13.27**	15.37***	0.06
Step 3: Neighborhood Variables				
Neighborhood Violence Perceptions	0.27**	0.15	0.22*	−0.08
Area Deprivation	−0.12	−0.21	−0.23*	−0.20
Area Crime	−0.01	0.06	−0.13	−0.10
R ²	0.25	0.18	0.25	0.21
ΔR ²	0.08	0.05	0.11	0.06
ΔF	3.18***	1.76	4.81**	2.48

^aAll standardized regression coefficients are from the final step in the analysis. $n = 93$.

^b $p < 0.05^*$, $p < .01^{**}$, $p < .001^{***}$.

significantly related to lower income and that negative symptoms were related to both lower income and fewer years of education. These results underscore the importance of examining shared versus differential associations between these symptoms, trauma, and environmental adversities. Additionally, findings replicate prior results indicating that functional impairment is associated with paranoid ideation (Pinkham et al., 2016) and negative symptoms (Blanchard et al., 2017). These results also support the need to examine the contribution of symptoms to neighborhood living circumstances, specifically how symptoms lead to lower income and, in turn, influence housing and neighborhood characteristics (Vargas et al., 2014).

Results indicated that greater trauma was associated with more severe paranoid ideation, greater positive symptoms, and more severe affective symptoms (but not negative symptoms). These results held across both correlational and regression analyses, controlling for income and education. These findings demonstrate trauma's adverse impact on a range of symptomatology and are consistent with prior research. For example, Alameda et al. (2021) reported that general childhood adversity, including abuse and neglect, was associated with all symptom dimensions assessed. However, inconsistent with Alameda et al. (2021), we found no associations between trauma and negative symptoms.

The present findings of the association of perceived violence but not administrative area crime with paranoid ideation converge with the meta-analytic findings, which indicate stronger symptom associations with subjective perceptions compared to administrative indicators (Baranyi et al., 2021). These results represent how neighborhood perceptions of violence and paranoid thoughts contribute to heightened threat perception. Regression analyses indicated that perception of neighborhood violence contributed to both paranoid ideation and affective symptoms – above and beyond income and education, and trauma. The importance of neighborhood perceptions is consistent with the findings of Newbury et al. (2017), who found that adolescents who perceived greater neighborhood disorder (including crime) were more likely to experience psychotic symptoms. Our results align with prior

findings indicating that crime impacts psychotic symptoms as well as internalizing symptoms (Baranyi et al., 2021).

The contribution of perceived neighborhood violence but not administrative indicators of crime may arise for multiple reasons, including administrative measures failing to capture local experiences due to underreporting of crime or because the measurement area does not accurately reflect the participant's local experiences (Diez Roux, 2007). Importantly, the association between perceived (but not administrative) crime raises interpretive issues concerning reverse causality, such that symptoms may give rise to increased perceptions of neighborhood crime or threat. However, the current study's supplemental results indicated that neighborhood perceptions were related to different facets of administrative crime statistics, with perceptions of greater violence associated with administrative indicators of neighborhood-level personal crimes, murder, robbery, assaults, and burglary (see Supplemental Table S1). These correlational findings suggest that perceptions of neighborhood violence are not merely manifestations of symptomatology but, in part, are influenced by crime in the community. Additionally, specific crimes may be more salient than others in impacting neighborhood perceptions, suggesting that research in this area may benefit from looking beyond total crime indices.

Our use of an overall crime index in regression analyses may overlook the potential unique contributions of specific forms of crime. An example of this pattern of differential associations was seen in our correlational analyses between neighborhood perceptions of violence and administrative crime: the overall crime index was not related to perceptions, but subcomponents of administrative crime data were. Similar to the current findings, in a study of psychotic-like experiences (PLEs), Karcher et al. (2021) found that perceptions of neighborhood safety but not overall crime statistics were related to PLEs. However, disaggregating crime showed that some offenses (i.e., drug) were related to PLEs (Karcher et al., 2021).

Contrary to hypotheses, neighborhood adversity was not related to more severe symptomatology. Unexpectedly, greater neighborhood adversity was related to fewer affective symptoms in both correlational analyses and in the regression model, which controlled for income, education, and trauma. This result contradicts prior research (e.g., Pruessner et al., 2021). However, when controlling for clinical status in supplemental analyses, this unexpected association between neighborhood adversity and affective symptoms was no longer significant. This aligns with prior research indicating that contextual stressors, such as deprivation, may influence psychosis or paranoid symptoms more directly than affective symptoms when group-level psychopathology is considered (Pruessner et al., 2021).

4.1. Limitations

There are several limitations to the present study. First, participants were asked to report on their personal trauma retrospectively. This limits our understanding of how prior experiences contribute to current symptomatology. Further, we utilized an aggregate measure of trauma that combined different traumatic experiences, from sexual assault to natural disasters. Prior research suggests that interpersonal trauma, such as abuse or bullying, may be particularly relevant to psychotic symptoms (e.g., Loewy et al., 2019; Wickham and Bental, 2016). A further limitation of our assessment of trauma is that it did not differentiate periods when the trauma occurred. Liu et al. (2021) reported that trauma experienced in adulthood versus in childhood may have differential associations with symptoms. Given our methodology, we cannot determine if reported traumas preceded or followed the development of symptomatology. Third, to determine area-level metrics of crime and perceptions of neighborhood adversity (i.e., perceptions of violence), the present study used only current addresses at the time of study enrollment. Thus, we lack information on previous residences and the duration of stay at these residences. As a result, we cannot determine

whether conditions in participants' previous neighborhood(s) contributed to their current presentation (e.g., Ku et al., 2020). Fourth, although there are advantages to adopting the transdiagnostic RDOC approach (Cuthbert, 2014; Insel, 2014; Insel et al., 2010), and controlling for clinical versus nonclinical status did not impact key findings, we were unable to examine possible disorder-specific relations given the sample size constraints. Future research should explore possible diagnostic differences in the associations between trauma, neighborhood context, and symptomatology.

4.2. Conclusion

This study provides further support for the association between trauma and a range of symptoms, including paranoid ideation, non-paranoid positive symptoms, and affective symptoms. Further, perceptions of neighborhood violence added unique variance to explain the severity of paranoid ideation and affective symptoms. These results extend prior literature and emphasize the need to consider both trauma and perceived neighborhood violence in assessing factors that exacerbate symptoms in psychotic disorders. Future research should continue to examine the mechanisms by which trauma and neighborhood violence contribute to symptoms, including the role of cognitive (e.g., Alameda et al., 2020) and neurophysiological (e.g., Hackman et al., 2021) mediators connecting such stress exposure to the development and maintenance of clinical symptoms. Results from the present study are consistent with recommendations that trauma-informed therapies may be useful for individuals with psychotic symptoms and disorders (Bloomfield et al., 2020; Wood et al., 2023).

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CRediT authorship contribution statement

Imani A. Todd: Writing – original draft, Software, Project administration, Investigation, Formal analysis, Data curation, Conceptualization. **Ryan D. Orth:** Writing – review & editing, Methodology, Data curation. **Christina L.G. Savage:** Methodology, Investigation. **Arianna M. Gard:** Writing – review & editing, Supervision, Software, Conceptualization. **Melanie E. Bennett:** Writing – review & editing, Supervision, Resources, Methodology, Conceptualization. **Jack J. Blanchard:** Writing – review & editing, Supervision, Resources, Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.psychres.2025.116774](https://doi.org/10.1016/j.psychres.2025.116774).

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