ABSTRACT

Title of Dissertation: EXPLORING THE ROLES OF SOCIAL ANXIETY, TRAUMA, AND URBANICITY IN THE RELATION BETWEEN POSITIVE AND NEGATIVE SYMPTOMS IN PSYCHOSIS

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Background: Research shows that positive and negative symptoms of schizophrenia are separate but related factors. However, it is unclear which specific symptoms may drive this relation or whether there are moderating factors. Moreover, it is unknown whether the relation between positive and negative symptoms is specific to schizophrenia or exists for individuals with psychosis regardless of diagnosis. Research is needed that looks specifically at individual symptoms within positive and negative symptom domains in a sample of mixed diagnoses. The current study examines whether paranoia, a positive symptom, and deficits in motivation and pleasure, a negative symptom, are correlated with one another in a transdiagnostic sample of individuals with psychosis. Literature suggests that paranoia and deficits in motivation and pleasure are both interpersonal in nature. This shared interpersonal characteristic suggests that these symptoms may be linked through social stressors. **Method:** Participants were 38 people with psychosis and six people without a psychiatric diagnosis. They completed the Clinical Assessment

Interview for Negative Symptoms (CAINS), including the Motivation and Pleasure (MAP) subscale; the Green et al. Paranoid Thought Scales (GPTS), including Social Reference (SR) and Persecution (P); the Social Interaction Anxiety Scale (SIAS); the Self-Beliefs Related to Social Anxiety scale (SBSA), including Unconditional Beliefs (UB); the Trauma History Questionnaire (THQ); and the Neighborhood Health Questionnaire (NHQ), including Activities with Neighbors (AN). **Results:** Inconsistent with hypotheses, neither GPTS nor its subscales was significantly correlated with CAINS MAP. GPTS was significantly correlated with SIAS, SBSA, and THQ totals; in exploratory analyses, the GPTS SR was significantly correlated with SBSA UB. CAINS MAP was significantly correlated with NHQ AN. **Conclusions:** This study revealed novel associations between paranoia and social anxiety cognitions and between motivation and pleasure deficits and neighborhood socialization. We explore reasons for null results (e.g., limitations with the transdiagnostic approach; low symptomatology in the sample). Future directions include examination of other positive and negative symptoms; investigation into facets of social anxiety and their overlap with paranoia; and assessment of urbanicity/neighborhood health and its relation to paranoia.

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by

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Introduction

One goal of the Research Domain Criteria (RDoC) initiative is to re-examine clinical phenomena across diagnostic categories, allowing researchers to understand shared features of psychopathology and develop better informed hypotheses regarding origins and treatments of psychopathology (Cuthbert & Insel, 2013). The current study is aligned with this RDoC goal and uses a transdiagnostic sample with psychosis to explore relations between positive and negative symptoms typical in people with schizophrenia. Positive symptoms are characterized by multisensory hallucinations and delusions, and negative symptoms include reduced motivation and pleasure (MAP) across social, work/school, and recreational domains and reduced facial and vocal expression (Peralta & Cuesta, 2001). Though these factors are treated as independent (Peralta & Cuesta, 1999), positive and negative symptoms have been shown to be related (e.g., Blanchard et al., 2017; Kring, Gur, Blanchard, Horan, & Reise, 2013). Here, we examine how specific symptoms and other experiences may link positive and negative symptom domains. Background literature is drawn primarily from schizophrenia given the large amount of research in this area.

The Relation Between Broad Factors of Positive and Negative Symptoms

Positive and negative symptoms historically have been viewed as distinct factors according to cross-sectional factor analyses, studies of the course of positive symptoms and negative symptoms, and experiments evaluating the treatment of these symptoms (Ventura et al., 2004). However, other empirical research reveals associations between these domains. A validation of the Clinical Assessment Interview for Negative Symptoms

(CAINS; Kring et al., 2013) found a significant correlation between the MAP subscale of the CAINS and the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962) positive symptom subscale at a medium effect size (Cohen, 1988). Blanchard et al. (2017) replicated this finding in a large sample (N = 501) within the Management of Schizophrenia in Clinical Practice (MOSAIC) multisite study. van Os et al. (2002) found that negative symptom and positive symptom ratings based on the Composite International Diagnostic Interview were related with an odds ratio of 3.89. Moreover, a 10-year longitudinal study of 14- to 24-year-olds showed that negative symptoms and positive symptoms occurred together more often than chance, and this relation predicted worse prognosis (Dominguez, Saka, Lieb, Wittchen, & van Os, 2010). Together, these studies suggest that there is an important connection between the positive and negative symptom domains.

Interpretations of this relation are typically concerned with causality. One interpretation presented by Carpenter, Heinrichs, and Alphs (1985) posits that some negative symptoms may be secondary to positive symptoms, medication, depression, substance use, and/or social withdrawal. In Carpenter's model (Carpenter et al., 1985), negative symptoms that develop independent of these variables constitute the deficit subtype of schizophrenia and reflect true negative symptoms. Relatedly, Ventura et al. (2004) found that individuals who experienced exacerbations in positive symptoms were more likely to have exacerbations in negative symptoms: The authors' explanations for this link included that the negative symptoms were secondary to the exacerbation in positive symptoms and that the dopaminergic hyperactivity that causes positive symptoms triggered cholinergic activity leading to negative symptoms (Ventura et al.,

2004). Thus, according to Carpenter and colleagues' model (1985), associations between positive and negative symptoms might reflect a causal direction of positive symptoms giving rise to secondary negative symptoms. Accumulating evidence suggests another pattern wherein negative symptoms lead to positive symptoms.

In a review of the course of schizophrenia, Millan et al. (2016) concluded that negative symptoms could play a role in the transition to schizophrenia from the prodrome and clinical high-risk (CHR) periods. For example, research has shown that negative symptoms predict the development of positive symptoms and conversion to psychosis (Kwapil, 1998; Mason et al., 2004; Velthorst et al., 2009). Using longitudinal methods, Piskulic et al. (2012) found that individuals who transitioned to psychosis had more severe and persistent negative symptoms, though their positive symptoms were comparable to those who did not transition. In a longitudinal study examining the predictive power of schizotypal features on transition to psychosis in a CHR sample, Salokangas and colleagues (2013) found that the subscale "No Close Friends," a social deficit related to negative symptoms, predicted transition. Thus, it appears that negative symptoms can precipitate positive symptoms and psychosis.

Regarding how negative symptoms might lead to positive symptoms, some researchers suggest that the combination of negative symptomatology and environmental factors, such as trauma and urbanicity, presents vulnerability for positive symptoms (Carpenter, 2010; Dominguez et al., 2010; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). For example, negative symptoms of social anhedonia or amotivation may interact with sequelae of trauma, such as arousal or negative cognitions about others or the world, to create a stress cascade leading to positive symptoms. In sum,

research offers evidence that the relation between positive and negative symptoms can be bidirectional.

The Relation Between Individual Positive and Negative Symptoms

In the aforementioned research, positive and negative symptoms are typically measured as overall scores without attention to individual symptoms. However, research that has begun to break down the major symptom domains suggests that paranoia (unsubstantiated thinking that others want to cause harm) and deficits in MAP may be related (see Figure 1). As previously mentioned, studies by Kring et al. (2013) and Blanchard et al. (2017) both observed a correlation between MAP deficits and total positive symptoms. Another study by Kelley, Van Kammen, and Allen (1999) found that composite positive symptoms were associated with the amotivation factor of negative symptoms. Kirkpatrick (2014) suggested that composite negative symptoms could be related to delusions. Finally, one study found that dimensional scores of paranoid personality disorder were elevated in non-clinical individuals high in social anhedonia compared to controls (Blanchard, Collins, Aghevli, Leung, & Cohen, 2011). This literature indicates a possible correlation between paranoia and MAP deficits, but no work has examined this relation directly.

Attention to individual facets of the larger symptom domains might be informative regarding how positive and negative symptoms are related and could be valuable in creating more specific treatments. Therefore, in the current study, we focus on the connection between individual symptoms of paranoia and MAP deficits. The literature suggests that these two symptoms are related and both are interpersonal in

nature. This shared interpersonal characteristic suggests that these symptoms may be linked through social stressors.

Factors Contributing to the Relation Between Paranoia and MAP Deficits

Work by Freeman and collaborators have identified interpersonal stressors as precipitants of paranoia in the general population (Freeman & Fowler, 2009; Freeman et al., 2011), which may inform the relation between paranoia and MAP deficits. From this body of work, we selected three candidate interpersonal influences that may be shared across paranoia and MAP deficits given their relation to paranoia and their interpersonal features. Freeman and colleagues (2011) suggested that paranoia is associated with anxiety, trauma, and urban residence. In support of this, Freeman and Garety (2014) review literature suggesting that persecutory delusions, the most severe form of paranoia, are related to worry, trauma, and urbanicity. An examination of how anxiety, trauma, and urban residence may relate to negative symptoms and the relation between positive and negative symptoms could shed light upon their complex relation and add to the collection of treatment targets for individuals who experience elevations in both positive and negative symptoms (see Figure 2).

Social anxiety. Beyond Freeman's work suggesting a relation between anxiety and paranoia, researchers have found that social anxiety in particular is increased in individuals with schizophrenia and is related to social withdrawal as both a contributor and an outcome (Millan, Fone, Steckler, & Horan, 2014). From first-episode to chronic samples of individuals with schizophrenia, researchers have observed a diagnosis of social anxiety disorder in 33% to 43% of their participants (Pallanti, Quercioli, & Hollander, 2004; Sutliff, Roy, & Achim, 2015; Voges & Addington, 2005). Regarding its

relation to specific symptoms of schizophrenia, social anxiety appears to be associated with both paranoia and MAP deficits, as discussed below.

Cognitions related to social anxiety may also be relevant to paranoia and MAP deficits, and the Clark and Wells (1995) model of social anxiety provides a foundation for assessing these connections. Clark and Wells (1995) propose that specific maladaptive thoughts that occur during social-evaluative situations maintain the experience of anxiety in those situations. The thought categories include *high standards*, such as needing everyone's approval, *conditional thoughts*, like, "If I make mistakes, others will reject me," and *unconditional thoughts*, such as viewing oneself as inferior to others. These thoughts guide behavior during social-evaluative interactions. If these thoughts occur alongside paranoia or MAP deficits, a person could experience any number of negative outcomes, such as repeated unpleasant social interactions, increased social anxiety, decreased attempts to socialize, increases in social rejection, and increased symptoms. As detailed below, the current study uses the model by Clark and Wells (1995) to understand beliefs and cognitions that may support the relation between positive and negative symptoms.

Paranoia, social anxiety, and related cognitions. Paranoid ideation has been shown to be associated with, but not on the same continuum as (Cooper, Klugman, Heimberg, Anglin, & Ellman, 2016), social anxiety in clinical and subclinical samples of adults and adolescents (Combs & Penn, 2004; Cooper et al., 2016; Gilbert, Boxall, Cheung, & Irons, 2005; Lysaker et al., 2010; Pisano et al., 2015; Tone, Goulding, & Compton, 2011) with one case study indicating a causal relation between social anxiety disorder and paranoid delusional disorder (Veras et al., 2015). Researchers suggest that,

in both clinical and non-clinical groups, paranoia may be preceded by both social anxiety and negative thoughts about the self (Freeman et al., 2005; Freeman et al., 2014; Freeman & Fowler, 2009). The model by Clark and Wells (1995) is a framework to explore whether negative thoughts about the self in a social context are related to paranoia given the social nature of paranoia. For example, Schutters et al. (2012) measured fear of negative evaluation, a concept related to social anxiety, in the general population and found a relation between those cognitions and paranoia cross-sectionally and longitudinally. However, no research has been done to explore the relation between negative social self-beliefs and paranoia; thus, the current study explores this relation using the Clark and Wells (1995) model.

Negative symptoms, social anxiety, and related cognitions. Some research suggests a relation between social anxiety and negative symptoms (Blanchard, Mueser, & Bellack, 1998; Romm et al., 2011; Voges & Addington, 2005; Park et al., 2009), but not all studies have replicated this finding (Birchwood et al., 2006). Additionally, negative symptoms are not always found to differ in those with and without social anxiety (Romm et al., 2011; Sutliff et al., 2015). As discussed above, the use of a single aggregate index of negative symptoms may be problematic in these studies given that the facets of negative symptoms (MAP and expressivity) can be differentially related to other features of the illness.

Similar to the paranoia literature, the relation between negative thoughts about the self in a social context and negative symptoms has not been thoroughly examined. Fear of negative evaluation is one example of a social anxiety cognition that has been investigated in schizophrenia samples. When examining fear of negative evaluation,

Beck, Grant, Huh, Perivoliotis, and Chang (2013) found that individuals with deficit syndrome, or primary negative symptomatology, endorsed less fear of negative evaluation than non-deficit individuals. The interpretability of this finding is limited as it was obtained after controlling for depression and excluding individuals with elevated positive symptoms. However, Blanchard et al. (1998) found that self-reported social anhedonia (one feature of MAP negative symptoms) was robustly correlated with fear of negative evaluation in people with schizophrenia. The literature on this type of cognition is mixed, and there is no work examining other social anxiety cognitions and negative symptoms. Therefore, the current study uses the model proposed by Clark and Wells (1995) to probe this relation.

Trauma. Research suggests that rates of trauma are higher in individuals with severe mental illness, like schizophrenia, and that trauma history is related to increased psychopathology in people with mental illness (Mueser, Rosenberg, Goodman, & Trumbetta, 2002). In line with this research, Freeman and Fowler (2009) showed that experiencing at least one traumatic event is associated with a 2.5-times increase in the likelihood of experiencing persecutory delusions. In a nonclinical sample, Gracie et al. (2007) found a relation between trauma and paranoia mediated by negative self and other beliefs (supported by Fisher et al., 2012). Gracie and colleagues' (2007) work also suggests that number of traumas, rather than type, may be the stronger predictor of paranoia, and a study by Freeman, Pugh, Vorontsova, Antley, and Slater (2010) supported this claim in nonclinical and clinical groups. Freeman et al. (2011) found that severity of paranoia was associated with likelihood of posttraumatic stress disorder (PTSD) in the general population. Additionally, a substantial literature supports an

association between bullying in childhood and increased risk for psychosis as observed in children, first-episode samples, individuals with schizotypy, and adults with and without schizophrenia (Anilmis et al., 2015; Boden, Van Stockum, Horwood, & Fergusson, 2016; Cunningham, Hoy, & Shannon, 2015; Lopes, 2013; Trotta et al., 2013; Velikonja, Fisher, Mason, & Johnson, 2015), suggesting that even stressors that do not meet the criteria of a trauma may still lead to psychosis. Experiencing trauma seems to have a strong connection with developing paranoia in both clinical and nonclinical populations. To further unpack the relation between positive and negative symptoms, it would be valuable to understand how trauma may be related to negative symptoms as well.

The literature regarding negative symptoms and trauma history is mixed. Some researchers have not observed a relation between experience of childhood trauma and negative symptoms in adults with schizophrenia (Baudin et al., 2016; Misiak & Frydecka, 2016; Spence et al., 2006; Üçok & Bıkmaz, 2007), though others have observed this relation (Green et al., 2014; van Dam et al., 2015; Vogel et al., 2011). Other work has examined the relation between negative symptoms and symptoms of PTSD. In the literature, there is support for a significant relation between symptoms of PTSD and negative symptoms (McGorry et al., 1991; Priebe, Broker, & Gunkel, 1998; Üçok & Bıkmaz, 2007; van Dam et al., 2015) but others have not seen that relation (Duke, Allen, Ross, Strauss, & Schwartz, 2010; Harrison & Fowler, 2004; Lysaker & LaRocco, 2008; Meyer, Taiminen, Vuori, Äijälä, & Helenius, 1999; van Dam et al., 2015). Additionally, Vogel et al. (2011) found a link between negative symptoms on the SANS and the occurrence of childhood trauma. The findings regarding negative symptoms of schizophrenia and both history of trauma and PTSD symptoms are mixed; however, by

examining deficits in MAP, we may be able to parse these literatures and illuminate how positive and negative symptoms may be related through trauma.

Urbanicity. Urban dwelling has been considered an environmental risk factor for the emergence of both positive and negative symptoms in individuals with and without formal psychiatric diagnoses (van Os et al., 2002). Urbanicity can be measured from an epidemiological or local perspective. Epidemiological studies may measure urbanicity by number of inhabitants, population density, own-ethnic-group density, deprivation (e.g., income, employment, education, health), ethnic fragmentation, and social fragmentation (e.g., number of single homes, number of single individuals, and number of privately rented houses) (Kirkbride et al., 2007; Oher et al., 2014; Vassos, Pedersen, Murray, Collier, & Lewis, 2012). In contrast, studies evaluating the effects of local neighborhoods may measure urbanicity by social cohesion or social capital (Freeman et al., 2011). The current study uses the latter approach to understand how urbanicity is related to positive and negative symptoms.

Most of the work examining urbanicity in schizophrenia has either focused on incidence rates of schizophrenia rather than on individual symptoms (O'Donoghue et al., 2016; O'Donoghue, Roche, & Lane, 2016; Tizón et al., 2009) or on population density rather than on neighborhood-level characteristics. Some of the studies examining incidence rates have found that neighborhood characteristics, such as crime, predict higher rates of incidence (Bhavsar, Boydell, Murray, & Power, 2014; Newbury et al., 2016). Research exploring factors that influence assessment of psychosis in urban areas also found that neighborhood crime predicted suspiciousness (Wilson et al., 2016). Other studies show that social fragmentation and disorganization predict incidence (Allardyce

et al., 2005; Veling, Susser, Selten, & Hoek, 2015). However, no studies have examined the role of neighborhood characteristics, like safety, violence, social cohesion, or neighborhood socialization (e.g., relationships with neighbors), on symptoms. Therefore, the current study uses a self-report measure of neighborhood characteristics to probe these relations with paranoia and MAP deficits.

An RDoC Approach

In the abovementioned literatures, most of the samples are comprised of individuals with diagnoses of schizophrenia and schizoaffective disorder. Traditionally, psychiatry has organized mental illness and diagnoses using apparent symptom clusters (Insel, 2014). However, psychiatry and psychology research communities have raised concerns about the heterogeneity within and similarity across diagnostic classes. Critics suggest that the knowledge that has grown from these categorical diagnoses does not reflect the true nature of mental disorder (Insel, 2014). Additionally, many diagnoses are not linked to an etiopathophysiology, which limits how well we can understand, and ultimately treat, mental disorders (Carpenter, 2013). To address these concerns, the National Institute of Mental Health proposed the RDoC initiative, which is intended to encourage research that examines mental health phenomena from the angle of shared factors across diagnoses and levels of analysis rather than examining those factors within the confines of categories (Insel et al., 2010). Using five factors (positive affect, negative affect, cognition, social processes, and arousal/regulation) across six units of analysis (genes, molecules, cells, circuits, behavior, and self-report), scientists can take a dimensional approach to reorganizing conceptualizations of mental illness.

The current study is embedded within a grant-funded RDoC project investigating a) whether individuals with psychosis can create new social affiliative bonds in a laboratory setting, b) whether these bonds can mitigate the neural activation of threat anticipation in people with psychosis, and c) whether these bonds are effective in motivating performance compared to money on a computer task. The present study examines paranoia, MAP deficits, anxiety cognitions, trauma, and the environment across the full psychosis spectrum, which is a novel research investigation in line with the recommendations of the RDoC initiative. Following the design of the larger study, we have included a sample of healthy controls to ensure that we have representation of the full range of psychosis, negative symptoms, and functioning within dimensional analyses.

There is already evidence that both psychosis and anhedonia exist across classical diagnostic boundaries (Bedwell, Gooding, Chan, & Trachik, 2014; Freeman et al., 2011), and the current work is line with the field's goal of further examining the similarities across diagnostic categories that include psychosis. Over time, this work and other work related to the RDoC initiative will aid researchers and clinicians in improving conceptualizations of mental illness.

Summary and Hypotheses

Researchers have observed a relation between positive and negative symptoms of schizophrenia, but the nature of this association is unclear given the use of overly broad symptom domains and the failure to examine possible common underlying contributors. The current study will look more closely at this relation by examining the effects of social anxiety and cognitions, trauma, and urbanicity among individuals across the psychosis spectrum. We hypothesize that a) negative symptoms of MAP will be

positively correlated with paranoia (Figure 3); b) paranoia will be positively associated with social anxiety and social anxiety cognitions, number of traumas, and urbanicity (Figure 4); c) MAP negative symptoms will be positively associated with social anxiety and related cognitions, number of traumas, and urbanicity (Figure 5); and d) social anxiety and related cognitions, number of traumas, and urbanicity will moderate the relation between paranoia and MAP negative symptoms (Figure 6). We will also assess the extent to which the above associations are unique to paranoia and MAP negative symptoms by examining the role of non-paranoid positive symptoms and expressive negative symptom in these relationships.

Method

This study is embedded in a larger study examining social affiliation in psychosis.

Participants

We recruited 44 participants: 38 clinical participants with psychotic disorders from outpatient clinics at the University of Maryland, School of Medicine and 6 healthy community controls (matched to clinical sample on age, gender, ethnicity, and parental education) from newspaper ads and flyers. The proportion of the sample that is nonclinical (14%) closely mirrors the sample composition of the parent grant (15% nonclinical). Selection criteria for all participants include a) age 18–60 years, b) able to understand English, c) no seizures or clinically significant neurological disease (e.g., epilepsy), d) no history of serious head injury or loss of consciousness due to head injury, e) no sedatives or benzodiazepines within 12 hours of testing, f) no history of intellectual disability or developmental disability, and g) no magnetic resonance imaging contraindications (for the parent study). For clinical participants, selection criteria include a) a referral from outpatient clinician, b) a lifetime history of a psychotic disorder (e.g., schizophrenia, schizoaffective disorder, delusional disorder, bipolar disorder, or major depression with psychotic features), c) clinically stable (i.e., no inpatient hospitalizations for 3 months before enrollment, no changes in psychoactive medication in the 4 weeks before enrollment), d) no substance or alcohol dependence in the past 6 months, and e) no evidence of substance or alcohol abuse in the past month. Community controls cannot have a current clinical disorder, history of psychotic or mood disorder, or avoidant, paranoid, schizotypal or schizoid personality disorder.

Measures

Clinical Assessment Interview for Negative Symptoms (CAINS; Kring et al., 2013). The CAINS is a 13-item clinician-rated interview assessing MAP (e.g., desire for close relationships) and expression (EXP; e.g., expressive gestures). All items are rated on a scale from 0 (*No impairment*) to 4 (*Severe deficit*) and are summed to create a total score. Each point on the scale is accompanied by a brief description of the meaning of that point for that item (e.g., for Item 1 – Motivation for Close Family/Spouse/Partner Relationships, 4 = Severe deficit: No interest in family relationships and does not consider them at all important. Prefers to be alone and is not at all motivated to be with family. If person does see family, it is done so grudgingly, passively and with no interest.). The CAINS has exhibited high inter-rater agreement (ICCs of 0.93 for MAP and 0.77 for EXP), good internal consistency (Cronbach's alpha for overall scale = 0.76, MAP = 0.74, and EXP = 0.88), and good convergent and discriminant validity in schizophrenia/schizoaffective patient samples (Kring et al., 2013). See Appendix A.

Brief Psychiatric Rating Scale (BPRS; Ventura et al., 1993). The BPRS is a 24-item clinician-rated interview measure assessing symptoms experienced over the previous week and assesses positive symptoms. Each item has a description (e.g., for suspiciousness, "Expressed or apparent belief that other persons have acted maliciously or with discriminatory intent. Include persecution by supernatural or other nonhuman agencies (e.g., the devil). Note: Ratings of '3' or above should also be rated under Unusual Thought Content.") and a set of questions to determine the appropriate rating (e.g., for suspiciousness, "Did you ever feel uncomfortable in public? Did it seem as though others are watching you? Are you concerned about anyone's intentions toward

you?"). Each item is scored on a scale from 1 (*Not present*) to 7 (*Extremely severe*); items are summed to compute a total score. To facilitate rating, there are specific descriptions for each anchor (e.g., for a 3 (mild) on suspiciousness, "Describes incidents in which others have harmed or wanted to harm him/her that sound plausible. Respondent feels as if others are watching, laughing, or criticizing him/her in public, but this occurs only occasionally or rarely. Little or no preoccupation"). The Positive Symptoms subscale includes grandiosity, bizarre behavior, unusual thoughts, hallucinations, disorientation, suspiciousness, and conceptual disorganization. The BPRS evidences good reliability and validity and is one of the most frequently used psychiatric scales in schizophrenia samples (Kay, 1990; Shafer, 2005). See Appendix B.

Green et al. Paranoid Thought Scales (GPTS; Green et al., 2008). The GPTS is a 32-item self-report measure of paranoid thinking over the past month. Part A assesses ideas of reference (e.g., "People definitely laughed at me behind my back," "I was worried by people's undue interest in me"). Part B assesses ideas of persecution (e.g., "People have intended me harm", "I was convinced there was a conspiracy against me"). Each item is rated on a 5-point Likert-type scale ranging from 1 (*not at all*) to 5 (*totally*) and can be totaled for subscale and overall scores. The internal consistency of the scale and test–retest reliability are good. Convergent validity has been shown with the Paranoia Scale (Fenigstein & Vanable, 1992). See Appendix C.

Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998). The SIAS is a 19-item self-report questionnaire that assesses fears associated with social interactions. Participants rate each item (e.g., "I become tense if I have to talk about myself or my feelings") on a 4-point Likert scale from 0 (*Not at all true of me*) to 4 (*Extremely true of*

me), summed to create a total score. This scale exhibited high levels of internal consistency (Cronbach's alpha ranged from .88 to .94) and high test-retest reliability (.92 for both 4- and 12-week periods) (Mattick & Clarke, 1998). Validity was also high, with strong discriminant validity among clinical groups and across clinical and non-clinical groups and high construct validity (Mattick & Clarke, 1998). Past research in samples with psychosis used a clinical cutoff score of 36.

Unfortunately, the measure that was included in the parent study was missing one item, "I find it easy to make friends my own age." Therefore, as the omission of this item may affect the reliability and validity of this measure, we use it with caution. See Appendix D.

Self-Beliefs Related to Social Anxiety Scale (SBSA; Wong & Moulds, 2009). The SBSA is a 15-item self-report measure of beliefs about the self in a social context (e.g., "If I make a mistake, others will reject me."). It includes items that tap three belief types—excessively high standards for social performance, conditional beliefs concerning social evaluation, and unconditional beliefs about the self. Participants rate their agreement with each item using an 11-point Likert-type scale from 0 (*do not agree at all*) to 10 (*strongly agree*), and items are added to yield subscale and total scores. There is no clinical cutoff score reported in the literature. This measure has been shown to have good internal consistency, test-retest reliability, discriminant validity, and convergent validity (Wong, Moulds, & Rapee, 2014). Wong & Moulds (2009) conducted a CFA that replicated a three-factor solution presented in previous research; this solution aligns with the original model by Clark and Wells (1995). See Appendix E.

Trauma History Questionnaire (THQ; Hooper, Stockton, Krupnick, & Green, 2011). The self-report THQ has 24 items assessing crime experiences (e.g., "Has anyone ever attempted to rob you or actually robbed you (i.e., stolen your personal belongings)?"), general disaster and trauma (e.g., "Have you ever had a serious or life-threatening illness?"), and physical and sexual experiences (e.g., "Has anyone, including family members or friends, ever attacked you with a gun, knife, or some other weapon?"). We chose to use the optional catchall item because our participants listed events that have been considered traumatic, like first-episode psychosis (Mueser, Lu, Rosenberg, & Wolfe, 2010) and homelessness (Goodman, Saxe, & Harvey, 1991). Frequency and age at the time of the event is assessed for all endorsed items. Test-retest reliability was found to be moderate to high in an SMI sample (Mueser et al., 2002), and the scale showed strong relations with other trauma measures and with expected outcomes of trauma (Hooper et al., 2011). The total number of types of traumatic events reported (i.e., crime, general disaster and trauma, and physical and sexual experiences) is shown to have good test-retest reliability despite participants varying where they categorize individual traumatic events, and it is the most common scoring convention (Hooper et al., 2011). See Appendix F.

Neighborhood Health Questionnaire (Mujahid et al., 2007). This 19-item self-report scale measures neighborhood safety (e.g., "I feel safe walking in my neighborhood, day or night") rated from 1 (*Strongly agree*) to 5 (*Strongly disagree*), violence (e.g., "During the past 6 months, how often was there a fight in your neighborhood in which a weapon was used?") rated from 1 (*Often*) to 4 (*Never*), social cohesion (e.g., "People around here are willing to help their neighbors") rated from 1

(*Strongly disagree*) to 5 (*Strongly agree*), and activities with neighbors (e.g., "How often do you and other people in your neighborhood visit in each other's homes or speak with each other on the street?") rated from 1 (*Often*) to 4 (*Never*) with items averaged to create subscale scores. This measure has shown high internal consistency and test-retest reliability (Mujahid et al., 2007). See Appendix G.

Procedure

All data were collected during the first study visit either in Baltimore, Rockville, or Silver Spring, MD. See Figure 10 for a recruitment consort chart. Participants completed all measures with trained Master's-level research staff who were blind to group status and community functioning.

Data Analysis Plan

We examined kurtosis and skewness of the dependent variables, examined missing data patterns, and then tested our four hypotheses.

Hypothesis A (negative symptoms of MAP will be positively correlated with paranoia; Figure 3): We performed a correlation between paranoia from the GPTS Total and motivation and pleasure negative symptoms from the CAINS MAP. We then planned to perform exploratory analyses using partial correlations to understand any effects of confounding variables such as other positive symptoms (including grandiosity, bizarre behavior, unusual thoughts, hallucinations, disorientation, and conceptual disorganization from the BPRS), expressivity deficits (EXP from the CAINS), and depression from the BPRS in the correlation between paranoia and MAP.

Hypothesis B (paranoia will be positively associated with social anxiety and social anxiety cognitions, history of trauma, and urbanicity; Figure 4): We performed correlations to test the relation between paranoia from the GPTS and social anxiety and related beliefs (SIAS total and SBSA total), number of traumas (THQ), and urbanicity (NHQ subscales).

Hypothesis C (MAP negative symptoms will be positively associated with social anxiety and related cognitions, history of trauma, and urbanicity; Figure 5): We used correlations to determine whether MAP is related to social anxiety and related beliefs (SIAS total and SBSA total), number of traumas (THQ), and urbanicity (NHQ subscales).

Hypothesis D (social anxiety and related cognitions, number of traumas, and urbanicity will moderate the relation between paranoia and MAP negative symptoms; Figure 6): We planned to explore whether social anxiety and related cognitions (SIAS total and SBSA total), number of traumas (THQ), and urbanicity (NHQ subscales) moderate the relation between GPTS and CAINS MAP using linear multiple regression.

Results

See Table 1 for demographic information and Table 2 descriptive information. Groups were significantly different on gender with all the women in the psychosis group. The diagnostic representation in the current sample is as follows: schizophrenia (16, 36.4%), schizoaffective bipolar type (7, 15.9%), schizoaffective depressive type (5, 11.4%), bipolar I with psychotic features (5, 11.4%), major depressive disorder with psychotic features (4, 9.1%), delusional disorder (1, 2.3%), and 13.6% without a psychiatric diagnosis. See Table 8 for observed and possible score ranges of each measure.

Using a guideline of +/- 3.0, skewness was outside the bounds of normality for the BPRS Positive Symptoms Total score, which was positively skewed as most participants endorsed low levels of positive symptoms. There were outliers in the THQ measure of instances of trauma (one person viewed 48 dead bodies as a cemetery worker; another person had 56 exposures to radioactive chemicals, 240 instances of self-torture, and 24 psychotic episodes); rather than remove these individuals or apply an arbitrary rule to standardize their responses, we chose instead to examine number of types of traumas instead of number of instances of trauma.

We also examined missing data patterns and observed seven missing values across six cases on the GPTS and NHQ Social Cohesion. We used mean replacement for these missing data points. Finally, only nine out of our 44 participants met the clinical cutoff score for the SIAS, indicating low levels of social anxiety in this sample.

Reliability of Measures

See Table 3 for reliability values and item *n*s. A coefficient of .70 or high is considered acceptable (Cohen, 1988). For the THQ, we conducted the Kuder-Richardson Formula 20, which is a measure of internal consistency for dichotomous scales. Reliability for the total score was adequate; however, the subscales exhibited poor reliability. Analyses with these variables should be interpreted with caution.

Hypothesis A: Paranoia and MAP deficits

A Pearson correlation between paranoia (GPTS Total) and motivation and pleasure deficits (CAINS MAP) revealed a non-significant relation between the variables (r = -0.11, p = .46). Due to this null result, we did not conduct exploratory partial correlations. We also could not replicate the finding from Kring et al. (2013) and Blanchard et al. (2017)—the correlation between BPRS Positive Symptoms and CAINS MAP was non-significant (r = -0.02, p = .91). See Table 4.

Hypothesis B: Paranoia and Interpersonal Variables

To test the relation between paranoia (GPTS) and social anxiety and related beliefs (SIAS total and SBSA total), number of traumas (THQ), and urbanicity (NHQ subscales), we performed Pearson correlations. GPTS Total was significantly related to SIAS Total (r = 0.31, p = .04), SBSA Total (r = 0.44, p = .003), and THQ Total (r = 0.31, p = .04). The relation between GPTS Total and NHQ subscales was not significant (Safety: r = 0.12, p = .44; Violence: r = -0.22, p = .15; Social Cohesion: r = 0.28, p = .07; Activities with Neighbors: r = -0.04, p = .82). See Table 4 and Figure 7.

Hypothesis C: MAP deficits and Interpersonal Variables

We used Pearson correlations to determine whether deficits in motivation and pleasure (CAINS MAP) is related to social anxiety and related beliefs (SIAS total and SBSA total), number of traumas (THQ), and urbanicity (NHQ subscales). CAINS MAP was not significantly related to SIAS Total (r = 0.27, p = .08), SBSA Total (r = -0.02, p = .91), THQ Total (r = 0.15, p = .32), NHQ Safety (r = -0.11, p = .48), NHQ Violence (r = 0.19, p = .22), and NHQ Social Cohesion (r = -0.18, p = .24). The correlation between CAINS MAP and NHQ Activities with Neighbors was significant (r = 0.42, p = .004). See Table 4 and Figure 8.

Hypothesis D: Moderation Tests

We examined whether social anxiety and related cognitions (SIAS total and SBSA total), number of traumas (THQ), and urbanicity (NHQ) moderate the relation between GPTS and CAINS MAP using linear multiple regressions. Both GPTS and MAP deficits served as the outcome variable, adjusting for multiple analyses. In the model regressing CAINS MAP onto GPTS Total and NHQ Activities with Neighbors, the interaction between GPTS Total and NHQ Activities with Neighbors was significant. Given the small sample size and large number of analyses, we do not have the statistical power to probe this interaction. However, we provide simple explanation of this interaction for basic interpretation of these results. According to the Johnson-Neyman approach for probing interactions, the level of the moderator NHQ Activities with Neighbors at which the interaction becomes significant is 2.95, a region of scores that represents responses of "*Rarely*" or "*Never*" in terms of frequency of interaction with neighbors. In other words, GPTS predicts CAINS MAP only for individuals who have

very little interactions with their neighbors. See Tables 6 and 7 for moderation statistics and Figure 9 for interaction.

Exploratory Analyses

Because several of the measures of interest have subscales that may provide a fuller understanding of how positive and negative symptoms are related, we conducted exploratory analyses using these subscales for each of the four hypotheses. We used a lenient application of the Bonferroni correction. Hypothesis A required two correlations, so we adjusted alpha to .025; Hypothesis B had 22 correlations, thus alpha was .002; we conducted 6 correlations for Hypothesis C, therefore alpha was .008. See Table 5 for exploratory correlations. GPTS Social Reference was significantly correlated with SBSA Unconditional Beliefs.

Regarding urbanicity, we used the Rural-Urban Continuum Codes from the USDA Economic Research Service (United States Department of Agriculture) to examine any differences in population across zip codes. These codes rank each zip code from *1 – 9* based on population data from the 2010 U.S. Census. All zip codes in the current sample had a rank of 1, meaning all of them were in metro areas with a population of 1 million or more. Therefore, there was not sufficient variance to conduct urbanicity analyses using these population rankings.

We were interested in examining the correlation between CAINS MAP, GPTS Total, and BPRS Positive Symptoms in the subsample of participants on the schizophrenia spectrum, including those with schizophrenia, schizoaffective disorder bipolar type, and schizoaffective disorder depressive type (n = 28). Again, the correlation between GPTS Total and CAINS MAP was non-significant (r = -0.03, p = .86) as well as

the correlation between BPRS Positive Symptoms and CAINS MAP (r = -0.02, p = .91). Means and standard deviations for this subsample are presented in the Note of Table 2. For additional information about suspiciousness in the general sample, please see the Note in Table 2.

Discussion

The current study is the first to explore how two major symptom categories of schizophrenia—positive and negative symptoms—may be related in a transdiagnostic sample of individuals with psychosis. Specifically, extant literature suggested that paranoia, a positive symptom, and deficits in motivation and pleasure, a negative symptom, are related in schizophrenia samples. This study sought to directly examine that relation and explore potential moderators of it. This novel work is aligned with the RDoC initiative, which encourages researchers to assess mental health phenomena across traditional diagnostic bounds.

Hypothesis A: Paranoia and Motivation and Pleasure Deficits

Previous work has found significant correlations (representing small to moderate effect sizes) between total positive symptoms and CAINS MAP negative symptoms (Blanchard et al. 2017; Kring et al., 2013), and other research suggested that paranoia might be related to negative symptoms (Blanchard et al., 2011; Kirkpatrick, 2014). However, we did not observe significant relations between paranoia (GPTS Total and subscales of Self-Reference and Persecution) or general positive symptoms (BPRS Positive Symptoms subscale) and deficits in motivation and pleasure (all correlation sizes were small).

Ratings of positive symptoms on both the GPTS and the BPRS were very low (the average GPTS Total score was 53, though the maximum for the measure is 160; three quarters of the sample endorsed no or very mild levels of suspiciousness on the BPRS), which may have reduced the relation between these variables and CAINS MAP. Previous studies (Blanchard et al., 2017; Kring et al., 2013) may have observed higher ratings of

paranoia. Kring et al. (2013) did not report the mean and standard deviation of positive symptoms in their study, and Blanchard et al. (2017) used the PANSS to measure positive symptoms, reporting a mean of 10.48 and standard deviation of 4.20. The range for this subscale is 7-49; therefore, positive symptoms were relatively low in their sample as well. Compared to other studies using the GPTS, our means for the total and subscales are about half of what the developers observed in a transdiagnostic sample of people with psychosis and at least one persecutory delusion (Green et al., 2008); similar to a sample of people with a schizophrenia-spectrum disorder (Fett et al., 2012); and similar to scores from a small pilot sample with first-episode psychosis (Veling, Brinkman, Dorrestijn, & van der Gaag, 2014).

Regarding rates of paranoia in other diagnoses, researchers looking specifically at those with major depressive disorder with psychotic features observed that 44% of their sample experienced persecutory delusions (Frangos, Athanassenas, Tsitourides, Psilolignos, & Katsanou, 1983). Additionally, Goodwin and Jamison (1990) reported that 28% of individuals in a manic episode endorsed persecutory delusions. Therefore, compared to the rates found in the literature, rates of paranoia in our sample appear to be very low, and this restricted range may have led to attenuated correlations. Though the low levels of paranoia do not appear to be driven by the nonclinical portion of the sample, they may be due to exclusion criteria such as clinical stability, which prevents recruitment of any individuals who have been hospitalized in the past 3 months.

Similarly, deficits in motivation and pleasure appear to be lower in the current sample than in prior studies. The mean for the CAINS MAP in Blanchard et al. (2017) was 16.80, nearly twice the mean for the current sample. Additionally, deficits in

motivation and pleasure may not be present in this sample because of selection criteria for clinical stability. For example, in major depressive disorder with psychotic features, people may only report deficits in motivation and pleasure while experiencing a major depressive episode (for an illustration of this idea with anhedonia in major depression versus schizophrenia, see Blanchard et al., 1998). Given that this sample is clinically stable, it is possible that some of our participants were not currently experiencing deficits in motivation and pleasure.

In addition to restricted range of these variables, the transdiagnostic nature of our sample may have obscured the relation between positive and negative symptoms, a relation that may be limited to the schizophrenia spectrum. Other researchers have observed a relation between motivation and pleasure negative symptoms and positive symptoms in mixed samples of people with schizophrenia, schizoaffective disorder, or schizophreniform disorder (Blanchard et al., 2017; Kring et al., 2013); however, when only looking at individuals on the schizophrenia spectrum in the current sample, the relation between paranoia or positive symptoms and deficits in motivation and pleasure was still not significant.

Hypothesis B: Paranoia and Interpersonal Variables

Paranoia and social anxiety cognitions. Paranoia (GPTS Total) was significantly related to social anxiety (SIAS Total, SBSA Total) with small to medium effect sizes. This relation between paranoia and social anxiety cognitions is consistent with the growing literature supporting the association between paranoia and social anxiety (Combs & Penn, 2004; Cooper et al., 2016; Gilbert et al., 2005; Lysaker et al.,

2010; Pisano et al., 2015; Tone et al., 2011), although research shows they are not on the same continuum (Cooper et al., 2016).

SIAS. The SIAS Total was significantly correlated with the GPTS Total, and although the SIAS Total was not significantly correlated with the subscales of the GPTS, both of those effect sizes were between small and medium. Therefore, it seems that GPTS Social Reference and GPTS Persecution are both associated with SIAS Total to a similar degree. The SIAS measures tension and difficulty while interacting with others, and the GPTS Total captures feelings of fear and tension regarding perceptions of treatment by others, thus they seem to be capturing similar experiences. It should be noted that most of our sample did not reach the clinical cutoff for social anxiety on the SIAS, despite other samples of individuals with psychosis reaching clinically high levels of social anxiety on the SIAS (e.g., Michail & Birchwood, 2013).

Two correlates of social anxiety as measured by the SIAS are fear of negative evaluation and fear of positive evaluation (Rodebaugh, Weeks, Gordon, Langer, & Heimberg, 2012). Although Clark and Wells (1995) posit that fear of negative evaluation anchors social anxiety, recent studies have revealed that fear of positive evaluation is also related to social anxiety and is separate from but related to fear of negative evaluation (Rodebaugh et al., 2012; Weeks, Heimberg, Rodebaugh, & Norton, 2008). Future research should examine how fear of positive evaluation is related to paranoia. For example, per interpretations by Weeks et al. (2008), a person with paranoid thinking, especially someone with ideas of social reference, may experience fear of positive evaluation, as they might believe that positive appraisals may evince jealously or malice from others, or they believe that they will be judged by higher unfair standards.

Continued examination of fear of positive and negative evaluation in transdiagnostic samples of people with psychosis would be especially informative as it would build the burgeoning literature on the connection between paranoia and social anxiety.

SBSA. To our knowledge, this is the first study to examine negative social self-beliefs via the SBSA in a sample of people with psychosis. Therefore, we discuss our finding in the context of previous work on the relation between negative thoughts about the self and paranoia (Freeman et al., 2005; Freeman et al., 2014; Freeman & Fowler, 2009) as well as work exploring the correlates of the SBSA.

In this study, we show that negative thoughts about oneself in social situations (e.g., "People think I'm boring," and "If I don't say something interesting, people won't like me") are related to paranoia, a new perspective on the relation between social anxiety and paranoia. Past work has shown that high levels of worry (comparable to levels found in generalized anxiety disorder) and rumination, negative self-schemas, interpersonal sensitivity, and anomalous internal experiences have also been associated with paranoia (Freeman & Garety, 2014). It may be interesting to explore how the social self-beliefs measured by the SBSA are related to worry, interpersonal sensitivity, and anomalous experiences in a sample of individuals with paranoia. These possible pathways to paranoia (Freeman & Garety, 2014) could contribute to anxiety-maintaining negative social self-beliefs, which may in turn contribute to paranoia.

Another study found that improving maladaptive self-beliefs as measured by the SBSA led to improvements in social anxiety, though the reverse was not true (Gregory, Wong, Marker, & Peters, 2018). Intervention studies could explore whether treatment of

negative social self-beliefs in individuals with co-occurring paranoia and social anxiety disorder might relieve both the social anxiety and the paranoia.

Exploratory analyses showed that the relation between GPTS Social Reference and SBSA Unconditional Beliefs was significant, providing even more nuanced comprehension of the relation between paranoia and social anxiety thoughts. Unconditional beliefs (e.g., "People think badly of me") are consistent and broad views that are activated during evaluative social encounters. These types of unequivocal negative self-views, which may be due to past negative social experiences (Wong et al., 2014), could provide a foundation for beliefs that one is the recipient of negative attention from others (e.g., ideas of social reference). Ideas of social reference (e.g., "I spent time thinking about friends gossiping about me") may also lead to unconditional beliefs: Individuals who frequently believe they have evidence that others are talking about them, for example, may begin to form a kind of schema that people in general do not like them. These two styles of thinking could exist for a person who perceives a hostile social world that specifically pertains to them.

There was not a significant association between GPTS subscales and SBSA High Standards. High standards include thoughts such as, "I have to convey a favorable impression," and "I must get everyone's approval." Wong et al. (2014) view this category of thoughts as a guide for behaving to gain acceptance or praise from others, whereas paranoid thoughts of social reference and persecution frame others as intending or causing emotional or social harm. Therefore, it seems that these two styles of thought are incompatible with one another. However, it may be possible that an individual who views others as mean may also want those people to like them in an attempt to mitigate the

exclusion or meanness. Future research should explore these possibilities. Given the null results between SBSA High Standards and GPTS subscales, it is possible that the relation between the total scores of GPTS and SBSA is driven by the significant correlation between GPTS Social Reference and SBSA Unconditional Beliefs.

Other studies examining self-beliefs related to social anxiety can shed light upon the current findings. In a sample of college students, rumination at baseline predicted Conditional Beliefs and Unconditional Beliefs but not High Standards on the SBSA at follow-up (Wong & Moulds, 2009). Providing more support to the association between rumination and negative social self-beliefs, findings from Wong and Moulds (2009) also indicate that rumination, a correlate of paranoia, is correlated with negative social self-beliefs. Thus, rumination may be another variable of interest in understanding how negative social self-beliefs and paranoia are connected.

Of note, a systematic review by Gkika, Wittkowski, and Wells (2018), found that High Standards and Conditional Beliefs from the SBSA were predictors of social anxiety; however, once post-event processing and self-focused attention were controlled for, this relation was no longer present, suggesting that other cognitive processing styles may play a mediating role. This provides yet another avenue for exploration in the relation between social anxiety and paranoia. Future research can examine whether documented cognitive processing styles present in paranoia (such as the Jumping to Conclusions bias; Freeman & Garety, 2014)) might mediate the relation between negative social self-beliefs and social anxiety in paranoia. In fact, Makkar and Grisham (2011) found that post-event processing in a nonclinical sample was associated with negative assumptions; therefore,

post-event processing should be further examined in the context of paranoia as another cognitive style that may promote paranoia.

Paranoia and trauma. Paranoia (GPTS Total) was significantly related to number of types of trauma (THQ Total) and represented a small to moderate effect size. Previous research has supported a relation between number of traumas and paranoia (Freeman et al., 2010; Freeman & Fowler, 2009), and findings from the current study are in line with this idea. As noted above, research shows that experiencing at least one traumatic event increases the likelihood of experiencing persecutory delusions by 2.5 times (Freeman & Fowler, 2009). Some research suggests that number of instances of trauma and not number of types of trauma are stronger predictors of paranoia (Freeman et al., 2010; Gracie et al., 2007); however; this study is in line with studies supporting that number of types of trauma is more relevant in predicting PTSD and symptom complexity (Breslau et al., 1998; Cloitre et al., 2009; Mueser et al., 1998). In a general sample of adults, Freeman and Fowler (2009) found that the relation between trauma history and paranoia, specifically the Persecution subscale of the GPTS, was mediated by anxiety, even after controlling for age, sex, ethnicity, socioeconomic status, intellectual functioning, and education. The authors explain that trauma causes anxiety, which can then build into paranoia (Freeman & Fowler, 2009). It may be interesting to explore whether this mediational pattern applies to variation in types of trauma in this population.

Paranoia and urbanicity. We did not observe a significant relation between paranoia and neighborhood characteristics of safety, violence, social cohesion, and activities with neighbors, and all correlation sizes for the NHQ subscales were small. The literature on neighborhood characteristics and paranoia is very limited—only one study

suggested that neighborhood crime predicted suspiciousness (Wilson et al., 2016), and most studies examined incidence rather than symptoms (O'Donoghue et al., 2016; O'Donoghue et al., 2016; Tizón et al., 2009). Therefore, more research is needed to understand how social and safety factors affect symptoms like paranoia as well as hallucinations, social amotivation, and anhedonia.

Two reviews of the literature on neighborhoods and health showed that depression is associated with various neighborhood-level characteristics including lower social cohesion, fewer activities with neighbors, increased violence, and high resident turnover (Diez Roux & Mair, 2010; Mair, Diez Roux, & Galea, 2008). Studies included in these reviews mostly focus on depression; therefore, there is a need for further research examining how other facets of mental health are related to neighborhood characteristics.

There is also some research to support the notion that higher social cohesion and neighborly support can exist despite high levels of violence and low safety: Shearer (2016) found that social neighborhood characteristics were more impactful than the physical environment when predicting neighborhood satisfaction and that subjective, rather than objective, assessments were stronger predictors of neighborhood satisfaction. This research is promising and should be included in the discussion of neighborhood environment and psychosis.

Hypothesis C: MAP Deficits and Interpersonal Variables

MAP and social anxiety. Our other hypotheses regarding deficits in motivation and pleasure were largely unsupported. The relation between motivation and pleasure deficits (CAINS MAP) and anxiety (SIAS Total) was marginally significant with a small effect size; however, MAP was not related to the SBSA variables. The literature

regarding negative symptoms and social anxiety is lacking. Beck et al. (2013) and Blanchard et al. (1998) examined fear of negative evaluation, one aspect of social anxiety, and its relation to negative symptoms and social anhedonia in a sample of people with schizophrenia, but they found conflicting results (i.e., fear of negative evaluation was positively and negatively related to negative symptoms). This may be due to the fact that Beck et al. (2013) examined the deficit syndrome in schizophrenia while Blanchard et al. (1998) examining social anhedonia in schizophrenia. Further examination of these relations with a larger transdiagnostic sample may shed more light on how MAP deficits are related to social anxiety beliefs.

MAP and trauma. MAP deficits were not related to trauma, a finding that adds to the mixed literature regarding the relation between trauma, PTSD, and negative symptoms of schizophrenia. As reviewed above, extant research is unclear regarding negative symptoms and trauma history, with many researchers observing no relation between experience of trauma and negative symptoms in adults with schizophrenia (Baudin et al., 2016; Misiak & Frydecka, 2016; Spence et al., 2006; Üçok & Bıkmaz, 2007; van Dam et al., 2015) and other researchers confirming this relation (Green et al., 2014; Vogel et al., 2011). Some work shows a significant relation between symptoms of PTSD and negative symptoms (Harrison & Fowler, 2004; McGorry et al., 1991; Meyer et al., 1999; Priebe et al., 1998; Üçok & Bıkmaz, 2007; van Dam et al., 2015) and other work does not (Duke et al., 2010; Lysaker & LaRocco, 2008; van Dam et al., 2015). Our findings show a null relation between deficits in motivation and pleasure and number of types of traumas. Morrison et al. (2003) discuss at length the similarities between positive and negative symptoms of psychosis and positive and negative symptoms of trauma:

Relevant to the current study is the overlap of social isolation in both diagnoses. Given this overlap, future research could examine the specific relation between negative symptoms of both disorders.

MAP and urbanicity. Analyses showed that the relation between CAINS MAP and NHQ Activities with Neighbors was significant with a large effect size. Individuals who endorsed less motivation and pleasure also had fewer interactions with neighbors. This finding replicates prior results showing a relation between CAINS MAP and poor social functioning (Blanchard et al., 2017), between a self-report version of the MAP and poor social functioning (Llerena et al., 2013), and between negative symptoms like social anhedonia and poor social skills (Addington & Addington, 1999; Bellack, Morrison, Wixted, & Mueser, 1990; Mueser, Bellack, Morrison, & Wixted, 1990). Research in this topic is growing: Kloos and Townley (2011) found that low neighborhood social climate was related to greater psychiatric disability, and Gonzales (2017) found that negative symptoms predicted community integration, which include neighborhood characteristics.

However, there are some points to consider regarding the interpretation of the correlation between MAP deficits and NHQ Activities with Neighbors. These constructs are very similar, thus, this correlation may reflect shared content across measures. For example, the NHQ subscale asks about frequency of visiting neighbors or speaking with them on the street and frequency of people in the neighborhood asking each other for advice about personal things. Several items on the CAINS MAP ask about pleasurable social interactions with family and friends, how often they occur, and if the person feels comfortable talking about the good and the bad with the family member or friend. Additionally, poor social skills have been documented in the schizophrenia literature

(e.g., Bellack et al., 1990), and it may be that social skill proficiency in our sample affects amount of interaction with neighbors. Future research should measure social skills in this type of sample to explore skill proficiency and its relation to socialization in neighborhoods. A final important consideration in interpreting this finding is that degree of violence and safety in one's neighborhood likely affects individuals' motivation, pleasure, and frequency of interacting with neighbors. Examining these particular neighborhood characteristics as they relate to deficits in motivation and social activity in future research may help to differentiate between psychiatric symptoms and rational behavior in violent neighborhoods.

Hypothesis D: Moderation

We conducted moderation analyses and found that the interaction between total paranoia and activities with neighbors was significant. Of note, our small sample size seriously limits power to assess and probe interactions, thus we can only interpret this finding in the context of a larger sample size.

Urbanicity

Exploratory analyses examined differences in symptom correlations based on zip code. This line of questioning is based in the substantial literature indicating higher rates of paranoia in more highly populated areas (Freeman et al., 2014). However, the current sample was recruited from a relatively small geographic area that is highly populated; therefore, all of the zip codes were associated with areas that had 1 million or more residents. Therefore, analyses could not be conducted using this measure of urbanicity.

Researchers have noted methodological limitations associated with using U.S. census data as a substitute for neighborhood characterization (Diez Roux, 2007): Because they are rough proxies, they lead to large measurement error; their broad nature prohibits analysis of factors specific to each neighborhood; and they do not allow measurement of person-level socioeconomic position, which is known to be associated with health and with neighborhood segregation. Therefore, measures of neighborhood characteristics should supplement census data when analyzing urbanicity. Moreover, Krabbendam and van Os (2005) highlight substantial variance associated with social isolation (i.e., social cohesion and safety) across neighborhoods; therefore, more granular examination of social neighborhood factors is warranted for understanding schizophrenia and related symptoms.

Limitations

The current study has limitations worth noting. The sample size of this study is small. This is an issue because we have less power to detect the correlations we hypothesized, which were of a small to medium magnitude. Additionally, we conducted many exploratory analyses, and although we corrected for increased Type I error using the Bonferroni method, it is nevertheless possible that our some of our findings are simply due to error. Therefore, hypotheses will be reexamined when the full sample size (N = 140) is obtained. This work is cross-sectional. Future studies should examine these hypotheses longitudinally, perhaps looking at people who have just experienced their first episode of psychosis. As with any study, the current project did not include many important variables that likely influence the relation between positive and negative symptoms, including migrant status, young age, insomnia (which can elevate negative

emotionality, mood dysregulation, and anomalous experiences), cannabis use, and other anxiety symptoms or experiences (e.g., phobias, panic, PTSD).

All of the women in our sample were in the clinical subgroup, which poses a potential issue for any analyses comparing the clinical and non-clinical groups, given the literature showing differences in mental health by gender (Hankin et al., 1998; Kawa et al., 2005; Ochoa, Usall, Cobo, Labad, & Kulkarni, 2012). In addition, there may have been bias in recruitment due to participants having to agree to complete two fMRI scans and endure muscle stimulations. It is possible that individuals who experience more paranoia may be less likely to agree to participate in such a study. Individuals with negative symptoms experience reduced motivation, thus it is possible that people with higher negative symptoms self-selected out of the study. Also, clinical heterogeneity in our sample may have reduced the degree of negative symptomatology present.

Medication use is an unavoidable complication when studying clinical disorders. One advantage of examining dimensional differences within a clinical sample is that many if not all participants will have some form of medication exposure and share other characteristics, including SES and effects of societal stigma, and this allows comparisons between individuals with comparable backgrounds while differing on the variable of interest. Reliability for the THQ subscales was low, thus results with these measures should be interpreted with caution. As discussed previously, rates of paranoia and MAP are low in this sample, which may have limited relations between these variables and other variables of interest.

For assessment of trauma using the THQ, we chose to examine number of types of trauma (i.e., four items for crime-related events, 13 items for general disaster and

trauma, and seven items physical and sexual experiences) rather than number of instances of each type of trauma. There is no standard scoring method for the THQ, so researchers can use the measure as needed (Hooper et al., 2011). This allowed us to maintain a full sample; however, we lost information regarding number of instances of trauma, meaning that an event that may have occurred repeatedly or chronically was given the same weight as an event that occurred only once and may have been less affecting. Use of self-report of paranoia, social anxiety, trauma, and urbanicity is a limitation to the current study. For example, it is possible that reports of persecutory delusions were related to the trauma and that individuals may misremember or incorrectly categorize traumatic experiences (Hooper et al., 2011).

As discussed above, we considered the possibility that using a transdiagnostic sample was obscuring results that may have been specific to schizophrenia-spectrum disorders per past research (Blanchard et al., 2017; Kring et al., 2013). Although additional analyses probing this possibility were also null, the impact of using a transdiagnostic sample should be considered. The current study is in line with RDoC in that we collected a transdiagnostic sample, but we still examined groups by diagnosis. Other research studying psychosis through an RDoC lens also used group analysis to compare individuals with and without psychosis (Bedwell et al., 2014) and to compare symptoms in one diagnosis to symptoms in another (Ford et al., 2014). Thus, RDoC is useful as a flexible guide both to explore dimensionality and compare traditional diagnostic groups. However, because of the transdiagnostic sample, we had less power to explore group differences because of our limited *n* in each group. Relatedly, we lose the power to examine more closely how paranoia differs between diagnoses. This question is

important as it speaks to one of the criticisms of RDoC—namely, that it does not acknowledge potentially real and important categorical differences across diagnoses (Wakefield, 2014). A large transdiagnostic sample would likely provide enough variance across and within groups such that dimensional and categorical analyses could be explored.

Future Directions

The current study provides many rich avenues for further testing. Although past literature has suggested a relation between positive and negative symptoms (Blanchard et al., 2017; Kring et al., 2013), the specific relation between paranoia and MAP deficits was not supported. Future research should examine how other positive symptoms, like hallucinations, might be related to other negative symptoms, like lack of expressivity, as it is yet unclear what is driving the previously observed correlations between positive and negative symptoms.

To parse the association between paranoia and social anxiety and related beliefs, future research should directly examine how worry, rumination, interpersonal sensitivity, and anomalous experiences (Freeman & Garety, 2014) are correlated with negative social self-beliefs (i.e., SBSA Total, High Standards, Conditional Beliefs, and Unconditional Beliefs). This type of examination would open the doors for discovery of moderators between paranoia and social anxiety beliefs. A longitudinal or experience sampling study would be especially enlightening as these designs could provide evidence for mediation of the relation between negative social self-beliefs and paranoia. An exploratory factor analysis would also help to specify how much these constructs overlap.

The stigma model of social anxiety in schizophrenia (Birchwood et al., 2006) may also help future research to illuminate correlates of paranoia. This model states that social anxiety in schizophrenia arises because of the shame of receiving a diagnosis and the fear of social rejection via stigma (Birchwood et al., 2006). The person is exposed to stigma against people with schizophrenia; they then become worried that someone will find out that they are part of that stigmatized group; if they are "found out," they fear losing social status (Birchwood et al., 2006). This process leads to hyperawareness of self during interactions, which means lack of attention on cues in the environment, including potential positive feedback (Birchwood et al., 2006). Finally, the person may become convinced that they have been "found out" and engage in safety behaviors, which may come across as odd to their interaction partner, and a feedback loop is then set into motion (Birchwood et al., 2006). Researchers should examine this process and shame cognitions (Michail & Birchwood, 2013) in a transdiagnostic sample of individuals with psychosis to explore whether paranoia is part of that feedback loop.

Regarding urbanicity, other measures for this construct, such as a number of houses in a zip code, household income by zip code (Chetty, Friedman, Saez, Turner, & Yagan, 2017), U.S. census tracts (4,000 per area), systematic social observation (Mair, Diez Roux, & Morenoff, 2010), and social information from the U.S. census, should be examined with these hypotheses in the future. Other variables relevant to neighborhood characteristics are age, race/ethnicity, and income (Mujahid et al., 2007). Mujahid and colleagues (2007) found that, after controlling for these variables, poverty was also associated with neighborhood characteristics, explaining most of the variance in safety, violence, and social cohesion.

Finally, several studies have begun to clarify the causal relation between urbanicity and schizophrenia—it appears to be conditional upon genetic liability (Krabbendam & van Os, 2005; Sariaslan et al., 2016; Sariaslan et al., 2015). Specifically, neither the causation hypothesis (that urbanicity causes increased incidence of schizophrenia) nor the selection hypothesis (that individuals at higher risk for developing schizophrenia are more likely to move to urban areas) is sufficient in explaining the association but rather it is an interaction of both environment and genes during childhood that increases incidence in adulthood (Krabbendam & van Os, 2005). Future studies should examine how genetic risk may interact with neighborhood characteristics like social cohesion and safety to affect paranoia.

Conclusion

The current study has provided unique perspectives on the relations between paranoia, other symptoms of psychosis, and social anxiety, as well as spurred several novel avenues of research regarding these and other constructs. This study has begun to uncover the specific nature of how paranoia is associated with social anxiety. Extant literature distinguishes these constructs from one another and also demonstrates how they affect one another. Going forward, it will be important to continue clarifying how cognitions related to social anxiety may maintain or otherwise affect paranoid thinking, from the most common benign versions to the most clinically severe.

The relation between paranoia and types of trauma can be further defined, especially regarding the range of severity of paranoia in both clinical and non-clinical populations. According to this study and the literature, it is unclear whether interpersonal or non-interpersonal traumas differentially affect paranoia and symptom complexity in

general. Relatedly, though this study did not reveal any significant relations between paranoia and neighborhood characteristics, it may be warranted to explore these relations in other more in-depth ways. For example, combining neighborhood characteristics with other measures of urbanicity could provide a rich picture of how feelings of interpersonal threat are related to neighborhood quality. This kind of analysis would also be useful for negative symptoms of motivation and pleasure.

Finally, this study was the first to examine these research questions in a transdiagnostic sample of people with psychosis. As researchers and clinicians continue to use the RDoC framework to generate new experiments and studies, we will learn more about the similarities between diagnoses that were previously viewed as separate. In the case of psychosis across various diagnoses, we can better understand how delusions and hallucinations form as well as how deficits in motivation and pleasure develop, thus providing a clearer understanding of the etiology of these experiences in different clinical contexts.

Appendix A: Clinical Assessment Interview for Negative Symptoms v1.0

Overall Introduction: In this interview, I'll be asking you some questions about things you have been doing over the past week. In the first section, I am going to ask you some questions about your family, romantic partners, and friends, including how motivated you have been to spend time with them and how you felt when you were around them.

I. SOCIAL (MOTIVATION & ENJOYMENT)

Ratings are based on two domains: A) Family relationships B) Friendships The item ratings are based on reports of the person's experiences, including the degree to which the person values and desires close social bonds and is motivated to seek out and sustain interactions with other people, and observable behaviors, namely, the extent to which the person initiates, actively engages in, and persists in interactions with others.

Item 1 Rating -- Family

0 = No impairment: VERY INTERESTED in and highly values close family bonds as one of the most important parts of life. Strongly desires and is highly motivated to be in contact with family. Regularly initiates and persists in interactions with family and actively engages in these interactions; good and bad times are openly discussed. Well within normal limits.

1 = Mild deficit: GENERALLY INTERESTED in and values close family bonds though response suggests some minor or questionable reduction. Generally desires and is motivated to maintain contact with family. Has a close relationship with family member(s) in which good and bad times can be discussed. Mild deficit in initiating and persisting in regular interactions with family – generally actively engaged when interactions occur.

2 = Moderate deficit: SOMEWHAT INTERESTED in family relationships and considers them somewhat important. May occasionally miss close connections with family but is only somewhat motivated to seek out interaction with family. Notable deficit in initiating and persistently engaging in interactions; discussion of good and bad times is limited. Interactions with family members may occur but are largely superficial and participation is best characterized as "going through the motions"; interactions are more likely initiated by family with mostly passive involvement of the person.

3 = Moderately severe deficit: LITTLE INTEREST in family relationships (could "take it or leave it") and does not describe family bonds as important. Describes hardly any motivation and minimal effort to have close family relationships. Rarely has discussion of good and bad times with family members. Contact and engagement with family is superficial and passive with almost all initiation and efforts to engage coming from others.

4 = Severe deficit: NO INTEREST in family relationships and does not consider them at all important. Prefers to be alone and is not at all motivated to be with family. If person does see family, it is done so grudgingly, passively and with no interest. **9 = Not**

rated: All relatives are deceased or dangerous, or person is raised in highly unstable conditions outside of a family context (e.g., frequently shifting to different foster homes or facilities) (Note: this rating should be used only in rare circumstances)

ITEM 2 Rating– Friendships

0 = No impairment: VERY INTERESTED in and highly values friendships as one of the most important parts of life. Strongly desires and is very motivated to engage in friendships. Regularly initiates and persists in interactions with friends and actively engages in these interactions; good and bad times are openly discussed. Well within normal limits.

1 = Mild deficit: GENERALLY INTERESTED in and values friendships though response suggests some minor or questionable reduction. Generally desires and is motivated to engage in friendships. Has friendships in which good and bad times can be discussed though this may be less consistent. Mild deficit in initiating or persistently engaging during interactions with friends. If no friends, misses friendships, is motivated to have friends, and makes efforts to seek out friends.

2 = Moderate deficit: SOMEWHAT INTERESTED in friendships and considers them somewhat important. May occasionally miss close connections with friends and is somewhat motivated to have friends. Notable deficit in initiating and persistently engaging in interactions; discussion of good and bad times is limited. Interactions with friends may occur but are largely superficial and participation is best characterized as "going through the motions"; interactions are initiated by others with mostly passive involvement of the person. If no friends, is only somewhat motivated to have friends and rarely if ever seeks our friends.

3 = Moderately severe deficit: LITTLE INTEREST in friendships (could "take it or leave it") and does not describe friends as important. Describes hardly any motivation to have friendships, and would just as soon be alone. Contact and engagement with friends is superficial and passive with almost all initiation and efforts to engage coming from others.

4 = Severe deficit: NO INTEREST in friendships and does not consider them at all important. Prefers to be alone and is not at all motivated to have friends.

Item 3 Rating – Frequency of pleasurable social activities

0 = No impairment: Pleasure experienced daily.

1 = Mild deficit: Pleasure experienced 5 - 6 days.

2 = Moderate deficit: Pleasure experienced 3 - 4 days.

3= Moderately severe deficit: Pleasure experienced 1 - 2 days.

4 = Severe deficit: No pleasure reported.

ITEM 4 Rating – Frequency of expected pleasurable social activities

0 = No impairment: Expecting 7 or more pleasurable experiences.

1 = Mild deficit: Expecting enjoyment from 5-6 pleasurable experiences.

2 = Moderate deficit: Expecting enjoyment from 3-4 pleasurable experiences.

3 = Moderately severe deficit: Expecting 1-2 pleasurable experiences.

4 = Severe deficit: Expecting NO pleasurable experiences.

II. VOCATIONAL (MOTIVATION AND ENJOYMENT)

The item ratings are based on reports of internal experiences, including the degree to which the person values and desires vocational activities and is motivated to seek out and sustain these activities, and observable behaviors, namely, the extent to which the person

initiates, actively engages in, and persists in vocational activities. Roles considered in this category include paid employment, volunteer work, caregiver for another person (not own children), or vocational rehabilitation-related activities.

Introduction: Now I am going to ask you some questions about work and school, including how motivated you have been for work or school activities and how you felt while doing these things over the past week. The item ratings are based on reports of internal experiences, including the degree to which the person values and desires productive work or school activities and is motivated to seek out and sustain these activities, and observable behaviors, namely, the extent to which the person initiates, actively engages in, and persists in work or school activities.

ITEM 5 Rating – Motivation for Work/vocational/school activities

0 = No impairment: Person is VERY MOTIVATED to seek out work or school, or new opportunities in work or school; initiates and persists in work, school, or job-seeking on a regular basis, well within normal limits.
1 = Mild deficit: Person is GENERALLY MOTIVATED to seek out work or school or new opportunities in work or school; a mild deficit in initiating and persisting; may report instances of initiating, but with moderate persistence.

2= Moderate deficit: Person is SOMEWHAT MOTIVATED to seek out work or school or new opportunities in work or school; notable deficit in initiating; may have initiated activities, but needed reminders on multiple occasions, and/or not initiated any new activities, and/or not persisted for very long.

3 = Moderately severe deficit: Person is only SLIGHTLY MOTIVATED to seek out work or school or new opportunities in work or school; significant deficit in initiating; may have needed constant reminders, and/or initiated a few activities; did not persist for very long.
4 = Severe deficit: Person is NOT AT ALL MOTIVATED to seek out work / school; nearly total lack of initiation and persistence in work, school, or job seeking. **9 = Not rated:** Person has been in the hospital, or has been on vacation/break from vocational role during the prior week.
ITEM 6 Rating – Frequency of expected pleasurable vocational activities
0 = No impairment: Expecting 7 or more pleasurable experiences.
1 = Mild deficit: Expecting enjoyment from 5-6 pleasurable experiences.
2 = Moderate deficit: Expecting enjoyment from 3-4 pleasurable experiences.
3 = Moderately severe deficit: Expecting 1-2 pleasurable experiences.
4 = Severe deficit: Expecting NO pleasurable experiences.
9 = Not rated: Will be on vacation/break from regular vocational role the following week.
III.RECREATION (MOTIVATION & ENJOYMENT)
The item ratings are based on reports of internal experiences, including the degree to which the person values and desires recreational activities and is motivated to seek out and sustain these activities, and observable behaviors, namely, the extent to which the person initiates, actively engages in, and persists in recreational activities.

Introduction: In the next section, I am going to ask you some questions about what you do in your free time – any hobbies or recreational activities. I will ask about your motivation and feelings about the things that you have done in your free time over the past week.

ITEM 7 Rating – Hobbies/recreation/pastimes

0 = No impairment: Person is VERY MOTIVATED to seek out hobbies and recreational activities; initiates and persists in hobbies and recreational activities on a regular basis, well within normal limits.
1 = Mild deficit: Person is GENERALLY MOTIVATED to seek out hobbies and recreational activities; a mild deficit in initiating and persisting; may report initiating hobbies, but with moderate persistence.
2= Moderate deficit: Person is SOMEWHAT MOTIVATED to seek out hobbies and recreational activities; notable deficit in initiating; may have initiated some activities and/or not persisted for very long. Others were somewhat more likely to initiate hobbies or activities.
3 = Moderately severe deficit: Person is only SLIGHTLY MOTIVATED to seek out hobbies and recreational activities; significant deficit in initiating and persisting; may have initiated a few activities and not persisted for very long. Others were much more likely to initiate hobbies or prompt initiation.
4 = Severe deficit: Person is NOT AT ALL MOTIVATED to seek out hobbies and recreational activities; nearly total lack of initiation and persistence in hobbies or recreational activities

ITEM 8 Rating– Frequency of pleasurable recreation past week

0 = No impairment: At least A FEW different types of pleasurable experiences, experienced daily.
1 = Mild deficit: At least A FEW different types of pleasurable experiences, experienced more days than not.
2 = Moderate deficit: 1 or 2 different types of pleasurable experiences, experienced more days than not.
3= Moderately severe deficit: 1 type of pleasurable experience, experienced on just a few days.
4 = Severe deficit: No pleasurable experiences.

ITEM 9 Rating – Frequency of expected pleasurable recreational activities

0 = No impairment: Expecting 7 or more pleasurable experiences.
1 = Mild deficit: Expecting enjoyment from 5-6 pleasurable experiences.
2 = Moderate deficit: Expecting enjoyment from 3-4 pleasurable experiences.
3 = Moderately severe deficit: Expecting 1-2 pleasurable experiences.
4 = Severe deficit: Expecting NO pleasurable experiences.

IV EXPRESSION

Note: all ratings are based on observations of behavior throughout the interview and responses to the specific emotional probe questions in this section. Be sure to ask questions that elicit BOTH positive and negative emotion. If the person does not respond to the prompts asking about emotional experiences, items can be rated based on the responses to other questions during the interview. At the end of the subscale, note the basis for the ratings.

ITEM 10 Rating – Facial Expression

0 = No impairment: WITHIN NORMAL LIMITS; frequent expressions throughout the interview.
1 = Mild deficit: MILD DECREASE in the frequency of facial expressions, with limited facial expressions during a few parts of the interview.
2= Moderate deficit: NOTABLE DECREASE in the frequency of facial expressions, with diminished facial expressions during several parts of the interview.
3 = Moderately severe deficit: SIGNIFICANT LACK of facial expressions, with only a few changes in facial expression throughout most of the interview.
4 = Severe deficit: NEARLY TOTAL LACK of facial expressions throughout the interview.

Item 11 Rating – Vocal Expression

0 = No impairment: WITHIN NORMAL LIMITS. Normal variation in vocal intonation across interview. Speech is expressive and animated.
1 = Mild deficit: MILD DECREASE in vocal intonation. Variation in intonation occurs with a limited intonation during a few parts of the interview.
2 = Moderate deficit: NOTABLE DECREASE in vocal intonation. Diminished intonation during several parts of the interview. Much of speech is lacking variability in intonation but prosodic changes occur in several parts of the interview.
3 = Moderately severe deficit: SIGNIFICANT LACK of vocal intonation with only a few changes in intonation throughout most of the interview. Most of speech is flat and lacking variability, only isolated instance of prosodic change
4 = Severe deficit: NEARLY TOTAL LACK OF change in vocal intonation with characteristic flat or monotone speech throughout the interview.

ITEM 12 Rating – Expressive Gestures

0 = No impairment: WITHIN NORMAL LIMITS; uses frequent gestures of the interview.
1 = Mild deficit: MILD DECREASE in the frequency of expressive gestures, with limited gestures in a few parts of the interview.
2= Moderate deficit: NOTABLE DECREASE in the frequency expressive gestures, with lack of gestures during several parts of the interview.
3 = Moderately severe deficit: SIGNIFICANT LACK of expressive gestures, with only a few gestures throughout most of the interview.
4 = Severe deficit: NEARLY TOTAL LACK of expressive gestures.

ITEM 13 Rating – Quantity of Speech

0 = No impairment: NORMAL AMOUNT of speech throughout the interview. Replies provide sufficient information with frequent spontaneous elaboration.
1 = Mild deficit: MILD DECREASE in the quantity of speech, with brief responses during a few parts of the interview.
2 = Moderate deficit: NOTABLE DECREASE in speech output, with brief responses during several parts of the interview.
3 = Moderately severe deficit: SIGNIFICANT LACK of speech, with very brief answers (only several words) in responses throughout most of the interview.
4 = Severe deficit: All or nearly all replies are one or two words throughout the entire interview.

Appendix B: Brief Psychiatric Rating Scale

SCALE ITEMS AND ANCHOR POINTS

Rate items 1-14 on the basis of patient's self-report. Note items 7, 12, and 13 are also rated on the basis of observed behavior. Items 15-24 are rated on the basis of observed behavior and speech. Provide examples.

1. Somatic Concern
2. Anxiety
3. Depression
4. Suicidality
5. Guilt
6. Hostility
7. Elevated Mood
8. Grandiosity
9. Suspiciousness
10. Hallucinations
11. Unusual Thought Content
12. Bizarre Behavior
13. Self-Neglect
14. Disorientation
15. Conceptual Disorganization
16. Blunted Affect
17. Emotional Withdrawal
18. Motor Retardation
19. Tension
20. Uncooperativeness
21. Excitement
22. Distractibility
23. Motor Hyperactivity
24. Mannerisms and Posturing

NA	1	2	3	4	5	6	7
Not Assessed	Not Present	Very Mild	Mild	Moderate	Moderately Severe	Severe	Extremely Severe

Sources of information (choose all applicable):

Patient Parents/Relatives

Mental health professionals Chart

Other (e.g., police report)

Explain here if validity of assessment is questionable:

Symptoms possibly substance-induced

Under reported due to lack of rapport

Patient uncooperative

Difficult to assess due to formal thought disorder

Other

Confidence in assessment

1 = not at all - 5 = very confident

Appendix C: Green Paranoid Thoughts Scale

Please read each of the statements carefully. They refer to thoughts and feelings you may have had about others over the last month. Think about the last month and indicate the extent of these feelings from 1 (Not at all) to 5 (Totally).
Please complete both Part A and Part B.
(N.B. Please do not rate items according to any experiences you may have had under the influence of drugs.)

Part A

1. I spent time thinking about friends gossiping about me 1 2 3 4 5
2. I often heard people referring to me 1 2 3 4 5
3. I have been upset by friends and colleagues judging me critically 1 2 3 4 5
4. People definitely laughed at me behind my back 1 2 3 4 5
5. I have been thinking a lot about people avoiding me 1 2 3 4 5
6. People have been dropping hints for me 1 2 3 4 5
7. I believed that certain people were not what they seemed 1 2 3 4 5
8. People talking about me behind my back upset me 1 2 3 4 5
9. I was convinced that people were singling me out 1 2 3 4 5
10. I was certain that people have followed me 1 2 3 4 5
11. Certain people were hostile towards me personally 1 2 3 4 5
12. People have been checking up on me 1 2 3 4 5
13. I was stressed out by people watching me 1 2 3 4 5
14. I was frustrated by people laughing at me 1 2 3 4 5
15. I was worried by people's undue interest in me 1 2 3 4 5
16. It was hard to stop thinking about people talking about me behind my back 1 2 3 4 5

Part B

1. Certain individuals have had it in for me 1 2 3 4 5
2. I have definitely been persecuted 1 2 3 4 5
3. People have intended me harm 1 2 3 4 5
4. People wanted me to feel threatened, so they stared at me 1 2 3 4 5
5. I was sure certain people did things in order to annoy me 1 2 3 4 5
6. I was convinced there was a conspiracy against me 1 2 3 4 5
7. I was sure someone wanted to hurt me 1 2 3 4 5
8. I was distressed by people wanting to harm me in some way 1 2 3 4 5
9. I was preoccupied with thoughts of people trying to upset me deliberately 1 2 3 4 5
10. I couldn't stop thinking about people wanting to confuse me 1 2 3 4 5
11. I was distressed by being persecuted 1 2 3 4 5
12. I was annoyed because others wanted to deliberately upset me 1 2 3 4 5
13. The thought that people were persecuting me played on my mind 1 2 3 4 5
14. It was difficult to stop thinking about people wanting to make me feel bad 1 2 3 4 5
15. People have been hostile towards me on purpose 1 2 3 4 5
16. I was angry that someone wanted to hurt me 1 2 3 4 5

Appendix D: Social Interaction Anxiety Scale

Instructions:

Indicate the degree to which you feel the statement is characteristic or true of you. Please respond to all the items; do not leave any blank. Choose only one response to each statement. Please be as accurate and honest as you can be. Respond to each item as if it were the only item. That is, don't worry about being "consistent" in your responses. Choose from the following five response options:

0	1	2	3	4
Not at all	**Slightly**	**Moderately**	**Very**	**Extremely**

……

1. I get nervous if I have to speak with someone in authority (teacher, boss, etc.).
   0 1 2 3 4

2. I have difficulty making eye-contact with others. 0
   1 2 3 4

3. I become tense if I have to talk about myself or my feelings. 0
   1 2 3 4

4. I find difficulty mixing comfortably with the people I work with. 0
   1 2 3 4

5. I tense-up if I meet an acquaintance in the street. 0
   1 2 3 4

6. When mixing socially, I am uncomfortable. 0
   1 2 3 4

7. I feel tense if I am alone with just one other person. 0
   1 2 3 4

8. I am at ease meeting people at parties, etc. 0
   1 2 3 4

9. I have difficulty talking with other people. 0
   1 2 3 4

10. I find it easy to think of things to talk about. 0
    1 2 3 4

11. I worry about expressing myself in case I appear awkward. 0
1 2 3 4

12. I find it difficult to disagree with another's point of view. 0
1 2 3 4

13. I have difficulty talking to attractive persons of the opposite sex 0
1 2 3 4

14. I find myself worrying that I won't know what to say in social situations.
0 1 2 3 4

15. I am nervous mixing with people I don't know well.
0 1 2 3 4

16. I feel I'll say something embarrassing while talking.
0 1 2 3 4

17. When mixing in a group, I find myself worrying I will be ignored.
0 1 2 3 4

18. I am tense mixing in a group.
0 1 2 3 4

19. I am unsure whether to greet someone I only know slightly.
0 1 2 3 4

Appendix E: Self-Beliefs Related to Social Anxiety Scale

I would like you to rate, on a 0–10 scale, **how strongly you agree with each of the following statements right now (that is, at the present moment)**, where 0 = 'I do not agree at all with this statement' and 10 = 'I strongly agree with this statement'. There are no right or wrong answers. **Please read each item carefully** before circling your answer.

1. If I make mistakes others will reject me

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

2. People think I'm boring

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

3. If people don't accept me, I'm worthless

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

4. I have to appear intelligent and witty

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

5. If someone doesn't like me, it must be my fault

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

6. People think badly of me

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

7. I have to convey a favorable impression

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

8. If people know I'm anxious, they will think I'm weak

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

9. People think I'm inferior

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

10. If I don't get everything right, I'll be rejected

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

11. I must get everyone's approval

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

12. If people see me anxious, they'll put me down

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

13. If I don't say something interesting, people won't like me

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

14. People don't respect me

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

15. I need to be liked by everyone

0 1 2 3 4 5 6 7 8 9 10

Do not agree at all Strongly agree

Appendix F: Trauma History Questionnaire

The following is a series of questions about serious or traumatic life events. These types of events actually occur with some regularity, although we would like to believe they are rare, and they affect how people feel about, react to, and/or think about things subsequently. Knowing about the occurrence of such events, and reactions to them, will help us to develop programs for prevention, education, and other services. The questionnaire is divided into questions covering crime experiences, general disaster and trauma questions, and questions about physical and sexual experiences.

For each event, please indicate (circle) whether it happened and, if it did, the number of times and your approximate age when it happened (give your best guess if you are not sure). Also note the nature of your relationship to the person involved and the specific nature of the event, if appropriate.

Crime-Related Events	Circle one	If you circled yes, please indicate			
		Number of times		**Approximate age(s)**	
1	Has anyone ever tried to take something directly from you by using force or the threat of force, such as a stick-up or	No	Yes		
2	Has anyone ever attempted to rob you or actually robbed you (i.e., stolen your personal belongings)?	No	Yes		
3	Has anyone ever attempted to or succeeded in breaking into your home when you were <u>not</u> there?	No	Yes		
4	Has anyone ever attempted to or succeed in breaking into your home while you <u>were</u> there?	No	Yes		
General Disaster and Trauma	Circle one	If you circled yes, please indicate			
		Number of times		**Approximate age(s)**	
5	Have you ever had a serious accident at work, in a car, or somewhere else? (**<u>If yes</u>**, please specify below)	No	Yes		

6	Have you ever experienced a natural disaster such as a tornado, hurricane, flood or major earthquake, etc., where you felt you or your loved ones were in danger of death or injury? (**If yes**, please specify below)	No	Yes		
7	Have you ever experienced a "man-made" disaster such as a train crash, building collapse, bank robbery, fire, etc., where you felt you or your loved ones were in danger of death or injury? (**If yes**, please specify below)	No	Yes		
8	Have you ever been exposed to dangerous chemicals or radioactivity that might threaten your health?	No	Yes		
9	Have you ever been in any other situation in which you were seriously injured? (**If yes**, please specify below)	No	Yes		
10	Have you ever been in any other situation in which you feared you might be killed or seriously injured? (**If yes**, please specify below)	No	Yes		
11	Have you ever seen someone seriously injured or killed? (**If yes**, please specify who below)	No	Yes		
12	Have you ever seen dead bodies (other than at a funeral) or had to handle dead bodies for any reason? (**If yes**, please specify below)	No	Yes		
13	Have you ever had a close friend or family member murdered, or killed by a drunk driver? (**If yes**, please specify relationship [e.g., mother, grandson, etc.] below)	No	Yes		
14	Have you ever had a spouse, romantic partner, or child die? (**If yes**, please specify relationship below)	No	Yes		
15	Have you ever had a serious or life-threatening illness? (**If yes**, please specify below) _____	No	Yes		

16	Have you ever received news of a serious injury, life-threatening illness, or unexpected death of someone close to you? (**If yes**, please indicate below)	No	Yes		
17	Have you ever had to engage in combat while in military service in an official or unofficial war zone? (**If yes**, please indicate where below)	No	Yes		
Physical and Sexual Experiences	Circle one	If you circled yes, please indicate			
		Repeated?		**Approximate age(s) and frequency**	
18	Has anyone ever made you have intercourse or oral or anal sex against your will? (**If yes**, please indicate nature of relationship with person [e.g., stranger, friend, relative, parent, sibling] below)	No	Yes		
19	Has anyone ever touched private parts of your body, or made you touch theirs, under force or threat? (**If yes**, please indicate nature of relationship with person [e.g., stranger, friend, relative, parent, sibling]	No	Yes		
20	Other than incidents mentioned in Questions 18 and 19, have there been any other situations in which another person tried to force you to have an unwanted	No	Yes		
21	Has anyone, including family members or friends, ever attacked you with a gun, knife, or some other weapon?	No	Yes		
22	Has anyone, including family members or friends, ever attacked you without a weapon and seriously injured you?	No	Yes		
23	Has anyone in your family ever beaten, spanked, or pushed you hard enough to cause injury?	No	Yes		
24	Have you experienced any other extraordinarily stressful situation or event that is not covered above? (**If yes**, please specify below)	No	Yes		

Appendix G: Neighborhood Health Questionnaire

Please respond to the following questions about your neighborhood. By neighborhood we mean the area within 1 mile of where you live.

Safety

1. I feel safe walking in my neighborhood, day or night.

Strongly Agree Agree Neutral Disagree Strongly Disagree

2. Violence is not a problem in my neighborhood.

Strongly Agree Agree Neutral Disagree Strongly Disagree

3. My neighborhood is safe from crime.

Strongly Agree Agree Neutral Disagree Strongly Disagree

Violence

During the past 6 months, how often:

1. . . .was there a fight in your neighborhood in which a weapon was used?

Often Sometimes Rarely Never

2. . . .were there gang fights in your neighborhood?

Often Sometimes Rarely Never

3. . . .was there a sexual assault or rape in your neighborhood?

Often Sometimes Rarely Never

4. . . .was there a robbery or mugging in your neighborhood?

Often Sometimes Rarely Never

Social cohesion

1. People around here are willing to help their neighbors.

Strongly Agree Agree Neutral Disagree
Strongly Disagree

2. People in my neighborhood generally get along with each other.

Strongly Agree Agree Neutral Disagree
Strongly Disagree

3. People in my neighborhood can be trusted.

Strongly Agree Agree Neutral Disagree
Strongly Disagree

4. People in my neighborhood share the same values.

Strongly Agree Agree Neutral Disagree
Strongly Disagree

Activities with neighbors

1. About how often do you and people in your neighborhood do favors for each other? By favors, we mean such things as watching each other's children, helping with shopping, lending garden or house tools, and other small acts of kindness.

Often Sometimes Rarely Never

2. When a neighbor is not at home or on vacation, how often do you and other neighbors watch over their property?

Often Sometimes Rarely Never

3. How often do you and other people in the neighborhood ask each other for advice about personal things such as child-rearing or job openings?

Often Sometimes Rarely Never

4. How often do you and people in your neighborhood have parties or other get-togethers where other people in the neighborhood are invited?

Often Sometimes Rarely Never

5. How often do you and other people in your neighborhood visit in each other's homes or speak with each other on the street?

Often Sometimes Rarely Never

Appendix H: Tables

Table 1.

Demographic Variables

	Total ($N = 44$)	Psychosis ($n = 38$)	Controls ($n = 6$)	*t* or *chi* squared	*df*	*p* value
Age (*M, SD*)	46.82 (10.54)	47.53 (10.76)	42.33 (8.41)	-1.13	42	.27
Years of Education (*M, SD*)	12.68 (2.3)	12.53 (2.37)	13.67 (1.63)	1.13	42	.26
Number of Children (*M, SD*)	1.39 (2.36)	1.58 (2.48)	0.17 (0.41)	-1.38	42	.18
Gender (*N*)	28	22	6	3.97	1	.046
Male	28	22	6			
Female	16	16	0			
Race (*N*)				0.75	3	.86
Am. Indian/Alaska Native	0	0	0			
Asian	1	1	0			
Hawaiian or Pacific Islander	0	0	0			
Black or African-Am.	31	26	5			
White or Caucasian	10	9	1			
More than one race	2	2	0			
Unknown or not reported	0	0	0			
Ethnicity (*N*)				0.33	1	.57
Span., Hisp., or Latino	2	2	0			
Not Span., Hisp., or Latino	42	36	6			
Refused	0	0	0			
Don't know	0	0	0			
Marital Status (*N*)				1.95	2	.39
Married	3	2	1			
Divorced/Separated	6	6	0			
Widowed	0	0	0			
Never Married	35	30	5			
Employment Status				0.38	1	.54
Employed	17	14	3			
Unemployed	27	24	3			
Living Circumstances				1.31	2	.52

Unsup. (house, apt., etc.)	37	31	6			
Unsup. (e.g., dormitory)	0	0	0			
Sup. (e.g., half-way home)	0	0	0			
Sup. (e.g., board and care)	6	6	0			
Temp. residence or shelter	0	0	0			
Homeless	1	1	0			
Hospital	0	0	0			
Veteran Status, negative (*N*)	43	37	6	0.16	1	.69

Table 2.

Descriptive Statistics for Variables of Interest

	Total	Psychosis		No Psychosis	
	M, SD	*M, SD*	Range	*M, SD*	Range
Variables of Interest					
CAINS MAP	9.14, 5.25	9.42, 5.49	1-25	7.33, 3.08	4-12
GPTS Total	53.2, 26.22	55.84, 27.23	32-136	36.50, 6.32	32-48
SIAS Total	22.68, 15.26	24.61, 15.04	0-66	10.50, 11.11	0-29
SBSA Total	36.32, 32.51	38.45, 33.37	0-129	22.83, 24.48	0-62
THQ Total	3.54, 2.99	3.84, 3.04	0-11	1.67, 1.97	0-4
NHQ Safety	2.33, 1.22	2.37, 1.22	1-5	2.11, 1.36	1-4.67
NHQ Violence	3.59, 0.56	3.61, 0.55	2-4	3.42, 0.65	2.5-4
NHQ Social Cohes.	3.46, 1.03	3.44, 1.00	1-5	3.58, 1.28	1.25-4.75
NHQ Neighbors	2.70, 0.84	2.74, 0.85	1-4	2.43, 0.78	1-3
Additional Variables					
GPTS Soc. Ref.	27.91, 13.56	29.13, 14.04	16-69	20.17, 6.21	16-32
GPTS Persecution	25.30, 13.83	26.71, 14.39	16-68	16.33, 0.82	16-18
SBSA High Stand.	11.63, 11.59	12.24, 12.15	0-40	7.80, 6.55	0-19
SBSA Uncond. Beliefs	9.89, 10.70	10.34, 10.91	0-40	7, 9.55	0-23
SBSA Cond. Beliefs	14.80, 17.30	15.87, 17.93	0-64	8, 11.51	0-29
THQ Crime	0.75, 0.94	0.82, 0.98	0-3	0.33, 0.52	0-1
THQ Phys./Sex. Exps.	0.84, 1.12	0.92, 1.15	0-3	0.33, 0.82	0-2
THQ Gen. Dis./Trauma	1.95, 1.8	2.11, 1.84	0-7	1, 1.26	0-3
BPRS Depression	7.84, 3.98	8.38, 4.03	4-19	4.50, 0.84	4-6
CAINS EXP	6.02, 3.56	6.53, 3.41	0-14	2.83, 2.99	0-7
BPRS Pos. Symptoms	10, 4.26	10.32, 4.48	7-27	8, 1.55	7-10

Note. For the subsample with schizophrenia-spectrum diagnoses, additional means and SDs are as follows: BPRS Positive Symptoms (10.86, 4.99); GPTS Total (54.96, 26.41); GPTS Social Reference (28.68, 13.80); and GPTS Persecution (26.29, 13.65). Most participants (75% or 33 individuals) rated a 1 or 2 on the BPRS item of suspiciousness,

indicating very low or no suspiciousness. CAINS = Clinical Assessment Interview for Negative Symptoms; MAP = Motivation and Please; EXP = Expressivity; GPTS = Green et al. Paranoid Thought Scales; SIAS = Social Interaction Anxiety Scale; SBSA = Self-Beliefs Related to Social Anxiety Scale; THQ = Trauma History Questionnaire; NHQ = Neighborhood Health Questionnaire; BPRS = Brief Psychiatric Rating Scale; Social Cohes. = Social Cohesion; Soc. Ref. = Social Reference; High Stand. = High Standards; Uncond. Beliefs = Unconditional Beliefs; Cond. Beliefs = Conditional Beliefs; Phys./Sex. Exps. = Physical and Sexual Experiences; Gen. Dis./Trauma = General Disaster and Trauma; Pos. Symptoms = Positive Symptoms.

Table 3.

Internal Consistency Estimates for Anxiety, Trauma, and Urbanicity Scales

	Cronbach's alpha	*n*	Kuder-Richardson 20	*n*
SIAS	0.86	19	-	-
SBSA Total	0.91	15	-	-
SBSA High Standards	0.83	4	-	-
SBSA Conditional Beliefs	0.92	7	-	-
SBSA Unconditional Beliefs	0.83	4	-	-
THQ Type Total	-	-	0.71	23
THQ Crime Type Total	-	-	0.48	4
THQ Gen. Disaster & Trauma Total	-	-	0.58	12
THQ Phys. & Sexual Experiences	-	-	0.48	7
NHQ Safety	0.85	3	-	-
NHQ Violence	0.73	4	-	-
NHQ Social Cohesion	0.85	4	-	-
NHQ Activities with Neighbors	0.84	5	-	-

Note. During reliability analyses for the THQ Type Total and THQ Gen. Disaster & Trauma Total, the item, "Have you ever had to engage in combat while in military service in an official or unofficial warzone? If yes, please indicate where below," was deleted due to having no variance. SIAS = Social Interaction Anxiety Scale; SBSA = Self-Beliefs Related to Social Anxiety Scale; NHQ = Neighborhood Health Questionnaire THQ = Trauma History Questionnaire

Table 4.

Pearson correlation coefficients for variables of interest

	GPTS Total		CAINS MAP	
	r	*p* value	*r*	*p* value
CAINS MAP	-0.11	.46	-	-
SIAS Total	0.31*	.04	0.27	.08
SBSA Total	0.44*	.003	-0.02	.91
THQ Total	0.31*	.04	0.15	.32
NHQ Safety	0.12	.44	-0.11	.48
NHQ Violence	-0.22	.15	0.19	.22
NHQ Soc. Cohes.	0.28	.07	-0.18	.24
NHQ Neighbors	-0.04	.82	0.42*	.004

Note. Light shading indicates analyses for Hypothesis A; medium shading indicates analyses for Hypothesis B; and dark shading indicates analyses for Hypothesis C. GPTS = Green et al. Paranoid Thought Scales; CAINS MAP = Clinical Assessment Interview for Negative Symptoms Motivation and Pleasure; SBSA = Self-Beliefs Related to Social Anxiety; NHQ = Neighborhood Health Questionnaire; Soc. Cohes. = Social Cohesion.

Table 5.

Exploratory Pearson correlation coefficients for variables of interest

	GPTS Soc. Ref.		GPTS Pers.		CAINS MAP	
	r	*p* value	*r*	*p* value	*r*	*p* value
CAINS MAP	-0.06	.71	-0.16	.30	-	-
SIAS Total	0.29	.054	0.30	.05	-	-
SBSA Uncond.	0.49*	.001	0.42	.005	-0.02	.90
SBSA Cond.	0.38	.03	0.44	.003	-.05	.77
SBSA High. Stand.	0.16	.29	0.21	.17	0.04	.80
THQ Crime	0.33	.03	0.14	.35	0.22	.15
THQ Gen. Disaster	0.25	.10	0.25	.10	0.003	.98
THQ Phys. & Sexual Exps.	0.27	.08	0.12	.43	0.22	.16
NHQ Safety	0.07	.65	0.16	.31	-	-
NHQ Violence	-0.18	.24	-0.24	.11	-	-
NHQ Social Cohesion	-0.24	.12	-0.30	.05	-	-
NHQ Neighbors	-0.01	.94	-0.05	.73	-	-

*Significant according to corrected alpha

Note. Light shading indicates analyses for Hypothesis A (alpha = .025); medium shading indicates analyses for Hypothesis B (alpha = .002); and dark shading indicates analyses for Hypothesis C (alpha = .008). GPTS = Green et al. Paranoid Thought Scales; Soc. Ref. = Social Reference; Pers. = Persecution; CAINS MAP = Clinical Assessment Interview for Negative Symptoms Motivation and Pleasure; SIAS = Social Interaction Anxiety Scale; SBSA = Self-Beliefs Related to Social Anxiety; Uncond. = Unconditional; Cond. = Conditional; High Stand. = High Standards; THQ = Trauma History Questionnaire; NHQ = Neighborhood Health Questionnaire; Neighbors = Activities with Neighbors.

Table 6. *Unstandardized beta weights from the regression of GPTS onto anxiety, trauma, urbanicity, and their interactions*

Model Summary			Model Statistics		
Predictor, Moderator	R	F (*df*)	Predictor	Moderator	Interaction
CAINS MAP, SIAS Total	0.39	2.46 (3, 40)	0.26	1.09	-0.05
CAINS MAP, SBSA Total	0.45	3.42* (3, 40)	-0.23	0.42	-0.01
CAINS MAP, THQ Total	0.39	2.39 (3, 40)	0.26	5.49*	-0.26
CAINS MAP, NHQ Safety	0.24	0.84* (3, 40)	1.40	9.30	-0.90
CAINS MAP, NHQ Viol.	0.28	1.17 (3, 40)	-7.28	-23.69	1.83
CAINS MAP, NHQ Soc. Cohes.	0.38	2.24 (3, 40)	-4.47	-16.83*	1.11
CAINS MAP, NHQ Neighbors	0.24	0.80 (3, 40)	3.50	9.16	-1.27

Note. CAINS = Clinical Assessment Interview for Negative Symptoms; MAP = Motivation and Pleasure; GPTS = Green et al. Paranoid Thought Scales; SIAS = Social Interaction Anxiety Scale; SBSA = Self-Beliefs Related to Social Anxiety; THQ = Trauma History Questionnaire; NHQ = Neighborhood Health Questionnaire; Viol = Violence; Soc. Cohes. = Social Cohesion; Neighbors = Activities with Neighbors

*$p < 0.05$

Table 7. *Unstandardized beta weights from the regression of CAINS MAP onto anxiety, trauma, urbanicity, and their interactions*

Model Summary			Model Statistics		
Predictor, Moderator	R	F (*df*)	Predictor	Moderator	Interaction
GPTS, SIAS Total	0.36	1.95 (3, 40)	0.002	0.21	-0.002
GPTS, SBSA Total	0.15	0.29 (3, 40)	-0.005	0.03	-0.0004
GPTS, THQ Total	0.28	1.11 (3, 40)	-0.0005	0.89	-0.009
GPTS, NHQ Safety	0.19	0.48 (3, 40)	0.02	0.57	-0.02
GPTS, NHQ Viol.	0.20	0.58 (3, 40)	-0.01	1.69	-0.001
GPTS, NHQ Soc. Cohes.	0.32	1.53 (3, 40)	-0.14	-3.13	0.03
GPTS, NHQ Neighbors	0.54	5.47* (3, 40)	0.23*	7.65*	-0.10*

Note. CAINS = Clinical Assessment Interview for Negative Symptoms; MAP = Motivation and Pleasure; GPTS = Green et al. Paranoid Thought Scales; SIAS = Social Interaction Anxiety Scale; SBSA = Self-Beliefs Related to Social Anxiety; THQ = Trauma History Questionnaire; NHQ = Neighborhood Health Questionnaire; Viol = Violence; Soc. Cohes. = Social Cohesion; Neighbors = Activities with Neighbors

*$p < 0.05$

Table 8.

Observed and Possible Ranges for All Variables

Variables of Interest	Observed Range	Possible Range
CAINS MAP	1-25	0-36
GPTS Total	32-136	32-160
SIAS Total	0-66	0-76
SBSA Total	0-129	0-150
THQ Total	0-11	0-24
NHQ Safety	1-5	1-5
NHQ Violence	2-4	1-4
NHQ Social Cohes.	1-5	1-5
NHQ Neighbors	1-4	1-4
Additional Variables	Observed Range	Possible Range
GPTS Soc. Ref.	16-69	16-80
GPTS Persecution	16-68	16-80
SBSA High Stand.	0-40	0-40
SBSA Uncond. Beliefs	0-40	0-40
SBSA Cond. Beliefs	0-64	0-70
THQ Crime	0-3	0-4
THQ Phys./Sexual Exps.	0-3	0-7
THQ Gen. Dis./Trauma	0-7	0-13
CAINS EXP	0-14	0-16
BPRS Depression	4-19	4-28
BPRS Pos. Symptoms	7-27	7-49

Note. CAINS = Clinical Assessment Interview for Negative Symptoms; MAP = Motivation and Please; EXP = Expressivity; GPTS = Green et al. Paranoid Thought Scales; SIAS = Social Interaction Anxiety Scale; SBSA = Self-Beliefs Related to Social Anxiety Scale; THQ = Trauma History Questionnaire; NHQ = Neighborhood Health Questionnaire; BPRS = Brief Psychiatric Rating Scale; Social Cohes. = Social Cohesion; Soc. Ref. = Social Reference; High Stand. = High Standards; Uncond. Beliefs =

Unconditional Beliefs; Cond. Beliefs = Conditional Beliefs; Phys./Sexual Exps. = Physical and Sexual Experiences; Gen. Dis./Trauma = General Disaster and Trauma; Pos. Symptoms = Positive Symptoms.

Appendix I: Figures

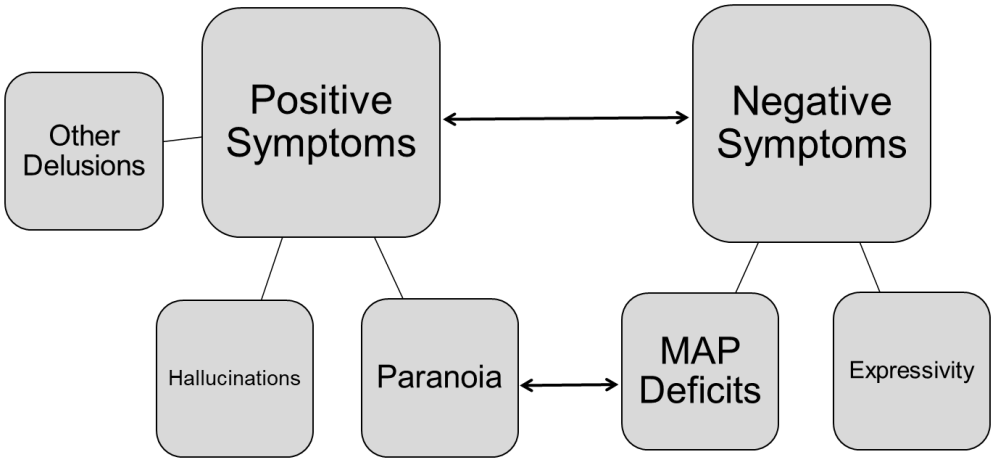

Figure 1. Role of specific symptoms in the relation between broad symptom domains. This figure illustrates that paranoia (from the positive symptom domain) and MAP deficits (from the negative symptom domain) may drive the relation between the broad domains.

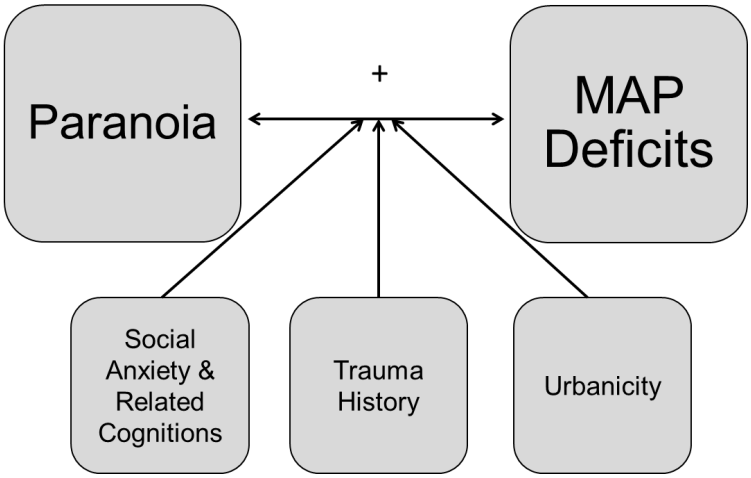

Figure 2. Variables that may affect the relation between paranoia and MAP deficits. This figure illustrates the moderating roles that social anxiety, trauma history, and urbanicity might play.

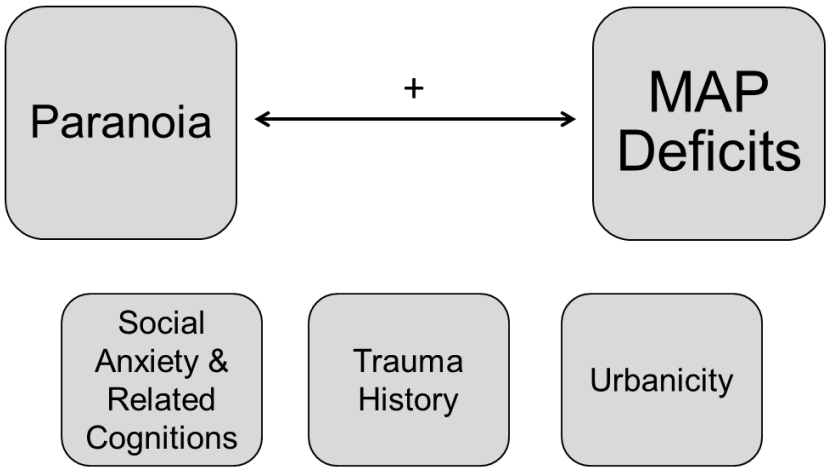

Figure 3. Hypothesis 1. This figure illustrates a direct positive correlation between paranoia and MAP deficits.

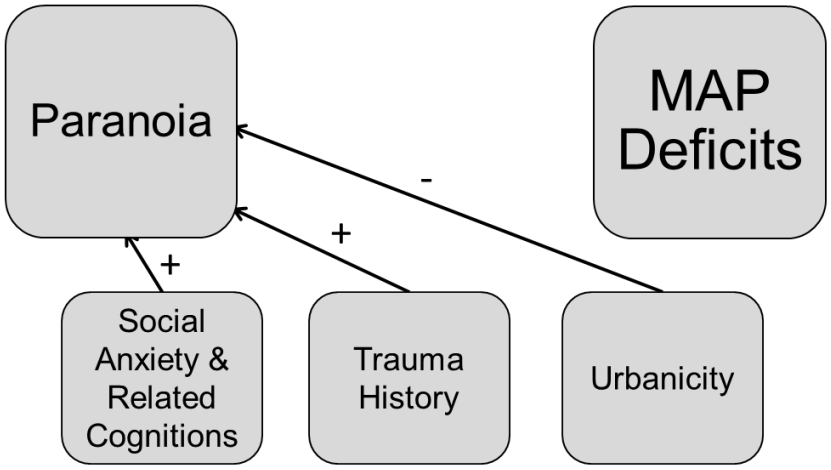

Figure 4. Hypothesis 2. This figure illustrates three positive correlations between paranoia and three variables of interest - social anxiety, trauma history, and urbanicity.

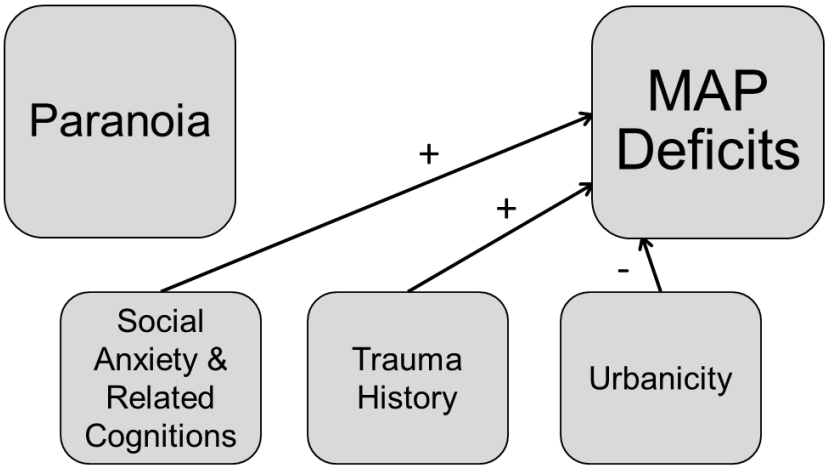

Figure 5. Hypothesis 3. This figure illustrates three positive correlations between MAP deficits and three variables of interest - social anxiety, trauma history, and urbanicity.

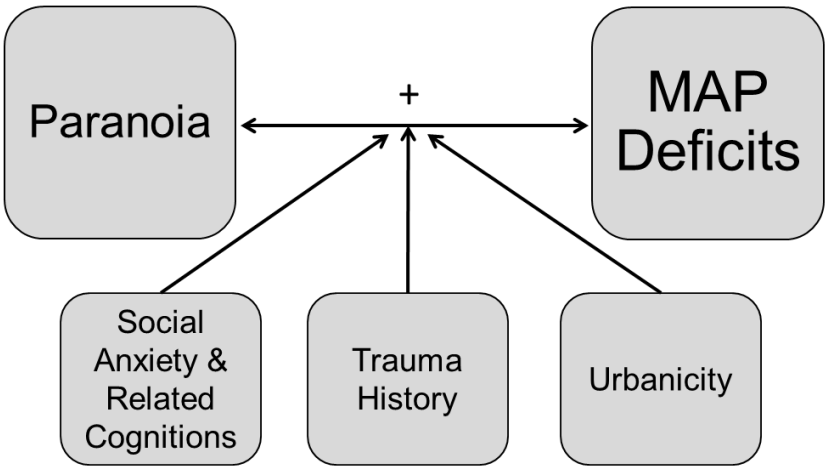

Figure 6. Hypothesis 4. This figure illustrates a moderation effect whereby the positive correlation between paranoia and MAP deficits is moderated by social anxiety, trauma history, and urbanicity.

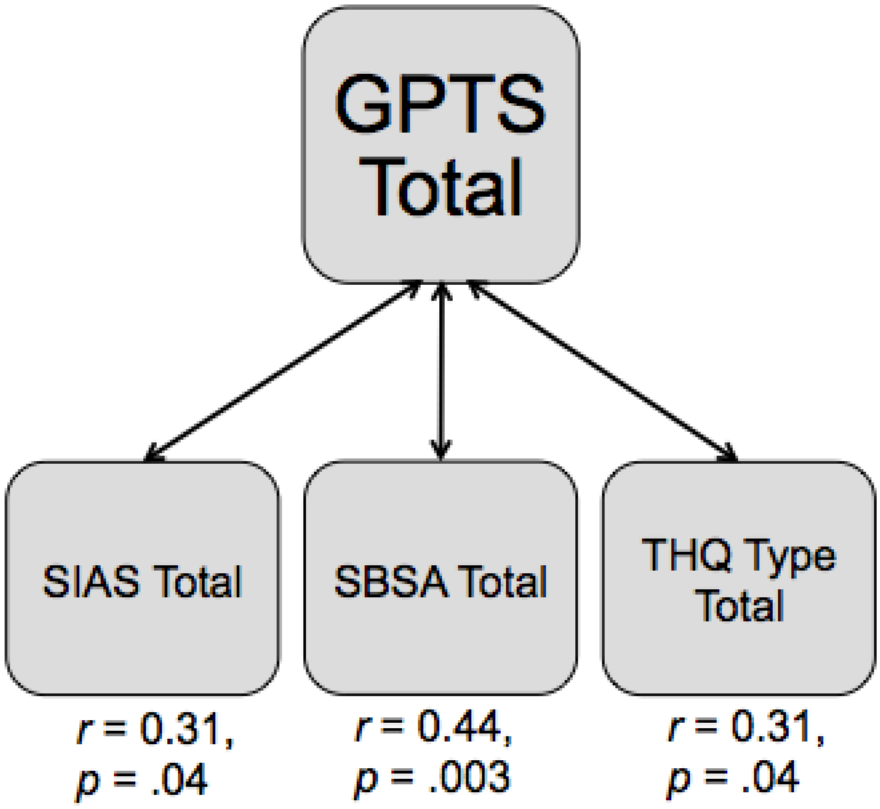

Figure 7. Correlations between paranoia, anxiety, and trauma. 2. This figure illustrates three positive correlations between paranoia and three variables of interest – SIAS Total, SBSA Total, and THQ Type Total.

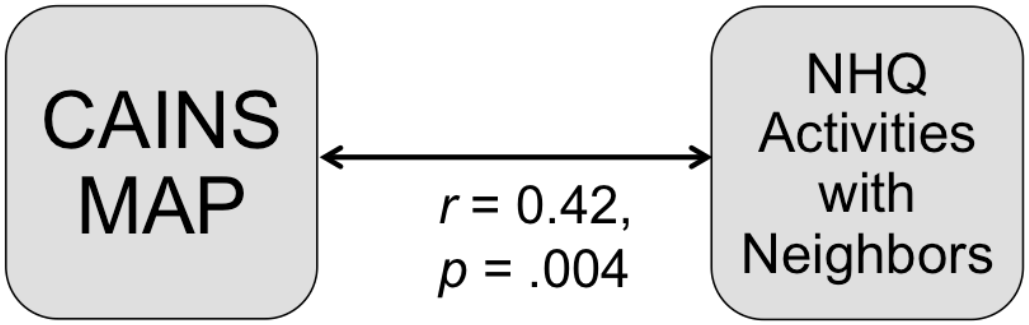

Figure 8. Correlation between MAP deficits and urbanicity. This figure illustrates the positive correlation between MAP deficits and NHQ Activities with Neighbors. It should be noted that this NHQ subscale is reverse scored.

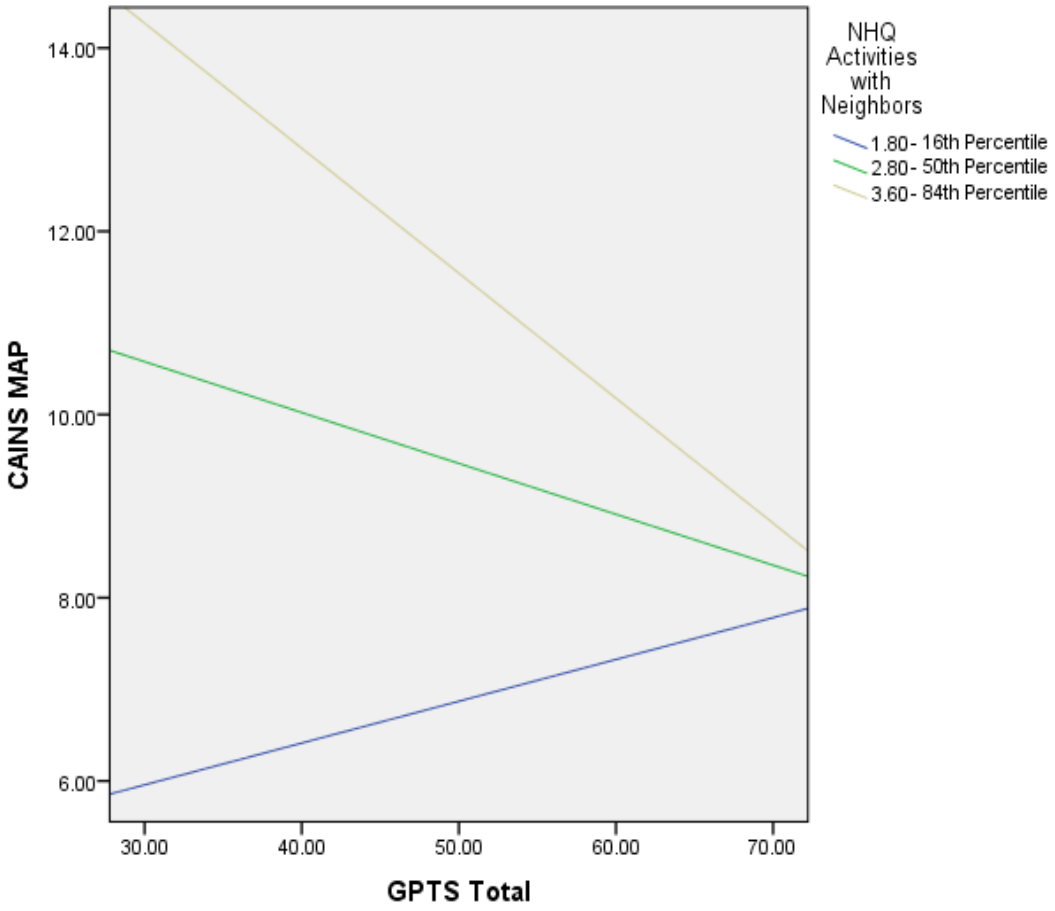

Figure 9. Moderation. This figure illustrates a moderation effect whereby the positive correlation between paranoia and MAP deficits is moderated by NHQ Activities with Neighbors.

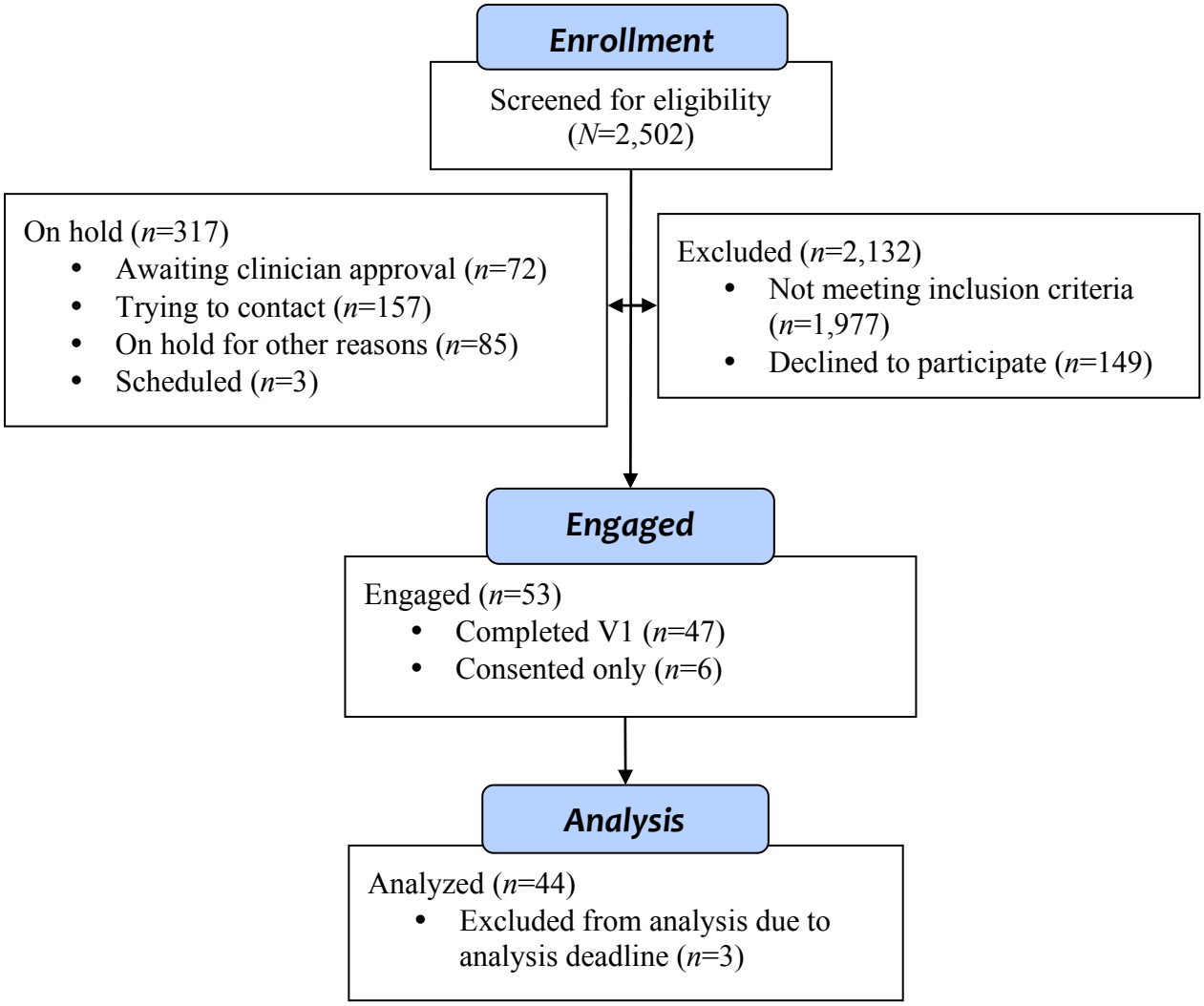

Figure 10. Consort flow chart presenting details regarding recruitment and attrition.

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