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Perceptual abnormalities in clinical high risk youth and the role of trauma, cannabis use and anxiety

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ABSTRACT

Recent research suggests that perceptual abnormalities are a group of diverse experiences, which have been associated with trauma, cannabis use, and anxiety. Of the attenuated psychotic symptoms that are present in youth at clinical high risk (CHR) of psychosis, perceptual abnormalities tend to be one of the most frequently endorsed symptoms. However, very few studies have explored perceptual abnormalities and their relationships with the above environmental and affective factors in a CHR sample. Four hundred and forty-one CHR individuals who met criteria for attenuated psychotic symptom syndrome (APSS) determined by the Structured Interview for Psychosis-risk Syndromes (SIPS) were assessed on the content of their perceptual abnormalities, early traumatic experience, cannabis use and self-reported anxiety. Logistic regression analyses suggested that both simple auditory and simple visual perceptual abnormalities were more likely to be reported by CHR who had early traumatic experiences, who are current cannabis users, and who have higher levels of anxiety. Multiple regression analysis revealed that only trauma and anxiety were independent predictors of both simple auditory and simple visual perceptual abnormalities. It is possible that examining subtypes of perceptual abnormalities in CHR leads to an improved understanding of the prevalence of such symptoms.

1. Introduction

Hallucinations have been long considered as an important psychotic symptom (Saddock et al., 2009) and are one of the key symptoms for a diagnosis of schizophrenia in DSM-5 (American Psychiatric Association, 2013). They have been defined as "...a false sensory experience that has the compelling sense of reality despite the absence of an external stimulus" (VandenBos, 2007)(p110). Hallucinations are a group of heterogeneous experiences and involve multiple sensory modalities, including auditory, visual, olfactory, gustatory and somatosensory/tactile (Jardri et al., 2014). In addition to categorizing hallucinations based on the sensory modalities, existing classification methods use the content

of perceptual abnormalities and further distinguish between complex (or formed) and simple (or unformed) perceptual abnormalities (Blom and Sommer, 2011) within each modality. In the auditory modality, complex perceptual abnormalities typically take the form of well-articulated speech and simple perceptual abnormalities commonly take the form of distinct or indistinct noises, such as clicking sounds and doorbell ringing. In the visual modality, complex perceptual abnormalities typically take the shape of a person, a face, an animal, a landscape or a scene, while simple perceptual abnormalities may take the form of flashes, shapes, geometric patterns, or shadows (Blom, 2010; Ffytche and Wible, 2014). Despite the documentation of the diversity of hallucinatory experiences, current research on hallucinations in

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psychiatric populations has mainly focused on auditory verbal hallucinations while hallucinations in other modalities or subtypes of hallucinations are less well understood (Langdon et al., 2011; Waters et al., 2014).

The experience of hallucinations has been associated with environmental factors, such as trauma and cannabis use, and affective factors, in particular anxiety. A large body of evidence has suggested a link between exposure to early traumatic experiences and the development of hallucinatory experiences in individuals with psychotic disorders (Daalman et al., 2012) as well as in the general population (Bentall et al., 2012; Read et al., 2005). Recent cannabis use has been associated with a greater risk of developing hallucinatory experience in adolescent general populations (Hides et al., 2009; Scott et al., 2009), in particular, visual hallucinations (Caton et al., 2005). In addition, anxiety has been considered as one of the antecedents that may lead to the onset of hallucinations in schizophrenia patients (Delespaul et al., 2002), in both the adult general population (Allen et al., 2005), and in the adolescent general population (Escher et al., 2002). Theoretical papers have suggested that anxiety is specifically associated with simple hallucinations (Dodgson and Gordon, 2009; Wilkinson, 2014). However, this hypothesis remains to be tested. Furthermore, younger age and being female were associated with increased experiences of hallucinations (Kelleher et al., 2012b; McGrath et al., 2015).

In the schizophrenia field, there has been a growing interest in the identification of individuals who are at clinical high risk (CHR) for developing psychosis. Individuals can be identified as being at CHR based on well-established clinical criteria (McGlashan et al., 2010). Perceptual abnormalities are one of the attenuated psychotic symptoms that can be used to determine CHR status. Perceptual abnormalities in CHR differ from full-blown hallucinations by their limited frequency, duration, severity, and the relative intact ability of the individual to question the reality of hallucinatory experience (McGlashan et al., 2010). As in psychotic disorders, perceptual abnormalities are one of the most frequently endorsed attenuated psychotic symptoms in CHR populations (Addington et al., 2015).

Although the associations between hallucinations and early traumatic experiences, cannabis use and anxiety have been documented in psychotic patients and the general population, few studies have addressed these relationships in CHR. One study reported higher severity of perceptual abnormalities among CHR individuals who reported a history of traumatic experiences (Velthorst et al., 2013), while other studies have failed to detect such a relationship (Stowkowy et al., 2016; Thompson et al., 2009). Furthermore, the presence of visual, but not auditory perceptual abnormalities was associated with traumatic experience in CHR (Velthorst et al., 2013). Cannabis use was reported to be temporally associated with the severity of perceptual abnormalities in CHR individuals, when controlling for concurrent exposures to other substance use (Corcoran et al., 2008). In addition, cannabis use in CHR has been linked to the visual perceptual symptom “photopsia” (Korver et al., 2010), which refers to a perceptual abnormality in the form of flashes, flames or geometric shapes (Klosterkotter et al., 2001). Anxiety has reportedly been associated with the overall severity of attenuated psychotic symptoms in CHR (McAusland et al., 2015), but the association between anxiety and perceptual abnormalities in CHR has not been examined. One of the limitations of the above studies is the lack of evaluations of the subtypes of perceptual abnormalities.

Since the findings from previous literature suggest that perceptual abnormalities are a group of diverse experiences in schizophrenia patients and the general population, it may help our understanding of perceptual abnormalities to explore the content and subtypes of the symptom in CHR. The first aim of this exploratory study was to examine the prevalence of different subtypes of perceptual abnormalities in a large sample of CHR individuals. The second aim was to examine the associations between different subtypes of perceptual abnormalities and early traumatic experiences, cannabis use and anxiety. Our primary hypothesis is that different subtypes of perceptual abnormalities have

different relationships with trauma, cannabis use and anxiety.

2. Methods

2.1. Sample

All participants were recruited as part of the North American Prodrome Longitudinal Study 2 (NAPLS-2). Specific details of ascertainment and recruitment have been described elsewhere (Addington et al., 2012). All CHR participants met the Criteria of Psychosis-risk Syndromes (COPS) using the Structured Interview for Psychosis-risk Syndromes (SIPS) (McGlashan et al., 2010). The COPS includes diagnosis of three CHR syndromes including: brief intermittent psychotic symptoms syndrome (BIPS), genetic risk and deterioration syndrome (GRD), and attenuated psychotic symptoms syndrome (APSS). Participants were excluded if they met criteria for any current or lifetime axis I psychotic disorder, IQ < 70 or past or current history of a clinically significant central nervous system disorder, DSM-IV criteria for a current substance dependence disorder or the diagnostic prodromal symptoms were clearly caused by an Axis I disorder or were clearly under the direct influence of substance use. Only participants who met APSS or APSS plus another COPS criteria were included in the current study. A total of 556 participants across the eight NAPLS 2 sites had been recruited from February 2009 until December 2011. Four hundred and forty-one participants met eligibility for inclusion in the current study based on meeting APSS.

2.2. Measures

2.2.1. Clinical rating scales

APSS criteria were evaluated using the SIPS. The severity of perceptual abnormalities was assessed using the P4- perceptual abnormalities severity rating from the Scale of Prodromal Symptoms (SOPS; McGlashan et al., 2010). The SOPS measures attenuated psychotic symptom severity on a range of 0–6, where 0 is absent, 1 is questionably present, 2 is mild, 3 is moderate, 4 is moderately severe, 5 is severe but not psychotic and 6 is severe and psychotic. The psychosis-risk range includes scores 3, 4, and 5.

Anxiety was assessed with the Self-Rating Anxiety Scale (SAS) (Zung, 1971). The scale is a self-report questionnaire with 20 items that assess general and somatic symptoms of anxiety that are rated on a 4-point Likert scale from 1 (none or little of the time to 4 (most or all of the time).

Based on commonly used measures and interview questions in the literature (Arseneault et al., 2002), a cannabis scale was used to record the history of cannabis use. Participants were asked about total usage in their lifetime, past or current use, the age of first usage and the frequency of usage.

Childhood Trauma and Abuse scale (Janssen et al., 2004), was used to assess the experience of traumatic experiences that occurred prior to the age of 16 are recorded. Traumatic events included emotional neglect, physical abuse, psychological abuse or sexual abuse. Trauma was coded as either present (1) or absent (0). Trauma was considered as present if it had been recorded that the participant had experienced one or more traumatic events.

2.2.2. Case vignettes

Vignettes were written for each participant at baseline based on the SIPS and were used on the NAPLS multi-site consensus diagnostic call to determine entry criteria to the NAPLS 2 project. Each vignette was generated to contain detailed and content-rich descriptions of each of the five attenuated psychotic symptoms from the SOPS, including unusual thought content, suspicious ideas, grandiose ideas, perceptual abnormalities, and disorganized communication. The descriptions of the symptoms for this project were taken from these comprehensive vignettes.

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