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Associations among domains of self-disturbance in schizophrenia

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ABSTRACT

Self-disturbances are increasingly recognized as important, possibly even central, features of schizophrenia. However, little is known about the associations among different manifestations of self-disturbances. The aims of the current study were threefold. We aimed to (1) replicate previous findings of increased self-disturbances in schizophrenia, (2) correlate manifestations of self-disturbances in schizophrenia across three domains, and (3) correlate self-disturbances with five symptoms domains of schizophrenia, including positive, negative, disorganized symptoms, excitement, and emotional distress. We examined three domains of self-experience, including somatosensation, anomalous self-experiences, and self-concept clarity. Participants included 48 individuals with schizophrenia and 36 non-psychiatric controls. The results of this study replicate previous findings of significantly higher levels of self-disturbances in people with schizophrenia. The results also indicate positive correlations between the domains of anomalous self-experiences and self-concept clarity, but not somatosensation, in individuals with schizophrenia. As well, anomalous self-experiences were positively correlated with positive symptoms, disorganized symptoms, and emotional distress and self-concept clarity was negatively correlated with disorganized symptoms and emotional distress.

1. Introduction

A long line of research suggests that people with schizophrenia spectrum disorders have disturbances in the experience of self (Henriksen and Parnas, 2012; Hur et al., 2014; Sass, 2014). Self-disturbances are abnormalities in the subjective experience of selfhood (Parnas et al., 2005). These self-disturbances have been conceptualized in several different ways by different research groups, including misattribution of agency (Voss et al., 2010), disrupted sense of body ownership (Röhricht and Priebe, 2006), impaired self-other distinction (Ferri et al., 2014), and disturbances in the subjective experience of self (Parnas et al., 2005). Research on self-disturbances in schizophrenia is important for several reasons. First, some theorists have suggested that self-disturbances are central to the pathology of schizophrenia, despite not being listed as a symptom in any of the major nosologies (Park, 2014; Parnas et al., 2005). Second, self-disturbances have been noted during the premorbid (Brent et al., 2014), prodromal (Nelson et al., 2012), first episode (Ebisch et al., 2014), and chronic phases of schizophrenia (Moe and Docherty, 2014). Thus, understanding self-disturbances may help to understand all phases of the disorder. Finally, self-disturbances have been linked to both positive and negative symptoms (Nordgaard and Parnas, 2014), suggesting that they may be important for understanding the underlying mechanisms of schizophrenia.

Although self-disturbances have been identified as an important feature of many recent conceptualizations of schizophrenia, few studies have explored the relation between different manifestations or conceptualizations of self-disturbance. Self-disturbances in schizophrenia have been documented in at least three domains or levels of experience, including: Domain (1) somatosensation, which includes exteroception, the perception of stimuli outside of the body, and proprioception, the perception of body position and movement based on internal stimuli; Domain (2) anomalous self-experiences, which are first-person experiences of body ownership and integrity (Raballo and Parnas, 2012); and Domain (3) self-concept clarity (Cicero et al., 2016b; Noyman-Veksler et al., 2013), which is the ability to converge the many aspects of self-concept into a coherent identity (Campbell et al., 1996). To our knowledge, no studies have examined all three of these domains in a single study. As a result, it is unclear if these conceptualizations of self-disturbances are related to one another.

The somatosensory system is the portion of the peripheral and central nervous system that processes touch, pain, body position, and internal bodily sensations. Previous research has found that people with schizophrenia are impaired on measures of somatosensation (e.g. Boettger et al., 2013; Dworkin, 1994; Javitt et al., 1999). Moreover, impairments in somatosensation may be a marker for the development

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of psychosis and present in the early stages of the disorder (Hauser et al., 2011; Stanghellini et al., 2012). This study included measures of three subdomains of somatosensation: proprioception and the exteroceptive subdomains of tactile perception and haptic perception.

Tactile perception refers to the passive sense of touch. Previous work has found that people with schizophrenia (Broekma and Rosenbaum, 1975; Michael and Park, 2016), people with subclinical psychotic-like symptoms (Lenzenweger, 2000), and first-degree relatives of individuals with schizophrenia (Chang and Lenzenweger, 2001, 2005) have impaired tactile acuity. As well, impaired tactile acuity has been associated with higher levels of schizophrenia-like symptoms in a non-clinical population (Lenzenweger, 2000)

Haptic perception refers to the active exploration of the environment using the sense of touch (Lederman and Klatzky, 2009). Previous research has found abnormalities in haptic perception in individuals with schizophrenia (Kuster et al., 1975; Schooler et al., 1976; Wertheimer and Wesley, 1957). In the current study, we examined susceptibility to a haptic illusion in people with schizophrenia as compared to controls. Previous research suggests that people with schizophrenia are more susceptible to somatosensory illusions (Thakkar et al., 2011). However, to the best of our knowledge, no published research has examined illusion perception primarily recruiting haptic processes.

The third aspect of somatosensory function explored in this study is proprioception, the system responsible for ascertaining body position, motion, and balance. Proprioception has been shown to be impaired in schizophrenia (e.g., Chapin et al., 1996; Gapenne, 2010; Tanno et al., 1999; Thakkar et al., 2011; Williams et al., 2010) and first-degree relatives of people with schizophrenia. Recent work has also found poorer proprioceptive function in relatives of people with schizophrenia as compared to controls, which may indicate a link between proprioceptive dysfunction and genetic liability for schizophrenia (Chang and Lenzenweger, 2005). Abnormalities in the proprioceptive system may underlie more explicit symptoms of self-disturbance, such as distortion in the perception of body shape (Erwin and Rosenbaum, 1979; Rosenbaum et al., 1959; Rosenbaum et al., 1965) and abnormal bodily experiences (Michael and Park, 2016). This is supported by a recent study reporting an association between disturbances in self-experience and abnormalities in an electroencephalographic (EEG) index of proprioception (Arnfred et al., 2015). Examination of association between proprioception and other schizophrenia symptoms has yield mixed results, with one study finding association between poor proprioceptive integrity and positive symptoms in people with schizophrenia (Michael and Park, 2016), and another linking poor proprioception with negative symptoms and cognitive-perceptual dysfunction in first degree relatives of people with schizophrenia (Chang and Lenzenweger, 2005).

The second domain of self-disturbances examined in the current research is anomalous self-experiences. Anomalous self-experiences are disruptions of the subjective first-person experience of oneself, such as the in-the-moment sense of owning one's own body, having control of one's own actions, and being an active participant in one's environment. Anomalous self-experiences include symptoms such as derealization, unusual bodily sensations, difficulty distinguishing oneself from others, disturbances in stream of consciousness, and lack of feeling of authorship over one's own thoughts (Raballo and Parnas, 2012), as well as loss of a sense of agency and ownership of experience (Nelson et al., 2014). Anomalous self-experiences have been conceptualized as a hyper-reflexivity of self-experience, in which first-person-ness that would usually be tacit becomes the focal point of attention (Parnas et al., 1998; Sass, 2003; Sass and Parnas, 2003). This hyper-awareness may lead to a number of unusual experiences such as the feeling that one is losing oneself, a loss of connection with life experiences, dampening of the emotions, and feelings of derealization (Cicero et al., 2017)

Anomalous self-experiences may be associated with other prominent features of schizophrenia, including positive symptoms (Kim et al., 2010; Sass and Parnas, 2003), lack of insight (Bedford and David, 2014), depression (Haug et al., 2012a), suicidality (Haug et al., 2012b; Skodlar et al., 2008; Skodlar and Parnas, 2010) and social cognition and function (Ebisch et al., 2014; Fisher et al., 2008; Haug et al., 2014). Theorists have suggested that anomalous self-experiences and schizophrenia symptoms may be very closely related, and that anomalous self-experiences may underlie traditional schizophrenia symptoms such as delusions and hallucinations (Haug et al., 2014; Sass, 2003; Sass and Parnas, 2003). For example, if the implicit sensation of inhabiting one's own body is not present in an individual with schizophrenia, it may provide a starting point from which delusional beliefs about external control may develop. As well, one prominent model of hallucinations posits auditory hallucinations as misattributions of inner speech (Ford and Mathalon, 2005). These misattributions may be a result of the loss of an intrinsic sense of ownership over one's own thoughts. Thus, in some ways, it may be difficult to differentiate anomalous self-experiences from symptoms.

The third domain of self-disturbances examined in the current research is self-concept clarity (SCC). SCC is the degree to which an individual holds a stable and consistent perception of his or her own attributes and attitudes (Campbell et al., 1996). Individuals form a unitary concept of themselves by integrating their personal histories, personality characteristics, and other self-descriptions into a singular self-concept. Several researchers suggest that difficulty forming and maintaining a coherent self-concept may be a prominent feature of schizophrenia (Lysaker and Lysaker, 2010; Meehan and Machlachlan, 2008; Stanghellini and Lysaker, 2007). Instances of disturbed self-concept clarity in schizophrenia include decreased memory of self-referential information (Harvey et al., 2011), difficulty attributing meaning to autobiographical memories (Berna et al., 2011a, b), and reduced clarity of self-concept (Boulanger et al., 2013; Cicero et al., 2016a; Noyman-Veksler et al., 2013).

Although all three of these domains have been studied in people with schizophrenia, few studies have directly assessed the relations among them. However, several authors have suggested conceptual evidence for an association between these domains of self-disturbances in schizophrenia. Sass et al., (2013) posit that aberrations in bodily sensations could be explained by hyper-reflexivity, the excessive attention allocated to otherwise implicit self-experience. The authors describe how paying close attention to the sensations in a part of one's body can create the impression that the body part is no longer connected to oneself. In this way, deficits in somatosensory processing may be associated with anomalous self-experiences.

There were three primary goals of the current study. The first goal was to replicate the results of past studies indicating that individuals with schizophrenia have higher levels of self-disturbances as compared to the general population. The second goal was to examine whether measures from the three domains were correlated with each other. If the three domains represent different aspects of same broader self-disturbances construct, we would expect to find that they would be significantly positively correlated with each other. If they do not represent different aspects of the same construct, we would expect to find that they are not correlated with each other. The third goal was to examine the relation between self-disturbances and the positive and negative symptoms of schizophrenia. We expected to find that self-disturbances and positive and negative symptoms would be positively correlated with each other.

2. Methods

2.1. Participants

Participants included 48 individuals with schizophrenia or schizoaffective disorder and 36 non-psychiatric controls. The schizophrenia group was recruited via fliers and presentations in outpatient mental health facilities including the Hawaii Department of Health outpatient