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The impact of social content and negative symptoms on affective ratings schizophrenia

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ABSTRACT

The anhedonia paradox has been a topic of ongoing study in schizophrenia. Previous research has found that schizophrenia patients report less enjoyment from various activities when compared to their healthy counterparts; however, the two groups appear to have similar in-the-moment emotional ratings of these events (Gard et al., 2007; Herbener et al., 2007; Horan et al., 2006). This study examined these in-the-moment experiences further, by assessing whether they differed between social and non-social experiences. The data were collected from 38 individuals with schizophrenia and 53 matched healthy controls in the greater Chicago area. In-the-moment emotional experience was measured by self-reported arousal and valence ratings for social and non-social stimuli taken from the International Affective Picture System (IAPS). Clinical ratings for patients were gathered by the Positive and Negative Syndrome Scale. A series of ANOVAs revealed that controls were more aroused by the social than nonsocial unpleasant stimuli, whereas patients did not show this distinction. Further, regression analyses revealed that negative symptom severity uniquely predicted lower arousal responses to unpleasant social, but not nonsocial, stimuli. Our results indicate that both subject and stimulus factors appear to contribute to differences in emotional responses in individuals with schizophrenia.

1. Introduction

In the last two decades, a significant research literature has developed surrounding a “paradox” in emotional functioning in schizophrenia. This paradox lies in the fact that although individuals with schizophrenia often self-report “normal” responses to emotional stimuli while experiencing them in the moment (Aghevli et al., 2003; Gard et al., 2007; Hempel et al., 2005; Herbener et al., 2008; Horan et al., 2006), they tend to report less enjoyment when describing noncurrent emotions, via trait questionnaires, interviews using a retrospective or prospective format, and experience sampling studies assessing past or future pleasure (Gard et al., 2007; Herbener et al., 2007; Horan et al., 2006; Pizzagalli, 2010). Recently, Strauss and Gold (2012) questioned whether there is an emotion paradox in schizophrenia at all, and suggested, based on the accessibility model of emotional memory developed by Robinson and Clore (2002), that differences between current and noncurrent reports about emotional experience are normative as they theorize that emotion self-reports typically rely on different types of information. Specifically, in-the-moment reports are believed to be derived from experiential emotional knowledge, while noncurrent reports are believed to be drawn from a combination of episodic memory and semantic knowledge about the individual's experience of pleasure (Robinson and Clore, 2002). Further, cognitive biases and cognitive impairments are expected to particularly impact reports of non-current, but not current pleasure. This is a compelling theory, addressing many important aspects of emotional memory. However, this theory does not address some types of emotional memory, such as associative learning (Levine et al., 2009), nor has this model been empirically tested in schizophrenia populations.

Recent reviews of the literature have found that most studies have found no differences between patients and controls on momentary emotional experiences (Cohen and Minor, 2010; Kring and Horan, 2008). There are, however, some exceptions to this finding, with some studies documenting differences between schizophrenia patients (SZ) and healthy controls (HC) in their affective responses to emotional stimuli (Aminoff et al., 2011; Burbridge and Barch, 2007; Dowd and Barch, 2010; Lee et al., 2006). Specifically, Dowd and Barch (2010) found that SZ reported blunted in-the-moment experiences (i.e., they reported experiencing pleasant stimuli less positively than HC and unpleasant stimuli less negatively than HC). Others have found that SZ and HC reported similar arousal to pleasant and neutral stimuli, but found that SZ were less aroused by unpleasant stimuli when compared to HC (Aminoff et al., 2011; Burbridge and Barch,

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2007), with an even greater decrease when the stimuli had human content (Aminoff et al., 2011). In contrast, Lee et al. (2006) found that SZ rated pleasant picture stimuli less positively, but their responses to unpleasant stimuli varied depending on the level of arousal of the stimuli. Therefore, at this point, it remains unclear how to explain differences in emotional experience in schizophrenia across studies.

1.1. Role of social content in emotional response

One potential explanation for inconsistencies in the research on emotional experience is that researchers have not fully considered how stimulus content might influence responses. A recent meta-analysis by Llerena et al. (2012), examined whether SZ and HC exhibited similar current ratings of arousal across various types of emotion induction paradigms. They found that the groups were similarly aroused by pleasant and unpleasant stimuli, but that SZ were more aroused by neutral stimuli than HC. Notably, however, their moderator analyses indicated certain methodological factors that may play a role in self-reported arousal, such as rating scale and stimulus type. In particular, they found that SZ rated complex neutral stimuli as more arousing than HC, but that the two groups rated non-complex neutral stimuli similarly.

These findings bring up an important question about how SZ process complex stimuli, particularly social stimuli. Many studies have revealed that SZ have difficulties in accurate facial affect perception (Bigelow et al., 2006; Hooker and Park, 2002; Johnston et al., 2010; Strauss et al., 2010b; Turetsky et al., 2007), and psychophysiological studies have identified functional abnormalities in neural response to affective facial stimuli (Hempel et al., 2003; Streit et al., 2001; Turetsky et al., 2007). These difficulties could reasonably influence emotional response to social stimuli. Further, Bigelow et al. (2006) reported that SZ exhibited impaired abilities in emotion identification for socially relevant stimuli, suggesting a specific deficit in social perception that may contribute to inconsistencies in research results which combine social and nonsocial stimuli.

In addition to deficits in emotion identification, Penn et al. (2008) noted impairments in social cognition which may influence emotional response in SZ. In particular, SZ have exhibited deficits in their ability to make accurate inferences about others' intentions (theory of mind). This impairment in perspective-taking may relate to reduced empathy in schizophrenia (Derntl et al., 2009; Smith et al., 2012), as these empathic skills are important in developing normative emotional responses.

Notably, one study of emotional response to visual stimuli that accounted for social content found differences between SZ and HC on arousal (Aminoff et al., 2011). While groups did not differ on their arousal ratings of neutral images, SZ were less aroused by unpleasant images than HC. This difference was greater still for images with human content. However, this experiment did not include an assessment of neutral social images, or any pleasant images, which may be valuable in understanding anhedonia.

1.2. Role of symptoms in emotional response

Inconsistent results across studies may also be influenced by differences in symptom type and severity across schizophrenia samples. Past research indicates that some SZ report experiencing less intense positive and negative emotions (Carpenter et al., 1988; Kirkpatrick et al., 2001; Strauss et al., 2010a); this decreased emotional experience is associated with the reduction of key aspects of human experience such as motivation, social behavior, speech, and the experience of enjoyment, and is typically associated with high levels of negative symptoms (Arango et al., 2004; Heinrichs et al., 1984). SZ with prominent and persistent negative symptoms also tend to experience less severe mood symptoms (Cohen et al., 2010; Kirkpatrick et al., 1994). Further, these individuals have demonstrated worse performance on emotion identification tasks relative to other SZ (Johnston et al., 2010; Strauss et al., 2010b).

Differences in positive symptom severity have also been associated with self-reported emotional response to affective stimuli. Lee et al. (2006) noted different patterns of responsivity within SZ, with a non-paranoid subgroup who responded more negatively and less positively to affective images, while a paranoid subgroup responded more strongly to lowly arousing stimuli and less strongly to highly arousing stimuli than comparison subjects (Lee et al., 2006). Further, Russell et al., (2007) found that non-paranoid SZ exhibited greater hippocampal activation in response to emotional facial expressions, compared to paranoid SZ. Given the heterogeneous symptom presentation of schizophrenia, consideration of these symptoms may shed some light on the inconsistencies in the literature.

1.3. Present study aims

The main aim of the study is to investigate whether differences in subject symptom severity or type, and/or stimulus content might explain past inconsistent results in studies evaluating self-report ratings of response to emotional stimuli. Based on past research demonstrating impairments in interpretation of social stimuli, we hypothesize that schizophrenia subjects will report more blunted emotional responses to social stimuli than healthy comparison subjects. We predict that this difference will not exist in comparisons of ratings of the nonsocial stimuli. In addition, as greater negative symptom severity in schizophrenia has been related to decreased affective experience in general (Cohen et al., 2010; Kirkpatrick et al., 1994), as well as impairments in facial and postural affect recognition (Johnston et al., 2010; Strauss et al., 2010b), negative symptom severity is expected to predict a general decrease in emotional response to stimuli, as well as an interaction with content such that emotional blunting is greater in response to social than nonsocial stimuli.

2. Methods

2.1. Participants

Participants in this study were 38 individuals who met DSM-IV (Diagnostic and Statistical Manuals of Mental Disorders 4th ed.; American Psychiatric Association, 1994) criteria for schizophrenia or schizoaffective disorder, who were recruited from the University of Illinois at Chicago Medical Center. These participants were chronic patients on a stable medication regimen for at least 4 weeks prior to baseline, and were excluded for having a history of mental retardation, head injury, hereditary neurological illness (e.g. Huntington's chorea, Wilson's disease, etc.), current substance abuse, or current use of benzodiazepines or sedatives. Diagnoses were determined by doctoral-level researchers using the Structural Clinical Interview for DSM-IV diagnoses (First et al., 1997). Fifty-three HC were recruited through advertisements posted on Chicago's public transportation system (for demographics information, see Table 1). HC were matched to the SZ on age, gender, education, and estimated intelligence. They were excluded for having a history of schizophrenia spectrum disorder or major mood disorder in first-degree relatives, history of neuroleptic use, or any psychotropic medication use within 6 months of baseline.

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