Psychiatry Research 228 (2015) 216–222

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Dealing with feeling: Specific emotion regulation skills predict responses to stress in psychosis

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ARTICLE INFO

Article history:
Received 3 September 2014
Received in revised form
26 January 2015
Accepted 5 April 2015
Available online 13 April 2015

Keywords:
Psychosis
Emotion-regulation
Stress
Acceptance
Awareness
Paranoia
Skin conductance levels

ABSTRACT

Elevated negative affect is an established link between minor stressors and psychotic symptoms. Less clear is why people with psychosis fail to regulate distressing emotions effectively. This study tests whether subjective, psychophysiological and symptomatic responses to stress can be predicted by specific emotion regulation (ER) difficulties. Participants with psychotic disorders ($n=35$) and healthy controls ($n=28$) were assessed for ER-skills at baseline. They were then exposed to a noise versus no stressor on different days, during which self-reported stress responses, state paranoia and skin conductance levels (SCL) were assessed. Participants with psychosis showed a stronger increase in self-reported stress and SCL in response to the stressor than healthy controls. Stronger increases in self-reported stress were predicted by a reduced ability to be aware of and tolerate distressing emotions, whereas increases in SCL were predicted by a reduced ability to be aware of, tolerate, accept and modify them. Although paranoid symptoms were not significantly affected by the stressors, individual variation in paranoid responses was also predicted by a reduced ability to be aware of and tolerate emotions. Differences in stress responses in the samples were no longer significant after controlling for ER skills. Thus, interventions that improve ER-skills could reduce stress-sensitivity in psychosis.

1. Introduction

That environmental stress is implicated in the development of psychotic symptoms can be considered as one of the most convincingly established facts in schizophrenia research (Brown, 2011; van Os et al., 2010). Furthermore, it is well established that a state of heightened emotionality, often in form of extreme arousal, precedes psychotic symptoms. For example, electrodermal arousal has qualified as a state-sensitive episode indicator (Dawson et al., 1992). Also, several studies using the experience-sampling method to investigate the interplay of stressors, emotions and psychotic symptoms in daily life show that increases in stress are generally associated with an increase in negative affect and psychotic symptoms (e.g. Delespaul et al., 2002; Myin-Germeys and van Os, 2007), with detailed time-lagged analyses suggesting that negative affect contributes to positive symptoms (Kramer et al., 2014). This is further supported by longitudinal studies showing that baseline mood or mood instability significantly predict later increases in psychotic symptoms over longer periods of time and mediate between early adverse events and later symptoms (Fowler et al., 2012; Freeman et al., 2012; Marwaha et al., 2014). Experimental studies also corroborate the importance of emotions in psychotic symptom formation. For example, a brief exposure to an urban environment was shown to increase anxiety and paranoid beliefs in patients with delusions (Ellett et al., 2008). Other researchers have found the speech of patients with schizophrenia to become more disordered when negative affect was induced (Cohen and Docherty, 2004). Within groups of psychosis prone participants induction of anxiety caused an increase in paranoid thoughts (Lincoln et al., 2010a) and a bias to perceive neutral faces as angry (Westermann and Lincoln, 2010). Accordingly, newer vulnerability-stress models of psychotic symptoms ascribe emotional distress a central role on the pathway from stress to psychosis (e.g. Garety et al., 2001; Preti and Celler, 2010).

What is less clear is why emotions become so pronounced in people with psychosis and why they translate into psychotic symptoms. Dealing with emotions is generally referred to as emotion regulation (ER; Gross, 2007). During ER, people may increase, maintain, or decrease emotions by means of various strategies, such as reappraisal, acceptance or diversion of attention. These have been conceptualized in a process model that distinguishes between antecedent focused (e.g. attentional deployment, reappraisal) and response focused (e.g. response modulation)

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http://dx.doi.org/10.1016/j.psychres.2015.04.003
0165-1781/

strategies (Gross, 1998). Across diagnostic categories the use of strategies aimed at either accepting emotions or at actively modifying them are related to lower symptom levels (Aldao et al., 2010). Findings from the few longitudinal studies available suggest that difficulties in using these skills do not merely accompany but predict subsequent mental health problems (Berking et al., 2011; Ciarrochi and Scott, 2006; Kassel et al., 2007).

Several recent studies point to ER difficulties in people with psychotic disorders: These studies found participants with psychosis to have problems in being aware of emotions (Kimhy et al., 2012, 2014; Lincoln et al., 2015a), which is a precondition for tolerating and accepting them. Compared to healthy controls, people with psychosis also use more dysfunctional and less functional strategies, for example, they tend to suppress rather than accept emotions and are less successful in using cognitive strategies to change emotions in the desired direction (O'Driscoll et al., 2014). Although some studies failed to find ER difficulties related to psychosis (Henry et al., 2008; Perry et al., 2012), the overall picture is that people with psychosis show increased difficulties in regulating emotions in a functional manner. These difficulties are associated with an array of psychotic symptoms and outcomes. For example, several studies indicated that greater use of suppression went along with an increase in auditory hallucinations (Badcock et al., 2011; Moritz et al., 2010). Henry et al. (2009) found the tendency to use suppression strategies to correlate with odd beliefs, unusual perceptual experiences and paranoid ideation. Furthermore, the ability to identify and describe emotions has been shown to be positively associated with social functioning in patients with psychosis (Kimhy et al., 2012). Westermann and Lincoln (2011) found general ER deficits to be related to paranoid ideation in a healthy sample. ER deficits even predicted paranoia 1 month later (Westermann et al., 2013).

Given these findings, we hypothesize that difficulties in using functional ER skills will help to explain the affective pathway outlined above that links stress to psychotic symptoms. There are two mechanisms by which a lack of functional ER sills could increase the likelihood of symptoms. The first and more straightforward mechanism is that negative affect is not down-regulated and thus becomes so intense that it triggers symptoms. This is the case if extreme arousal results in hallucinations (Dudley et al., 2014) or if extreme anxiety increases the likelihood of threat beliefs (Freeman, 2007). A second mechanism could be that delusions are a dysfunctional way of regulating emotions. This is the case if a delusional belief causes a short-term decrease of a negative affect (Lincoln et al., 2014). Irrespective of which mechanism comes into play, one would expect that more pronounced general ER skills will predict less negative affect following a stressor but also a reduced (or absent) symptomatic response to it. The assumption that ER will predict the stress response is intuitive. It also has important implications for interventions aimed at prevention of symptom formation or relapse. However, so far no study has tested whether and which type of ER skills predict the emotional and symptomatic response to stress in individuals with psychotic disorders.

This study thus tests the hypothesis that the subjective, physical and symptomatic response to a stressor in people with psychotic disorders as compared to healthy controls is predicted by their ER skills. We included skin conductance levels as a psychophysiological indicator of arousal, because psychosis has been found to be related to specific difficulties in being aware of and able to describe feelings (alexithymia, Cedro et al., 2001; Kimhy et al., 2012), which speaks against relying solely on self-report measures. We also aimed to identify the type of ER skills that are best suited to predict the stress response. Based on what has been shown in previous work, we predicted that the ability to be aware of, tolerate or accept, and modify emotions will be associated with less pronounced stress responses. Finally, we tested whether the differences between healthy controls and participants with psychosis in their responses to a stressor would disappear if baseline ER skills were controlled for.

2. Method

2.1. Participants

The clinical sample was recruited from in- and outpatient treatment settings in Germany. The healthy control group was recruited via leaflets and advertisements in local newspapers and on the Internet.

All participants were 18 years or older, able to provide informed consent, had no neurological disorder or dementia and had sufficient German language ability. In the psychosis sample all participants had a psychotic disorder in an acute or remitted state according to DSM-IV criteria (APA, 1994). Healthy controls were selected to correspond to the psychosis sample in regard to sex, age and degree of education. They were also required not to have any clinically relevant present Axis I disorder or any disorder requiring treatment in the past, not to be taking medication for any type of mental problem, to have no first-degree relatives with psychotic disorders, and to have no attenuated positive symptoms of psychosis, indicated by a score below 1.45 on the positive subscale of the Community Assessment of Psychic Experiences (Stefanis et al., 2002). All participants provided informed consent. The study was approved by the Ethical Committees of the German Medical Societies in Hamburg and Hessen.

The psychosis sample consisted of 37 patients. However, two participants with psychosis dropped out after the baseline assessment, thus the final sample contained 35 patients with schizophrenia ($n=29$) and schizoaffective disorder ($n=6$) according to DSM-IV of which 23 patients were acutely psychotic and 12 were remitted. The mean PANSS positive syndrome score of this sample was 15.9 (S.D.=4.8, [9–29]), 14.6 (S.D.=4.2, maximum [9–26]) for the negative syndrome score, and 32.2 (S.D.=6.6, [20–48]) for the general subscale score, which reflects mild to moderate symptom severity (Leucht et al., 2005). The majority of the patients were taking atypical or typical antipsychotics. The mean chlorpromazine equivalent (following Benkert and Hippius, 2006) was 882.7 (S.D.=1111.6). The healthy control group comprised 28 participants. The demographic and clinical information for each group is provided in Table 1.

2.2. Design and procedure

The study was part of a larger study in Hamburg and Marburg (Germany) which was conducted as a randomized repeated measures design. In this study, participants with psychotic disorders, persons with attenuated positive symptoms, first-degree-relatives of persons with psychotic disorders, participants with depression and healthy controls were assessed at baseline in regard to a variety of variables including emotion regulation. In a randomized order they were then exposed to a no stress, noise stress and social stress condition. Thus, each participant was assessed within each stress condition. The time period between each condition was approximately 3–4 days and each condition lasted approximately 1.5 h involving the completion of emotion- and symptom-ratings and other assessments (reasoning paradigms, neurocognitive tests) that are reported along with further details on the study design (Lincoln et al., 2015b). For the purpose of the present study we will use the baseline ratings of emotion-regulation skills that we have reported in detail in Lincoln et al. (2015a) in order to test whether they predict the emotional, psychophysiological and symptomatic responses to the noise

Table 1
Socio-demographic characteristics of the participants by group.

	Psychosis sample ($n=35$)	Healthy controls ($n=28$)	Statistics
Age	40.5 (12.5)	35.6 (14.5)	$t=1.4$, d.f.=61, $p=0.16$
Gender [men/women in %]	21/14	16/12	χ^2 (1)=0.05, $p=0.82$
Final school degree [High/Middle/Low in %]	15/12/7	17/7/4	χ^2 (4)=1.7, $p=0.43$