



Contents lists available at ScienceDirect

Schizophrenia Research

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

Abstract and experiential thinking differentially account for anomalous perception of reality in people with or without schizophrenia

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ARTICLE INFO

Article history:

Received 14 December 2016

Received in revised form 22 March 2017

Accepted 1 April 2017

Available online xxxx

Keywords:

Abstract rumination

Anomalous perception

Schizophrenia

ABSTRACT

Abstract repetitive thinking is often increased in various psychopathological conditions. However, evidence for its possible contribution to psychotic symptoms relies only on correlational analysis and has not been experimentally tested within the psychotic continuum. This research aims to examine whether repetitive thinking about a negative past experience using concrete versus abstract processing might modify the reporting of anomalous sensory experiences. 89 patients with schizophrenia and 89 matched controls were asked to reflect on their most negative Self-Defining Memory during a thirty-minute period. By means of a written script, half of the participants were instructed to remember thoughts, feelings and sensations associated with the event in an abstract mode, while the other half followed an equivalent script but with concrete questions. After induced concrete-experiential thinking, both controls and patients significantly reduced self-reported anomalous reality perception. However, participants in the induced abstract-analytical thinking condition increased anomalous experience, especially sensory experience from an unexplained source. Multigroup path analyses showed that involvement in abstract-analytical thinking during the task significantly mediated the relationship between pre-test and post-test anomalous perception scores, but only in the patient group. These results suggest that abstract thinking contributes to distorted sensory experiences. In contrast, training in a concrete processing mode of past experiences may be a useful tool to reduce subjective anomalous perceptions.

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1. Introduction

Repetitive thinking, or rumination, is defined as a cognitive process in which people focus their thoughts on themselves and their worries in a repetitive, prolonged and recurrent way (Harvey et al., 2004; Watkins, 2008). Two types of repetitive thinking are usually distinguished: abstract-evaluative thinking, characterized by general and decontextualized representations focused on causes, meanings, and implications of personal events, and concrete-experiential thinking, characterized by direct, specific, and contextualized representations focused on event details. It has been suggested that abstract thinking is responsible for the dysfunctional effects of rumination in the appraisal of a highly distressing/traumatic events (Ehring and Watkins, 2008; Watkins, 2008). Accordingly, abstract-evaluative thinking compared to concrete-experiential thinking leads to enhanced emotional reactivity and increased negative self-evaluation (Watkins et al., 2008). Recent studies have provided support for this in psychosis. Following a

paranoia induction procedure, non-clinical participants assigned to a rumination task maintained baseline levels of paranoia, whereas a decrease in levels of paranoia was observed in the group assigned to distraction (Martinelli et al., 2013). The induction of worry in a patient group with persecutory delusions increased the reporting of mild anomalous experiences such as feelings of unreality, perceptual alterations, and temporal disintegration (Freeman et al., 2013). Deficits in metacognition (defined as the capacity to form complex ideas about oneself and others) have also been linked to the development of psychotic symptoms (Morrison, 2001; Morrison et al., 2007). Negative beliefs about paranoia (e.g. worry about paranoid thoughts) are significantly higher in patients with a diagnosis of schizophrenia meeting criteria for persecutory delusions than in those without (Morrison et al., 2011). Deficits in metacognition are also associated with more severe negative symptoms and poorer psychosocial functioning, regardless of symptoms or neurocognitive deficits (Lysaker and Dimaggio, 2014). Metacognitive Therapy has thus been developed in order to challenge beliefs that worry and rumination are uncontrollable or dangerous (Hutton et al., 2014).

Studies including patients with schizophrenia have also exhibited links between repetitive thinking and both positive and negative

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symptoms of schizophrenia. Brooding, a form of rumination defined as a passive comparison of one's current situation with some unachieved standard (Trenor et al., 2003), was higher in patients with schizophrenia than in control participants, and was associated with higher scores for negative symptoms (Ricarte et al., 2014). Emotional withdrawal has also been associated with rumination in schizophrenia (Halari et al., 2009). Regarding positive symptoms, rumination seems to be indirectly associated with hallucination-proneness, with this association being mediated by intrusive thoughts (Jones and Fernyhough, 2009). In fact, ruminative thinking leads directly to an increase in intrusive memories (Smets et al., 2012). Moreover, reduced executive functioning is associated with increases in intrusive thinking (Bomyea and Amir, 2011) and trait rumination predicts executive functioning impairments (Connolly et al., 2014). Consequently, it is of clinical importance to identify the types of repetitive thinking usually encountered in patients with schizophrenia and how the different types influence symptoms of illness and their associations with executive functioning.

The effects of the type of information processing on schizophrenia symptoms are currently unknown. Hence, this study aims to identify the differential effects in patients and controls of concrete-experiential thinking induction versus abstract-analytical thinking (i.e. rumination) induction on symptoms associated with loss of contact with reality. To this end, we used the Cardiff Anomalous Perceptions Scale (CAPS; Bell et al., 2006), which has been validated in general population and patients with psychosis and assesses factors underlying anomalous perceptual experience in the psychotic continuum.

There are several ways to activate rumination (Watkins et al., 2008). In the present study, patients with schizophrenia and control participants were asked to focus on negative life events, particularly negative self-defining memories (SDM; Blagov and Singer, 2004). These events are self-defining as they support the understanding of who we are as individuals (e.g., the death of my father made me realize I was more vulnerable than I thought). This issue is of particular interest as patients with schizophrenia have difficulty in appraising this kind of events, finding it especially difficult to draw meaning from them (Allé et al., 2015, 2016; Berna et al., 2011a, 2011b; Raffard et al., 2009, 2010). In addition, autobiographical recall (e.g. writing down or narrating a happy or sad event experienced in the past) is more efficient than other procedures (e.g. combined music and guided imagery) to induce negative thoughts (Jallais and Gilet, 2010). Based on the literature reviewed above, we expected that analytical-abstract thinking about SDM (Singer and Moffitt, 1991) would increase the reporting of anomalous perceptions of reality in both groups, whereas experiential-concrete thinking would decrease this reporting.

2. Methods and materials

2.1. Participants

In the course of their regular follow-ups, patients with schizophrenia were invited to participate in the study by their psychiatrist/clinical psychologist. The inclusion criteria were: a) schizophrenia diagnosed by accredited mental health professionals (according to DSM-IV-TR), b) stability in schizophrenia symptoms for at least 6 months, c) no history of neurological damage or illness, d) prescribed medication without foreseeable changes in dose or type of medication. The control group was recruited by public notice but was controlled for age and gender to match the patients group. Inclusion criteria for the control group were: a) no history of neurological damage, b) no mental disease reported, c) no history of substance abuse. A total sample of 178 participants (89 patients and 89 controls) were recruited for a period of 3 years.

2.2. Procedures

This research obtained the approval of the Clinical Research Ethics Committee of the local Health Area.

Data collection was divided in two separate sessions. In session one, information about the general aims of the study, procedure, and measures was provided before obtaining informed consent from participants or legal guardian (if applicable). Trait and control measures (see below) were also administered. In session two, participants, who were randomly assigned to conditions, first completed the questionnaire on anomalous reality perception (CAPS). They were then instructed to retrieve the most negative SDM in their life, to score it and follow the experimental induction of analytical versus experiential thinking focused on their negative memory. Following this, patients scored their current feelings of happiness and sadness, the intensity of self-focus and abstract thinking during the task of induced-thinking and, finally, they completed the CAPS a second time. Two clinical participants decided to drop out of the experiment in the first session.

2.2.1. Session 1: trait and control measures

2.2.1.1. Verbal Fluency Test (Benton and Hamsher, 1976). This task is a verbal phonetic and semantic fluency test measuring the number of words the subject can say in a minute, beginning consecutively with "F", "A", "S" and "names of animals". The total score is obtained by adding up the number of words pronounced by the participant for each of the letters and the number of names of animals produced.

2.2.1.2. Beck Depression Inventory (Beck and Steer, 2006). This is a self-report questionnaire comprising 21 items, each rated on a 4-point scale and tapping usual symptoms of depression. Participants are instructed to appraise their feelings over the last two weeks regarding each of the items.

2.2.1.3. The Positive and Negative Syndrome scale for Schizophrenia (Kay et al., 1987). This instrument provides a balanced representation of positive, negative, and other general symptoms of schizophrenia.

2.2.2. Session 2: experimental induction and dependent variables

2.2.2.1. The Cardiff Anomalous Perceptions Scale (CAPS; Bell et al., 2006). This is a 32-item self-report measure to assess perceptual anomalies within the psychosis continuum. Participants were instructed to answer each item as they felt before and after the induction of rumination. CAPS provides a total score and nine subscores of anomalous experiences (e.g. sensory experience from an unexplained source).

2.2.2.2. Self-defining task. Participants were asked to retrieve their most negative SDM, following these instructions from Singer and Moffitt (1991): (a) It is at least one year old; (b) It is a memory from your life that you remember very clearly and that still feels important to you; (c) It is a memory that helps you to understand who you are as an individual and might be a memory you would tell someone else if you wanted that person to understand you in a basic way; (d) It is a memory that you have thought about many times. Participants were then asked to score degrees of vividness, affect and arousal associated with the memory retrieval from 0 (minimum) to 6 (maximum).

2.2.2.3. Procedure to induce experiential and analytical thinking. The induction procedure followed the same instructions as those indicated by Watkins and Teasdale (2004). In the experiential and analytical self-focus inductions, participants worked at their own pace, focusing on the negative SDM for 30 min, through a list of 28 questions adapted from Nolen-Hoeksema and Morrow's (1993) rumination task. Both inductions used identical symptom-focused items (e.g. "physical sensations", "experienced feelings" or "clarity of thoughts"), but questions changed "how" for "why" depending on the experimental condition. In the experiential condition, the instruction "Focus your attention on how your experience of" preceded each specific question. In the

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