



The role of emotion regulation in auditory hallucinations

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ABSTRACT

Emotion regulation involves the use of strategies to influence the experience and expression of emotions. Anxiety and depression are strongly associated with the positive symptoms of schizophrenia, such as auditory hallucinations (AHs). Individuals usually try to down-regulate (decrease) such emotions, consequently abnormal or maladaptive use of one or more of these down-regulatory processes (e.g. increased use of expressive suppression or maladaptive attentional deployment, i.e. rumination/worry) may play an important role in AHs (e.g. increasing AH severity and distress). This study examined the self-reported use of a range of emotion regulation strategies in individuals with schizophrenia and current AHs (SZ AH; $N = 34$) and healthy controls ($N = 34$). Two separable dimensions of hallucinatory experiences (severity and distress) were assessed together with measures of anxiety, depression and happiness. Within the SZ AH group, greater use of expressive suppression was associated with an increase in severity of AHs and greater disruption in daily life. In addition, rumination was significantly positively correlated with the distress (but not with the severity) associated with AHs. Within the control group, expressive suppression, rumination and worry were associated with more anxiety/depression and less happiness, as predicted. The implications of different emotion regulation strategies for the treatment of individuals with schizophrenia and AHs are discussed.

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1. Introduction

Emotion regulation broadly refers to “people’s active attempts to manage their emotional states” (Koole, 2009, p. 10). Various emotion regulation strategies are available to increase, maintain or decrease positive and negative emotions, and individuals vary in which of these control processes they tend to select (John and Gross, 2007). Different strategies for emotion regulation are associated with different affective, cognitive and social consequences (Gross, 2002) and different underlying neural circuits (Ochsner et al., 2004; Ochsner and Gross, 2005; Goldin et al., 2008).

Individuals with schizophrenia show significant abnormalities in the experience, expression and perception of emotion (Aleman and Kahn, 2005; Treméau, 2006; Pinkham et al., 2007; Kring and Moran, 2008). Recent evidence also points to the existence of dysfunctional emotion regulation (Henry et al., 2007; Henry et al., 2008; van der Meer et al., 2009), which may be an important predictor of coping with psychotic symptoms (Bak et al., 2008). For example, Henry et al. reported that although emotion regulation skills, assessed with the

Emotion Regulation Questionnaire (ERQ; reappraisal and suppression), were not significantly lower in schizophrenia patients as a group, compared to healthy controls, within the schizophrenia group, blunted affect (a negative symptom of psychosis) was associated with difficulties amplifying (up-regulating) emotional expression and not with the over-use of suppression (Henry et al., 2007; Henry et al., 2008). These findings highlight the potential importance of understanding the interplay between emotion regulation strategies and individual symptoms of schizophrenia. Elsewhere van der Meer et al. (2009) have reported that schizophrenia patients use significantly more suppression and somewhat less reappraisal as measured with the ERQ; however, to our knowledge no studies to date have examined the relationship between these different emotion regulation strategies and the positive symptoms of psychosis.

The positive symptoms of schizophrenia, such as auditory hallucinations (AHs) are strongly associated with the experience of heightened anxiety and depressed mood (Morrison, 2001; Birchwood, 2003; Freeman and Garety, 2003; Smith et al., 2006; Lysaker and Salyers, 2007) which are normally under the control of down-regulatory strategies (John and Gross, 2007) such as changing attention to the meaning of, or bodily expression of emotions (Koole, 2009). Consequently, AHs may be linked to deficient or inappropriate regulation in one or more of these processes.

Expressive suppression involves inhibiting behavioural responses (e.g. facial or vocal expressions) to emotional stimuli. Suppression

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is, in fact, an ineffective strategy for reducing the experience of unwanted emotions, and repeated use of this strategy typically leads to reduced control of emotion, poor memory, a lower level of happiness, increased depression and poor social interactions (Gross, 2002; Gross and John, 2003). No studies have specifically examined emotional suppression in individuals with AHs, however, recent evidence clearly shows that successful emotional down-regulation draws heavily on executive functioning (Gyurak et al., 2009), which is typically impaired in schizophrenia. For example, intentional inhibition of non-emotional stimuli is abnormal in individuals with schizophrenia and is significantly correlated with the severity of AHs (Waters et al., 2003). Recent evidence also suggests that these various forms of (inhibitory) self-control rely on limited, common resources (Baumeister et al., 2007; Goldin et al., 2008). Consequently, the tendency to utilize emotional suppression to handle unwanted emotions (e.g. anxiety) in individuals with schizophrenia may contribute to the development or maintenance of AHs by taxing already depleted executive abilities – such as inhibitory control. Unsuccessful or less frequent inhibition might be expected to increase the frequency or duration of AHs (Waters et al., 2003). Thus, the severity of AHs in schizophrenia may be associated with an abnormality (increased use) of expressive suppression.

Alternative strategies for emotional down-regulation involve changing attention to, or the meaning (beliefs or appraisals) of emotionally relevant information. These forms of emotion regulation generally result in more favourable health outcomes, including more happiness and less anxiety or depression (John and Gross, 2007). Cognitive models of psychosis have clearly emphasized the importance of abnormal attention (e.g. worry and rumination), appraisal¹ or reappraisal in the onset, maintenance and, in particular, the distress associated with positive symptoms (Fowler, 2000; Morrison, 2001; Bentall, 2003; Birchwood, 2003; Morrison and Wells, 2007). For example, in individuals with schizophrenia, negative beliefs about the self are specifically associated with the heightened distress related to AHs rather than the severity of the experience (Smith et al., 2006). Repeatedly thinking about negative events (i.e. worrying or ruminating) may increase the likelihood that such negative beliefs are triggered by inadvertently prolonging negative emotional states (Nolen-Hoeksema et al., 1994). Alternatively, rumination or worry may repetitively focus an individual's attention on the possible causes, content or future implications of AHs in such a way as to preclude active problem solving (Lyubomirsky and Nolen-Hoeksema, 1995) and thereby enhance subjective distress. Consequently, the distress associated with AHs (but not the severity) may be linked to excessive worrying or rumination, though only limited empirical support for this association has so far been provided (Morrison and Wells, 2007).

In summary, the aim of the current study was to examine the relationship between emotion regulation and the experience of AHs; specifically whether the separable dimensions of AHs – distress and severity – may be related selectively to maladaptive attentional deployment (i.e. worry or rumination) and to abnormal use of expressive suppression, respectively. In order to test these predictions, we assessed multiple forms of emotion regulation in a group of individuals with schizophrenia who were currently experiencing AHs. In order to check that the pattern of relationships observed in individuals with schizophrenia does not simply reflect atypical responses to the ERQ in Australian participants (Haga et al., 2009) we also examined emotion regulation in a healthy control group.

¹ Since appraisals of situations control the onset of the emotional response, they constitute part of the emotion generation process. In contrast, reappraisal contributes to the offset of an emotional response and is, therefore, classified as a form of emotion regulation (Koole, 2009).

2. Methods

2.1. Participants

Two groups of participants are included in the current study: 34 individuals with schizophrenia reporting current hallucinations (SZ AH; 10 females and 24 males) and 34 non-clinical control participants (NC; 6 females and 28 males). The SZ AH participants were volunteers drawn from a larger study (the Western Australian Family Study of Schizophrenia) whose patients were recruited from consecutive referrals to inpatient and community-based services associated with Graylands Hospital, Western Australia and who met DSM-IV criteria for schizophrenia or schizoaffective disorder using the Diagnostic Interview for Psychosis (DIP; Castle et al., 2006). Individuals who reported current hallucinatory symptoms during the DIP interview were identified and undertook a multidimensional assessment of their hallucinatory experiences using the Psychotic Symptom Rating Scale (PSYRATS; Haddock et al., 1999).² Of these SZ AH participants, 90.9% were taking antipsychotic medications (66.7% atypicals only, 9.1% typicals only, and 15.2% typicals and atypicals) and 82.4% were out-patients at the time of testing.

The NC group consisted of volunteers with no self-reported personal or family history of psychosis, recruited from the local community (Perth, Western Australia) by random sampling from local telephone directories or among Red Cross blood donors. On formal examination, NC participants also did not meet DSM-IV criteria for any current or lifetime diagnosis of psychosis.

All participants were aged between 18 and 60 years and were fluent in English, assessed on the basis that participants had been educated since primary school level in English, and that English was reported to be the participants' first language. Exclusion criteria for all participants included the presence of self-reported neurological disease or trauma, hospital admission for drug/alcohol rehabilitation within the past year, or low intelligence (IQ < 75) – assessed using the National Adult Reading Test–Revised (NART; Nelson and Willison, 1991).

2.2. Measures

2.2.1. Diagnostic interviews

The Diagnostic Interview for Psychosis (DIP; Castle et al., 2006) was administered to confirm that participants in the SZ AH group met the DSM-IV criteria for schizophrenia. The DIP is designed around the Operational Criteria Checklist for Psychosis (OPCRIT), a 90-item checklist linked to a computerized diagnostic algorithm which uses the interview data to generate diagnoses (McGuffin et al., 1991). The Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1997) was administered to all community controls to ensure that these participants did not meet DSM-IV criteria for psychosis and to screen for the presence of other mental health disorders. No individuals in the control group met the criteria for a current mood disorder. A trained doctoral candidate in clinical psychology conducted the interviews.

2.2.2. Assessment of auditory hallucinations

The Psychotic Symptom Rating Scales (PSYRATS; Haddock et al., 1999) consists of 11 items for the assessment of current AHs (frequency, duration, loudness, amount of negative content, degree of negative content, amount of distress, degree of distress, location, beliefs about origin, control and disruption to life). Each item is scored on a five point scale (0–4). Factor analysis of the PSYRATS (Haddock et al., 1999; Steel et al., 2007) shows that items relating to negative content and distress consistently load on one factor (*Distress*) whilst items relating to the severity of perceptual features of frequency, duration and loudness load on a separate factor (*Severity*).

2.2.3. Assessment of emotion and emotion regulation

The Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983), which is a 14-item self-report measure, was used to assess levels of anxiety and depression. The HADS has good test-retest reliability and internal consistency (Crawford et al., 2001). Positive emotion was assessed using the single-item scale of Happiness (Abdel-Khalek, 2006) which is rated on an 11 point scale (0–10). This single-item scale has been shown to have good convergent and concurrent validity and high temporal stability (0.86).

Self-report measures of rumination and worry provided indices of abnormal attentional regulation of emotion. The Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990) is commonly used to assess pathological worry in both clinical and non-clinical groups. The PSWQ is a 16-item inventory with good reliability and validity (Brown et al., 1992; Meyer et al., 1990; Turk et al., 2004). Each item of the PSWQ is rated on a 1 (not at all typical) to 5 (very typical) Likert-type scale (maximum total score = 80). Rumination was examined with a short (10-item) version of the Ruminative Response Scale (RRS), which has been shown to provide a reliable measure of self-focused attention uncontaminated with items related to depressed mood (Treyner et al., 2003). Participants rated each item on the RRS from 1 (*almost never* – indicating infrequent use of a strategy) to 4 (*almost always* – indicating frequent use of the strategy), yielding a total score range of 10–40.

The Emotion Regulation Questionnaire (ERQ; Gross and John, 2003) is designed to assess individual differences in the habitual use of two emotion regulation strategies:

² Patients with only a past (or no) history of auditory hallucinations could not be assessed with PSYRATS and were, therefore, excluded.

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