



## Emotion regulation strategies in patients with schizophrenia

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### ARTICLE INFO

#### Article history:

Received 29 January 2009

Received in revised form 22 June 2009

Accepted 15 July 2009

#### Keywords:

Alexithymia  
Emotion regulation  
Verbal IQ  
Schizophrenia  
Suppression  
Reappraisal

### ABSTRACT

Schizophrenia patients might experience difficulties in applying two widely used emotion regulation strategies, reappraisal and suppression. We investigated the relationships among emotion regulation strategies, alexithymia (i.e. inability to identify and verbalize feelings) and the role of pre-morbid IQ on alexithymia in schizophrenia. Participants comprised 31 schizophrenia patients and 44 healthy subjects who were tested on measures of emotion regulation strategies (ERQ), alexithymia (BVAQ) and pre-morbid IQ (NART). Patients reported significantly more use of suppression strategies and tended to use reappraisal strategies less frequently. Patients differed significantly on the cognitive–emotional component of alexithymia. This difference remained significant even with pre-morbid IQ as a covariate, but disappeared with depression as a covariate. Schizophrenia patients have specific difficulties identifying their feelings. These difficulties were related to symptoms of depression. Interventions specifically targeted at affect regulation and recognition of emotional state could promote emotional well-being in schizophrenia patients.

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### 1. Introduction

Emotion processing has been found to be deficient in schizophrenia (Edwards et al., 2001; Kohler et al., 2003; Aleman and Kahn, 2005), while other evidence suggests that subjective emotional experience may be at normal levels (Myin-Germeys et al., 2000; Kring and Neale, 1996), and emotional reactivity (i.e. response to emotion-inducing events) may even be stronger in patients with schizophrenia (Myin-Germeys et al., 2000; Kring and Neale, 1996). This disjunction between the expression, the experience and the perception of emotions has been termed the “emotion paradox” (Aleman and Kahn, 2005). If such a disjunction between the different domains of emotion is present, it is likely that the underlying process of regulating emotions will be influenced (e.g. if one experiences difficulties in perceiving emotions, the subsequent steps in the regulation of emotions will be hampered). Despite this “emotion paradox”, there is a paucity of research investigating emotion regulation in schizophrenia.

The concept of emotion regulation refers to a diverse set of processes by which “individuals influence which emotions they have, when they have them, and how they experience and express these

emotions” (cf. Gross, 1999, p. 557). Two well-studied regulation strategies are emotional reappraisal or suppression to decrease (or increase) emotional response tendencies or affective states (Frijda, 1988; Gross, 1998). Suppression reduces emotion-expressive behavior by inhibition during a state of emotional arousal (Gross and Levenson, 1993) (e.g. keeping a poker face when playing cards). Reappraisal is the reinterpretation of emotionally valenced stimuli in unemotional terms (Speisman, 1964) (e.g. reinterpreting a disturbing remark so it is less disturbing). After evaluating emotional cues and triggering of accompanying responses, emotion regulation can be seen as the fine-tuning of emotional responses (Gross, 1998). Neuroimaging results have shown that in an attempt to reappraise negative stimuli, amygdala and insula activation is reduced, whereas in an attempt to suppress negative stimuli, amygdala and insula activation is increased (Goldin et al., 2008). Both the reappraisal and suppression of emotional stimuli reduced negative affect. Thus, even though on a subjective level both strategies seem to be effective, brain areas associated with emotion processing are highly activated when using the suppression strategy as opposed to the reappraisal strategy. Goldin et al. (2008) demonstrated that when the emotional networks were still highly active, the physiological responses were also still present (e.g. skin conductance was greater).

Taking these new neuroimaging findings into account in relation to the emotion paradox in schizophrenia as discussed, it might be the fine-tuning of emotional responses that seems to go wrong in schizophrenia patients. More explicitly, even though it has been widely acknowledged that schizophrenia patients suffer from

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flattened affect (Carpenter, 2004; Gur et al., 2006), some evidence suggests that the subjective experience of schizophrenia patients is similar to that in healthy subjects (Kring and Neale, 1996; Gur et al., 2006), while skin conductance reactivity is greater in schizophrenia subjects. In light of the above, this disjunction might be due to a disability in the reappraisal of negatively valenced stimuli leading to the need to suppress these emotional experiences. This can then result in a similar reduction of negative affect in both groups, but higher activation of emotional circuits in the brain, and thus greater physiological reactivity in schizophrenia patients. To our knowledge there has only been one study that has looked at emotion regulation in schizophrenia (Henry et al., 2008), but the investigators did not find a relationship between the two. Even though this study did not report any group differences, we believe that it is important to carefully study this relationship and to determine whether these results can be replicated. In the present study, we tested the hypothesis that patients with schizophrenia suppress emotions more frequently than healthy subjects, and make less use of the reappraisal strategy.

Problems in emotion regulation have been linked to the personality trait of alexithymia (Taylor et al., 1997; Connelly and Denney, 2007). Alexithymia, literally “no words for feelings”, is a multidimensional construct that includes difficulties identifying one’s feelings, describing feelings to other people, and appraising bodily sensations of emotional arousal, constricted imaginary processes and an externally oriented cognitive style with a relative lack of introspection (Taylor et al., 1997; Sifneos, 1973; Bermond et al., 2006). Alexithymia can be subdivided into a more cognitive–emotional component [encompassing subscales identifying, verbalizing and analyzing of the Bermond–Vorst Alexithymia Scale (BVAQ)(Vorst and Bermond, 2001)] and a more subjective–emotional component (encompassing subscales emotionalizing and fantasizing of the BVAQ). Up to now, three studies reported significantly higher alexithymia scores in schizophrenia patients (Stanghellini and Ricca, 1995; Cedro et al., 2001; van’ t Wout et al., 2007) and non-psychotic siblings (van’ t Wout et al., 2007) compared with scores in healthy controls. It is possible that these high alexithymia scores in schizophrenia patients derive from a deficit in verbalizing thoughts in general, not solely feelings. That is, more eloquent individuals will have less difficulty in verbalizing their thoughts, including their feelings. Even though this is an important question – that is, are schizophrenia patients really more alexithymic or does this deficit arise due to a lower verbal IQ? – there has not been sufficient research to provide an answer to this question. Up to now, only the relationship between current IQ, and not specifically verbal IQ, and alexithymia has been studied (Bermond et al., 1999; Taylor et al., 1990; Cohen et al., 1985) and does not appear to be significant. In the present study, we investigated the role of pre-morbid IQ, more specifically verbal IQ, in alexithymia. This will provide more insight into whether or not verbal IQ could explain alexithymia scores and thus whether alexithymic tendencies are due to more general deficits (verbal IQ) in schizophrenia patients. Given that previous studies have found sex differences in incidence and severity of alexithymia (Lane et al., 1998; van’ t Wout et al., 2007; Vorst and Bermond, 2001), we also include sex as a covariate in our analyses.

Finally, we investigated the relationship between emotion regulation strategies and alexithymia. Being unable to correctly analyze, identify and verbalize one’s emotions might result in inappropriate regulation of that emotion. We hypothesize that schizophrenia patients have higher levels of alexithymia associated with a preference for the suppression strategy to regulate their emotions.

In sum, we expect to find higher levels of alexithymia in schizophrenia patients, possibly mediated by pre-morbid IQ. Secondly, we expect that schizophrenia patients will make more use of the suppression and less of the reappraisal strategy as opposed to healthy control subjects. This could explain their normal or heightened levels of subjective arousal, while they show less expression of emotion. Finally, we expect to find a relationship between emotion regulation strategies and alexithymia.

## 2. Materials and methods

### 2.1. Sample

Thirty-one patients with a DSM-IV diagnosis of schizophrenia, confirmed with the structured interview Comprehensive Assessment of Symptoms and History (Andreasen et al., 1992) (CASH) participated in the study. The patient sample was largely an outpatient population who were in a non-acute state of the illness as these patients were stable on their current medication for at least 1 month without a worsening of symptoms. The presence and severity of symptoms was measured using the Positive and Negative Syndrome Scale (Kay et al., 1987) (PANSS) by two trained raters; see Table 1 for PANSS scores.

Healthy comparison subjects were 44 participants who volunteered after advertisement in local newspapers and on the University campus. They were free of any history of psychiatric illness as confirmed with the Mini International Neuropsychiatric Interview Plus (Sheehan et al., 1998) (MINI-Plus). In addition, controls were screened for the absence of a positive family history for schizophrenia. The patient and control group did not differ from each other on age, sex and parental education. Table 1 provides clinical and demographic characteristics of the sample.

This study was approved by the local ethics committee (METC) and carried out in accordance with the latest version of the Declaration of Helsinki. All participants provided written informed consent after the procedure had been fully explained and prior to testing.

### 2.2. Measures

#### 2.2.1. Emotion regulation

The previously defined emotion regulation strategies, suppression and reappraisal (Gross, 1998), were measured by means of the Dutch translation of the Emotion Regulation Questionnaire (ERQ) as developed by Gross and John (2003). The questionnaire contains 10 items (statements), of which six assess the reappraisal strategy and four the suppression question: I keep my emotions to myself; an example of a reappraisal question: When I want to feel more positive emotion, I change the way I’m thinking about the situation). Subjects were asked to indicate on a 7-point scale to what extent the statements apply to them and higher scores reflect the use of a particular strategy more. The ERQ has been shown to be a reliable and valid measure of emotion regulation; Gross and John (2003) reported a Cronbach’s  $\alpha$  coefficient for reappraisal = 0.79, suppression = 0.73 and test-retest reliability across 3 months = 0.69.

#### 2.2.2. Alexithymia

Alexithymia was assessed with the Bermond–Vorst Alexithymia Scale (BVAQ), a 40-item self-report scale (Vorst and Bermond, 2001). This scale distinguishes five separate subscales (8 items per subscale) comprising the alexithymia features as defined by Nemiah and Sifneos (1970) and Sifneos (1973), namely emotionalizing, fantasizing, identifying, verbalizing and analyzing. Subjects were asked to determine on a 5-point Likert scale to what extent the statement applied to them, with higher scores indicating more problems.

Previous studies have repeatedly shown that factor analyses support the five factors that are distinguished in the BVAQ (Zech et al., 1999; Berthoz et al., 2007; Vorst and

**Table 1**

Clinical and demographic characteristics of the patient and control groups.

	Patients (N = 31)	Controls (N = 44)	P
	Mean (S.D.)	Mean (S.D.)	
Age	32.3 (8.0)	29.2 (8.6)	0.12
Sex (male/female)	24/12	22/24	0.09
Own education (years)	13.9 (2.9)	15.4 (2.1)	0.01
Education mother (years)	14.0 (3.0)	14.6 (2.9)	0.37
Education father (years)	15.0 (3.2)	14.9 (3.2)	0.95
Positive scale PANSS	13.7 (4.7)		
Negative scale PANSS	14.9 (65.8)		
General psychopathology PANSS	26.3 (6.5)		
Medication (N)			
	Risperidone (8)		
	Olanzapine (2)		
	Clozapine (14)		
	Quetiapine (5)		
	Fluvoxamine (1)		
	Diazepam (1)		
	Oxazepam (3)		
	Rifotril (2)		
	Citalopram (1)		
	Penfluridol (1)		
	Testosterone gel (1)		
	Cortisol (1)		
	Levothyroxine (1)		
	Biperiden (4)		

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