Metacognitive beliefs, beliefs about voices and affective symptoms in patients with severe auditory verbal hallucinations

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Objectives. This study explores associations between metacognitive beliefs and beliefs about voices in patients with severe auditory verbal hallucinations, and their hypothesized relationship with levels of depression and anxiety. Furthermore, it was hypothesized that metacognitive beliefs are better able to explain differences in levels of depression and anxiety, than beliefs about voices.

Design. Cross-sectional data were obtained from baseline measurements of a randomized controlled trial. All patients ($N = 77$) met the criteria for a DSM-IV diagnosis within the schizophrenia spectrum. A correlation analysis was conducted to explore the associations between metacognitive beliefs and beliefs about voices. Regression analysis was performed to test the second hypothesis.

Method. Metacognitive beliefs were measured using the MCQ-30. Beliefs about voices were measured using the BAVQ-R. Furthermore, the Beck Depression Inventory-II and the Beck Anxiety Inventory were applied to measure depression and anxiety. All analyses were a priori controlled for gender and level of education.

Results. Significant associations were found between negative beliefs about voices and negative metacognitive beliefs. One of the metacognitive beliefs, that is, perceived uncontrollability and danger of thinking, proved to be a key variable in explaining differences in levels of depression and anxiety and seemed to have greater explanatory value than all of the beliefs about voices when analysed simultaneously.

Conclusions. The results offer modest support to models emphasizing the fact that metacognitive beliefs are a core feature in the development and maintenance of depression and anxiety in patients with severe auditory verbal hallucinations.

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Practitioner points

Positive clinical implications:

- Further evidence for the importance of metacognitive beliefs.
- Specific emphasis on anxiety and depression in patients with severe hallucinations.

Limitations

- Small sample size.
- Cross-sectional data only.

According to cognitive models of psychopathology, it is the appraisal of certain experiences rather than the experience itself that determines distress. This also applies to psychotic experiences in general (e.g., Garety, Bebbington, Fowler, Freeman, & Kuipers, 2001) and, more specifically, to auditory verbal hallucinations (AVHs).

In a series of ground-breaking papers, Chadwick and Birchwood described an evolving cognitive approach to understanding and treating auditory hallucinations. They demonstrated that reactions to voices were mediated by beliefs about the voices' identity, power, purpose, and the consequences of obedience and disobedience to the voices (Chadwick & Birchwood, 1994). To measure the concepts of malevolence, benevolence, resistance, and engagement, the authors developed the Beliefs About Voices Questionnaire (BAVQ, Chadwick & Birchwood, 1995). They found that malevolent voices were associated with fear and anger and were resisted, whereas benevolent voices were associated with positive affect and were engaged with (Birchwood & Chadwick, 1997). In the revised version of the BAVQ, the concept of omnipotence was added to the questionnaire thereby acknowledging new insights about the central importance of the power attributed to the voices (BAVQ-R; Chadwick, Lees, & Birchwood, 2000).

Although these findings are informative, they do not necessarily imply causality. That is, a third variable may well be responsible for covariance between beliefs about voices and distress, for example, a common aetiological factor (e.g., trauma and trauma symptoms; Andrew, Gray, & Snowden, 2008) or a psychological factor (e.g., self-esteem).

First of all, Birchwood *et al.* (2004) found that the feelings of powerlessness and inferiority endured by voice hearers in their relationships with other people in general (i.e., social ranking) are strongly linked to the attributed power of voices and feelings of depression and distress caused by voices. Therefore, the appraisal of social power and social rank may be a primary contributor to the appraisal of voice power and distress to voices.

Another variable influencing the relationship between beliefs about voices and distress is self-esteem. Individuals with more depression and lower self-esteem have auditory hallucinations of more intensely negative content and greater severity, and are more distressed by their auditory hallucinations (Smith *et al.*, 2006). Other research (e.g., Fannon *et al.*, 2009) indicates that beliefs about voices and low self-esteem independently contribute to depression in patients with persistent auditory hallucinations.

A third important variable is metacognition. The S-REF model (Wells & Mathews, 1994) proposes that positive and negative metacognitive beliefs about worrying are responsible for the development and maintenance of a cognitive-attentional syndrome which is associated with psychological disorders. Morrison and Wells (2003) found that dysfunctional metacognitions (or metacognitive beliefs) are a vulnerability factor for

psychological disorders in general and for psychosis in particular. Patients with AVHs, in particular, exhibited higher levels of dysfunctional metacognitive beliefs than delusional patients, panic patients, and non-patient controls. The hallucinating patients scored higher on negative beliefs about uncontrollability and danger and negative beliefs about responsibility and superstition, compared with patients with persecutory beliefs. More recently, Barkus *et al.* (2010) found that help-seeking at-risk mental state (ARMS) patients differed from healthy volunteers on several domains of metacognition, with the former showing higher levels of thoughts about uncontrollability and danger of thinking and beliefs about superstition, punishment, and responsibility. Results showed that ARMS patients and high-schizotypal healthy controls (i.e., prone to psychosis but not seeking help) are similar in their positive beliefs about worry, but are significantly different in other aspects of metacognition. More specifically, ARMS patients display significantly higher levels of thoughts about uncontrollability and danger of thinking and beliefs about superstition, punishment, and responsibility. In addition, metaphysical beliefs (metacognitive beliefs regarding negative spiritual appraisal) about voices (e.g., 'They mean I am possessed'.) were found to be the only predictor of distress in non-patient voice hearers (Morrison, Wells, & Nothard, 2002), which indicates the importance of metacognitive beliefs in explaining distress in voice hearers. In conclusion, even though it is currently unclear whether metacognitive beliefs play an important aetiological role in the way patients react to their AVHs, it is clear that metacognitive beliefs are associated with distress (Barkus *et al.*, 2010; Jones & Fernyhough, 2006; Morrison, French, & Wells, 2007; Morrison, Wells, & Nothard, 2000).

The current study addresses metacognitive beliefs and beliefs about voices and how they are associated with feelings of anxiety and depression. In this study, beliefs about voices were considered to be cognitive rather than metacognitive because, from a patient's perspective, beliefs about voices are beliefs about an external stimulus; however, in the context of voices this distinction may be debatable.

Sufficient evidence is available to support metacognitive models of anxiety (Wells, 2005) and depression (Papageorgiou & Wells, 2003). In both depression and anxiety, negative metacognitive beliefs about rumination prospectively predict symptomatology even after statistically controlling for initial levels of symptoms and rumination (Papageorgiou & Wells, 2003; Wells, 1997, 2005). It seems plausible that metacognitive beliefs may also play a significant role in the aetiology and maintenance of symptoms of anxiety and depression in psychotic patients. Brett, Johns, Peters, and McGuire (2009) found maladaptive metacognitive beliefs in psychotic patients and ARMS patients to be related more to high levels of general psychopathology (including anxiety and depression) than to the presence of psychotic experiences. In particular, 'General negative beliefs about thoughts' were elevated in (sub-)clinical groups compared with non-patients. Indeed, depression often predates psychosis and there is evidence that a depressed disposition marks the onset of psychotic disorder in individuals reporting hallucinatory experiences (Krabbendam *et al.*, 2005). It is also widely believed knowledge that a negative disposition, low self-esteem and negative emotions can contribute to the development and maintenance of psychosis and that symptoms of depression and low self-esteem are common among patients with auditory hallucinations (Fannon *et al.*, 2009; Birchwood, Iqbal, Chadwick, & Trower, 2000; Krabbendam & van Os, 2005).

Concerning beliefs about voices, Van der Gaag, Hageman, and Birchwood (2003) found that depression was independently predicted by malevolent voice appraisals and anxiety by power and benevolent voice appraisals, respectively. Chadwick *et al.* (2000)

found positive associations between depression and voice omnipotence, malevolence and voice resistance, and a negative association with voice engagement. Anxiety was also related to voice malevolence, voice resistance, and voice omnipotence and similarly there was a negative association with voice engagement.

The relationship between different kinds of metacognitive beliefs and beliefs about voices is the main topic of this study. A question not yet addressed in the literature is how beliefs about voices are associated with different metacognitive beliefs. The metacognitive model of GAD (Wells, 1997) argues that positive metacognitive beliefs drive excessive worry, and that negative metacognitive beliefs facilitate and intensify feelings of anxiety. Morrison *et al.* (2000) found similar results for psychotic phenomena: positive beliefs about psychotic experiences are associated with the *occurrence* of psychotic phenomena and negative beliefs are associated with *distress* in response to them. Indeed, psychotic symptoms such as voices (similar to worry and intrusive thoughts) are often viewed as intrusions into awareness (Morrison, 1998). Based on Wells (1997), Morrison (2001), and Chadwick and Birchwood (1994), it is hypothesized that negative beliefs about voices (i.e., malevolence, omnipotence, resistance) are associated with negative metacognitive beliefs.

Furthermore, in the S-REF model it is assumed that transient mood disturbances associated with negative appraisals of life events are amplified into clinically depressive symptoms because the patient employs ruminative coping, threat monitoring, and other types of behaviour that lock him or her into an emotion-focused, self-perpetuating negative coping state. Similar to the S-REF model which emphasizes the importance of metacognitive beliefs instead of specific dysfunctional (non-metacognitive) beliefs, it is expected that in this study population metacognitive beliefs are better able to explain differences in affective symptoms than specific beliefs about voices. To our knowledge, this is the first time this question has been addressed.

This study explores associations between beliefs about voices and metacognitive beliefs in patients with severe AVHs and their relative contribution to affective symptoms. It is hypothesized that: (i) negative beliefs about voices (malevolence and omnipotence) will be associated with negative metacognitive beliefs; and that (ii) metacognitive beliefs will be better able to explain differences in affective symptomatology than beliefs about voices in patients suffering from AVHs.

Answers to these questions are of clinical relevance as they can help us understand affective symptoms in (for example) schizophrenia patients and may offer directions for more effective treatment of our patients. Cognitive behavioural therapy (CBT) has proved to be an effective way of reducing patients conviction in their beliefs about voices, resulting in a reduction of distress in those suffering from psychosis in general (including AVHs) (Gould, Mueser, Bolton, Mays, & Goff, 2004). The results may elucidate why certain patients develop depressive and anxiety symptoms while others do not and how these symptoms can best be treated; furthermore, they may provide evidence for a more metacognitive approach to treating patients.

Method

Cross-sectional data from measurements of metacognitive beliefs, beliefs about voices, depression, and anxiety were collected from an efficacy study (randomized controlled trial; RCT) of a treatment for patients with persisting AVHs. Other baseline measurements included the Beck Cognitive Insight Scale (Beck, Baruch, Balter, Steer, & Warman, 2004),

the Positive Outcome Scale (Dutch: PUL; Appelo & Herkema-Schouten, 2003), and the Social Comparison Rating Scale to Voices (Allan & Gilbert, 1995), none of which were included in this study. Baseline data were obtained before randomization. Regression models included depression and anxiety as outcome variables and general metacognitive beliefs, different beliefs about voices and possible confounders as explanatory variables.

Participants

Baseline measurements of a sample of 77 patients (52% men and 48% women, M_{age} = 42.3 years, SD = 12.0, age range 21–64 years) suffering from AVHs were analysed. The sample had a long history of AVHs ($M_{duration}$ = 13.5 years, $Mdn_{duration}$ = 9 years, range 0–50 years) All patients were treated in either a psychiatric institution (Parnassia, The Hague and Reinier van Arkel, 's-Hertogenbosch) or a university hospital (University Medical Centre Utrecht). All participants were diagnosed with a DSM-IV axis-I disorder of the schizophrenia spectrum (American Psychiatric Association, 1994): 69% paranoid schizo-phrenia, 16% psychotic disorder NOS, 5% disorganized schizophrenia, and 10% other categories. Psychiatric evaluation was used to confirm DSM-IV axis-I diagnoses. The patients took part in an RCT, which evaluated a new CBT technique on AVHs. Inclusion criteria were moderate to high scores on the *frequency* of, the *distress* caused by, and the *intensity* of their AVHs as measured by the PSYRATS-AHRS (Haddock, McCarron, Tarrier & Faragher, 1999: items 1, 9 and 10 $\geq$ 3). This amounted to severe pharmacotherapy refractory AVHs occurring daily, showing at least moderately intense distress and at least a moderate disturbance of daily functioning due to the voices. Patients with primary addiction diagnoses were excluded. All participants were informed that data could be used for additional studies and signed an informed consent form. Ethical approval was granted by the Medical Ethical Committee.

Measurements

Participants completed five questionnaires regarding general metacognitive beliefs, specific beliefs about voices, depression, and anxiety.

To measure metacognitive beliefs, the shorter version of the Metacognitions Questionnaire, the MCQ-30 was used (Wells & Cartwright-Hatton, 2004). This question-naire measures individual differences in a selection of metacognitive beliefs, judgements and monitoring tendencies considered important in the metacognitive model of psychological disorders.

The questionnaire consists of 30 items divided into five domains assessing three aspects of both positive and negative metacognitive beliefs, metacognitive monitoring, and judgements of cognitive confidence on a 4-point Likert scale. The three aspects of positive and negative metacognitive beliefs are as follows: (i) positive beliefs about worry (six items; typical items include, for example: 'Worrying helps me to get things sorted out in my mind' and 'Worrying helps me cope'); (ii) negative beliefs about the controllability of thoughts and corresponding danger (six items; typical items include, for example: 'Worrying is dangerous for me' and 'I cannot ignore my worrying thoughts'); and (iii) negative beliefs about thoughts in general, including: responsibility, punishment, and superstition (six items; typical items include, for example: 'Not being able to control my thoughts is a sign of weakness' and 'If I did not control a worrying thought, and then it happened, it would by my fault'). Metacognitive monitoring was operationalized as cognitive self-consciousness (six items; typical items include, for example: 'I think a lot

about my thoughts' and 'I pay close attention to the way my mind works). Judgements of cognitive confidence were also measured using six items (typical items include, for example: 'I have a poor memory' and 'My memory can be misleading').

The MCQ-30 can be relatively easily applied and shows good internal consistency (Cronbach's alpha .93) and convergent validity, and an 'acceptable' to 'good' test–retest reliability (Wells & Cartwright-Hatton, 2004).

The revised BAVQ-R (Chadwick *et al.*, 2000) is a 25-item measure of people's beliefs about auditory hallucinations, and their emotional and behavioural reactions to them. There are five subscales: three subscales relating to beliefs (i.e., malevolence, benevolence, and omnipotence) and two subscales relating to emotional and behavioural relationships to auditory hallucinations (i.e., resistance and engagement). Malevolence, benevolence, and omnipotence each consist of six items (e.g., 'My voice is punishing me for something I have done' [malevolence], 'My voice wants to protect me' [benevolence] and 'My voice is very powerful' [omnipotence]). The resistance subscale has five items on emotion (e.g., 'My voice frightens me') and four on behaviour (e.g., 'When I hear my voice, I usually tell it to leave me alone'). The engagement subscale has four items on emotion (e.g., 'My voice reassures me') and four on behaviour (e.g., 'When I hear my voice, I usually listen to it because I want to'). All responses are rated on a 4-point Likert scale. With a mean Cronbach's alpha for the five subscales of .86 (range .74–.88), its psychometric qualities can be considered 'good'.

The Beck Depression Inventory-II (BDI-II, Beck, Steer & Brown, 1996) is a series of 21 questions developed to measure the level of intensity, severity, and depth of depression in patients with psychiatric diagnoses. It is composed of 21 questions, all of which are constructed to provide a means of assessing a specific symptom on a 4-point Likert scale common among people suffering from depression. Internal consistency is 'good', with a Cronbach's alpha coefficient of around .85 (Ambrosini Metz, Bianchi, Rabinovich, & Undie, 1991).

The Beck Anxiety Inventory (BAI; Beck & Steer, 1993) consists of 21 questions on how the subject had been feeling during the past week, expressed as common symptoms of anxiety. Each question is rated on a 4-point Likert scale. Internal consistency ranges from .92 to .94 in adults. Concurrent validity, correlation with the Hamilton Anxiety Rating Scale-Revised, was .51. Therefore, its psychometric properties can be considered 'good' (Beck & Steer, 1993).

The PSYRATS-AHRS is a subscale of the Psychotic Symptom Rating Scales (PSYRATS; Haddock *et al.*, 1999). It is an 11-item, 5-point subscale (0–4) multidimensional measure of auditory hallucinations. The 11 items of the auditory hallucination scale assess the different dimensions of auditory hallucinations over the past week and can be clustered into three factors: a physical characteristics factor (consisting of frequency, duration, location, and loudness), an emotional characteristics factor (consisting of the amount and degree of negative content and distress), and a cognitive interpretation factor (consisting of disruption, belief about origin and attribution of control). The psychometric properties of the PSYRATS have been investigated, and both the auditory hallucination scale and the delusion scale show excellent inter-rater reliability and good validity (Drake, Haddock, Tarrier, Bentall, & Lewis, 2007).

Before analysing the data, the internal reliability of all four instruments in the current sample was assessed using Cronbach's alpha statistic. Statistics ranged from .82 (BAVQ-R) to .94 (BAI). With values greater than .70 the internal consistency of all instruments can be considered 'good'.

Table 1. Summary of regression analysis of possible confounders predicting depression and anxiety (N = 77)

Predictor variable	Depression			Anxiety		
	B	SE B	β	B	SE B	β
Constant	24.579	8.811		18.003	10.898	
Gender	7.417	2.805	.292*	6.795	3.469	.228***
Education	−2.761	0.935	−.331**	−2.216	1.157	−.226***
Age	−0.033	1.116	−.003	0.700	1.380	.059
Medication	−0.118	1.041	−.012	0.930	1.288	.083

Note. For depression R^2 = .231 (p < .01); for anxiety R^2 = .144 (p < .05); *Indicates significance at the p < .05 level; **Indicates significance at the p < .01 level; ***Indicates significance at the p < .10 level (tendency).

Statistical analysis

All data were analysed using SPSS 17. Gender, age, highest level of education, and level of antipsychotic medication were a priori included in the analyses as potential confounding factors. Selection of confounders was either based on existing literature or on correlation analysis of the current data. The influence of age, gender, and levels of medication on depression are commonly acknowledged (e.g., age and depression: Gatz & Hurwicz, 1990; gender and depression: World Health Organization [WHO], 2012a; and medication and depression: WHO, 2012b). The same applies to the influence of age, gender, and levels of medication on anxiety (e.g., age and anxiety: Flint, 1994; gender and anxiety: WHO, 2012a; and levels of medication and anxiety: Blanco *et al.*, 2003). For education, a correlation analysis showed significant medium Pearson's correlations with anxiety (−.293, p < .05) and depression (−.386, p < .01) which justifies entering it as a possible confounder. To avoid overfitting of the following regression models an initial regression analysis was then conducted with the possible confounders acting as predictors, with depression and anxiety acting as outcome variables, to downsize the number of confounders (Table 1). Gender and level of education remained possible confounders.

Secondly, Pearson's correlation coefficients were calculated to establish correlations between metacognitive beliefs and beliefs about voices. Finally, we performed two hierarchical linear regression analyses with depression and anxiety acting as the outcome variables, and the metacognitive beliefs *and* beliefs about voices (step 2) and the two possible confounders (step 1) acting as predictor. All models were significant (p < .05). All assumptions for multiple regression analysis were met according to Berry (1993).

Results

Demographic, clinical, and questionnaire characteristics of the sample are presented in Table 2. All patients were using antipsychotic medication. To compare different levels of antipsychotic medication, we used chlorpromazine equivalent doses as calculated by Woods (2003). The sample included 40 men and 37 women. Mean levels of depression and anxiety were moderate to high: 35% (N = 27) had a score of 30 or higher on the BDI-II which indicates severe depression and 42% (N = 32) of the sample scored 26 or more on the BAI which indicates severe anxiety.

Table 2. Descriptive measurements according to metacognitive domains, beliefs about voices, levels of symptoms, highest level of education, age, and daily use of antipsychotic medication

Variable	Range	Mean	SD
MCQ-30: Positive beliefs about worrying	6–23	10.47	4.28
MCQ-30: Uncontrollability	6–24	15.35	5.33
MCQ-30: Need to control thoughts	7–24	14.35	4.07
BAVQ-R Malevolence	0–18	11.95	4.35
BAVQ-R Benevolence	0–18	3.18	4.28
BAVQ-R Omnipotence	0–18	11.3	4.19
BDI: Depression	1–57	23.52	12.46
BAI: Anxiety	0–63	23.87	14.87
PSYRATS-AHRS	17–38	29.78	5.134
Highest level of education	1–7	4.26	1.529
Age[a]	2–6	3.78	1.253
Medication[b]	0–8	3.16	1.387

Note. [a]Categorized: 0–9 = 0, 10–19 = 1, 20–29 = 2, etc.; [b]Categorized: 0–99 = 0, 100–199 = 1, 200–299 = 2, etc.

Table 3. Correlation matrix (Pearson's *r*) of the beliefs about voices and metacognitive beliefs

	Uncontrollability	Need to control thoughts	Positive beliefs about worry
Malevolence	.358*	.428*	.165
Omnipotence	.310*	.315*	.220
Benevolence	.167	.085	.320*

Note. *Indicates significance at the $p < .01$ level.

Table 4. Summary of hierarchical regression analyses predicting depression and anxiety ($N = 77$)

	Depression			Anxiety		
Predictor variable	B	SE B	β	B	SE B	β
Step 1						
Constant	24.407	6.209		25.154	7.719	
Gender	7.157	2.750	.283*	6.299	3.419	.213
Education	−2.706	0.899	−.328**	−2.391	1.117	−2.47*
Step 2						
Constant	4.366	7.670		7.336	9.914	
Gender	2.750	2.687	.109	2.596	3.473	.088
Education	−1.535	0.866	−.186	−1.459	1.119	−.151
BAVQ: Malevolence	−0.048	0.453	−.016	−0.777	0.586	−.226
BAVQ: Benevolence	−0.284	0.373	−.090	−0.350	0.482	−.094
BAVQ: Omnipotence	0.575	0.407	.191	0.912	0.526	.259
MCQ: Uncontrollability	0.880	0.289	.374**	1.006	0.374	.374**
MCQ: Need to control	0.275	0.407	.086	0.048	0.527	.013
MCQ: Positive beliefs	−0.052	0.338	−.017	0.350	0.437	.100

Note. For depression: $R^2 = .223$ ($p < .01$) for step 1, and $\Delta R^2 = .199$ ($p < .01$) for step 2; for anxiety: $R^2 = .126$ ($p < .05$) for step 1 and $\Delta R^2 = .171$ ($p < .01$) for step 2; *Indicates significance at the $p < .05$ level; **Indicates significance at the $p < .01$ level.

Hypothesis (i):   Negative beliefs about voices (malevolence and omnipotence) are associated with negative metacognitive beliefs.

Results for this hypothesis are given in Table 3. 'BAVQ-R malevolence' and 'BAVQ-R omnipotence' are associated with 'MCQ-30 uncontrollability' and 'MCQ-30 need to control thoughts'.

Hypothesis (ii):   Metacognitive beliefs are better able to explain differences in variance in levels of depression and anxiety than beliefs about voices in patients suffering from AVHs.

Results for this hypothesis are given in Table 4. The total model including beliefs about voices, metacognitve beliefs, and confounders accounted for 22% of the variation in levels of depression, and 13% of the variation in levels of anxiety. After controlling for two confounders only 'MCQ uncontrollability' was significantly positively associated with both depression and anxiety (on a $p < .01$ level).

Discussion

To our knowledge, this is the first study in which both metacognitive beliefs and beliefs about voices have been simultaneously compared with regard to their ability to explain differences in severity of depression and anxiety in a group of patients with treatment-refractory AVHs. After controlling for two possible confounders, one of the metacognitive beliefs concerning 'uncontrollability of thoughts and corresponding danger' appeared to be relatively important after beliefs about voices were statistically controlled; this offers further support for a metacognitive approach towards affective psychopathology in psychotic patients. This is in accordance with metacognitive models which emphasize the importance of metacognitive beliefs, instead of specific dysfunctional (non-metacognitive) beliefs, in the transition from everyday worrying to psychopathology. Similar to the field of depression (Papageorgiou & Wells, 2003) our findings show that, in our sample, negative beliefs about worrying explain variance in the severity of depressive symptoms. In addition, corresponding to Wells' (1997) model of GAD, we found that negative metacognitive beliefs are associated with feelings of anxiety. The current results, although derived from a relatively small sample, suggest that this is also the case in patients suffering from severe AVHs: in our sample variance in affective psychopathology is to some extent explained by negative metacognitive beliefs.

Additional results are discussed below.

Specific beliefs about voices, anxiety, and depression
This study found no significant associations between beliefs about voices and depression and anxiety. In one scientific review (Mawson, Cohen, & Berry, 2010) 26 studies on hallucinations were compared. Several types of appraisals were found to be linked to higher levels of distress in voice hearers, such as 'voice malevolence', and attitudes of disapproval and rejection towards voices. Our modest results on the impact of beliefs about voices may underline the importance of introducing other concepts (e.g., metacognition) to understand the pathway from psychotic symptomatology to affective psychopathology.

Associations between beliefs about voices and metacognitive beliefs

The results show that specific metacognitive beliefs are associated with specific beliefs about voices. Even though no conclusions can be drawn as to causality it is possible that dysfunctional metacognitive beliefs act as a vulnerability factor and may be responsible for the covariance between beliefs about voices and anxiety and depression in those suffering from AVHs. Our results give some support to the proposal of Wells (1997), who assumed that negative metacognitive beliefs are associated with feelings of anxiety. Similarly, Morrison (2001) proposed that positive beliefs about psychotic experiences are associated with the occurrence of psychotic phenomena and negative beliefs are associated with distress in response to them. Furthermore, psychotic symptoms such as voices (similar to worry and intrusive thoughts) are often viewed as intrusions into awareness (Morrison, 1997). This underlines the idea that beliefs about voices and metacognitive beliefs could be associated, which the current study confirms.

The sample that was included in our trial had similarities with other study samples. Some of the main descriptives (age and duration: Fannon *et al.*, 2009; Age: Morrison *et al.*, 2007; Morrison & Wells, 2003) were similar whereas others showed divergence (diagnosis and gender: Fannon *et al.*, 2009; Gender: Morrison *et al.*, 2007; Morrison & Wells, 2003), with our sample having a relatively large proportion of females.

In summary: this study shows that symptoms of depression and anxiety are to some extent explained by dysfunctional beliefs about cognitive processes and worrying, and are not explained by dysfunctional (non-metacognitive) beliefs about voices.

Strengths

A strength of this study is that, to our knowledge, it is the first study of its kind to have addressed the question as to whether beliefs about voices and metacognitive beliefs are associated in a group of severely distressed patients with persistent AVHs and, more importantly, in which both metacognitive beliefs and beliefs about voices are compared simultaneously with regard to their ability to explain differences in severity levels of depression and anxiety.

Another strong feature is that the study addressed and distinguished between depression/anxiety and the general concept of distress, resulting in more specific conclusions about their relationship to metacognitive beliefs and beliefs about voices.

Limitations

A first limitation is the fact that this study analysed cross-sectional data, and could therefore not draw any conclusions with regard to causality, but only explain variance of the considered factors. Strictly speaking, given the statistical method, it is possible that elevations in beliefs about voices and metacognitive beliefs are *the result* of anxiety and mood symptoms.

And secondly, as already suggested in the introduction, it is possible that other variables (e.g., aetiological, psychological, genetic variables) may well be responsible for the significant associations found between metacognitive beliefs/beliefs about voices and affective symptoms.

A third limitation is the use of self-report measures, which implies that we cannot rule out a response bias, for example, social desirability.

A fourth limitation is the relatively small sample size. Considering guidelines provided by Miles and Shevlin (2001) with the current number of predictors and sample size we

would only be able to detect medium-to-large effects and therefore we cannot rule out smaller, undetectable effects. Furthermore, our sample was screened to have moderate/ severe distress about voices and therefore represents a sample with reduced variance in terms of beliefs about and responses to voices. A broader sample, including people with lower distress about voices might have shown a different distribution of scores on metacognitive beliefs and beliefs about voices.

A fifth and final limitation is that voice-related distress as measured by the PSYRATS could not be examined because the PSYRATS had already been used as a screening instrument for the primary RCT from which the data were obtained.

Therefore, in summary, it follows that in some aspects these results replicate and extend earlier work in this field, that is, in patients suffering from persistent AVHs our findings suggest that different domains of metacognitive beliefs and more specific beliefs about voices are related, and that they may contribute to psychological disorder (S-REF model, Wells & Matthews, 1996) and, more specifically, to depression and anxiety. An important feature is the perceived high level of uncontrollability and danger of thoughts (metacognitive belief).

These findings support the current trend in CBT for psychosis, in which particular emphasis is placed on metacognition and cognitive biases in addition to the traditional focus on content of thought (Garety *et al.*, 2001; Morrison, 2001; Van der Gaag, 2006). There is also evidence to suggest that catastrophic worrying (with strong metacognitive beliefs about worry) is not only linked to voices but also to paranoid psychosis (Morrison *et al.*, 2010; Startup, Freeman, & Garety, 2007). These findings encourage the development and implementation of training and therapy in the field of schizophrenia focussing (indirectly) on metacognitive beliefs as performed earlier in the field of anxiety disorders (Wells, 2009). Current initiatives focus primarily on paranoid patients; however, the present results support the idea that, *if* there is a causal link between dysfunctional metacognitive beliefs and affective symptoms, metacognitive training may also be relevant in a group of chronically impaired patients suffering from AVHs.

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