Behavioural and Cognitive Psychotherapy, 2015, 43, 209–223
First published online 9 October 2013 doi:10.1017/S1352465813000817

Beliefs about Voices and Schemas about Self and Others in Psychosis

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Background: In people who experience auditory verbal hallucinations, beliefs the person holds about their voices appear to be clinically important as mediators of associated distress and disability. Whilst such beliefs are thought to be influenced by broader schematic representations the person holds about themselves and other people, there has been little empirical examination of this, in particular in relation to beliefs about voice intent and the personal meaning of the voice experience. **Method:** Thirty-four voice hearers with a diagnosis of schizophrenia or schizoaffective disorder completed the Psychotic Symptom Rating Scales and measures of beliefs about voices (Revised Beliefs About Voices Questionnaire, Interpretation of Voices Inventory) and schemas (Brief Core Schema Scales). **Results:** Beliefs about voices were correlated with both negative voice content and schemas. After controlling for negative voice content, schemas were estimated to predict between 9% and 35% of variance in the six beliefs about voices that were measured. Negative-self schemas were the strongest predictors, and positive-self and negative-other schemas also showed potential relationships with beliefs about voices. **Conclusions:** Schemas, particularly those regarding the self, are potentially important in the formation of a range of clinically-relevant beliefs about voices.

Keywords: Auditory verbal hallucinations, voice-hearing, psychosis, schema, interpersonal beliefs, cognitive-behavioural therapy

Introduction

Cognitive models of auditory verbal hallucinations assert that the beliefs that people hold about the voices they hear mediate associated levels of distress and disability. Two main

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types of belief have been proposed as important. The first, and more widely studied, set of beliefs was described by Chadwick and Birchwood (1994), who highlighted the importance of explanatory beliefs associated with seeing voices as sentient others interacting with the person. These include appraisals of whether the entities responsible for their voices have malevolent or benevolent intent, and of their power and status relative to the person hearing them. In particular, appraisals of voices as malevolent and omnipotent were proposed to mediate distress. Accordingly, measures of these beliefs have been associated with ratings of voice-related distress (e.g. Birchwood and Chadwick, 1997; Peters, Williams, Cooke and Kuipers, 2012) and measures of depression and anxiety (e.g. Van der Gaag, Hageman and Birchwood, 2003). They have also been shown to predict behavioural responses to hearing voices (e.g. Chadwick and Birchwood, 1995; Hayward, 2003; Hayward, Denney, Vaughn and Fowler, 2008; Thomas, McLeod and Brewin, 2009), including compliance with command hallucinations (Barrowcliff and Haddock, 2010; Beck-Sander, Birchwood and Chadwick, 1997; Fox, Gray and Lewis, 2004; Shawyer et al., 2008; Trower et al., 2004).

The second set of beliefs about voice experience was described by Morrison (1998; Morrison, Haddock and Tarrier, 1995; Morrison, Wells and Northard, 2002). Morrison highlighted beliefs about the self-related implications of experiencing voices as a mental phenomenon, in a similar way to metacognitive beliefs about experiences such as worry (e.g. Wells, 1995). Specifically, Morrison suggested that positive beliefs held about the value of hallucinatory experience may be associated with efforts to engage with and maintain hallucinatory experience (Morrison et al., 2002), reinforcing this phenomenon. Meanwhile, the person may hold parallel negative appraisals that hearing voices is a source of threat, which mediate distress (Morrison, 1998). Developing a measure of these "metacognitive" beliefs, the Interpretation of Voices Inventory (IVI), Morrison et al. (2002) derived three factors: positive beliefs (e.g. "they make me special"; "I would not cope without them"), plus two types of negative belief, namely metaphysical beliefs (e.g. "they mean I have done something bad", "they mean I am possessed") and beliefs about loss of control (e.g. "they will take over my mind", "they will make me go crazy"). These beliefs differ from those described by Chadwick and Birchwood (1994) in focusing on the consequences of hearing voices as an experience of the hearer, rather than on the perceived attributes of voices as social agents. Positive beliefs about voices have been found to be associated with hallucination-proneness (Morrison et al., 2002), whilst negative beliefs predict whether hallucinatory experiences are regarded as problematic and distressing (Morrison et al., 2002; Morrison, Northard, Bowe and Wells, 2004).

It has been observed that these beliefs about voices involve the person making inferences beyond what is manifest in voice content alone (Birchwood and Chadwick, 1997; Close and Garety, 1998), in fact sometimes being quite incongruent with content (Chadwick and Birchwood, 1994; Shawyer et al., 2008; Van der Gaag et al., 2003). In explaining the formation of such beliefs, a central idea within cognitive models is that appraisals of ongoing events are influenced by more generalized cognitive representations of prior experience, often referred to as schemas. Hence cognitive representations of the personal and social meaning of voices may be understood as influenced by schemas the person holds about themselves and the social world (Chadwick, Birchwood and Trower, 1996; Morrison, 2001; Paulik, 2012). Indeed, key psychological models of psychosis have proposed that negative schemas relating to self and others are central to understanding the interplay between environment, emotion and cognition in psychosis (e.g. Birchwood et al., 2004; Garety, Kuipers, Fowler, Freeman and Bebbington,

2001; Garety, Bebbington, Fowler, Freeman and Kuipers, 2007; Morrison, Frame and Larkin, 2003). Extreme negative evaluations of both self and others are readily endorsed in people with psychosis (Fowler et al., 2006), and there is developing evidence for the association of these with delusional beliefs (Addington and Tran, 2009; Freeman and Fowler, 2009; Smith et al., 2006). In providing a cognitive representation of early experience, schemas also provide a model for understanding the influence of social environment on the understanding the person forms of their psychotic experiences (Birchwood, 2003; Garety et al., 2007; Morrison et al., 2003), including the role of aversive environmental factors such as abuse, trauma and marginalization, which are increasingly seen as important in relation to psychosis (e.g. Read, Van Os, Morrison and Ross, 2005). This provides a means of conceptualizing connections observed between beliefs about voices and recollections of parental behaviour (Offen, Thomas and Waller, 2003), childhood sexual abuse (Offen, Waller and Thomas, 2003), and trauma variables (Andrew, Gray and Snowden, 2008).

There is some initial evidence that schemas may be linked with beliefs about voices. Using the "downward arrow" thought-chaining technique, a method used in cognitive therapy to identify core schemas from specific appraisals, Close and Garety (1998) found that the majority of their participants were able to draw out negative cognitions about self that related to the specific appraisals of voices that had been elicited. Other studies have found that measures of the perceived relative power and superiority of voices in relation to oneself correspond to views of one's own lack of power and inferiority in relation to others (Birchwood, Meaden, Trower, Gilbert and Plaistow, 2000; Birchwood et al., 2004). However, whilst power-related dimensions have been compared with broader beliefs using formal measures, there has yet to be a systematic study of how either appraisals of voice intent (malevolence or benevolence) or metacognitive beliefs about voices may relate to broader cognitive representations of self and others.

Representations of both self and others potentially influence appraisals of voice intent. Chadwick et al. (1996) argued that appraisals of voices' malevolence may arise from negative evaluative beliefs about self. For example, malevolent intent might be appraised if the person has schemas relating to being deserving of punishment or vulnerable to victimization. In support of this, Close and Garety (1998) were successful in eliciting semantically congruent self-related beliefs from targeted questioning. Self-representations might also influence the negative metacognitive beliefs proposed as important by Morrison et al. (2002). The highest loading items on the metaphysical beliefs scale refer to voices being interpreted as meaning the hearer has done bad things, is a bad person or is possessed, likely to be influenced by negative self schemas. Similarly, negative self schemas are likely to influence the second set of negative beliefs relating to concerns about loss of control when hearing voices.

Cognitive representations of others also seem relevant to the formation of voice-related beliefs. Appraisals of voice malevolence and benevolence involve the voice hearer imposing characteristics upon their voices as if the voice were another person in their social environment. Here, the person is viewing their voices using the same lens through which they view other people. In line with this, there is evidence that voice hearers conceptualize their experience of hearing voices in coherent interpersonal terms (Benjamin, 1989; Chin, Hayward and Drinnan, 2009; Hayward, Berry and Ashton, 2011; Hayward et al., 2008; Vaughn and Fowler, 2004), that this influences their responses to voices (Thomas et al., 2009), and that their relationships with voices mirror broader patterns of social relating (Hayward, 2003). Consequently, schemas about others – cognitive representations of the behaviour of other

people –may also be important in influencing the types of appraisals formed. Specifically, it might be expected that appraisals of malevolence would be related to schemas held about people in general as potentially hostile or untrustworthy, whilst appraisals of benevolence would be related to more positive schemas held about others. Additionally, Morrison et al. (2003) have proposed that immersion in hallucinatory experience may develop as a coping strategy for dealing with experiences and memories of trauma and abuse, for which there is accumulating evidence of an association with predisposition to hallucination (McCarthy-Jones, 2011; Read et al., 2005). Hence it is possible that the positive beliefs about the value of voice experience described on the IVI will be predicted by negative schemas about other people.

In this study we examined the relationship between beliefs about voices and cognitive representations of self and others in people who experience auditory hallucinations. The schema measure developed by Fowler et al. (2006) was used, as this had been designed to capture schemas about self and others that are proposed as particularly pertinent to psychosis, and has been validated within this population (Fowler et al., 2006; Smith et al., 2006). This measure assesses four schema factors: negative-self, positive-self, negative-others, and positive-others. The primary aim was to determine whether relationships between these schemas and beliefs about voices exist, including after controlling for the amount and degree of negative voice content. A second aim was to examine the extent to which beliefs about voices would be associated with schemas relating to self or schemas relating to others. In particular, we predicted relationships between each of the negative beliefs about voices (omnipotence, malevolence, metaphysical and loss of control beliefs) and negative-self schemas, and additionally between malevolence and negative-others, between benevolence and positive-others, and between positive beliefs about voices and negative-others.

Method

Participants

Following ethics committee approval, attendees at a specialist outpatient clinic providing psychological therapy for auditory hallucinations (Thomas, Rossell, Farhall, Shawer and Castle, 2011) completed measures as part of a baseline assessment during their initial appointment. Of 38 consecutive patients seen at the clinic during the data collection period, 34 met the study inclusion criteria of: (a) a diagnosis of schizophrenia or schizoaffective disorder; (b) current auditory hallucinations in the form of voices; (c) history of hearing voices of at least one year; and (d) sufficient literacy and English to complete self-report questionnaires. Twenty-two (65%) were male, and the overall mean age was 35.4 (*SD* 8.52). Thirteen (38%) were in paid or voluntary employment. Participants reported hearing voices for a mean of 11.1 (*SD* 6.91) years. All were taking antipsychotic medication at the time of the study.

Measures

Psychotic Symptom Rating Scales Auditory Hallucinations Subscale (PSYRATS; Haddock, McCarron, Tarrier and Faragher, 1999) is an interview-based set of clinician rating scales, comprising 11 5-point items assessing dimensions of voice experience such as frequency, content and distress. The amount of negative content of voices (item 6) and degree of negative

content (item 7) subscales were used to assess negative content. Inter-rater reliabilities of these PSYRATS items are excellent, and they show good test-retest reliability and validity (Haddock et al., 1999; Drake, Haddock, Tarrier, Bentall and Lewis, 2007).

Interpretation of Voices Inventory (IVI; Morrison et al., 2002) is a 26-item questionnaire assessing three types of metacognitive belief about voices: positive beliefs, negative metaphysical beliefs, and loss of control beliefs (see introduction for examples of items). Scales show good internal consistency and test-retest reliability and there is evidence of validity from predicted correlations between scales and hallucination-proneness, hallucinations and hallucination-related distress (Morrison et al., 2002, 2004).

Revised Beliefs About Voices Questionnaire (BAVQ-R; Chadwick, Lees and Birchwood, 2000). The BAVQ-R was administered, assessing beliefs about voices on three scales: malevolence (e.g. "my voice is punishing me for something I have done"), benevolence (e.g. "my voice wants to protect me"), and omnipotence (e.g. "my voice seems to know everything about me"). Each scale has six items that are rated on a 4-point scale ranging from 0 (disagree) to 3 (agree strongly), producing scales of 0 to 18 points. Scales show good internal reliability and validity (Chadwick et al., 2000; Mawson, Cohen and Berry, 2010).

Brief Core Schema Scales (BCSS; Fowler et al., 2006). The BCSS is a 24-item questionnaire assessing both negative and positive schemas about self (e.g. "I am vulnerable", "I am successful") and others (e.g. "Other people are devious", "Other people are supportive"), forming four subscale scores, each with a possible range of 0 to 24 points. The measure shows good internal consistency, test-retest reliability and validity within a psychotic population (Fowler et al., 2006; Smith et al., 2006).

The Positive and Negative Syndrome Scales (PANSS; Kay, Opler and Lindemayer, 1987) and Schedule for the Assessment of Insight (David, Buchanan, Reed and Almeida, 1992) were also administered as part of the initial assessment, and scores on these measures were used to examine positive symptoms, negative symptoms and insight as potential confounding variables.

Data analysis

Skewing on the negative metaphysical beliefs and benevolence scales was corrected with square root transformations, after which all variables conformed to a normal distribution, allowing parametric analyses to be used. Initially, correlations between beliefs about voices and voice content, schemas and other clinical and demographic variables were calculated. Studies of relationships between appraisals of voice power and schemas (Birchwood et al., 2000, 2004) have observed large effect sizes equivalent to $r \geq .5$, which the sample of $N = 34$ had 87% power ($\alpha = .05$) to detect in this analysis. A series of hierarchical linear regression analyses was then conducted for each of the six beliefs about voices. In each analysis, the amount of negative content and degree of negative voice content scales of the PSYRATS were entered as predictors in a first step, and then any of the four schema scales identified as holding a bivariate correlation with that belief at $p < .10$ (two-tailed) were entered as predictors in a second step. The sample size provided 80% power to detect incremental changes in R^2 of 0.198 with one additional predictor and 0.239 with two additional predictors. Regressions were then rerun to examine whether inclusion of potential confounding variables changed results. For each regression analysis, data were screened for multicollinearity (no predictor

Table 1. Mean (*SD*) of scores on main measures

	Mean	*SD*
PSYRATS Amount of Negative Content	2.88	0.84
PSYRATS Degree of Negative Content	3.18	0.83
IVI Positive Beliefs	14.76	5.72
IVI Metaphysical Beliefs	24.18	7.84
IVI Loss of Control Beliefs	11.65	4.61
BAVQ-R Malevolence	8.12	5.38
BAVQ-R Benevolence	4.62	4.99
BAVQ-R Omnipotence	9.38	5.21
BCSS Negative-self	8.44	6.88
BCSS Positive-self	10.68	6.66
BCSS Negative-others	9.85	7.59
BCSS Positive-others	12.74	6.26

Notes: $N = 34$. PSYRATS, Psychotic Symptom Rating Scales; BCSS, Brief Core Schema Scales; BAVQ-R, Revised Beliefs About Voices Questionnaire; IVI, Interpretation of Voices Inventory

variables were intercorrelated $r > .7$) and residuals plots checked for normality, linearity and homoscedacity. Two-tailed significances are reported throughout.

Results

Mean scores on the main measures are given in Table 1. High rates of endorsement of negative-self and negative-other schemas were observed, similar to those reported by Fowler et al. (2006) for their psychosis sample.

Beliefs about voices were unrelated to age, gender, overall severity of either positive or negative symptoms, or to insight. Malevolence was correlated with voice loudness, $r = .36$, $p = .035$, but no other relationships were observed between beliefs about voices and voice frequency, duration, loudness or location. However, several of the beliefs about voices were correlated with the number of years the person had heard voices for: omnipotence, $r = .34$, $p = .050$; malevolence, $r = .35$, $p = .042$; negative metaphysical beliefs, $r = .44$, $p = .009$; and positive beliefs, $r = .41$, $p = .017$.

Negative schema scales were relatively independent from corresponding positive schema scales for self, $r = –.25$, $p = .16$, and others, $r = –.12$, $p = .49$, supporting their separate examination. On the other hand, negative-self and negative-others were moderately correlated, $r = .45$, $p = .008$, as were positive-self and positive-others, $r = .70$, $p < .001$. None of the schema scales were correlated with amount or degree of negative voice content.

Correlations between the beliefs about voices and the predictor variables are presented in Table 2. This shows that five of the six beliefs about voices were correlated with either the amount, or the degree, of negative content of voices, the exception being positive beliefs about voices. All but one of the beliefs about voices also showed correlations with one or more of the schema scales. In line with predicted relationships, the BAVQ-R scales omnipotence and malevolence were each positively correlated with negative-self, and malevolence showed the expected additional positive correlation with negative-others. However, contrary to

https://doi.org/10.1017/S1352465813000817 Published online by Cambridge University Press

Table 2. Bivariate correlations between beliefs about voices and both negative voice content and schemas

	PSYRATS Negative content		BCSS Self		BCSS Others	
Belief scale	Amount	Degree	Negative	Positive	Negative	Positive
BAVQ-R						
Malevolence	.22	.38*	.52***	−.06	.41*	.06
Benevolence	−.39*	−.17	−.08	.34†	.01	.19
Omnipotence	.11	.46**	.57***	−.02	.14	.02
IVI						
Metaphysical	.21	.51**	.52**	−.01	.20	.07
Loss of control	.15	.43**	.66***	−.22	.42*	−.10
Positive	−.21	.06	.25	.38*	.31†	.17

Notes: $N = 34$. PSYRATS, Psychotic Symptom Rating Scales; BCSS, Brief Core Schema Scales; BAVQ-R, Revised Beliefs About Voices Questionnaire; IVI, Interpretation of Voices Inventory. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

predictions, benevolence was unrelated to positive-others, instead showing a trend, $p = .051$, to be associated with positive-self. On the IVI, metaphysical and loss of control beliefs were also each associated with negative-self, again in line with predictions. However, loss of control beliefs showed an additional unexpected correlation with negative-others. The predicted relationship between positive beliefs about voices and negative-others approached significance, $p = .078$, although positive beliefs about voices also showed an unpredicted relationship with positive-self.

Hierarchical regression analyses examining voice content and schemas as predictors of beliefs about voices were then conducted, each entering the two negative voice content variables as a first step, and the schemas scales identified above as correlated with that belief as a second step (see Table 3). The estimated proportion of variance explained by negative voice content alone ranged from 7% to 25%. Entering schemas in the second step explained statistically significant additional variance for five of the six beliefs, with the variance explained for the remaining belief (benevolence) falling just below significance. The estimated proportion of additional variance explained by schemas ranged from 9% to 35%, with the total variance explained by negative voice content and schemas combined ranging from 24% to 54%.

Table 3 also presents standardized regression coefficients for each of the schema scales. In considering these, it should be noted that the small sample size limits how precisely the parameter estimates of the regressions could be derived, so these should be regarded as approximate. On the basis of the observed bivariate correlations, more than one schema scale had been entered as a predictor in three of the belief about voices regressions: malevolence, loss of control, and positive beliefs about voices. For both the malevolence and loss of control regressions, the two predictors entered were negative-self and negative-others. Only negative-self showed an independent relationship with the belief about voices in each of these regressions. For positive beliefs about voices, positive-self emerged as an independent

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Table 3. Hierarchical multiple regression analysis predicting beliefs about voices from negative voice content (Step 1) and schemas (Step 2)

Belief scale	Predictor	R^2 change	F change	β	t
Malevolence	Step 1:	.15	2.672†		
	Amount of negative content			− .01	− 0.028
	Degree of negative content			.27	1.620
	Step 2:	.23	5.429**		
	Negative-self			.36	2.111*
	Negative-others			.22	1.343
	Total R^2	.38	4.432***		
Benevolence	Step 1:	.15	2.710†		
	Amount of negative content			− .37	− 2.049*
	Degree of negative content			.04	0.234
	Step 2:	.09	3.425†		
	Positive-self			.30	1.851†
	Total R^2	.24	3.089*		
Omnipotence	Step 1:	.22	4.469*		
	Amount of negative content			− .16	− 1.056
	Degree of negative content			.41	2.630*
	Step 2:	.23	12.597**		
	Negative-self			.50	3.549**
	Total R^2	.45	8.293***		
Metaphysical	Step 1:	.26	5.450**		
	Amount of negative content			− .05	− 0.328
	Degree of negative content			.43	2.687*
	Step 2:	.16	8.537**		
	Negative-self			.42	2.922**
	Total R^2	.42	7.362***		
Loss of control	Step 1:	.19	3.674*		
	Amount of negative content			− .12	− 0.842
	Degree of negative content			.35	2.391*
	Step 2:	.35	11.207***		
	Negative-self			.51	3.513**
	Negative-others			.19	1.304
	Total R^2	.54	8.650***		
Positive	Step 1:	.07	1.224		
	Amount of negative content			− .33	− 1.839†
	Degree of negative content			.23	1.314
	Step 2:	.23	4.853*		
	Positive-self			.34	2.178*
	Negative-others			.31	1.975†
	Total R^2	.31	3.191*		

Notes: $N = 34$. BAVQ-R, Revised Beliefs About Voices Questionnaire; IVI, Interpretation of Voices Inventory. † $p < .10$; * $p < .05$; * $p < .01$; ** $p < .001$

https://doi.org/10.1017/S1352465813000817 Published online by Cambridge University Press

predictor, with the hypothesized relationship with negative-others approaching significance, $p = .058$.

In line with previous observations (Chadwick et al., 2000; Peters et al., 2012; Simms, McCormack, Anderson and Mulholland, 2007; So and Wong, 2008), omnipotence and malevolence were positively correlated, $r = .68$, $p < .001$. To isolate the effects of schemas on voice malevolence from those already observed in the literature on the voice power dimension, the regression for malevolence was rerun including the omnipotence scale as a covariate. Doing this, findings changed, with negative-others becoming the sole significant predictor, $\beta = .29$, $t = 2.097$, $p = .045$, in place of negative-self, $\beta = .02$, $t = 0.132$, $p = .90$.

Given the observed correlation between beliefs about voices and length of illness, the regressions were also rerun, entering length of illness as an additional predictor. Length of illness was a significant independent predictor of only one of the six beliefs (positive beliefs about voices, $\beta = .33$, $t = 2.218$, $p = .035$), and entering it did not alter any of the other observed results. The regression of malevolence was also rerun entering the identified potential confound of voice loudness, but it did not emerge as a significant predictor or alter the pattern of results.

Discussion

Overall, the findings suggest that schemas are meaningfully related to the full range of beliefs, which have been described as important in mediating adjustment to hearing voices, including both the beliefs about voice intent (malevolence and benevolence) described by Chadwick and Birchwood (1994) and the metacognitive beliefs about voices described by Morrison et al. (2002).

We examined whether beliefs about voices were related to both negative voice content and to schemas. In line with previous observations (Birchwood and Chadwick, 1997; Chadwick and Birchwood, 1994; Close and Garety, 1998; Van der Gaag et al., 2003), beliefs about voices appeared to be influenced by negative voice content: a significant proportion of variance was predicted by the combined negative voice content scales in the regressions for omnipotence, metaphysical and loss of control beliefs, and there were trends for the malevolence and benevolence regressions. These relationships arose even though beliefs about voices appeared mostly unrelated to other aspects of voice experience such as frequency, duration, loudness and location. Our study extends previous findings of the relationship between content and appraisals of voices by providing data on relationships with the two aspects of negative voice content assessed by the PSYRATS: the amount and the degree of negative content. The results suggest that all of the negatively valenced beliefs about voices (omnipotence and malevolence on the BAVQ-R; metaphysical and loss of control beliefs on the IVI) tend to be predicted by the degree, rather than amount, of negative content. In other words, it was not how often voice content was negative but how negative it was when it occurred that predicted these beliefs. Conversely, benevolence was inversely correlated with the amount of negative content, suggesting that positive appraisals of voice intent are less likely to arise when there is a significant proportion of negative voice content. Positive content was not assessed, which may additionally contribute to the formation of benevolence beliefs (Van der Gaag et al., 2003) as well as positive beliefs about the value of voice experience. Overall, these observations reinforce that there are meaningful associations between voice content and beliefs about voices, that studying these may be of value in understanding how appraisals

of and responses to voices develop, and that controlling for voice content is an important consideration in future studies of beliefs about voices.

After controlling for voice content, five of the six beliefs about voices were significantly predicted by schema scales, with the sixth approaching statistical significance. The proportion of additional variance explained by schemas was at least as much as that explained by negative content. Whilst this cross-sectional study does not provide data on the direction of causality, these results support the key tenet of cognitive theory that core schemas play a role in formation of beliefs. Our results suggest that general schemas influence the formation of not only appraisals of voice social rank and power (e.g. omnipotence), as has been previously demonstrated, but also those of voice intent (e.g. malevolence) and metacognitive beliefs about voices (e.g. fears of loss of control). This provides a means of accounting for observed individual differences in adaptation to hearing voices: the person's broader schemas influence the extent to which they interpret the phenomenon of hearing voices as a personal or social threat, in turn impacting upon adaptation and distress.

This examination of the respective contributions of cognitive representations of self and of others was preliminary, given the sample size limitations of the study. However, it is notable that there was a general pattern in which negative-self schemas were more widely associated with beliefs about voices than were negative-other schemas. Negative self-schemas were linked to malevolence, loss of control and metaphysical beliefs in addition to omnipotence, although the relationships with malevolence and negative metaphysical beliefs were no longer significant when partialing out variance shared with omnipotence. The association between omnipotence and negative-self concurs with findings by Birchwood et al. (2000, 2004) that the rated power and status differential between self and voice is associated with appraisals of one's own relative power and status in the social world. The metaphysical and loss of control scales have been found to be associated with intolerance of uncertainty (White and Gumley, 2010), but have not otherwise been significantly studied. Finding an association with negative-self schemas suggests a potential broader relationship with negative self-evaluative beliefs.

When examining the role of cognitive representations of others, the anticipated bivariate relationship between malevolence and negative-others was found, but, as this was confounded with omnipotence, further examination with a large sample would be required to clarify the relative contributions of negative schemas about self and about others in explaining variability in appraisals of voice malevolence. Even so, the predicted association between benevolence and positive-others did not emerge, and instead benevolence appeared primarily related to an absence of negative content. This suggests that positive representations of others are not significantly involved in the formation of this belief, or have only a small effect. Finally, the predicted relationship between positive beliefs about voices and negative schemas about others was partially supported by this predictor approaching statistical significance, lending credence to the proposal of Morrison et al. (2003) that engagement with voices may develop as response to negative real-life relationships. However, this predicted relationship was overshadowed by positive-self unexpectedly being a stronger predictor of positive beliefs about voices. Positive views of voices have often been regarded as more adaptive because they are more readily endorsed by nonpsychiatric voice hearers (e.g. Sorrell, Hayward and Meddings, 2010), which may account for an association with positive self-representations. It seems possible that endorsement of the positive metacognitive belief scale more often reflected people applying an optimistic view to their voice experience than positive self-regulatory beliefs about engagement with voice experience.

Few other studies have examined potential determinants of these beliefs about voices, although some attention has been paid to early experiences. Offen, Thomas and Waller (2003) found that malevolence was predicted by recollections of paternal (but not maternal) overprotection, and in another study the same authors reported a correlation with early childhood sexual abuse (Offen, Waller and Thomas, 2003), whilst Andrew et al. (2008) reported that higher ratings of malevolence and omnipotence and lower ratings of benevolence were associated with past trauma. Schemas may provide a pathway by which these early experiences impact upon the formation of beliefs about voices and, in turn, the person's resulting relationship with their hallucinatory experience. Future study including measures of early experiences in conjunction with schemas may clarify a possible mediating role.

In addition to schemas influencing appraisals of voices, some models have proposed that schemas may also directly influence voice content (e.g. Beck and Rector, 2003; Paulik, 2012). Data in our current study did not support this, with no correlations observed between any of the schema scales and either of the negative voice content scales. This is in contrast to reports that voice content very often appears meaningful in the context of the person's history (e.g. Reiff, Castille, Muenzenmaier and Link, 2012). This discrepancy may, however, reflect voice content arising from relatively specific mental representations: this is consistent with models of hallucinations as intrusions of specific intrusions from memory not recognized due to a failure to encode contextual cues (e.g. Steel, Fowler and Holmes, 2005; Waters, Badcock, Michie and Maybery, 2006). Hence voice content may reflect relatively specific cognitions, whilst appraisals of their meaning and development of ideas about their identity are influenced by more generalized self and other representations. Indeed, as schemas also appear unrelated to the overall severity of voices (Smith et al., 2006), the findings of this study suggest that schemas relate primarily to adaptation to voice experience rather than to mechanisms involved in voice formation.

Clinically, identifying schematic beliefs related to beliefs about voices potentially provides an additional therapeutic target for psychological intervention. They may provide a parallel focus of intervention, or an alternate target when beliefs about voices are held with too strong conviction to provide a workable focus. Schemas associated with malevolence may be particularly important in providing a potential target for cognitive restructuring because no trials of cognitive-behavioural therapy (CBT) for psychosis that have included voice malevolence as an outcome have observed changes in this dimension (Peters et al., 2010; Trower et al., 2004; Valmaggia, van der Gaag, Tarrier, Pijnenborg and Slooff, 2005). Indeed, even though malevolence beliefs are robustly associated with distress, methods for working with these beliefs have not tended to be included in descriptions of CBT, which primarily focus on modifying beliefs about voice power, and control over the experience and the origins of voices (e.g. Trower et al., 2004; Chadwick et al., 1996; Morrison and Renton, 2001). Beliefs in voice malevolence are not easy to directly modify into an alternative belief without either colluding with the idea that voices are sentient others, or challenging the person's overall explanatory model. Hence schemas that may be supporting these beliefs about voices represent an important alternate avenue for intervention. In addition to traditional cognitive restructuring methods, methods of working with voices are emerging that adopt a more experiential approach, which may be well-suited to intervening at a schematic level (e.g. Chadwick, 2003; Mayhew and Gilbert, 2008; Van der Gaag, Van Oosterhout, Daalman, Sommer and Korrelboom, 2012). Other suitable approaches include methods from acceptance and mindfulness-based therapies that can defuse the impact of negative self-related ideation

(Thomas, Morris, Shawyer and Farhall, 2013), and methods described for working with voices in a broader interpersonal context (Hayward, Overton, Dorey and Denney, 2009). Further study on identifying the specific content of schemas associated with voice beliefs may inform more precise targets of these developing interventions.

This study was a preliminary investigation. Descriptions of voice content were limited to scales capturing overall levels of negativity in content that would not have been sensitive to variation in different content themes, which may have had closer relationships with schemas. Likewise, there was no specific assessment of positive or neutral voice content. Conversely, ratings were dependent upon participant report during interview, so participant reports of the amount and degree of negative content may have been influenced by broader beliefs about voices inflating their potential relationship. The schema scales also focused on overall negative versus positive themes, so would not have been sensitive to nuances of meaning or emotional themes that may have greater congruity with aspects of voice experience. Further study examining the relationships between beliefs about voices, content and schemas may focus on this in more detail. In particular, the role of negative-other schemas is demanding further clarification, given the sample size limitations of this present investigation. A further limitation of the study is the use of a treatment-seeking sample that will not be representative of the full spectrum of voice hearers.

Nonetheless, the study suggests that schemas offer a promising means of conceptualizing the formation of beliefs about voices, and possess potential as a therapeutic target in the future development of interventions for voices. When working clinically with people who hear voices, broader schemas may be worth incorporating into formulations of the person's experience and interpretation of their voices.

Acknowledgements

This research project was supported by funding from the William Buckland Foundation.

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