

Research Article

Expressed Emotion and Hallucination Proneness: The Mediating Role of Metacognitive Beliefs

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Article Information

ABSTRACT

Key words:
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proneness; psychosis

This study was designed to examine the mediating role of meta-cognitions in the relationship between perceived expressed emotions and hallucination proneness in a non-clinical sample. The study sample (n = 432 university students) was selected through a stratified cluster sampling procedure and measures of perceived expressed emotions, metacognitive beliefs and hallucination proneness were administered. Two dimensions of expressed emotion, perceived irritability and perceived intrusion, and two metacognitive beliefs, beliefs about uncontrollability and danger and beliefs about cognitive confidence were found to be associated with hallucination proneness. However, only negative beliefs about uncontrollability of thoughts mediated the relationship between perceived intrusiveness and hallucination proneness. Findings imply the experience of real or perceived parental intrusiveness may activate negative beliefs about thoughts concerning uncontrollability and danger, which in turn, leads to hallucinatory experiences as a coping strategy and contributes to the persistence of real or perceived career intrusiveness.

INTRODUCTION

Several studies have suggested that psychotic symptoms, such as hallucinations and delusions, may lie on a continuum with normal functioning at one end and abnormal functioning (psychosis) at the other end (Verdoux and van Os, 2002; Johns and van Os, 2001; Claridge, 1997). Empirical findings have confirmed the prevalence of hallucinations, described as false perceptions, and delusions, described as false beliefs, in individuals without clinical psychosis (Choong, Hunter and Woodruff, 2007; Freeman, 2006), thereby providing support for the continuum model.

Morrison (2001) put forth the idea that hallucinations may arise from a dysfunction in the regulation of cognition (metacognition). Metacognition, currently defined to include processes involved in generating complex representations of the mental states of the self and others (Semerari et al., 2003; Lysaker et al., 2013b), has also been proposed as an important factor in the development and maintenance of psychotic symptoms (García-Montes, Cangas Pérez-Álvarez, Fidalgo, &

Gutiérrez, 2006; Morrison, Wells & Nothard, 2000). Based on the S-REF model, Morrison et al. (1995) proposed that hallucinations could be considered as intrusions that are mediated by metacognitive beliefs. The model proposed by Morrison et al. postulates that hallucination-prone individuals hold certain metacognitive beliefs regarding the importance of thought consistency and the need to control thoughts. But when intrusive thoughts occur, these individuals experience a state of cognitive dissonance, a state of negative arousal, which the individual is motivated to escape. By attributing the intrusive thoughts to an external source, that is, by generating hallucinations, these individuals attempt to reduce or prevent the negative arousal.

Metacognitive beliefs have been found to be associated with the presence of hallucinations in both clinical and nonclinical samples (Baker & Morrison, 1998 Morrison, Wells, & Wells, & Nothard, 2002; Lobban, Haddock Kinderman, & Wells, 2002; Morrison & Wells, 2003; Larøi, Collignon, & Van der Linden, 2005; Larøi, Van der Linden, Marczewski, 2004a). Specifically, patients have been found to endorse a higher frequency of metacognitive beliefs about uncontrollability and danger,

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positive beliefs about worry, lack of cognitive confidence and negative beliefs about thoughts in general than their non-hallucinating counterparts (Baker and Morrison, 1998; Morrison and Wells, 2003).

On the other hand, there have also been studies which revealed no association between the metacognitive factors of the MCQ measures assessing lifetime occurrence of auditory hallucinations (Brett, Johns, Peters and McGuire, 2009; Linney and Peters, 2007), therefore, suggesting that metacognitive beliefs are not specifically implicated in the genesis of these experiences.

Results from studies investigating the association between metacognitive beliefs and hallucination-proneness have been more consistent. Hallucination-prone students scored significantly higher than non-prone students on cognitive self-consciousness (Fernihough & Jones, 2006; Larøi & Van der Linden, 2005; Morrison, Wells and Nothard, 2000; Sterling et al., 2007; Varese et al., 2010) and negative beliefs about the uncontrollability and danger of thoughts (Cangas, Errasti, García-Montes, Álvarez, and Ruiz, 2006; Jones & Fernyhough, 2006; Larøi & Van der Linden, 2005; Morrison et al., 2000; Morrison and Peterson, 2003; Sterling et al., 2007), lack of cognitive confidence (Cangas, Errasti, García-Montes, Álvarez, and Ruiz, 2006; Jones & Fernyhough, 2006; Larøi & Van der Linden, 2005; Morrison and Peterson, 2003; Sterling et al., 2007; Varese et al., 2010).

Apart from metacognitions, psychosocial stress has long been considered to contribute to the expression of symptoms in schizophrenia. In particular, Expressed Emotion (EE), has been recognized as an index predictive of schizophrenia relapse (Kavanagh 1992; Bebbington and Kuipers 1994; Butzlaff and Hooley 1998). EE is an attitude referring to the degree of criticism, hostility and emotional involvement in family relationships and interactions with a mentally ill patient that the relatives show towards the illness and the person.

EE has been well established as a predictor of relapses (Kavanagh, 1992; King, 2000; Cechnicki et al., 2010), re-hospitalizations (Schulz-Monking et al., 1997; Marom et al., 2005), and severity of positive symptoms in schizophrenia (Woo et al., 2004). Among its components, perceived criticism has been singled out as playing a particularly important role in these associations (Cechnicki et al., 2014; Docherty et al., 2011; Hooley, 2007). Another component of EE, emotional over involvement (EOI) has also been reported as exerting an adverse impact on the course of schizophrenia but only when expressed at high levels (Breitborde et al., 2007; Raune et al., 2004). In fact, moderate levels of EOI have been found to be protective (Breitborde et al., 2007). As a result of such findings, many interventional efforts

consider lowering expressed emotion to reduce the relapse rate (e.g. Tarrier et al., 1994; Linszen et al., 1997; Leff, 1998).

Although EE was originally conceptualized as pertaining to chronic schizophrenia, recent studies have shown that levels of EE in relatives of patients may be independent of illness chronicity (Bachmann et al., 2002; Meneghelli et al., 2011). This suggests that the study of EE in early psychosis and in high risk populations may be relevant as this phenomenon can be studied without the bias created by illness symptomatology. In a recent study, EE was studied in families of patients with first episode of psychosis and in families of those at ultrahigh risk of psychosis. Using EOI as an indicator of EE, this study found no differences in EE between these families and found no association between EE and illness severity (Meneghelli et al., 2011). A more recent study found that relatives' attributions of blaming patients for their impairment mediated the relationship between EE and patients' features in early psychosis. In particular, higher levels of criticism were related to the severity of positive symptoms (Domínguez-Martínez et al., 2014). However, EE and its components have not been studied in families of non-clinical populations. Studies of EE in families of non-clinical individuals can help further refine our understanding of the meaning and implications of the construct. Gavazzi, McKenry, Jacobson, Julian, and Lohman (2000) promote EE as a construct that is applicable to both clinical and non-clinical populations and as one that may be employed in research with individuals and families with various functioning levels.

Based on the above findings, it is likely that emotion-cognition interactions may be critical in the development of hallucinations and delusions. Although the extant research on hallucination proneness has investigated the link between metacognitive beliefs and hallucinations or hallucination proneness, no study has combined these cognitive variables with the expressed emotion experienced by patient or non-clinical samples. This is the first study aimed at sorting out moderation or mediation effects between them.

The purpose of this study was to investigate multiple metacognitive beliefs as simultaneous mediators between components of expressed emotion experienced by individuals reporting hallucination proneness and degree of hallucination proneness reported. We hypothesized that the association of indices of level of expressed emotion experienced to hallucination proneness is mediated by the meta-cognitive beliefs held by individuals. That is, we expected to find that metacognitive variables would mediate between indices of expressed emotion and hallucination proneness. We also expected that metacognitive beliefs would have a stronger unique effect than expressed emotions on hallucination proneness. Therefore, the purpose of the

present study was to explore this hypothesized relationship of expressed emotion and metacognitive beliefs to hallucination proneness.

MATERIALS AND METHODS

Ethics statement

This research protocol was approved by the Ethics Committee of the University of Mohaghegh Ardabili, Iran, and informed consent was obtained from the study participants prior to administration of the questionnaires.

Participants

Undergraduate and postgraduate students (N= 432, 289 women) with a mean age of 21.23 years (SD=2.04, range=18–26) were recruited for the study. Participants were selected through stratified cluster sampling procedure. Participants received no financial compensation for participation and recorded their responses anonymously, with only the age and gender of the participants being recorded.

Measures

Level of Expressed emotions Scale. The Level of Expressed Emotion Scale (LEE) was specifically designed by Cole and Kazarian (1988) as a self-reported measure of patient's perceptions of the amount of expressed emotion in family interactions during the past three months. The LEE consists of four factors: perceived lack of emotional support (pLES: 19 items), perceived intrusiveness (pIN: seven items), perceived irritation (pIR: seven items), and perceived criticism (pC: five items). Each item is scored on a scale from 1 to 4 (1: untrue; 2: somewhat untrue; 3: somewhat true; 4: true). The total score of the 38 items is entitled perceived expressed emotion (pEE). The total score on this scale ranges from 38 to 152, with subscale scores ranges being 5 to 20 (for pC), 7 to 28 (for pIN and pIR), and 19 to 76 (for pLES). In this study, the LEE demonstrated high internal consistency for both the total scale (Cronbach's alpha = .80) and the subscales (Cronbach's alpha ranged from .68 (pIR) to .83 (pIN)).

Metacognitions Questionnaire (MCQ-30). The MCQ-30 (Cartwright-Hatton & Wells, 1997) was used to assess metacognitive beliefs. The 30 MCQ items are scored from 1 to 4 (1 = "do not agree", 2 = "agree slightly", 3 = "agree moderately", 4 = "agree very much"). The MCQ items have been found to load on to five relatively distinct subscales (Cartwright-Hatton & Wells, 1997): (1) positive beliefs about worry (PWB), (2) negative beliefs about the uncontrollability of thoughts and corresponding danger (BUD), (3) cognitive confidence (BCC), (4) negative

beliefs about thoughts in general (in particular relating to superstition, punishment and responsibility; SPR), and (5) cognitive self-consciousness (CSC). Each of the subscales contain 6 items with a score range of 6 to 24. The MCQ has been reported to possess good psychometric properties, and in the present study a high Cronbach alpha coefficient was found for all items ($\alpha = 0.90$) as well as for each of the subscales (PWB=.84, BUD=.77, BCC=.69, SPR=.66 and CSC=.69).

Launay-Slade Hallucination Scale-revised (LSHS-R) (Bentall & Slade, 1985). The LSHS-R was developed based on the assumption that hallucinatory experiences are part of a continuum of normal-psychosis functioning. In this study, we used the 12-item version adapted to Persian, which uses a Likert type response format with 4 categories (1= "certainly does not apply to you"; 2="possibly does not apply to you"; 3= "possibly applies to you"; 4 = "certainly does apply to you") Scores range from 12 to 48, with higher scores indicating a greater predisposition toward hallucinating. The scale is divided into items that load on two factors, a subclinical factor and a clinical factor. In this study only total scores were considered. The internal consistency of the LSHS-R total score was 0.82.

Procedure

Before responding to the questionnaires, all participants were informed about the purpose of the study, ensured complete anonymity and informed that they could end their participation whenever they liked. After they gave consent to participation, the questionnaires were administered individually.

RESULTS

First internal consistency analyses were run to determine the reliability of each scale used in this study. Next, means and standard deviations were computed for each scale. Table 1 presents the correlation coefficients, mean values and standard deviations (SD), as well as Cronbach's alphas for all the variables in the study.

A reading of Table 1 shows that the participants in this study scored in a moderate positive direction on the Hallucination Proneness, Metacognitions and Level of Expressed Emotions scales. Hallucination proneness (HP) showed significant positive relationships with only two of the indices of expressed emotion, perceived irritability (pIR) and perceived intrusiveness (pIN), and with all metacognitive beliefs except beliefs regarding cognitive self-consciousness (BSC).

Next, two separate regression analyses were run to determine whether the independent variable, perceived intrusiveness predicted each of the hypothesized

mediators, metacognitive beliefs about uncontrollability and danger and metacognitive beliefs about cognitive confidence. Results are displayed in Table 2. Finally, a bootstrapping approach (Preacher & Hayes, 2008) was conducted to test the mediating role of metacognitive beliefs, including beliefs about uncontrollability and danger (BUD) and beliefs about cognitive confidence (BCC) (from the MCQ), between perceived intrusiveness, assessed by the Level of Expressed Emotions Scale and the Hallucination Proneness scores.

Bootstrapping is a nonparametric approach that resamples the original sample size from the data multiple times (in this data set, 1000 times). In contrast to other tests of mediation (Baron & Kenny, 1986; Sobel, 1982), this approach does not rely on the assumption that the results are normally distributed. The difference between mediation and indirect effects need to be considered.

Mediation may exist if a significant association between the independent variable (Perceived Intrusiveness) and the dependent variable (Hallucination Proneness) exists (path c). Otherwise, an indirect model may be considered (i.e., Perceived Intrusiveness is significantly related to one or more of the hypothesized metacognitive mediators [a paths], which is (are) significantly related to hallucination proneness [b paths]). The point estimate of the indirect effect is the mean ab path value computed over the samples. A 95% confidence interval is calculated; if the upper and lower bounds of the bias corrected and accelerated (BCa) confidence intervals do not contain 0, then the indirect effect is significant. The total indirect effect of the set of multiple mediators and the specific indirect effects are tested. It is possible to find specific indirect effects to be significant in the presence of a non-significant total indirect effect (Preacher & Hayes, 2008). A specific indirect effect represents the unique ability of a specific mediator to mediate above and

beyond any other mediators (See Figure 1). The results of the bootstrapping analyses in this study are presented in Table 3.

The fit for the whole model for Hallucination Proneness was significant [$F(3, 428) = 6.63, p < .01$]. The bootstrapping results indicated that the total (path c) and direct (path c') effects of Perceived Intrusiveness on Hallucination Proneness, are 0.597, $p < .05$, and 0.354, $p > .05$, respectively. Because path c' was not significant, mediation may exist.

To test the predicted pattern of mediation between perceived intrusiveness and hallucination proneness, we used Hayes and Preacher's (2014) bootstrapping macro designed for SPSS to run a multiple mediation model. This method encompasses two processes: first, the "direct effect" measures changes in the DV when the IV increases. In contrast, the "mediation effect" measures changes in the DV when the MV increases and the IV is fixed. The mediation effect is our sole focus here. In order to test the significance of the mediation effect, we used 1000 bootstrap re-samples to describe the confidence intervals of mediation effects in a manner that makes no assumptions about the distribution of the mediation effects. Results from the current study are presented in Table 3 and Figure 1. The multiple mediation analysis of the effect of perceived intrusiveness on hallucination proneness indicated that beliefs about uncontrollability and danger but not beliefs about cognitive confidence (controlling for each other) was a significant mediator of this effect. Therefore, as hypothesized, participants who endorsed perceived intrusiveness to a greater extent indicated greater proneness to hallucinations and beliefs about uncontrollability and danger emerged as a significant mediator of the relationship between perceived intrusiveness and hallucination proneness.

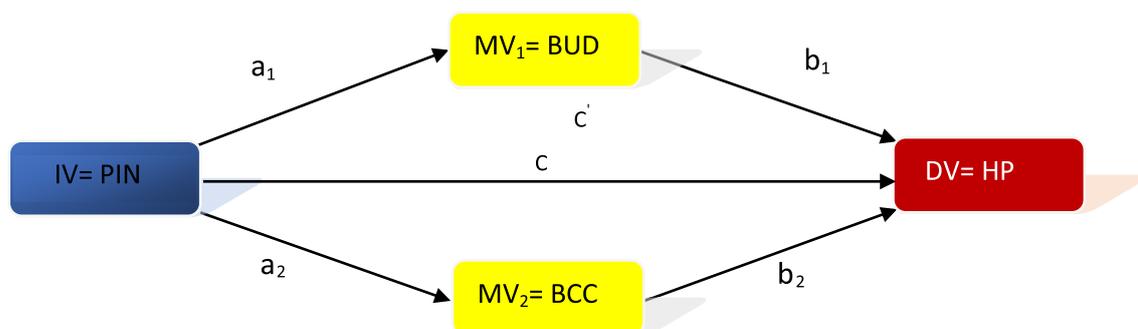


Figure 1. Diagram of mediation schema

Table 1. Means and Standard Deviations on Expressed Emotions, Metacognitive beliefs and Hallucination Proneness Scales (n= 432) along with Cronbach's alpha for each measure

	Cronbach's	Mean & SD	pLES	pIR	pIN	pC	LEE	HP
BCC	.69	12.11 ± 3.9	.291	.173	.330*	.183	.306	.382*
PWB	.84	13.62 ± 4.70	.355*	.180	.323	.231	.400*	.457**
BSC	.69	16.81 ± 3.67	.105	-.056	.039	.075	.176	.211
GNB	.81	15.76 ± 3.43	.168	.043	.070	.087	.194	.391*
BUD	.77	13.57 ± 4.39	.236	.190	.354*	.301	.340	.646**
NC	.66	15.05 ± 3.89	.113	.108	.315	.004	.248	.581**
MC	.90	73.86 ± 16.21	.136	.048	.234	.172	.200	.593**
pLES	.63	38.71 ± 5.97						.330
pIR	.73	17.62 ± 3.15						.451**
pIN	.83	16.23 ± 5.35						.431**
pC	.68	10.54 ± 2.35						.158
LEE	.80	82.18 ± 12.29						.445*
HP	.82	23.88 ± 6.97						1

Table 2. Two separate regressions examining Perceived Intrusiveness as predictor and the two mediator variables as criterion

Criterion	B	t
Beliefs about uncontrollability and danger	.288	.354
Beliefs about cognitive confidence	.273	.371

*p<.05

Table 3. Bootstrapping mediation test of the relationship between Perceived Family Intrusiveness and Hallucination Proneness mediated by metacognitive beliefs about uncontrollability and danger and cognitive confidence

Mediator variables MV			Dependent variable DV		
Path	Coeff	(SE)	Path	Coeff.	SE
a ¹	.276	(.16)*	c	.597	(.25)*
a ²	.278	(.14)*			
'MV'			b ¹	.920	(.29)*
			b ²	-.042	(.32)

*p<.05

A mediation test of the relationship between perceived intrusiveness(IV; a) and hallucination proneness (DV; c) through metacognitive beliefs about uncontrollability and danger⁽¹⁾, and metacognitive beliefs about cognitive confidence⁽²⁾(MVs; b) (n = 432; 1000 bootstrap samples).

DISCUSSION

These results highlight the strong effects, especially through specific mediating paths, that metacognitive beliefs have in the relationship between expressed emotion and hallucination proneness. What stands out is the unique role that a belief about uncontrollability and danger has between perceptions of intrusiveness and young adults' reports of hallucination proneness.

The present study confirms the association of metacognitive beliefs about uncontrollability and danger, lack of cognitive confidence, positive beliefs about worry and need to control thoughts to hallucination proneness. These findings are in keeping with previous research (Cangas, Errasti, García-Montes, Álvarez, and Ruiz, 2006; Fernyhough, 2006; Larøi & Van der Linden, 2005; Morrison, Wells and Nothard, 2000; Sterling et al., 2007; Varese et al., 2010) Cangas, Errasti, García-Montes, Álvarez, and Ruiz, 2006; Fernyhough, 2006; Larøi & Van der Linden, 2005; Morrison et al., 2000; Morrison and Peterson, 2003; Sterling et al., 2007). The only subscale that failed to correlate significantly was cognitive self-consciousness, a finding that is inconsistent with some previous studies (e.g. Fernyhough, 2006). Hallucination proneness was also significantly associated with EE and two of its components, perceived irritability and perceived intrusiveness. This is the first study providing evidence for the association between perceived EE and hallucination proneness. High EE in carers has been reported to be related to duration of untreated psychotic illness (MacMillan et al., 1986; Stirling et al., 1991), treatment outcome, the risk of relapse and rehospitalization in psychotic illness (Butzlaff & Hooley, 1998; Cechnicki, Bielanska, Hanuszkiewicz, & Daren, 2013, Phillips et al., 2007). High levels of EE have also been hypothesized to result from a reaction to the disorder (McFarlane and Cook, 2007) either in the form of criticism or emotional overinvolvement (Patterson et al., 2000; Hooley and Campbell, 2002), with attribution to controllability of symptoms mediating between the patients' problems and carers' EE (Hooley and Campbell, 2002; Hooley, 2007; Domínguez-Martínez, Medina-Pradas, Kwapil, Barrantes-Vidal, 2014). This is the first study in which specific aspects of EE have been investigated in relation to hallucination proneness. But whether or not, in line with previous research, EE, reflected by perceived intrusiveness and irritability in the present study, is a reaction to an individual's vivid mental events and auditory and visual hallucinatory experiences, findings of the present study indicate a bidirectional relationship. The association of perceived intrusiveness and irritability with hallucination proneness adds credence to findings from previous research that higher levels of criticism are related to the severity of positive symptoms (Domínguez-Martínez, Medina-Pradas, Kwapil, Barrantes-Vidal, 2014).

Criticism by carers may well be perceived as intrusiveness or irritability.

The finding that metacognitive beliefs, in particular, negative beliefs about uncontrollability and danger, correlated with indices of perceived EE and mediated the relationship between EE and hallucination proneness has not been reported before. A recent meta-analysis suggested that negative beliefs about uncontrollability and danger as the strongest predictors of hallucination proneness among healthy subjects (Varese and Bental, 2011). Dysfunctional meta-cognitions have been suggested to provoke hallucinations (Morrison et al., 1995) in response to triggering events. The triggering events might include negative experiences or the negative interpretations of experience including perceived intrusiveness and irritability. In particular, it has been suggested that negative beliefs about thoughts concerning uncontrollability and danger may contribute to persistent and negative interpretations of experience and the execution of maladaptive coping strategies. Therefore, it can be inferred that the experience of real or perceived parental intrusiveness may activate negative beliefs about thoughts concerning uncontrollability and danger, which in turn, leads to hallucinatory experiences as a coping strategy as well as contributing to the persistence of real or perceived career intrusiveness.

It might be argued that perceived irritability and intrusiveness likely reflect deficits in social cognition which have been reported to be associated with impairment in Theory of Mind (Brüne, 2005), ability to accurately identify others' emotions (Johnston et al., 2010) and understand the underlying meaning of common social interactions (Brüne, 2005; Brüne and Brüne-Cohrs, 2006). However, deficits in social cognition are believed to be trait-like (Lysaker et al., 2011b; Biedermann et al., 2012) and have been linked to negative and disorganized symptoms in prolonged psychosis (Lysaker et al., 2013; Vohs, Lysaker, Francis, Hamm, Buck, Olesek, Outcalt, Dimaggio, Leonhardt, Liffick, Mehdiyoun, & Breier, 2014).

Coupled with findings from the present study, this raises several questions such as do individuals who experience high levels of real or perceived carer criticism and intrusiveness develop negative beliefs about uncontrollability and danger and resort to coping with hallucinatory experiences? Does continued experience of real or perceived carer criticism and intrusiveness lead to trait-like deficits in social cognition resulting in increasingly compromised metacognitive capacity and severe levels of negative and disorganized symptoms? It is also likely that carers' beliefs about individuals' problematic behaviors are related to carers' emotional attitudes which, in turn, results in their resorting to criticism or over-involvement to change those behaviors. That is, whether EE in carers and metacognitive and

social cognition deficits in an individual develop prior to or after the onset of an individual's anomalous behavior remains obscure.

The implications of this study need to be considered within certain limitations. The correlational design precludes definite any causal inferences. Although adding to previous findings, the obtained findings should be verified through studies on clinical samples. Future studies focusing on distinguishing between the role of perceived career criticism, intrusiveness or over involvement and actual expressed emotion in dysfunctional metacognitions may shed light on the process of symptom development and severity.

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