The relationship between cognitive biases and psychological dimensions of delusions: The importance of jumping to conclusions

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ABSTRACT

Background and objectives: Cognitive biases play a role in the development and maintenance of delusions. However, delusions are multidimensional (i.e., emotional and cognitive facets) and often co-occur with auditory hallucinations. Therefore, further refinement of the precise relationship between cognitive biases, delusions, and hallucinatory experiences is warranted.
Methods: A total sample of 167 patients with schizophrenia spectrum disorders was split into two groups consisting of patients with active delusions ($n = 127$) and active hallucinations ($n = 92$). All patients were assessed for delusions and hallucinations using the semi-structured psychotic symptom rating scales (PSYRATS), which assesses the emotional (i.e., distress) and cognitive (i.e., conviction, preoccupation) dimensions of these symptoms. Cognitive biases were assessed with the Cognitive Biases Questionnaire for Psychosis (CBQp) self-report questionnaire (assessing jumping to conclusions, intentionalising, catastrophising, emotional reasoning, and dichotomous thinking biases). Multiple stepwise regressions were performed to investigate the relationship between delusions and cognitive biases, while controlling for auditory hallucinations (and vice-versa).
Results: The only cognitive bias to significantly predict delusions after controlling for the severity of auditory hallucinations was the jumping to conclusions (JTC) bias (predicted both emotional and cognitive dimensions). Only the emotional dimension of auditory hallucinations was predicted by the intentionalising and dichotomous thinking biases, after delusional severity was controlled for.
Limitations: The cross-sectional design precludes causal inferences. Only positive psychotic symptoms were assessed and no wider psychopathology assessment was utilised (e.g., negative symptoms, anxiety, depression).
Conclusions: The jumping to conclusions bias is associated with both delusional conviction and emotional distress.

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1. Introduction

Delusions are a characteristic and frequent clinical symptom of schizophrenia spectrum disorders. More recently, cognitive models have provided an empirically-based theoretical framework to explain mechanisms that may lead to psychotic symptoms (Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001). One of the core assumptions of these cognitive models is that delusions are a consequence of dysfunctional information processing, typically referred to as 'cognitive biases' (Freeman & Garety, 2014; Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002). Indeed, growing evidence suggests that cognitive biases both precede (An et al., 2010; Gawęda & Prochwicz, 2015; McKay, Langdon, & Coltheart, 2006) and actively contribute to the formation and maintenance of delusions (Falcone et al., 2015; Moritz & Woodward, 2005; Woodward, Moritz, & Chen, 2006). Furthermore, cognitive models have been supported by clinical studies showing that ameliorating cognitive biases during psychological interventions improves psychotic symptoms (for review see: Eichner & Berna, 2016; Garety et al., 2015; Moritz, Andreou et al., 2014; Moritz,

Veckenstedt et al., 2014).

A wide range of cognitive biases have been recognised as contributing to the development and maintenance of delusions, however the most extensively studied is the 'jumping to conclusions' (JTC) bias (for reviews and meta-analyses see: Dudley, Taylor, Wickham, & Hutton, 2015; Fine, Gardner, Craigie, & Gold, 2007; Garety & Freeman, 2013; Ross, McKay, Coltheart, & Langdon, 2015). A very recent meta-analysis of the existing cross-sectional and longitudinal JTC data concluded that the bias is associated with delusions specifically, rather than merely with a diagnosis of schizophrenia or with being psychiatrically ill, consistent with the possibility that it contributes to delusional severity (McLean, Mattiske, & Balzan, 2016).

Although these results highlight the role that cognitive biases play in the development and maintenance of delusions, it is less clear which specific aspects or dimensions of delusions are influenced by these biases. One of the most frequently used measures for assessing the psychological dimensions of psychotic symptoms, such as delusions and hallucinations, is the PSYRATS (Haddock, McCarron, Tarrier, & Faragher, 1999). This measure assesses the total severity of delusions and hallucinations by incorporating the cognitive (e.g., conviction, preoccupation) and emotional (e.g., distress) dimensions of these symptoms. Preliminary findings suggest that jumping to conclusions may be linked to the cognitive dimension of delusions (Garety et al., 2005), but these results need to be replicated with a wider range of cognitive biases. The recently developed self-report Cognitive Biases Questionnaire for psychosis (CBQp) questionnaire captures five cognitive biases or distortions (jumping to conclusions, intentionalising, catastrophising, emotional reasoning, and dichotomous thinking), which are considered important for the pathogenesis of psychosis (Peters et al., 2014). The CBQp is a valid and reliable tool for distinguishing patients with schizophrenia, and also clinical voices-hearers, from healthy controls in terms of self-reported cognitive distortions (Peters et al., 2014). A recent study using the CBQp revealed that catastrophising and JTC predicted delusion-like experiences among healthy individuals and patients with schizophrenia (Gawęda & Prochwicz, 2015). With regard to the clinical sample exclusively, it was found that the *total severity* of active clinical delusions (as measured with the PSYRATS) was best predicted by catastrophising, and the *cognitive* dimension of delusions was specifically related to JTC (Gawęda & Prochwicz, 2015).

Despite refining the relationship between cognitive biases and delusions, previous studies (e.g. Gawęda & Prochwicz, 2015) did not take into the account the potential confounding influence of hallucinations. Therefore, it is difficult to determine whether these cognitive biases are specific to delusional thinking or whether they may also be caused by, and/or lead to, distressing hallucinatory experiences. Hence, the aim of this study was to investigate whether there are cognitive biases that predict psychological dimensions of delusions specifically, after controlling for hallucinations. For this purpose, we assessed psychological dimensions of both delusions and hallucinations to see whether these two psychotic symptoms share similar cognitive biases. To investigate this, regression analyses were conducted for delusions and hallucinations separately, while controlling for the other symptom. We hypothesized that delusions (particularly the cognitive dimension of delusions), but not hallucinations, would be related to the jumping to conclusions bias.

2. Methods

2.1. Participants

A total sample of 167 patients diagnosed with schizophrenia spectrum disorders (i.e., schizophrenia: 149; schizoaffective: 13; other psychosis: 5) took part in the study after written informed consent was obtained. Participants were recruited if they had a diagnosis of a schizophrenia spectrum disorder according to ICD-10 (diagnosis was based on clinical records, but not verified using structured clinical interviews), and active delusions and/or hallucinations. Exclusion criteria included a history of illicit substance and alcohol abuse (with no illicit drug use within 6-months), previous brain injury or concussion, or intellectual disability. Patients were recruited from in- and out-patients departments that cooperate with II Department of Psychiatry, Medical University of Warsaw ($n = 112$) and from psychiatry outpatient departments affiliated with University of Adelaide and Flinders University across Adelaide, Australia ($n = 55$). The majority of participants were currently receiving stable antipsychotic treatment (i.e., >12-months) during the study ($n = 165$).

The sample was split into those patients that had active delusions ($n = 127$) or hallucinations ($n = 92$) at least one week prior to the PSYRATS semi-structured interview (these two subgroups were not independent, and among those with active delusions, 68.5% had co-morbid auditory hallucinations, and among those with active auditory hallucinations 93.4% patients had delusions). Detailed characteristics of patients are presented in Table 1.

2.2. Assessment

2.2.1. Psychotic symptoms rating scale (PSYRATS)

All patients were individually interviewed by trained assessors with the semi-structured PSYRATS interview, which assesses the psychological characteristics of delusions and hallucinations. Both the Polish (Gawęda, 2012) and standard English (Haddock et al., 1999) versions of the PSYRATS were used. The auditory hallucination scale consists of eleven items centered on three factors: physical characteristics of voices (e.g. frequency); a cognitive component (e.g. beliefs about the origin of voices); and an emotional component (e.g. distress associated with hearing voices). The delusion scale consists of six questions which assess both cognitive (e.g. conviction/confidence in delusions) and emotional components (e.g. distress associated with delusions). The factor structure derived from the study by Haddock et al. (1999) has been confirmed by others (Drake, Haddock, Tarrier, Bentall, & Lewis, 2007). Each of the items in both scales is rated on a five point scale (0–4) and responses refer only to the previous week.

2.2.2. Cognitive biases

The Cognitive Biases Questionnaire for Psychosis (CBQp) by Peters et al. (2014) measures five different types of cognitive biases. Three of these (catastrophising, dichotomous thinking and emotional reasoning) are referred to as Beckian cognitive biases (i.e. depression and anxiety related) but are still important to the pathogenesis of psychosis; the remaining two (internationalizing and jumping to conclusions) are related primarily to psychosis. The CBQp consists of 30 vignettes that target each of the five cognitive biases (minimum of six items per bias). Responses are rated on a three point scale (1 = absence of bias; 2 = presence of bias with some qualification; 3 = presence of bias). CBQp has a good psychometric validity with Cronbach's alpha 0.89 and test-retest intraclass correlation 0.96.

2.3. Statistical analysis

Statistical analyses were carried out using SPSS 23.0. In order to establish the relationship between cognitive biases and the psychological dimensions of delusions and hallucinations, Pearson's correlational coefficients were calculated. Bonferroni adjustments