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## Monocausal attribution and its relationship with reasoning biases in schizophrenia

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### ABSTRACT

**Background:** Aberrant attributional styles are counted to a set of circumscribed cognitive biases that are implicated in the pathogenesis of (paranoid) psychosis. However, evidence for a specific profile (e.g., an exaggerated self-serving bias, other-blaming bias) has become equivocal over the years. More recently, one-sided (monocausal) attributions have been reported in patients with psychosis.

**Methods:** We compared a large sample of patients with diagnosed schizophrenia ( $n = 145$ ) to nonclinical controls ( $n = 30$ ) on a revised version of the *Internal, Personal and Situational Attributions Questionnaire* (IPSAQ-R). In this task, participants have to assign probability estimates to each of three potential causes (i.e., myself, others, circumstances) for a specific (negative or positive) event.

**Results:** Participants with schizophrenia displayed an abolished self-serving bias and showed a significant preference for one-sided/monocausal attributions, which was neither correlated with jumping to conclusions nor overconfidence in errors. School education correlated with less monocausal attributions. We did not find any congruence between attributional styles with core delusional ideas.

**Conclusions:** Our study corroborates earlier investigations showing that monocausal attributions may play a role in the pathogenesis of psychosis; this bias unlikely represents an epiphenomenon of established biases. Unexpectedly, attributional styles (e.g., external-blaming) did not shape delusional contents. The true prevalence of monocausal attributions in psychosis is perhaps underestimated in the study, as groups were equated on school education, which was correlated with monocausal attributions.

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### 1. Introduction

Cognitive impairments have long been implicated in the formation and maintenance of schizophrenia. Early accounts emphasized the alleged cognitive disability in patients with schizophrenia, then called dementia praecox (Kraepelin, 1899). Schizophrenia was regarded an illness at the brink of psychological disorder and mental-physical disability (i.e., imbecility). Evidence for severe neuropsychological impairment has become equivocal as poor cognitive test results partially reflect the effects of psychotropic medication and poor motivation (Barker et al., 2004; Faber et al., 2012; Fervaha et al., 2014; Moritz et al., 2017). Recent years have witnessed increasingly sophisticated theoretical models describing how subtle cognitive problems, especially biases in reasoning and attribution, translate into symptom formation of schizophrenia, particularly delusions (Bentall, 2003; Freeman and Garety, 2014; Moritz et al., 2016a, b). Researchers have begun to use this knowledge to develop novel interventions to reduce symptoms

and prevent relapse (Moritz et al., 2014a; Roberts and Penn, 2009; Waller et al., 2015). While accounts highlighting the role of attributional processes for the formation of paranoid delusions date back to the first wave of psychoanalytic theories (Adler, 1929), more rigorous empirical research on this topic began with the work of Bentall and Kinderman in the late 1980s (Bentall et al., 1994; Kaney and Bentall, 1989; Kinderman and Bentall, 1996a, b, 1997). Their initial investigations used a scale from depression research, the Attributional Style Questionnaire (ASQ; Peterson et al., 1982). Patients with depression usually show an abolished self-serving bias,<sup>1</sup> often termed depressive realism, or a tendency to internalize blame for negative events (Moore and Fresco, 2007; Moritz et al., 2007). Initial studies detected the opposite response pattern in patients with paranoid delusions, involving an excessive tendency to attribute positive events to oneself and negative events to external causes, indicating an increased self-serving bias (Candido and Romney, 1990; Kaney and Bentall, 1989; Lyon et al., 1994). Subsequent studies found that paranoid patients attributed negative events to the

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<sup>1</sup> Healthy participants show a bias to blame others or circumstances for negative events while crediting themselves for positive events (Zuckerman, 1979).

agency of others (Berry et al., 2015; Kinderman and Bentall, 1997; Kinderman and Bentall, 1996a, b; Martin and Penn, 2002). It has been argued that this bias may serve the implicit purpose of raising a primary low self-esteem (delusion-as-defense theory; Bentall et al., 1994; Lyon et al., 1994; Moritz et al., 2006).

Most subsequent research confirmed differences between patients with persecutory delusions and controls on attributional biases but – unlike in studies on depression – no consensus about a specific profile was garnered and the delusion-as-defense theory has not received full support (Garety and Freeman, 2013; Thewissen et al., 2011). To illustrate, two studies found increased helplessness in patients, that is, a bias to externalize both positive and negative events (Lincoln et al., 2010; Moritz et al., 2007), while another study observed more self-blame in patients (Mehl et al., 2014). Merrin et al. (2007) found that paranoid patients made attributions on the basis of little evidence (i.e., jumping to attributions) but there were no significant differences between the groups in the final attributions made. These findings are further complicated by differences between analogue and patient samples (Janssen et al., 2006), suggesting that an excessive self-serving bias may only be evident during an acute psychotic phase.

Difficulties in identifying a specific profile of attributional processes in patients with psychosis are likely due to the heterogeneity of delusional symptoms. While delusions are characterized by the high degree of conviction with which they are held and their (partial) incorrigibility – at least in the acute state –, the content of the delusion belief and the role of the patient in his/her delusional belief may vary greatly among patients, even in those with the same subtype (e.g., paranoia). We think it deserves examination whether attributional styles *shape* rather than *cause* delusions, which may help to reconcile some of the inconsistencies in the literature (see also Jolley et al., 2006). For example, patients with ideas of reference relate innocuous incidences and behavior of others (e.g., looks) to themselves. The world is full of hidden cues that are meaningful to the patient only. Such symptoms may mirror a more general egocentric attributional style in which most events are attributed to the self. Some patients with self-disorders (e.g., thought broadcasting) believe they have supernatural powers, yet others feel like marionettes, that is, powerless and without any control over their lives. These symptoms again may stem from very different attributional styles; the latter set of symptoms may go along with increased sense of helplessness.

Despite the heterogeneity of attributional styles, there is mounting evidence for a common denominator; it has been suggested that patients with schizophrenia share a tendency for monocausal or one-sided attributions (Randjbar et al., 2011), that is, they do not spread the potential causes for events across different factors (i.e., myself, other persons, circumstances) but confine the causal search to one predominant source. This has been essentially replicated (Mehl et al., 2014; Moritz et al., 2015) and ties in well with an early finding from Bentall's group that deluded patients are excessively certain about their attributional judgments (Bentall et al., 1991). Whether monocausal inferences are confined to presently paranoid patients or represent a trait marker awaits to be established. Preliminary evidence suggests that this bias may represent a shared vulnerability factor in both borderline personality disorder and schizophrenia (Schilling et al., 2015). One-sided attributions in conjunction with a liberal decision threshold (Moritz et al., 2016a, b) may foster negative and momentous consequences.

The present study aimed at replicating the tendency for monocausal attributions in patients with schizophrenia. We also examined whether different psychotic symptoms, for example, ideas of reference and ideas about own versus alien control (individual as *active protagonist* (e.g., hero) or *object* (e.g., victim) in his or her delusional belief), are associated with different attributional styles.

Monocausal attributions may be framed as a special case of jumping to conclusions (i.e., one instead of many attributional sources are contemplated) and overconfidence (for a study on attributional style and confidence see Libby and Rennekamp, 2012). As mentioned earlier,

Merrin et al. (2007) found that, when seeking information before making attributions, paranoid patients asked less questions than healthy or depressed controls. We therefore attempted to determine the interrelationships among these distortions to examine if monocausal attributions might be a consequence of other cognitive biases. We also explored whether a self-serving bias and an external-blaming style may be associated with enhanced self-esteem.

## 2. Methods

A total of 145 patients were recruited from the departments of psychiatry and psychotherapy of the university hospitals in Hamburg and Heidelberg (Germany). Data relied on the baseline assessment of a randomized controlled trial on metacognitive training (Moritz et al., 2013, 2014b), which was registered at the International Standard Randomised Controlled Trial Number Register (ISRCTN95205723). Approval was obtained from both local ethics committees. We applied rather broad inclusion criteria to recruit a representative clinical population: age between 18 and 65 years, a DSM-IV schizophrenia spectrum disorder according to the MINI interview as well as receipt of written informed consent. Substance dependence, as well as IQ of <70 and scores of 5 or higher on the Positive and Negative Syndrome Scale (PANSS) hostility item and 6 or 7 on the PANSS paranoia/suspiciousness items led to exclusion. No minimal symptom threshold was defined for inclusion. The same interview was administered to 30 nonclinical controls to verify absence of any major psychiatric illness. Controls were recruited via word of mouth and advertisement.

### 2.1. Psychopathology

Severity of psychiatric symptoms was assessed by trained and experienced raters following the semi-structured interview of the Positive and Negative Syndrome Scale (PANSS; Kay et al., 1988). The PANSS contains 30 symptoms that are rated on a 7-point scale. The psychometric properties are adequate to good (Kay et al., 1988; Peralta and Cuesta, 1994; Santor et al., 2007). We adopted the five-factor algorithm put forward by van der Gaag et al. (2006). Positive symptoms were assessed with the Psychosis Rating Scales (PSYRATS; Haddock et al., 1999), which provide a fine-grained analysis of qualitative aspects of hallucinations and delusions (e.g., degree of conviction, loudness of voice-hearing). The Psychosis Rating Scales yield good to excellent psychometric properties (Drake et al., 2007; Haddock et al., 1999).

### 2.2. Internal, Personal and Situational Attributions Questionnaire (IPSAQ-R)

The revised version (Mehl et al., 2014; Moritz et al., 2011) of the IPSAQ was presented to participants (original scale by Kinderman and Bentall, 1996a, b). Eight hypothetical positive and negative situations were presented in pseudo-random order. For each of the scenarios (e.g., "A friend tells you that she respects you"), participants were asked to write down the main cause and then to provide estimates in percent to what extent the situation was caused by oneself, others or circumstances. There was no requirement for the assigned % to total 100%. A percentage of at least 70% for one of the three options was defined as one-sided attributional style (this was further graded in 10%-steps). Among other styles, we examined the bias to attribute negative events to other persons (i.e., external-personal blaming), which has been ascribed a possible role in paranoid delusion formation (Kinderman and Bentall, 1997).

### 2.3. Other cognitive biases

Participants were administered a variant of the probabilistic reasoning task (Garety et al., 1991), called the fish test (for a description see Moritz et al., 2012; Speechley et al., 2010). Participants have to deduce

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