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The moderating role of cognitive biases on the relationship between negative affective states and psychotic-like experiences in non-clinical adults

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ABSTRACT

Negative emotions and cognitive biases are important factors underlying psychotic symptoms and psychotic-like experiences (PLEs); however, it is not clear whether these factors interact when they influence psychotic phenomena. The aim of our study was to investigate whether psychosis-related cognitive biases moderate the relationship between negative affective states, i.e. anxiety and depression, and psychotic-like experiences. The study sample contains 251 participants who have never been diagnosed with psychiatric disorders. Anxiety, depression, cognitive biases, and psychotic-like experiences were assessed with self-report questionnaires. A moderation analysis was performed to examine the relationship between the study variables. The analyses revealed that the link between anxiety and positive PLEs is moderated by External Attribution bias, whereas the relationship between depression and positive PLEs is moderated by Attention to Threat bias. Attributional bias was also found to moderate the association between depression and negative subclinical symptoms; Jumping to Conclusions bias served as a moderator in the link between anxiety and depression and negative PLEs. Further studies in clinical samples are required to verify the moderating role of individual cognitive biases on the relationship between negative emotional states and full-blown psychotic symptoms.

1. Introduction

According to the continuum hypothesis (van Os et al., 2000, 2009; van Os and Reininghaus, 2016), the psychotic phenotype is not restricted to clinical psychosis, but represents a wide range of phenomena including subclinical manifestations of psychotic phenotype, i.e. psychotic-like experiences (PLEs) which similarly to clinically relevant conditions cover both positive (delusions and hallucinations) and negative (social withdrawal, blunted affect, anhedonia) symptoms.

Different stages of the psychosis phenotype were found to share potential risk factors and underlying mechanisms (Kelleher and Canon, 2011) which were recently integrated in the framework of cognitive models of psychosis (Garety et al., 2001; Freeman et al., 2002). Cognitive models highlight the importance of both emotional and cognitive distortions for the development and maintenance of positive psychotic symptoms, as well as the role of the interaction between these factors (Garety et al., 2005).

Within cognitive models anxiety and depression were recognized as the most important emotional disturbances exaggerating the risk for psychosis. Anxiety and depression were postulated to support maladaptive appraisals of anomalous experiences constituting the basis for symptoms development and to shape themes of subsequently formed delusions and hallucinations (Freeman et al., 2002; Freeman and Garety 2003). Also numerous empirical studies have confirmed that negative affective states immediately precede the occurrence of positive psychotic symptoms and commonly co-occur with phenomena lying on different points of the psychosis continuum, including psychotic-like experiences (Armando et al., 2010; Fusar-Poli et al., 2014; Johns et al., 2004; Stefanis et al., 2002; Yung et al., 2006; van Os et al., 2000; Varghese et al., 2011).

Some findings also suggested a link between emotional disturbances and negative PLEs; however, there are limited data on this field. Certain studies on non-clinical groups confirmed relationships between self-reported depressive symptoms and a subclinical level of social withdrawal, avolition and social anhedonia (Barragan et al., 2011; Lewandowski et al., 2006); as well as a link between anxiety and subclinical forms of social anhedonia (Lewandowski et al., 2006). Both depression and anxiety have been found to mediate the relationship between personality traits and negative PLEs (Prochwicz and Gawęda, 2016).

Apart from negative emotional states cognitive biases, i.e. distortions of gathering and processing information, were also postulated to be crucial for the development of psychosis (Garety et al., 2001; Freeman et al., 2002). Although a precise causal relationship between

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cognitive distortions and psychotic symptoms is still being refined, a wide range of cognitive biases have been recognized as contributing to psychotic symptoms. Jumping to Conclusion bias (JTC), i.e. a tendency to make hasty decisions without sufficient evidence, has been consistently replicated in the psychosis continuum including studies on healthy individuals with psychotic-like experiences (Bristow et al., 2014; Freeman et al., 2008; McKay et al., 2006; Moritz and Woodward, 2005; Startup et al., 2008; Warman et al., 2007). Jumping to Conclusions bias was suggested to arise in conditions of enhanced distress (Ellett et al., 2008; Warman et al., 2013) and to be related primarily to positive symptoms, delusions in particular. Indeed, a relationship between JTC and delusional ideation was clearly indicated in a recent meta-analysis (McLean et al., 2017). Also a tendency to search the environment for threats (Attention to Threat bias, ATB) has been confirmed as contributing to positive psychotic symptoms including PLEs (Arguedas et al., 2006; Green et al., 2001; Prochwicz and Kłosowska, 2017) since it favours false interpretations of neutral events as supporting delusional beliefs and exaggerates threat anticipation which was assumed to be a cognitive marker for psychosis (Freeman et al., 2013; Green et al., 2001; Lincoln et al., 2010; Reininghaus et al., 2016). Moreover, positive psychotic symptoms were consistently found to be associated with a tendency to make external, personal attributions of failures (External Attribution bias; ETB). Since the earlier study of Keney and Bental (1989) there has been accumulated evidence that schizophrenia patients reveal a tendency to blame other people rather than situations for negative events, which was conceptualized as defense against negative emotional states. This External Attribution bias was confirmed to increase persecutory symptoms in clinical and non-clinical groups (Bental et al., 2001; Gawęda et al., 2015; Kinderman and Bentall, 1996; Kinderman and Bentall, 1997) and result in further threat anticipation (Kinderman and Bental, 1996; Kinderman and Bentall, 1997).

Although biased cognitive processes have been investigated mostly in the context of delusions, they have also been suggested to shape appraisals of attenuated perceptions (Freeman and Garety, 2003; Freeman et al., 2014), hereby favouring the development of hallucinations. For example, Freeman et al. (2008) showed a relationship between Jumping to Conclusions bias and perceptual anomalies (Freeman et al., 2008), whereas a recent study of Daalman et al. (2013) demonstrated associations between Jumping to Conclusions bias and auditory verbal hallucinations, as well as between hallucinations and cognitive biases related to anxiety and depression (Catastrophizing, Dichotomous Thinking, Emotional Reasoning) which have also been recognized as important for the pathogenesis of psychosis (Peters et al., 2013).

There is a paucity of studies addressing the link between cognitive biases and negative psychotic symptoms, however, some data on this field have already been provided in the context of psychotic-like experiences. Negative PLEs were found to be related to Attention to Threat bias and External Attribution bias in recent cross-sectional studies (Gawęda et al., 2015; Gawęda et al., 2018). The predictive role of reduced Jumping to Conclusions bias on negative psychotic-like experiences has also been reported (Gawęda et al., 2015).

Lately, the role of interaction between emotional and cognitive distortions in the development of psychotic symptoms has been investigated with reference to PLEs. For example, Lincoln et al. (2010) found that paranoid ideations in vulnerable individuals increase in conditions of induced anxiety, and that the association between anxiety and positive symptoms is mediated by elevated Jumping to Conclusions bias (JTC). However, when investigating the effect of induced anxiety on the data-gathering bias in both patients with delusions and healthy non-help-seeking individuals, So et al. (2008) showed no increase in JTC, suggesting that anxiety and JTC may affect delusions independently. Although these prior studies provided valuable findings, they yielded inconsistent results raising awareness of the need of future research. Moreover, these studies concerned only positive psychotic symptoms and utilized methods that assessed solely data-gathering bias (JTC). However, prior studies have already provided evidence suggesting that not only positive but also negative psychotic-like experiences may be affected by the association between negative affective states and biased cognitive processes, and that a wider range of cognitive biases may be involved in this interplay (Gawęda et al., 2015; Prochwicz and Gawęda, 2016). Unfortunately, these studies investigated the links between emotions, cognitive biases and PLEs separately, leaving open the question as to how negative affective states and cognitive biases may interact, increasing the risk for psychosis. Hence, in the present study we aimed to provide further evidence which might help clarify whether Jumping to Conclusions bias may influence the effect of anxiety on both positive and negative psychotic-like experiences. Following earlier studies suggesting the link between reduced JTC and negative psychotic-like experiences we intended to examine whether data-gathering bias may impair the link between anxiety and negative PLEs. Furthermore, in line with previous cross-sectional studies revealing the relationship between cognitive biases and both positive and negative psychotic-like experiences, as well as between anxiety and different types of PLEs (Prochwicz and Gawęda, 2016), we tested the potential moderational effect of Attention to Threat bias and External Attribution bias on the interaction between anxiety and both positive and negative subclinical symptoms. Although the relationship between biased cognitive processes and positive PLEs has been well documented, to our knowledge there is a lack of studies investigating whether psychotic-related cognitive biases may change the strength and direction of the link between anxiety and positive PLEs. What is more, although the association between ATB, ETB and negative psychotic-like experiences have already been confirmed, it has been established mostly based on the results of correlational and regression analyses which did not allow to explore the dynamic interplay between cognitive and emotional factors. It is plausible, however, that since both Attention to Threat and External Attribution biases express a tendency to perceive others as causing personal harm, they may stimulate social withdrawal considered as an important negative symptom of psychosis. Therefore, in the present study we also explored the potential effect of ATB and ETB on the association between anxiety and negative psychotic-like experiences.

Apart from anxiety, depression was also hypothesized (Freeman et al., 2002; Freeman and Garety, 2003) and repetitively confirmed (Addington et al., 1998; An der Heiden et al., 2005; Bottlender et al., 2000; Birchwood et al., 2005; Cotton et al., 2012; Hafner et al., 2005; Romm et al., 2010; Sönmez et al., 2016) to be associated with psychotic symptoms; therefore, in our study we also searched for interactions between lowered mood, cognitive biases and psychotic-like experiences. Since Jumping to Conclusions bias favours hasty acceptance of delusional explanations of events, including those formed on the basis of depressive mood, i.e. with the central content being that of punishment for intrinsic badness or being rejected by others, it is possible that it may increase the effect of depression on positive PLEs. Moreover, taking into account the previously observed relationship between reduced JTC and negative symptoms (Gawęda et al., 2015; Gawęda et al., 2018) there is also a possibility that lowered mood exaggerates negative PLEs when accompanied with reduced rather than enhanced data-gathering bias. Furthermore, since Attention to Threat bias raises the tendency to search the environment for danger (social danger in particular) it is likely that it may also stimulate a delusional belief of being a target for others, thus strengthening the relationship between depression and persecutory delusions. In a similar way, Attention to Threat bias may moderate the previously reported relationship between depression and negative symptoms (social withdrawal in particular) since enhanced oversensitivity to threat may increase the tendency to avoid social situations; therefore, in our study we also checked the moderational role of ATB on the relationship between depression and both positive and negative PLEs.

To sum up, the main purpose of our research was to examine