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A positive-psychological intervention reduces acute psychosis-proneness

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ABSTRACT

Background: While individuals at ultra-risk for schizophrenia are characterized by high negative/disorganised but low positive schizotypy, schizophrenia patients are usually high in all three schizotypy facets. Thus, avoiding increases in positive schizotypy in ultra-high risk individuals may constitute of form of schizophrenia-prevention. A possible method of reducing positive schizotypy could be Positive-Psychological intervention (PI).
Methods: We present results from 2 independent studies, including a 12-month follow-up from study 1, using an easy-to-perform intervention based on Positive Psychology to reduce positive schizotypy.
Results: A PI can significantly and sustainably reduce positive schizotypy compared to a placebo-condition. Furthermore, our results show very high response-rates to said intervention, with responsiveness to the intervention increasing significantly with disorganised schizotypic traits.
Conclusions: As especially disorganised schizotypy is of relevance for the risk of transition from high benign schizotypy to schizophrenia and is found most closely associated to familial schizophrenia-risk and highly elevated in at-risk mental states, our results are encouraging. We suggest, thus, that positive psychology can not only reduce positive schizotypy, but may be increasingly useful with rising schizophrenia-risk and, thus, be worthy of further investigation regarding it potential in schizophrenia-prevention.

1. Introduction

Schizophrenia is one of the most disabling conditions (WHO, 2004, 2008). Considering its prevalence, schizophrenia, requires a disproportionate share of health services (Mueser and McGurk, 2004) and constitutes considerable economic burden (Austin, 2005). Apart from its potentially chronic nature (one third of patients recover; Lally et al., 2017), antipsychotic drugs are suggested to cause neurological damage (Zipursky et al., 2013). Thus, the necessity for primary prevention is high, and intervention trials in ultra-high risk individuals show promising effects both regarding reduced transition into psychotic disorder as well as better outcome in those who develop first-episode psychosis (q.v., Yung, 2017).

In this context, schizotypy is highly attractive and has been described as "*the most influential, comprehensive psychological construct in schizophrenia research*" (Debbané and Mohr, 2015, p. S363), being strongly linked to individual risk for schizophrenia (Grant et al., 2018) and sharing greatly regarding etiological and phenomenological factors of spectrum disorders (Barrantes-Vidal et al., 2015; Ettinger et al., 2015; Mohr and Ettinger, 2015). Like schizophrenia (Vollema and van den Bosch, 1995), schizotypy also consists of sub-facets; namely, a positive and a negative facet (Kwapil et al., 2008). A third cognitive-disorganised facet is also found, sharing genetic variance with both aforementioned facets equally (Linney et al., 2003). The multidimensionality of schizotypy has been consistently replicated and found pan-culturally in large samples (e.g., Fonseca-Pedrero et al., 2017; Fonseca-Pedrero et al., 2018), although the content of the individual facets is slightly dependent of the measurement-inventory used (Grant et al., 2018).

A widely accepted schizotypy-model is the *fully dimensional* approach (Claridge, 1997), stating that high schizotypy is necessary but not sufficient for schizophrenia-development. Herein, positive schizotypy represents a dimension of (not inherently malign (Mohr and Claridge, 2015)) proneness for psychosis (in schizophrenia) rather than schizophrenia (q.v., Howes and Kapur, 2009). Most highly schizotypic individuals do not develop schizophrenia; suggesting influences of another dimension that explains differences between healthy vs. schizophrenic highly schizotypic individuals. This dimension has been argued to be overall health (Claridge, 1997) and/or resilience (Barrantes-Vidal et al., 2015; Grant, 2015a) and to be related to negative/disorganised schizotypy (Grant, 2015b). Thus, positive schizotypy

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appears of itself insufficient for *clinical significance*. Furthermore, individuals with high negative/disorganised but low positive schizotypy will also not develop schizophrenia; i.e., the clinical condition occurs in individuals (extremely) high in all schizotypy facets (Kwapil et al., 2013).

Considering that (1) negative/disorganised schizotypy is more stable *within* individuals (Barrantes-Vidal et al., 2013), (2) individuals at high (familial) risk for schizophrenia present with extremely high values thereof (Tarbox and Pogue-Geile, 2011) and (3) it is the accrual of positive symptoms that leads hitherto healthy individuals high in negative/disorganised schizotypy to seek professional help (Debbané et al., 2015), it would seem that active reduction of positive schizotypy in at-risk individuals may prevent the transition into schizophrenia. Positive schizotypy, although also being a stable *trait* (Mason and Claridge, 2006), interacts strongly with the environment to produce psychotic/psychosis-like *states* of varying intensity. For example, drugs (Mason et al., 2008), sensory stimulation/deprivation (Daniel and Mason, 2015) or stress (Barrantes-Vidal et al., 2013) may increase positive schizotypic *states*. To assess intra-individual variations, measures exist that specifically capture *state* rather than *trait* schizotypy (e.g., Mason et al., 2008; Barrantes-Vidal et al., 2013).

While most studies focus on identifying factors that increase *state* schizotypy, this study aims to reduce it. This notion is routed in Positive Psychology, which has been described by one of its founders as "*the scientific study of what makes life most worth living*" (Peterson, 2008): Treatment is usually deficit-oriented, but Positive Psychology does not attempt to "correct a negative" but increase beneficial qualities in healthy individuals; reducing risk or even preventing illness. Few studies have been published as yet, but a large study (Seligman et al., 2005) showed that Positive-Psychological interventions (PIs) increase happiness and decrease depressive symptoms. A highly effective PI was the daily writing of "three good things" over (at least) one week. The beneficial effects of PIs have been replicated and improved (Gander et al., 2013). Although (few) studies exist regarding PIs in schizophrenic patients, these are not of relevance here; having an entirely different focus (i.e., increasing quality-of-life in patients rather than preventing healthy individuals from becoming patients). PIs are generally considerably easier to carry out (not requiring professional assistance) and may, thus, augment the aforementioned more sophisticated intervention-trials used in ultra-high risk individuals (Yung, 2017). The aim of this study was, therefore, to examine, if a PI targeted at increasing happiness could reduce acute schizotypal feelings and cognitions **in healthy individuals** and, thus, reduce acute psychosis-proneness.

Additionally, we wanted to assess potential moderation/mediation through perceived stress and trait schizotypy. We hypothesised that PIs would reduce state schizotypy (via stress-reduction) and that the intervention-efficacy would correlate positively with trait negative/cognitive schizotypy. The latter assumption was based on findings that negative trait schizotypy predicted variations in state schizotypy and susceptibility to defeating social appraisal (Barrantes-Vidal et al., 2013), wherefore we hypothesised that this effect would also work in reverse.

2. Methods

2.1. Study design and questionnaire-measures

The study consisted of two independent repeated-measures studies with two time points each and a 12-month follow-up for study 1. Trait schizotypy were assessed using the German (Grant et al., 2013) Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE; Mason and Claridge, 2006). It captures all schizotypy-facets through the scales *Unusual Experiences* (UnEx; positive), *Introvertive Anhedonia* (IntAn; negative) and *Cognitive Disorganisation* (CogDis; cognitive/disorganised). The debated *Impulsive Nonconformity*-scale was not used.

Before and after intervention, state schizotypy was assessed using a German translation of the Psychotomimetic States Inventory (PSI; Mason et al., 2008) and Experience Sampling-items from Barrantes-Vidal et al., 2013. ESM-scales were adapted as described in Grant et al. (2014) and only used in study 1 as a validity-estimate for the German PSI.

The PSI has 6 scales: Delusional Thinking (DelThi), Perceptual Distortion (PerDis), Cognitive Disorganisation (CogDi), Anhedonia, Mania and Paranoia. The ESM items form a positive (ESMpos) and negative (ESMneg) scale. For both measures, item-wording was changed from present ("I currently am...") to past tense ("Throughout the course of the last weak I was...") to assess more persistent rather than ultra-acute states.

For all measures (i.e., the O-LIFE, the ESM-items and the PSI) over all samples and time-points, internal consistency-values (Cronbach's alpha) were satisfactory (ranging from 0.88 to 0.75), with the exception of the Mania-scale of the PSI (alpha ranging from 0.54 to 0.7). These values (including those for the Mania-scale) are comparable with (and for the PSI, mostly higher than) those published for both the respective German and original versions (q.v., above). Furthermore, fluctuations of internal consistency are not unexpected regarding measures of states (compared to measures of traits), whereby the alpha-fluctuations in this study were considerably lower than has been found, e.g., for the English PSI (q.v., Mason et al., 2008).

The PI was adapted from Seligman et al. (2005), with a *happy*-condition and a *placebo*-condition. A third (*thankful*) condition existed as part of another study but was not used here. PIs each took place over four weeks in independent samples. Follow-up for study 1 was performed 12 months post-intervention.

The studies were performed according to international ethical standards; ethics-approval is on file.

2.2. Design

2.2.1. Study 1

Participants in the *happy*-group wrote down daily what they were looking forward to most about the upcoming day, while the *placebo*-group wrote down two rhyming words daily. All tasks were performed via a self-programmed mobile phone-application (Supplementary materials); regular participation was assured through daily text-message reminders and assessed via individual number of completed trials.

2.2.2. Study 2

Study 2 was conducted one year later in an independent sample with the same principal design. The procedure was, however, altered slightly to assess whether a less frequent but more intense protocol would be more effective: Once a week, participants wrote a mini-essay (approx 200–300 words); the *happy*-group about a personal happy experience, the *placebo*-group were given a neutral text to summarize. After writing, all participants were asked to re-read their written text aloud to themselves. The *happy*-group were, additionally, prompted to re-imagine the feelings of happiness originally experienced. The online-tool used for data-collection saved the time spent herewith, wherefore uncompliant participants could be identified. The intervention consisted of 5 trials, whereby the texts in the *placebo*-group were different for each trial to avoid boredom.

2.3. Participants

Participants were healthy (self-report) individuals (mostly psychology students of Caucasian ethnicity), gave written informed consent and were not pre-selected. The reason for this was twofold: Firstly, schizotypy has been shown to be the best predictor of schizophrenia-development (better than individual schizophrenia-risk factors; e.g., Mason et al., 2004). Therefore, we focussed on proximal schizotypy rather than potential distal factors like familial risk. Secondly, pre-

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