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Schizotypy versus openness and intelligence as predictors of creativity

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Abstract

Schizophrenia-spectrum risk alleles may persist in the population, despite their reproductive costs in individuals with schizophrenia, through the possible creativity benefits of mild schizotypy in non-psychotic relatives. To assess this creativity-benefit model, we measured creativity (using 6 verbal and 8 drawing tasks), schizotypy, Big Five personality traits, and general intelligence in 225 University of New Mexico students. Multiple regression analyses showed that openness and intelligence, but not schizotypy, predicted reliable observer ratings of verbal and drawing creativity. Thus, the 'madness-creativity' link seems mediated by the personality trait of openness, and standard creativity-benefit models seem unlikely to explain schizophrenia's evolutionary persistence.

Keywords: Schizotypy; Verbal creativity; Drawing creativity; Intelligence; Openness; Personality

1. Introduction

The evolutionary origins of schizophrenia spectrum disorders can illuminate their hidden adaptive costs and benefits, guide the search for genetic and environmental risk factors, and suggest new interventions (Keller and Miller, 2006; Shaner et al., 2004). Following millennia of controversy about the 'madness–creativity' link (see Becker, 2000; Lauronen et al., 2004; Sass, 2000), some current models (e.g. Andreasen, 1987; Crow, 2000; Eysenck, 1995; Nettle and Clegg, 2006) suggest that schizophrenia-spectrum risk alleles may persist in current human populations through the possible creativity (and hence reproductive) benefits of mild schizotypy in non-psychotic relatives, which may counterbalance their severe reproductive costs in individuals with schizophrenia (Avila et al., 2001; Haukka et al., 2003).

Many studies have shown positive relationships between schizotypy and creativity among creative professionals (Burch et al., 2006a; Merten and Fisher, 1999; Nettle and Clegg, 2006), normal young adults (Cox and Leon, 1999; Folley and Park, 2005; Rushton, 1990; Schuldberg, 2000; Tsakanikos and Claridge, 2005; Weinstein and Graves, 2002), and non-psychotic relatives of schizophrenics (Andreasen, 1987; Karlsson, 1984; Kinney et al., 2000). However, schizotypy might not predict creativity after controlling for other heritable traits that have better-established associations with creativity, such as general intelligence (Eysenck, 1995;

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Jensen, 1998; Kuncel et al., 2004; Rushton, 1990) and the personality trait of 'openness' from the Big Five model (Carson et al., 2005; Dollinger et al., 2004; King et al., 1996; McCrae, 1987; Wolfradt and Pretz, 2001; Zhang and Huang, 2001). To investigate the possible role of such confounds, we administered the SPQ measure of schizotypy (Raine, 1991), diverse verbal and drawing creativity tasks, and standard intelligence and personality measures to a diverse sample of normal young adults from a state college.

2. Methods

2.1. Participants and procedures

225 undergraduate students (163 women, 62 men; age mean 20.0 years, SD 2.7, range 18–33; 54% Caucasian, 41% Hispanic) from the University of New Mexico volunteered to participate in the study in partial fulfillment of psychology course credit requirements. Participants completed questionnaires under conditions of complete confidentiality and anonymity, in 2–3 h, sitting in groups of 9 to 95 students within UNM lecture rooms; to maximize privacy, they sat only in alternating rows, and alternating seats within each row. The work was carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans, and under UNM Institutional Review Board approval.

2.2. Individual differences measures

To measure schizotypy, we used Raine's (1991) 74-item SPQ scale. To measure personality, we used the NEO–FFI (Costa and McCrae, 1992), a 60-item measure of the Big Five personality traits: openness, conscientiousness, extraversion, agreeableness, and neuroticism. To measure intelligence, we used an 18-item version of Raven's Advanced Progressive Matrices (Raven et al., 1998). Participants also completed questionnaires regarding age, sex, ethnicity, family psychiatric history, self-reported creative abilities, and several other background variables.

2.3. Creativity tasks

Participants completed 6 verbal creativity tasks (Appendix A) and 8 drawing creativity tasks (Appendix B), and were explicitly instructed to be as creative as possible, as if trying to attract potential romantic partners. Previous research has shown that priming participants with mating-relevant cues boosts creative output (Griskevicius et al., 2006), and we wished to elicit peak creative performance from participants.

Examples of our 6 verbal creativity tasks include: "Imagine that all clouds had really long strings hanging from them — strings hundreds of feet long. What would be the implications of that fact for nature and society?" and "If you could experience what it's like to be a different kind of animal for a day, what kind of animal would you want to be, and why?" For the 8 drawing creativity tasks, participants were asked to create 4 abstract drawings (e.g. "Please draw an abstract symbol, pattern, or composition that represents the taste of pure, rich, dark chocolate"), and 4 representational drawings (e.g. "Please draw what an alien civilization might look like on a distant planet").

2.4. Creativity ratings

Following Amabile's (1982) Consensual Assessment Technique, each participant's 6 verbal responses were independently rated on a 1–5 creativity scale by four raters (the two authors of this study, plus two Ph.D. students). We did not define "creativity" for the raters; we assumed they would know it when they saw it, and inter-rater reliabilities would suffer if they did not. Each participant's 2 pages of abstract and representational drawings were rated on the same 1–5 creativity scale by four raters (the two authors of this study plus two undergraduate research assistants). All ratings were done independently, blindly, and without any knowledge of the participant's sex, intelligence, personality, schizotypy, or any other information.

3. Results

3.1. Schizotypy factors

Schizotypy responses on the 9 SPQ subscales were factor-analyzed in SPSS using maximum likelihood extraction, with promax rotation. In contrast to Raine's (1991) three factors, we obtained just two factors (see Table 1): a 'positive schizotypy' factor with strong positive loadings on the 5 subscales concerning unusual experiences, magical ideation, ideas of reference, confusing/odd speech, and odd behavior; and a 'negative schizotypy' factor with strong positive loadings on the 4 subscales concerning flat affect, having no close friends, social anxiety, and paranoid ideation. These two factors emerged robustly across different factor extraction and rotation methods, across both sexes, and from factoring the 74 SPQ items directly. Both schizotypy factors showed nearly normal distributions, with no floor effects, but with slight positive skew.