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## Schizophrenia and creativity: A meta-analytic review

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### ABSTRACT

The present study investigated the relationship between creativity and schizophrenia with a 3-level multilevel meta-analytic approach. Analyses with 200 effect sizes obtained from 42 studies found a mean effect size of  $r = -0.324$ , 95%CI  $[-0.42, -0.23]$ . Further analyses focused on moderators and indicated that the relationship between schizophrenia and creativity is moderated by type of creativity measure, the content of creativity measure, the severity of schizophrenia, and patient status. The negative mean effect size was stronger with semantic-category or verbal-letter fluency tasks than the divergent thinking or associational measures. Performance on verbal measures of creativity was significantly lower than the nonverbal measures. When effect sizes were compared at different levels of severity, a stronger and more negative mean effect size was obtained at chronic schizophrenia than acute and early onset levels. Studies that involved inpatients had a significantly higher (more negative) mean effect size than those involving outpatients. When these findings are considered along with previous meta-analyses on the link between creativity and psychoticism and schizotypy, creativity and psychopathology seem to have an inverted-U relationship. A mild expression of schizophrenia symptoms may support creativity but a full demonstration of the symptoms undermines it.

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### 1. Schizophrenia and creativity: A meta-analytic review

The link between madness and genius is one of the oldest and most persistent among laypeople and unsurprisingly has become controversial among researchers (Jamison, 1993; Simonton, 2010a, 2010b). Simply phrased as mad-genius hypothesis, this connection is often explored in terms of the relationship between creativity and psychopathology. In fact, creativity may be one of the few fields, if not the only one, in which mental illnesses are perceived differently. Instead of being portrayed as something to avoid, creativity research has approached mental illnesses in a relatively positive light (Kaufman et al., 2006). Fortunately, there is much literature exploring the relationship between creativity and psychopathologies.

Andreasen (1987) conducted a prominent empirical study on this subject, in which he interviewed 30 creative writers and 30 matched controls. The results showed that writers had higher levels of affective disorders than the controls. The same kind of differences was also found between their first-degree relatives. Andreasen's work is a milestone of empirical evidence showing the connection between creative writing and mental illness. Those findings are also consistent with

asynchronicity view of creativity (Gardner, 1993; Gardner and Wolf, 1988) that refers to the idea that “creative efforts are more likely to arise when there is a certain tension or asynchrony among principal factors that underlie human behavior. It is this tension that gives rise to creative works” (Gardner and Wolf, p. 101).

Some researchers (Rothenberg, 1990; Schlesinger, 2009) challenged Andreasen's (1987) work. They pointed out that the control group was not well matched to the writers examined for this study and that Andreasen was the sole interviewer. Furthermore, participants were writers and Andreasen's conclusion may not necessarily apply to other domains such as arts, sciences, or everyday creativity. Supporting this argument, research indicated that poets were more likely to have mental illness than others. More specifically, women poets are significantly more likely to suffer from mental illness (Kaufman, 2001). Additionally, analysis of eminently creative individuals may not be generalizable to laypeople.

Andreasen's work focused on creative people and examined the presence of a psychopathology. Similar to Andreasen, Ludwig (1995) and Jamison (1993) also followed a similar approach and found similar conclusions. Some others (i.e., Keefe and Magaro, 1980; Richards et al., 1988; Strong et al., 2007) focused on people with mental illnesses and compared them with healthy controls for their creativity. However, the findings were quite diverse probably because the nature of the relationship depends on the type and severity of mental illnesses, and how creativity was measured (Acar and Runco, 2012; Silvia and Kaufman, 2010). In other words, creativity and psychopathology may have only an occasional and very specific relationship rather than a broad and

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general one (Acar and Runco, 2012). Simonton (2005, 2014) also argued that the concept of mad-genius is often exaggerated and discussed the possibility that creative people may be mentally healthier but highly creative individuals could be more mentally ill. Therefore, blanket statements on the nature of the relationship between the two are likely to fail to describe the reality. Therefore, a meta-analytic approach would be helpful to clarify the controversy around the mad-genius hypothesis and it would be a useful approach to analyze the relationship between creativity and specific types of psychopathologies. The present study focuses on the relationship between creativity and schizophrenia.

Although many researchers find creativity very complex and hard to define (Taylor, 1988), the field has developed some consensus around the two-partite definition of creativity that creative things are novel and useful (Nickerson, 1999; Runco and Jaeger, 2012). These two components of creativity mirror two major forms of thinking employed in creative thinking process: divergent and convergent thinking. Divergent thinking is defined as the ability to generate multiple solutions, ideas, or products through thinking in multiple directions and including a broad search for alternatives (Guilford, 1959; Puccio et al., 2012; Runco, 1999a; Taylor, 1988). Convergent thinking is defined as the generation of logical conclusions and best outcomes by narrowing down the options based on certain criteria (Guilford and Hoepfner, 1971).

One possible reason why some people feel they are not creative is that they have difficulty with the first component of creativity – generation of original, novel, unusual ideas or solutions. This challenge may stem from habits, self-imposed constraints, past learning, untested assumptions, lack of tolerance for ambiguity or other reasons. Yet, this component seems to be more essential to creativity than usefulness (Acar et al., 2017; Diedrich et al., 2015). Traditional and common forms of problem solving often involve convergent rather than divergent thinking although novel and original ideas usually emerge as a result of divergent thinking. Certainly divergent thinking does not guarantee actual creative achievement and creativity is much broader than divergent thinking (Runco, 2008) but tests of divergent thinking are good predictors of certain creative performance (Runco and Acar, 2012).

The distinction of divergent and convergent thinking as well as novelty and usefulness is relevant to the hypothesized link between creativity and schizophrenia because access to novel and original idea or solutions may be easier to individuals with psychoticism and schizophrenia because of their unusual experiences and versatile thinking resulting from delusions, hallucinations, and limited attention and concentration (Chapman and Chapman, 1973). The opportunities and challenges are opposite for those with schizophrenia and healthy controls from the perspective of creativity. It is sometimes difficult for healthy people to go beyond their conventional way of thinking and use their imagination freely. Individuals with schizophrenia, however, occasionally live in a fantasy or imagined world and have difficulty with staying in touch with reality. It could be argued that this seemingly and mostly undesirable challenge is an opportunity for creativity simply because those with schizophrenia possess what many others need for creative thinking. Creatives and individuals with schizophrenia share certain other characteristics such as over-inclusive thinking (Andreasen and Powers, 1975; Claridge and Beech, 1995), regression in the service of ego (Kris, 1952), and reduced latent inhibition (Brugger and Graves, 1997; Green and Williams, 1999; Weinstein and Graves, 2001). Carson (2011) proposed the “shared vulnerability model” to explain higher risk among creative individuals to demonstrate psychopathology. According to this model, both creative and mentally disturbed individuals share certain factors such as cognitive disinhibition, stronger attention to novelty, and neural hyperconnectivity. Carson argued that those vulnerabilities could enhance creativity when they are accompanied by factors such as high IQ, superior working memory, and cognitive flexibility to be able to process a wide variety of stimuli. This model is important for mad-genius hypothesis because “genius” refers to both high intelligence and high creativity (Colman, 2014) and Carson's model echoes that perspective.

Carson's emphasis in “protective factors” such as IQ, cognitive flexibility, and memory is crucial because schizophrenia is associated with lower IQ (Aylward et al., 1984; Khandaker et al., 2011), lower memory (Aleman et al., 1999), and lower cognitive flexibility (Hanes et al., 1995) whereas creativity benefits from intelligence (Kim, 2005; Karwowski et al., 2016), cognitive flexibility (Nijstad et al., 2010; Simonton, 2000), and memory (Stein, 1989; Vandervert et al., 2007). Therefore, in spite of the communalities, the hypothetical relationship between creativity and schizophrenia may be more complex than it seems. It could be argued that higher creativity with schizophrenia can be a case for people with high ability at best, and therefore, should not be generalized. In fact, there are quite a few good reasons to expect lower creativity from people with schizophrenia. First, schizophrenia is a form of mental illness whereas creativity is largely a healthy behavior (Isaksen, 1987). A weird, unusual idea may meet the primary criteria of creativity (i.e., novelty and originality) to some degree but it will not be considered creative unless it has some basis in reality. Second, as suggested by dual path to creativity model (Nijstad et al., 2010), creative ideation is enhanced by cognitive flexibility and persistence whereas schizophrenia is related to lower cognitive flexibility and impaired attention (Cornblatt and Malhotra, 2001; Erlenmeyer-Kimling et al., 2000). Third, executive functions are heavily involved in creative thinking and they are lacking among those with schizophrenia (American Psychiatric Association, 2013; Benedek et al., 2014; Delis et al., 2007; Runco and Acar, 2012; Wang et al., 2005; Weisbrod et al., 2000). Potential benefits of certain schizophrenia symptoms that are exhibited at mild or sub-clinical levels may be reversed by a profound demonstration of the same or other symptoms because they undermine executive functions.

Additionally, some researchers (Abraham, 2015; Akiskal and Akiskal, 1988; Kinney et al., 2001; Richards et al., 1988; Schuldberg, 2000–2001) described the relationship between creativity and psychopathologies as an inverted-U relationship, in which one or two minor demonstrations of symptoms may be good but more would be detrimental to creativity. Based on Eysenck's (1992, 1993) psychoticism (P) continuum that defines schizotypy as a weaker demonstration of P than schizophrenia, the inverted-U relationship between creativity and psychopathology may apply to the schizophrenia spectrum. According to this, the relationship with creativity would change across schizophrenia, psychotic disorders, and schizotypal disorders. Acar and Runco (2012) conducted a meta-analysis with 119 effect sizes from 32 studies and found that the correlation between psychoticism and creativity is significant, yet small ( $r = 0.16$ ). In a separate investigation, Acar and Sen (2013) focused on the relationship between schizotypy and creativity based on data from 45 articles that provided 268 effect sizes. The mean effect size was  $r = 0.07$ , but creativity was positively related to positive schizotypy and negatively related with negative schizotypy. Schizophrenia is more severe than psychoticism and schizotypy. Therefore, if the inverted-U relationship hypothesis is indeed true, the relationship between creativity and schizophrenia would either be negatively related or the effect size would be too small and non-significant.

Quite a few empirical studies investigated the relationship between creativity and schizophrenia. Some researchers found that people with schizophrenia are less creative than the healthy controls (Eisenman, 1990) whereas a few others found the opposite (Kinney et al., 2001; Jena and Ramachandra, 1995; Rubinstein, 2008). Some others (e.g., Son et al., 2015) provided mixed evidence reporting both positive and negative relationships. Therefore, the empirical evidence is diverse and a meta-analysis can be helpful to clarify it. Such a clarification attempt benefits from considering possible moderators. As mentioned previously, some of the seminal works on the relationship between creativity and psychopathology depend on analyses of eminently creative individuals (Andreasen, 1987; Ludwig, 1995; Son et al., 2015). However, findings from such studies may not be generalizable to non-eminently creative people when their creativity and schizophrenia are measured or diagnosed objectively. Some studies involved inpatients (Agarwal,

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