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The relationship between measures of creativity and schizotypy

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ABSTRACT

The aim of this study was to determine the extent to which a measure of multidimensional schizotypy and intelligence predicted measures of creativity, as assessed by self-rated creativity, a measure of the creative personality (CPS: Gough, 1979) and an inventory of creative behaviours. Additionally an aggregation of the three different measures; total creativity was examined. 140 participants completed the creativity measures, a general intelligence test (Wonderlic Personnel Test: Wonderlic, 1992) in addition to a multidimensional schizotypy inventory (O-LIFE: Mason, Claridge, & Jackson, 1995). The *Unusual Experiences* and *Impulsive Nonconformity* dimensions of the O-LIFE were positively and significantly related to creativity. The *Cognitive Disorganisation* dimension was found to be negatively and significantly related to creativity. The implications of the findings were discussed.

1. Introduction

The importance of creativity for humankind is undeniable (Runco, 2004). Yet, the scientific study of creativity has lagged considerably behind research on constructs like intelligence (Sternberg & Lubart, 1999). Researchers have begun to converge upon "a general agreement that creativity involves the production of novel, useful products" (Mumford, 2003, p. 107). Creativity in the individual is perceived to consist of multiple components (Amabile, 1996; Batey & Furnham, 2006; Mumford & Gustafson, 1988; Sternberg & Lubart, 1999) which has led to the adoption of multi-trait, multi-method analyses (Wolfradt & Pretz, 2001).

Researchers investigating creativity in the individual have tended to adopt a psychometric framework (Batey & Furnham, 2006). The examination of creativity from a cognitive ability (Silvia, 2008) or personality (Feist, 1998) perspective has been common. Research has begun to examine the relationship of sub-clinical measures of psychopathology such as schizotypy (Nettle, 2006) and hypomania (Furnham, Batey, Anand, & Manfield, 2008) to individual creativity. The study of the relationships between clinical and sub-clinical psychopathologies to creativity is important, because it provides insight into the cognitive and behavioural correlates of creativity. Further, such studies are able to cast light on the issue of why potentially debilitating conditions like schizophrenia have not succumbed to evolutionary pressures. In that, the same cognitive mechanisms that give rise to schizophrenia are those which lend themselves to creative cognition (Eysenck, 1993; Green & Williams, 1999). The purpose of this study was to examine three different measures of creativity; self-rated creativity (Batey, 2007), the Creative Personality Scale (CPS: Gough, 1979) and an inventory of creative achievement (Biographical Inventory of Creative Behaviours: BICB; Batey, 2007) in relation to schizotypy, whilst accounting for the contribution of intelligence.

There is evidence that creative people possess insight into or awareness of their own creativity (Barron & Harrington, 1981) making a self-rating of creativity a valid measure. In a review of the characteristics of creative people, Ochse (1990) suggested that "contemporary creators... have good insight into their own capabilities. They typically describe themselves explicitly as creative" (p. 127). There exists a rationale for the belief that creative people would rate themselves as highly creative, the evidence for which may be found in the small but consistent literature on self-rated abilities and personality. Studies have demonstrated that people are able to predict their own IQ scores with the typical correlation between estimated and psychometric IQ on the order of $r = 0.20$ (Paulhus, Lysy, & Yik, 1998). In the domain of personality, studies have shown that people can consistently predict their own personality test scores with correlations on the order of 0.30–0.50 for different personality factors (Furnham, 1997; Gray, 1972). The rationale for suggesting that self-ratings of creativity are valid follows thus. If creativity is in part a combination of intellectual and personality variables (Amabile, 1996; Eysenck, 1993) and individuals have insight into their own intelligence and personality, it follows that individuals should be able to recognise their own creativity to a certain degree. Additionally, "creative" is a popular term, therefore individuals may be hypothesised to have received feedback throughout their development as to how creative they are perceived to be. Self-rated creativity has been used in recent studies (Furnham et al., 2008).

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The Creative Personality Scale (CPS: Gough, 1979) for the adjective checklist (ACL: Gough & Heilbrun, 1983) is a commonly used criterion of creativity in psychometric studies (Carson, Peterson, & Higgins, 2005; McRae, 1987; Wolfradt & Pretz, 2001). It purports to assess aspects of the creative personality that have been demonstrated to relate to rated creativity (Gough, 1979). It is more commonly employed as a criterion of creativity than as a measure of personality (Carson et al., 2005; Wolfradt & Pretz, 2001).

A brief measure of creative production or achievement can be obtained through biographical inventories of purportedly creative behaviours. Hocevar and Bachelor (1989) contended the self-report inventory of creative achievement to be the most defensible measure of creativity. Self-report inventories of achievement have been used in studies of creativity (Carson et al., 2005; Furnham et al., 2008). The current study utilised a 34 item checklist of everyday creative achievements. There are numerous studies that have demonstrated that self-reported creativity is related to performance measures of creativity like divergent thinking (DT) and ratings of creativity (Barron, 1955; Batey & Furnham, 2006; Carson et al., 2005; Gough, 1979).

Most theories of intelligence trace their roots back to the hierarchical model first proposed by Spearman (1904) who suggested intelligence to consist of a general factor (g) in addition to a set of specific factors (s). It has been suggested that individual difference investigations of creativity should control for the effects of intelligence (Reuter et al., 2005), which the bulk of schizotypy studies have failed to address. Insofar as this study utilised a university student sample, it may be presumed that the effects of intelligence are controlled to a degree. However, there is evidence that even amongst university students, the relationship between intelligence and creativity (as DT) is strong (Silvia, 2008). In this study, intelligence will be considered as a possible correlated variable. However, because the measures of creativity in this study are based on self-report and self-report creativity measures do not usually correlate with intelligence, no significant relationship is anticipated. A recent study by Furnham et al. (2008) has adopted this methodology for investigating hypomania and DT. A detailed consideration of the relationship between intelligence and creativity is presented in Sternberg and O'Hara (2000).

Schizotypy refers to an individual's proneness to psychosis and, in particular, to schizophrenia (Claridge, 1997). The most comprehensive measure of schizotypal traits is the Oxford-Liverpool Inventory for Feelings and Experiences (O-LIFE: Mason, Claridge, & Jackson, 1995). This multidimensional inventory consists of a positive schizotypy dimension; *Unusual Experiences*, which is concerned with unusual experiences not normally encountered in the normal population (e.g. hallucinations). *Introvertive Anhedonia* is concerned with negative symptoms (or exaggerations of symptoms found in the normal population) and refers to a tendency to not gain pleasure from social and physical stimulation. The third dimension, known as *Cognitive Disorganisation* refers to disorganised thoughts and loosening of conceptual boundaries. Claridge et al. (1996) argued that these three dimensions represent the central facets of schizotypy and parallel schizophrenic symptoms in a milder form. The O-LIFE also includes a fourth dimension (*Impulsive Nonconformity*) measuring impulsive, aggressive and asocial aspects of psychosis. This dimension is based upon both Eysenck's Psychoticism scale (Eysenck & Eysenck, 1975) and the hypomania construct. Hypomania, a primary feature of bipolar disorder, is defined by DSM-IV as elevation of mood identified by the usual criteria for mania: irritability, racing thoughts, distractibility, pressured speech, decreased need for sleep, high self-esteem, feeling of grandiosity, increase in goal-orientated activity, risk taking – but lesser in intensity and duration. Hypomania has been found to relate to self-rated creativity (Furnham et al., 2008).

The four sub-scales of the O-LIFE have been found to possess good psychometric properties and reflect the pattern of the Disorganisation syndrome in schizophrenia (APA, 2000) as individuals display a combination of positive and negative features (Loughland & Williams, 1997). The O-LIFE has been demonstrated to be valid, as many studies have shown that high schizotypy scorers show similar neurocognitive deficits as those found in schizophrenic patients (Goodarzi, Wykes, & Hemsley, 2000; Rawlings & Goldberg, 2001; Tsakanikos & Reed, 2003).

Studies have found evidence for the contribution of positive schizotypy in predicting creativity as assessed by DT scores (Green & Williams, 1999; O'Reilly, Dunbar, & Bentall, 2001). Schuldberg (2000–2001) found relationships with measures of positive schizotypy to a self-report measure of creativity (HDYT: *How Do You Think*; Davis & Subkoviak, 1975 – a 100 item measure that assesses creative interests, attitudes and self-perceptions) and the CPS. Studies comparing nominally creative groups with less-creative groups have found higher scores on the *Unusual Experiences* dimension (Burch, Pavelis, Hemsley, & Corr, 2006; O'Reilly et al., 2001).

Studies have demonstrated relationships between negative schizotypy and DT. Cox and Leon (1999) found a positive relationship between DT as assessed by Alternate Uses (Guilford, 1967) and a measure of negative schizotypy (Social Anhedonia: Eckblad, Chapman, Chapman, & Mishlove, 1982). However, Dinn, Harris, Aycicegi, Greene, and Andover (2002) found a negative relationship between the Interpersonal Difficulties (akin to *Introvertive Anhedonia*) scale of the Schizotypal Personality Questionnaire (Raine & Benishay, 1995) and DT. Batey and Furnham (submitted for publication) reported a negative relationship between *Introvertive Anhedonia* and Word fluency, DT fluency and rated DT. Similarly, Tsakanikos and Claridge (2005) demonstrated that individuals who scored one standard deviation above the mean on *Introvertive Anhedonia* showed decreased verbal fluency. Schuldberg (2000–2001) also found negative relationships between negative schizotypy and creativity as assessed by HDYT and the CPS.

There exists disagreement throughout research on creativity and schizotypy regarding the influence of cognitive dysfunction. It has been suggested that the cognitive style of divergent, creative thinkers is over-inclusive (Eysenck, 1993) and involves remote associations (Mednick, 1962). This is extremely similar to the thought-processing style associated with the *Cognitive Disorganisation* facet of schizotypy. There is no evidence to demonstrate that *Cognitive Disorganisation* can predict DT test scores. In their study comparing visual artists with non-artists, Burch et al. (2006) found the artists group to score significantly higher on the *Cognitive Disorganisation* dimension of the O-LIFE.

A recent study by Batey and Furnham (submitted for publication) demonstrated positive relationships between *Impulsive Nonconformity* and rated DT. Several studies have reported correlations between Psychoticism (Eysenck & Eysenck, 1975) and DT (Aguilar-Alonso, 1996; Stavridou & Furnham, 1996; Woody & Claridge, 1977). Cox and Leon (1999) found positive relationships with Psychoticism and HDYT and the Barron–Welsh Art Scale (Welsh & Barron, 1963), findings replicated by Schuldberg (2000-2001). Burch et al. (2006) found that their visual artists group scored significantly higher on *Impulsive Nonconformity* than the non-artists.

2. Hypotheses

In this study it is anticipated that there will be:

H1: No relationships between intelligence and creativity.
H2: Significant and positive relationships between *Unusual Experiences* and creativity.

H3: Significant and negative relationships between *Introvertive Anhedonia* and creativity.
H4: Significant and positive relationships between *Cognitive Disorganisation* and creativity.
H5: Significant and positive relationships between *Impulsive Nonconformity* and creativity.

3. Method

3.1. Participants

An opportunistic sample of 140 (20 male) University College London undergraduate Psychology students took part due to course requirements, provided informed consent, were debriefed and given feedback on their scores. The ages ranged from 18 to 28, with a mean of 18.96 (SD = 2.49). All participants possessed a high degree of English language proficiency.

3.2. Materials

3.2.1. Intelligence

Intelligence (IQ): was measured through the *Wonderlic Personnel Test* (WPT: Wonderlic, 1992). This 50-item test is administered in 12 min. Items include word and number comparisons, disarranged sentences, serial analysis of geometric figures and story problems that require mathematical and logical solutions. The mean score for this sample was 25.82 (SD = 6.22). The test has impressive norms and correlates very highly (r = .92) with the WAIS-R.

3.3. Measures of creativity

(a) *Self-rating of creativity:* was measured on a 10-point Likert-type scale (Batey, 2007). The rating for creativity was embedded within 10 other ratings of personal attributes (e.g. intelligent, wise, knowledgeable, impulsive, etc.). Participants were required to rate themselves in comparison with other people with scores of 1 or 10 indicating that the participant considered themselves to be less or more creative (or intelligent, wise, etc.). The internal consistency of the self-ratings scale (11 items) for this study was acceptable (α = 0.75).
(b) *Creative personality:* was measured by Gough's (1979) *Creative Personality Scale* (CPS) for the Adjective Checklist (Gough & Heilbrun, 1983). The administration of the scale was untimed. Scores for the CPS can range from −12 to 18. The CPS was validated by comparing self-reported adjectives with ratings of creativity by faculty on over 1000 students (Gough, 1979). The CPS is a reliable and valid test for the identification of creative personality (Carson et al., 2005; Gough, 1979; Kaduson & Schaefer, 1991; McRae, 1987).
(c) *Creative achievement:* was assessed by *The Biographical Inventory of Creative Behaviours* (BICB: Batey, 2007). This is an assessment of everyday creative achievement (Runco & Richards, 1998). Participants were required to indicate, from a list of 34 activities (e.g. Written a short story, Produced your own website, Published research, Designed and planted a garden, Composed a piece of music, etc.) those in which they had been actively involved over the past 12 months. The BICB demonstrated adequate reliability in this study (α = 0.78) and has been used to investigate creative achievement in students (Furnham et al., 2008).
(d) *Total creativity:* was assessed by taking the sum of the three creativity measures when z-scored. This allowed the examination of the relationship between a more comprehensive measure of creativity and schizotypy

3.4. Schizotypy

Multidimensional schizotypy: was assessed via the *Oxford-Liverpool Inventory of Feelings and Experiences* (O-LIFE: Mason et al., 1995) which is a self-report measure consisting of 159 items with a dichotomous response format measuring four dimensions: *Unusual Experiences*, *Introvertive Anhedonia, Cognitive Disorganisation* and *Impulsive Nonconformity*. The O-LIFE possesses good psychometric properties (Loughland & Williams, 1997) and ecological validity (Goodarzi et al., 2000; Rawlings & Goldberg, 2001; Tsakanikos & Reed, 2003).

3.5. Procedure

Participants were tested over a period of several weeks. The self-rating of creativity the BICB and the WPT data were gathered in the first week, out of the context of an investigation of creativity. The full Adjective Checklist was administered by questionnaire from which the scores for the CPS were derived in the second week. Lastly, one week later, participants were asked to fill out the O-LIFE questionnaire in their own time.

4. Results

4.1. Descriptive statistics and correlations

Means, standard deviations and the Pearson correlations between the variables in this study are presented in Table 1.

Table 1
Descriptive statistics and inter-correlations for all measures

	M	(SD)	1	2	3	4	5	6	7	8
Total creativity	0.00	2.27	.77**	.75**	.75**	.03	.29**	−.25**	−.15	.35**
1. Self-rated creativity	5.96	2.14	–	.37**	.37**	−.07	.26**	−.15	−.02	.25**
2. CPS	2.52	3.50		–	.34**	.08	.14	−.28**	−.30**	.30**
3. BICB	8.96	4.56			–	.06	.26**	−.13	−.03	.23**
4. IQ (WPT)	25.82	6.22				–	.01	−.11	−.09	.06
5. Unusual experiences	11.10	7.07					–	−.11	.40**	.50**
6. Introvertive anhedonia	4.79	3.69						–	.27**	−.13
7. Cognitive disorganisation	13.16	5.64							–	.27**
8. Impulsive nonconformity	9.49	3.81								–

Note: N = 140.
CPS, creative personality scale; BICB, biographical inventory of creative behaviours; WPT, wonderlic personnel test; Un. Exp, unusual experiences; Int. Anh, introvertive anhedonia; Cog. Dis, cognitive disorganisation; Imp. Non, impulsive nonconformity.
* p < .05.
** p < .01.

The Pearson Product Moment correlations revealed no significant relationships between IQ and the three measures of creativity and the total creativity score, confirming H1. *Unusual Experiences* was found to be significantly and positively correlated with total creativity, Self-rated Creativity and the BICB, partially confirming H2. There was a significant negative correlation between *Introvertive Anhedonia* and both total creativity and the CPS partially confirming H3. There was a significant negative correlation between *Cognitive Disorganisation* and the CPS, this was in the opposite direction to that anticipated in H4. *Impulsive Nonconformity* was found to be positively and significantly correlated with total creativity, self-rated creativity, the CPS and the BICB, confirming H5.

4.2. Multiple regressions

A series of hierarchical regressions were performed on the data to test the extent to which age, gender, IQ and schizotypy could predict differences in self-rated creativity, CPS, BICB and total creativity. In these analyses, no significant contribution was found for age, gender or IQ. Therefore, these variables were dropped for subsequent regression analyses.

In the regression to predict self-rated creativity, as shown in Table 2, only *Unusual Experiences* was significantly positively related, confirming H2.

In the regression to predict the CPS, as shown in Table 3, *Cognitive Disorganisation* was negatively related. This finding was in opposition to H4. *Impulsive Nonconformity* was positively related, confirming H5.

In the regression to predict the BICB, as shown in Table 4, *Unusual Experiences* was significantly related, confirming H2. *Cognitive Disorganisation* was significantly negatively related to the CPS in opposition to H4.

Lastly, as illustrated in Table 5, the regression to predict total creativity found both *Unusual Experiences* and *Impulsive Nonconformity* to be significantly positively related, confirming H2 and H5. *Cognitive Disorganisation* was significantly negatively related to total creativity in opposition to H4.

Table 2
Hierarchical regression: schizotypy as a predictor of self-rated creativity

	St. β	t
Unusual experiences	.23	2.27*
Introvertive anhedonia	−.07	−.80
Cognitive disorganisation	−.14	−1.44
Impulsive nonconformity	.17	1.75
$F(4, 135) = 4.35$**	Adj. $R^2 = .09$	

Note: $N = 140$.
* $p < .05$.
** $p < .01$.

Table 3
Hierarchical regression: schizotypy as a predictor of CPS

	St. β	t
Unusual experiences	.12	1.28
Introvertive anhedonia	−.12	−1.52
Cognitive disorganisation	−.40	−4.61**
Impulsive nonconformity	.33	3.89**
$F(4, 135) = 12.35$**	Adj. $R^2 = .25$	

Note: $N = 140$.
CPS, creative personality scale.
* $p < .05$.
** $p < .01$.

Table 4
Hierarchical regression: schiztypy as a predictor of BICB

	St. β	t
Unusual experiences	.25	2.45**
Introvertive anhedonia	−.05	−.51
Cognitive disorganisation	−.15	−1.60
Impulsive nonconformity	.15	1.54
$F(4, 135) = 4.10$**	Adj. $R^2 = .08$	

Note: $N = 140$.
BICB, biographical inventory of creative behaviours.
* $p < .05$.
** $p < .01$.

Table 5
Hierarchical regression: schizotypy as a predictor of total creativity

	St. β	t
Unusual experiences	.26	2.81**
Introvertive anhedonia	−.10	−1.28
Cognitive disorganisation	−.30	−3.45**
Impulsive nonconformity	.28	3.26**
$F(4, 135) = 10.96$**	Adj. $R^2 = .22$	

Note: $N = 140$.
* $p < .05$.

5. Discussion

The hypotheses in this study of schizotypal personality in relation to self-reported creativity were partially supported.

Intelligence was not found to be predictive of any of the measures of creativity, fully confirming H1. The failure to find a relationship between intellect and creativity, indicates that self-perceptions, creative personality and self-reported creative engagement in creative behaviours are not reliant on intellect. This finding is common in the literature on creativity (Batey & Furnham, 2006). However, when creativity is assessed by a performance measure, like DT, then positive relationships to intelligence are observed, even amongst university student samples (Silvia, 2008).

It was anticipated (H2) that there would be positive relationships between *Unusual Experiences* and the creativity measures. This hypothesis was partially confirmed, in that self-rated creativity, the BICB and total creativity were positively related to *Unusual Experiences*. This finding for other indices of creativity is not uncommon in the literature (Green & Williams, 1999; O'Reilly et al., 2001; Schuldberg 2000–2001). This indicates that lay or self-perceptions of what constitutes the label 'creative' are related to self-perceived unusual ideational experiences. This, in turn, may be explained with reference to the common notion that psychopathologies are indicative of genius (Ludwig, 1995) or creativity (Jamison, 1993; Lloyd-Evans, Batey, & Furnham, 2006). Further, it may be contended that the thinking style of the creative person is shared to a degree with schizophrenia and the schizotypal personality (Green & Williams, 1999). Therefore, it may then be suggested that due to the value of creativity to humankind (Runco, 2004) the genes that contribute to both schizophrenia and creativity have been preserved.

There was minimal support for the negative role of *Introvertive Anhedonia* in predicting creativity, largely failing to confirm H3. The finding that *Introvertive Anhedonia* was not negatively predictive of creativity in the regression models, indicates that self-reported creativity is not dependent upon perceived sociability and that engagement in creative behaviours is also independent of enjoyment of social and physical pleasure. In turn, the observation relating to *Introvertive Anhedonia* may be explained by the inclusion of several activities in the BICB which could be popular for

those who shun direct social contact (e.g. planning a website, writing a story or a poem, etc.). It may be that a negative relationship of *Introvertive Anhedonia* would be observed to the BICB if only socially-oriented activities were included (e.g. choreographed a dance).

There is little evidence of a relationship between *Cognitive Disorganisation* and creativity in the literature. In this study *Cognitive Disorganisation* was found to be negatively predictive of the CPS. This finding is contrary to H4. It has been hypothesised that *Cognitive Disorganisation* assesses flexible, creative cognition. However, it may be proposed that it more largely taps into mild forms of disarrayed, chaotic thinking. If so, then disorganised thinkers would unlikely be rated by faculty as creative, as was necessary as part of the validation process for the CPS. This then may explain the negative relationship to the CPS and would be unlikely to be organised and focused in order to engage in creative activities as assessed by the BICB.

There was partial support for the expected relationship, as stated in H5 between *Impulsive Nonconformity* and the creativity measures used in this study. *Impulsive Nonconformity* was found to correlate with all three measures and to be predictive of the CPS in the regressional analyses. The finding that *Impulsive Nonconformity* was not predictive in the regressions for self-rated creativity and the BICB, but significant in the correlations can be explained with reference to the shared variance between the O-LIFE dimensions, so that when the effects of the other three dimensions had been taken into account, *Impulsive Nonconformity* was not predictive. The observed relationship between *Impulsive Nonconformity* and the CPS can be explained, again, with reference to the validation process for the CPS. Those people who were observed to be more creative than their peers in the sample population, would be more likely to venture different and more challenging suggestions. These behaviours are hallmarks of the *Impulsive Nonconformity* dimension. This finding accords well with the extant literature on Psychoticism (Eysenck & Eysenck, 1975) and DT (Aguilar-Alonso, 1996; Stavridou & Furnham, 1996) and hypomania (Furnham et al., 2008).

The examination of schizotypy and total creativity, as assessed by the aggregation of the three different self-report creativity measures demonstrates a consistent relationship between schizotypy and creativity. *Unusual Experiences* and *Impulsive Nonconformity* are positively related to creativity, whilst *Cognitive Disorganisation* is negatively related. Therefore, it is possible to assert that the optimum constellation of schizotypal traits for creativity involves individuals who are prone to unusual ideation, whilst possessing a degree of impulsivity, but not perceiving themselves to be cognitively disorganised.

Overall, this study was able to demonstrate that schizotypy is able to account for variance in creativity scores. However, it is important to note that although consistent relationships were observed, the predictor variables often did not account for much variance in the three creativity measures when examined individually. This suggests that although schizotypy does predict creativity, there are clearly other important individual difference constructs, like motivation for example, that need to be accounted for.

There were a number of limitations which need be acknowledged before an examination of the implications of this study. The sample size was relatively small and the gender distribution unequal. There may be order effects, as the procedure followed was the same for all participants. Lastly, the observed significant relationships could in part be explained by method overlap, in that self-report measures predicted self-report measures.

The finding that none of the creativity variables were predicted by intelligence suggests that organisations and institutions looking to identify creative individuals should not look solely to tests of intellect. However, to more fully explore the relationships between self-reported creativity and intellect, further research is required in representative samples. The finding that schizotypal personality traits were predictive of creativity has important implications for creativity in a host of applied settings. First, it has been suggested that schizotypal symptoms are likely to be found together (APA, 2000; Loughland & Williams, 1997). This indicates that though certain features of schizotypy are predictive of creativity, creative individuals are likely to possess other schizotypal traits which would have implications for their behaviour. Elevated *Unusual Experiences* traits would be present in the holding of beliefs and values not normally found in others. *Introvertive Anhedonia* traits would suggest that creative people may be withdrawn. *Cognitive Disorganisation* traits would indicate that the creative individual might find structure, order and organisation problematic, although this study did not find evidence for this. In addition, *Impulsive Nonconformity* traits could make creative people disruptive and more prone to taking risks.

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