



Schizotypy and creativity: are self-reported measures of creativity more effective in studying the relationship than divergent thinking tests?

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ABSTRACT

Schizotypy refers to personality traits that relate to a proneness to schizophrenia and has been linked in the past to creativity (Claridge and Blakey, 2009). This has been researched using divergent thinking (DT) tests, however, self-reported measures of creativity are suggested to be superior but are not often used. The study aimed to assess the best measure of creativity in relation to schizotypy, whilst investigating a creativity-schizotypy relationship. Age was also considered. DT tests, The Biographical Inventory of Creative Behaviours (Batey, 2007) and The Creativity Styles Questionnaire-Revised (Kumar et al, 1997) measured creativity and The Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE – Short Form) (Mason et al, 2005) measured schizotypy. Sixty-seven participants (M = 23, F = 44) of all ages completed the questionnaires. Data was analysed using ANOVAs for age, and Pearson's correlations and regressions for assessing a creativity-schizotypy relationship. DT did not correlate with schizotypy whereas self-reported measures positively correlated with positive and asocial schizotypy ($p < .01$) and negatively correlated with negative schizotypy ($p < .05$). A partial age effect on schizotypy and creativity was found. In conclusion, self-reported measures are good tests of creativity in relation to schizotypy and should be included in future research, as should age and creative styles which are significant.

KEY WORDS:	SCHIZOTYPY	SELF-REPORTED MEASURES	CREATIVITY	DIVERGENT THINKING	CSQ-R
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Introduction

What is schizotypy?

Schizotypy is a construct formulated by Rado (1956) who hypothesised that many cases of schizophrenia involve a genotype that interacts with environmental influences to produce a pattern of personality traits called the schizotype (Shean, 2004). Schizotypy, then, refers to an individual's proneness to psychosis, in particular to schizophrenia (Claridge, 1997). The personality traits and symptoms of schizophrenia, schizotypal and borderline personality disorders have formed its component structure (Mason et al, 1995), which is comprised of four factors (Claridge et al, 1996). These have been described as "aberrant perception and beliefs," "cognitive disorganisation," "introvertive anhedonia" and "asocial behaviour."

There have been various scales that measure this multidimensional construct, such as Raine's (1991) Schizotypal Personality Questionnaire. However, the most comprehensive and widely used scale is the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) (Mason et al, 1995) of which the reliability and validity has recently been re-established (Mason and Claridge, 2006) and which has been constructed into a shortened form (Mason et al, 2005). The O-LIFE consists of four scales which correspond, respectively, to the four aforementioned factors of schizotypy. *Unusual Experiences* (UnEx), referred to as positive schizotypy, describes experiences not normally encountered in the normal population, e.g. hallucinations, and relates to the positive symptoms of psychosis. *Cognitive Disorganisation* (CogDis) refers to disorganised thoughts and the loosening of conceptual boundaries, relating to thought disorder in psychosis. The third scale, *Introvertive Anhedonia* (IntAn), refers to a tendency to not gain pleasure from social and physical interaction, relating to the negative symptoms of psychosis thus is known as negative schizotypy. The final scale, *Impulsive Nonconformity* (ImpNon), refers to impulsive and anti-social behaviour and a lack of control which can be known as asocial schizotypy. It is based upon the hypomania construct; however, it is sometimes not recognised in this form (Venables and Rector, 2000). The theory behind this fourth scale is that schizotypy as a concept is too restrictive so a psychosis-proneness theory that combines features of both bipolar disorder and schizophrenia, such as hypomania, may be more suitable (Mason and Claridge, 2006).

The O-LIFE has been implemented in many schizotypy studies and, in view of the long history of a connection between 'madness' and genius (Nettle, 2001), it has been used to assess a relationship between schizotypy and creativity (e.g. Burch et al, 2006).

What is creativity?

Since Guilford's (1950) address, there has been much research considering the systematic study of creativity (Mumford, 2003). Nevertheless, no single, concrete definition or standard measurement has been agreed upon; all that is acknowledged definitively is that, akin to schizotypy, it is a multidimensional construct. Even so, it seems to be widely accepted that, 'creativity involves the production of novel, useful products,' (Mumford, 2003). As multifaceted, creativity can be studied from various stances: what features define a product as creative; the biological personality and cognitive characteristics of the creative person; the environmental and socio-cultural conditions that favour creativity; and the elements that compose the creative process (Barrantes-Vidal, 2004). These perspectives lead to the constitution of various paradigmatic

approaches: psychodynamic, cognitive and social-personality approaches have all contributed to creativity theory (Sternberg and Lubart, 1999). For example, creativity has been associated with personality (Eysenck, 1993), intelligence (Miller and Tal, 2007; Sternberg and O'Hara, 1999) and knowledge (Weisberg, 1999).

It is interesting to consider the types of people and the fields within which they study, profess or work that are deemed creative. Researchers, for instance Jamison (1993), have looked solely at 'artists' as poets, painters, musicians etc, which has been criticised by Sass (2000-2001) who maintains that other fields, such as philosophy and physics, are associated with creative people also. In fact, it is a fairly recent concept that types of creativity are considered as distinct (Sass, 2000-2001; Weisberg, 2006).

As a consequence of its diversity, multiple tests are signified as necessary to measure creativity (Furnham et al, 2008). Since Guilford (1967), divergent thinking (DT) tests have been used as a measure, which can be defined as the ability to generate a broad range of ideas and is a construct thought to include components such as fluency, flexibility, originality and elaboration (Runco, 1991). DT is recognised as a good measure of creativity (Burch et al, 2006), however, Nettle (2006) found that DT was only related to artistic creativity as opposed to mathematical creativity. Additionally, Claridge and Blakey (2009) did not observe a relationship between other creativity measures and DT, confounding support for the test. Mumford (2003) has suggested that an overreliance on DT tests can be problematic for creativity research by raising method bias in theory and findings, which implies a need for other tests of creativity.

Self-reported measures of creativity are used less in comparison to DT yet it has been established that creative people possess insight into, and awareness of, their own creativity (Barron and Harrington, 1981), purporting that self-reported measures are reliable. Kumar et al (1997) intimated that self-reported measures can be seen as new measures that, 'gain a broader perspective on creativity,' (Sternberg and Lubart, 1992) which could tap into creative attitudes or opinions more than DT (Furnham et al, 2008). Measures include self-reported creative achievement inventories, which Hocevar and Bachelor (1989) state are the most defensible measure of creativity.

Developed under this theory, the Creativity Styles Questionnaire-Revised (CSQ-R) (Kumar et al, 1997) asks subjects to self-report on their creative styles. The questionnaire consists of eight scales which all refer to a person's beliefs about their creativity, the ways they are creative and the creative techniques they use: *Self-perceived creativity* (Self-perceived; 2 items), *Belief in unconscious processes* (Belief; 17 items), *Use of techniques* (Techniques; 18 items), *Use of other people* (OtherPeople; 9 items), *Final product orientation* (FinalProduct; 7 items), *Environmental/Behavioural control* (Environment; 18 items), *Superstition* (2 items) and *Use of senses* (Senses; 5 items). Creative people were found to have belief in unconscious processes, to use more techniques to be creative and to be less concerned about developing a final product. These eight scales seem to tap into all four aspects of psychometric research in creativity identified by Plucker and Renzulli (1999): creative process, personality and behavioural correlates of creativity, characteristics of creative products and attributes of creativity-fostering environment, hence it seems to test the multidimensional nature of creativity. Self-reported measures then are a good test for creativity; however, they have not been implemented in much research in relation to schizotypy hence they were employed in the present study.

'Madness' and genius

There is much evidence in the literature that psychosis, and in this case schizotypy, correlates with creativity. As the personality trait that underlies psychosis, schizotypy is suggested to share biological, emotional and cognitive features with creativity (Barrantes-Vidal, 2004), which can elucidate the type of personality that may be prone to schizophrenia. Evolutionary connections have been found (O'Reilly et al, 2001) in the sense that a relation to creativity, as an advantageous, positive gene, can explain why schizophrenia, as a negative, debilitating condition, has remained in the population, thus studying the link between the two is important. A genetic link between creativity and psychopathology has also been found (Kinney et al, 2000-2001).

In studies looking at creativity and schizotypy, positive correlations between creativity and positive schizotypy have been observed, often measured by the UnEx scale of the O-LIFE, and also between asocial schizotypy, measured by ImpNon (Batey and Furnham, 2008; Burch et al, 2006). CogDis has also been found to be positively correlated to creativity (Burch et al, 2006), however, differences between types of creativity have been found. For example, Nettle (2006) distinguished between artistic creativity (poets and visual artists) and scientific creativity (mathematicians) and found that artistic creatives scored significantly higher on UnEx and CogDis and lower on IntAn, whereas mathematicians scored significantly lower on CogDis and higher on IntAn. They reasoned that this was because mathematicians have an interest in order thus do not score as highly on DT, whereas, artists and poets are associated with more cognitive disorganisation therefore score higher on DT. These results exemplify the somewhat debatable nature of DT measures and imply that there are differences in types of creativity.

Further researchers have also perceived ambivalence of DT measures when DT did not correlate with schizotypy compared to other measures (Claridge and Blakey, 2009; O'Reilly et al, 2001; Shulberg et al, 1988). O'Reilly et al (2001) reasoned this was because DT is specifically associated with psychoticism, as a personality trait (Eysenck and Eysenck, 1976), instead of the more clinically derived concept of schizotypy. Claridge and Blakey (2009) concluded that various measures are essential for creativity as separate measures tap into different creative aspects which relate differentially to schizotypy. Through recognising this, Claridge and Blakey determined that the CSQ-R positively correlated with schizotypy on the Belief and Technique scales, which emulates Kumar et al (1997), indicating it is a competent self-reported measure of creativity in relation to schizotypy and so was included in the present study.

In using self-rated, verbal and drawing creativity as measures, Miller and Tal (2007) found positive correlations between positive schizotypy and creativity and concluded that schizotypy better predicts self-reported creativity than other measures. However, they reported that, when inclusive of intelligence and openness, these factors were better predictors of creativity in comparison to schizotypy, supporting the hypothesis that intelligence is related to creativity. Nevertheless, Burch et al (2006) measured intelligence and found no difference between artists and non-artists; in fact the difference was between genders. This was replicated by Batey and Furnham (2008) who found no correlation between intelligence and creativity and confirmed that self-perceptions, creative personality and self-reported creative engagement in creative behaviours are not reliant on intellect, thus intelligence was not included in the present study.

Despite these robust findings, all of the aforementioned studies have only used students as participants therefore they are unrepresentative of age in the general population. With regards to

the O-LIFE, Mason et al (1995) commented that it is important to take age into account as it has been shown to correlate with several aspects of schizotypy. Mason and Claridge (2006) found age differences in the O-LIFE where older participants, those over 50, on average scored lower on all scales but IntAn, which showed modest increases with age. Age was therefore taken into account in the present study, considering all ages to gain a representative sample and observe whether age has an effect on creativity in relation to schizotypy. Age may also refer to the idea that education and knowledge relates to creativity (Simonton, 1984) in that undergraduate training is at the peak of creative eminence whereas post-graduate training is associated with lower eminence. This may have implications for education, in terms of creativity, as a therapeutic treatment of schizophrenia.

Aims and Hypotheses

The primary aim of this study was to assess which measures are the best tests for creativity, in relation to schizotypy, since self-reported measures have not often been used in this way, whilst investigating the acknowledged relationship between schizotypy and creativity. Findings may highlight different measures to be considered for future research. The CSQ-R and the Biographical Inventory of Creative Behaviours (BICB) (Batey, 2007) were used as measures of self-rated creativity, and two DT tests measured creative ability. The O-LIFE – Short form was used to measure schizotypy.

Additionally, as much previous research has used students, all ages were included in the study to investigate the effect of age, plus, all types of creativity were incorporated in order to gain a wholly representative sample, i.e. the study did not specifically target poets or scientists.

It was hypothesised that:

- H1: Self-rated measures will correlate significantly more with schizotypy than DT.
- H2: There will be significant positive correlations between creativity and, individually, UnEx, ImpNon, CogDis.
- H3: There will be a significant negative correlation between creativity and IntAn.
- H4. There will be a significant main effect of age on schizotypy.

Method

Participants

Opportunistic sampling was used to recruit 67 participants (M=23, F=44) for the study, which employed a questionnaire-based observational design. The ages of participants ranged from 18-64, the mean age was 28.9 (SD=13.04). All participants were either in higher education or had been.

Measures

Firstly, a briefing form (see Appendix 1) was used to verify informed consent and make participants aware of ethical considerations, such as the right to withdraw and anonymity. The form additionally asked demographic questions, such as age, gender and degree (if applicable).

Following this, a battery of questionnaires was implemented which included three measures of creativity testing DT, self-reported creativity and creativity styles, as well as one measure of schizotypy.

- *Divergent thinking (DT)*

DT was measured using Guilford's Alternative Uses Task (1967) (see Appendix 2). Participants were told to think of as many possible uses for a brick and a newspaper. They were given 3 minutes for each object as participants often give their least creative answers in the first 2 minutes (Dow, n.d.) and 3 minutes has been implemented in previous studies (Furnham et al, 2008). The DT tasks were scored according to Guilford (1967) where scoring comprises of four components: originality (uniqueness of response), fluency (the total number of responses given), flexibility (different categories) and elaboration (of detail). However, Hocevar (1979) found a contamination problem of fluency on originality. Thus originality was scored by finding the originality score then dividing it by fluency, according to Glover et al (1989). The measure has good reliability ($\alpha = 0.74$).

- *Creativity measures*

As well as using DT to test creativity, two more creativity questionnaires were used.

The Biographical Inventory of Creative Behaviours (BICB) (Batey, 2007) (see Appendix 3) was used to determine self-assessed everyday creative achievement and consisted of 34 items describing creative activities, which participants may have been actively involved in over the past 12 months, e.g. 'Written a short story', or, 'Composed a poem'. The BICB is scored simply by totalling the number of items participants had indicated involvement in. A higher score indicated higher creativity. Good reliability has been found for this scale ($\alpha = 0.74$).

The Creativity Styles Questionnaire-Revised (CSQ-R) (Kumar et al, 1997) (see Appendix 4) was used to assess participant's own beliefs and strategies for being creative. The questionnaire consisted of 78 statements measured by a 5-point Likert scale where 1='strongly agree' and 5='strongly disagree' for the eight subscales. The questionnaire was scored according to Kumar et al (1997) who found the revised questionnaire to have good reliability across the eight subscales (median $\alpha = 0.74$).

- *Schizotypy measure*

The Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE – Short Form) (Mason et al, 2005) was used to measure schizotypy (see Appendix 5). The O-LIFE – Short Form, a self-report measure, consisted of 43 items with a dichotomous response format, 'Yes' or 'No', measuring the four previously discussed dimensions, UnEx (12 items), CogDis (11 items), IntAn (10 items) and ImpNon (10 items). The scale has good internal consistency ($\alpha = 0.77$) and was scored according to Mason et al (2005).

Procedure

Questionnaires were distributed amongst participants in small groups of between 5-10 people in a classroom setting. They were asked to read the briefing form in which they were informed of the nature of the study, that they had the right to withdraw at any time during or following the study and that all data would be kept anonymous. After giving informed consent, participants were asked to impart their age, gender, degree and e-mail address and they were given a participant number in order to obtain their own results, if so desired, after the study.

With the researcher present throughout, participants were asked to complete the two DT tasks in the allotted three minutes per task. After this timed period, they were instructed to fill out the rest of the questionnaire battery; the BICB, the CSQ-R then the O-LIFE – Short Form. Participants were then debriefed and informed that they were entitled to contact the researcher via e-mail for any further information. They were also notified that the study looked at schizotypy and that this construct measured personality yet in no way predicted schizophrenia. The scores for the three creativity measures and scores for schizotypy were then calculated, which were recorded against age and gender.

Ethics

Before conducting the study, ethical approval was gained from the Internal Psychology Ethics Committee which is in line with the British Psychological Society guidelines (see Appendix 6).

Data Analysis

Data were analysed using SPSS version 16 for Windows. To assess the hypotheses, one-way independent ANOVAs were conducted to establish if age had any significant effects on scores. Pearson's correlations were used to assess how creativity measures correlated with schizotypy and step-wise multiple regressions were performed to find out which of the creativity measures best predict schizotypy scores.

Results

Table 1 (page 9) shows the means and standard deviations for creativity and O-LIFE scores from the raw data collected which can be found in the appendix (Appendix 7).

	sex	N	Mean	SD	SE Mean
Age		67	28.90	13.04	
DT total	male	23	47.87	14.76	3.08
	female	44	34.75	18.69	2.82
Creative achievement score (BICB)	male	23	11.00	7.03	1.47
	female	44	9.70	4.77	0.72
Self-perceived	male	23	7.91	1.90	0.40
	female	44	6.84	2.00	0.30
Belief	male	23	3.00	0.50	0.10
	female	44	3.16	0.52	0.08
Technique	male	23	3.05	0.70	0.15
	female	44	3.11	0.49	0.07
OtherPeople	male	23	3.22	0.58	0.12
	female	44	3.30	0.58	0.09
FinalProduct	male	23	2.83	0.36	0.07
	female	44	2.97	0.40	0.06
Environment	male	23	2.13	0.52	0.11
	female	44	2.28	0.41	0.06
Superstition	male	23	1.54	0.88	0.18
	female	44	1.95	0.83	0.12
Senses	male	23	2.48	0.98	0.20
	female	44	2.65	0.73	0.11
UnEx	male	23	2.87	2.77	0.58
	female	44	3.89	2.45	0.37
CogDis	male	23	4.13	2.60	0.54
	female	44	6.07	2.45	0.37
IntAn	male	23	1.91	2.07	0.43
	female	44	1.55	1.59	0.24
ImpNon	male	23	3.43	2.50	0.52
	female	44	3.84	1.93	0.29

Table 1: Means and standard deviations for creativity and O-LIFE scores by gender. Initial Analysis

Independent samples t-tests were used to look for effects of gender. An effect was found on overall DT scores, $t(65) = 2.92$, $p < .005$, where males ($M = 47.87$) scored much higher than females ($M = 34.75$). An effect was also found on CSQ-R Self-perceived creativity, $t(65) = 2.12$, $p < .05$, where males again scored higher than females.

Schizotypy and Creativity - Correlations between measures O-LIFE and DT scores

There was a negative correlation between overall DT scores and CogDis, ($r = -0.242, p < .05$). No other significant correlations were found.

O-LIFE and self-reported creativity

Self-reported creativity was assessed and a significant positive correlation was found between BICB scores and UnEx, $r = .32, p < .01$ and ImpNon, $r = .27, p < .05$. CSQ-R Self-perceived also positively correlated with UnEx, $r = .28, p < .05$. Moreover in terms of the measures, BICB scores significantly correlated with CSQ-R Self-perceived scores, $r = .50, p < .01$.

O-LIFE and CSQ-R

As shown in Table 2, there were significant positive correlations between UnEx and Self-perceived, Belief, Technique and Senses. There were also significant positive correlations between ImpNon and Belief, Technique, Environment, Superstition and Senses. Unsurprisingly, there was a significant negative correlation between IntAn and OtherPeople and also Senses. IntAn also positively correlated with FinalProduct, yet, no significant correlation was found with CogDis.

CSQ-R scales

	(OLIFE)	UnEx	CogDis	IntAn	ImpNon
Self-perceived	.09	.28*	-.13	-.09	.19
Belief	.43**	.50**	.21	-.15	.47**
Technique	.40**	.50**	.13	-.06	.41**
OtherPeople	-.11	-.09	-.004	-.25*	.002
FinalProduct	.07	-.02	.07	.24*	-.05
Environment	.22	.19	.10	.03	.25*
Superstition	.20	.16	.09	-.07	.31*
Senses	.23	.44**	.01	-.27*	.31*

** $p < 0.01$

* $p < 0.05$.

Table 2: Correlations between O-LIFE scores and CSQ-R scores

Schizotypy and self-perceived creativity - Regression analyses

Regression analyses were conducted to establish which variables best predicted schizotypy (O-LIFE scores) and self-perceived creativity. Independent variables were entered into the models according to previously found significant correlations from the present study and previous research. As age and gender had a significant effect, they were included in the analyses, however, they did not account for significant variance so are not included in tables below.

Self-reported creativity

Step-wise multiple regression was used to examine the influence of DT and the most salient CSQ-R subscales on BICB, the dependent variable, as a self-reported measure of creativity.

<i>Model</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
<i>Belief</i>	.59	5.84	.001
<i>DT total</i>	.24	2.42	.02
Self-perceived	.21	1.68	.10
Technique	.18	1.56	.12
FinalProduct	-.14	-1.31	.20

Table 3: Step-wise multiple regression on BICB

It can be seen from Table 3 that the two significant predictors of BICB, thus self-perceived creativity, were Belief and DT total, (Adj $R^2 = 0.34$; $F(2,66) = 18.28$, $p < .001$), which accounted for approximately 34% of variance.

O-LIFE – UnEx

Step-wise multiple regression was used to examine the influence of positively correlated creativity measures on UnEx, as the dependent variable. Table 4 shows the two significant predictors of UnEx were Technique and Senses, (Adj $R^2 = 0.31$; $F(2, 66) = 15.54$, $p < .001$), which accounted for approximately 31% of the variance.

Model	Beta	t	Sig.
<i>Technique</i>	.39	3.58	.001
<i>Senses</i>	.30	2.70	.009
Belief	.23	1.74	.09
Superstition	.01	.11	.92
Environment	-.02	-.17	.87

Table 4: Step-wise multiple regression on O-LIFE – UnEx

O-LIFE – ImpNon

Step-wise multiple regression was used to assess the influence of positively correlated creativity measures on ImpNon, as the dependent variable. As was found in Table 5, the only significant predictor of ImpNon was Belief, (Adj $R^2 = 0.20$; $F(1,66) = 17.92$, $p < .001$), which accounted for approximately 20% of the variance.

Model	Beta	t	Sig
<i>Belief</i>	.47	4.23	.001
Superstition	.15	1.30	.20
Technique	.22	1.73	.09
Environment	.19	1.70	.09
Senses	.11	.84	.41

Table 5: Step-wise multiple regression on O-LIFE – ImpNon

O-LIFE – IntAn

Step-wise multiple regression was used to assess the influence of negatively correlated creativity measures on IntAn as the dependent variable. As was found in Table 6, the only significant negative predictor was Senses, (Adj $R^2 = 0.70$; $F(1,66) = 4.89$, $p < .05$), which accounted for approximately 70% of the variance.

Model	Beta	t	Sig
<i>Senses</i>	-.27	-2.21	0.31
OtherPeople	-.23	-1.92	.06
Age	.09	.69	.49
FinalProduct	.18	1.46	.15

Table 6: Step-wise multiple regression on O-LIFE – IntAn

Effect of age – ANOVAS

Three age-bands were created in SPSS; young (18-21), mid age (22-28) and older age (29-64). One-way independent ANOVAs were performed to establish any significant effects of age-bands on the O-LIFE and creativity scores.

There was a significant main effect of age on ImpNon, $F(2,64) = 3.223$, $p < .05$, but no significant effects on the three other subscales; however, the scores did all decrease with age, except for IntAn. There was a significant main effect of age on the overall DT score, $F(2,64) = 15.07$, $p < .001$ as can be seen in Figure 1. People in the older age group ($M = 53.24$) scored significantly higher than the young group ($M = 28.20$).

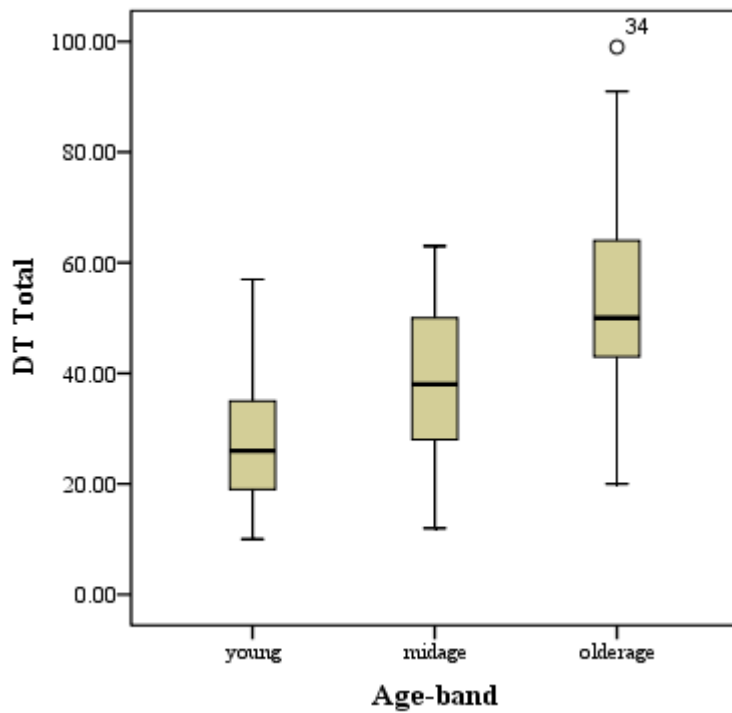


Figure 1: Box-plot to show the effect of age by age-bands on overall DT scores.

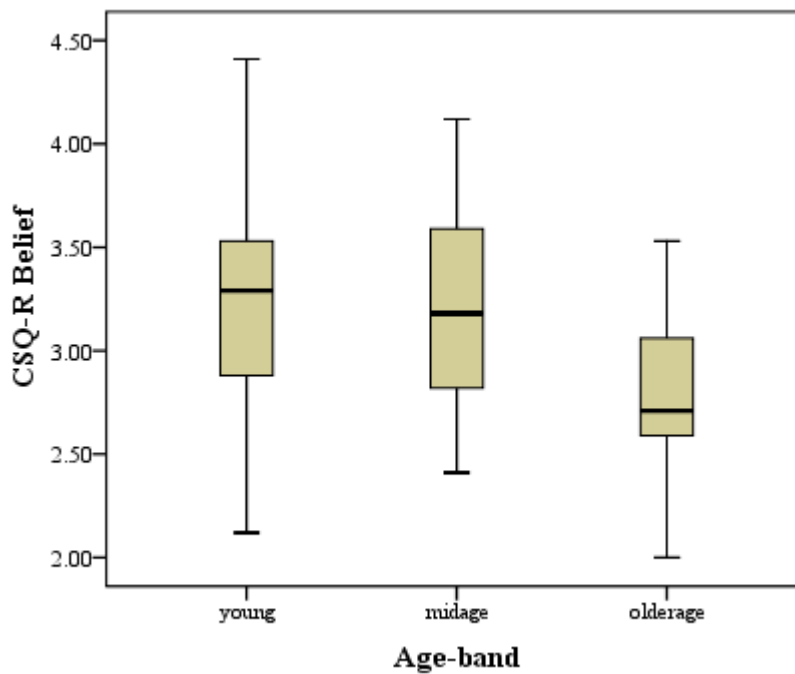


Figure 2: Box-plot to show the effect of age by age-bands on Belief, one of the most salient CSQ-R subscales.

Regarding the CSQ-R, there was a significant main effect of age on Belief, $F(2,64) = 6.296$, $p < .005$, Environment, $F(2,64) = 3.485$, $p < .05$ and Superstition, $F(2,64) = 5.29$, $p < .01$ where people in the older age group scored significantly lower than the young group, however the means are not overtly different (see Figure 2). No significant effect of age on BICB scores was found.

Discussion

This study found evidence for the hypothesis that self-reported measures are a more reliable measure of creativity in relation to schizotypy than DT tests. The main findings were that self-reported measures correlated with and predicted several elements of schizotypy, thus providing evidence of a link between creativity and psychosis, consistent with previous research. Age also had a partial effect on both schizotypy and creativity. Thus, H1, H2 and H3 were supported and H4 was partially supported.

The finding that DT did not correlate with schizotypy adds to the conflicting results of previous research and supports the claim that self-reported measures are more reliable tests of creativity. The only significant correlation between DT and schizotypy was with CogDis which was negative ($r = -.24$, $p < .05$), contrary to Burch et al's (2006) findings. This could be explained by a number of things. Firstly, it may be due to the reasoning expressed by O'Reilly et al (2001) which links with Barrantes-Vidal (2004), who found that 'hypomanics' presented higher DT than 'schizotypals,' suggesting that creative cognition is more akin to manic 'flight of ideas' than schizophrenic 'loose associations.' This suggests DT may be more suited to measuring features of bipolar disorder, as Nettle (2006) highlighted, however, if this was the case, DT may have correlated with ImpNon as the scale that measures psychosis-proneness (Mason and Claridge, 2006), yet there was no significant correlation ($r = 0.064$), confounding O'Reilly et al (2001).

Secondly, Burch et al (2006) reasoned that DT is related to the desire to shock people, i.e. antisocial responses, and that DT scores may simply reflect the willingness to voice unusual ideas rather than ability to construct unique thought. In this case, DT scores may not have correlated with schizotypy because of the formal university setting in which participants responded, thus participants were less willing to express more shocking thoughts. However, according to Burch et al (2006), older participants scoring higher on DT should have scored higher on ImpNon since this scale corresponds to anti-social behaviour yet they scored lower, which shows that DT may not measure schizotypy reliably.

Lastly, it may be due to differences in types of creativity, between artistic creativity and scientific creativity, according to Nettle (2006). Based on the assumption that artistic and scientific creativity overlap (Weisberg, 2006), this study specifically targeted the general population, not distinguishing between creative types. However, when looking at participants' degree titles (see Appendix 7), there were more scientific degree subjects ($n=44$), such as biology and psychology, compared to artistic degrees ($n=16$), such as advertising and photography. Therefore, DT scores may not have correlated as there were, unintentionally, more scientific creatives who are less associated with DT (Nettle, 2006). This reasoning may also explain Claridge and Blakey's (2009) finding that DT did not correlate with positive schizotypy as they had unequal numbers of creative types also: 47 scientists, 23 studying humanities and 8 studying social science. This also corresponds with the view that scientists relate more to convergent thinking (Claridge and

McDonald, 2009). Thus, Burch et al's (2006) finding of a positive correlation to CogDis may actually have been due to the type of creativity (visual artists and non-artists) affecting DT scores rather than schizotypy. Additionally, the statistical analyses used (2x2 MANOVA on 13 variables) may have been too simplistic in comparison to other studies, hence if post-Hoc tests, or correlation or regression analyses, had been performed a relationship may not have been found. Nevertheless, it seems that DT is a measure not wholly understood. It may be more related to measuring other psychopathologies, such as bipolar disorder, but it seems more likely that it relates differently to specific types of creativity.

On the other hand, BICB, as a self-reported measure, positively correlated with positive ($r = .32, p < .01$) and asocial schizotypy ($r = .27, p < .05$), consistent with the literature and in validation of H2, yet a negative correlation with IntAn ($r = -0.185$) was not found. This may be because, as Batey and Furnham (2008) explained, the BICB contains more individualised activities (e.g. planning a website) that correspond to, not diverge with, asocial preferences of IntAn. However, Batey and Furnham did not implement counterbalancing which may weaken their evidence and play a role in why they did not find a negative correlation between BICB scores and IntAn, as in the present study. Yet, Richards (2000-2001) found that introversion traits in the schizophrenia spectrum made subjects more likely to display creativity in less judged, socially pressured environments, such as leisure and avocational activities as opposed to work-based creativity, which may account for why a negative correlation was not found.

Nevertheless, a negative correlation was found between IntAn and creativity when measured by CSQ-R, a result that Claridge and Blakey (2009) did not observe, validating H3. Claridge and Blakey may not have observed this result as they only used students in their study and IntAn is found, as it was in the present study, to increase with age (Mason and Claridge, 2006), thus highlighting a limitation of their research. The present observed negative correlation suggests that the CSQ-R is more competent in measuring negative schizotypy than the BICB and implies that creative styles are undoubtedly significant, relating differently to different aspects of schizotypy. This is consistent with Claridge et al (1998) who commented that various types of creativity map onto different aspects of psychosis and that, even within numerous creative fields, distinctions in creative processes and styles will arise, which relate to different cognitive and personality traits. To discern which specific personality traits, personality should be included in future research, using the CSQ-R as a self-reported measure, to highlight specific creative personalities that correspond to specific traits of schizotypy, such as negative schizotypy.

Nonetheless, BICB scores correlated with CSQ-R Self-perceived ($r = 0.50, p < .01$), identifying itself as a good measure of creativity. It also corresponds to the assumption that the best predictor of future creativity is past creative behaviour (Colangelo et al, 1992). Moreover, the regression analyses showed that CSQ-R Belief and DT total were the main predictors of BICB scores which, although shows it as a good measure of creativity, it overlaps with self-reported measures. It is also surprising that DT total predicts self-reported creativity, however, this may be due to the combination of Burch et al's (2006) proposal that DT concerns the willingness to give anti-social responses and the observation that the BICB contains individualised activities which are more anti-social (Batey and Furnham, 2008).

Creativity, when measured by CSQ-R, also correlated with positive and asocial schizotypy, consistent with the literature and supportive of H2. Specifically, the two main subscales, Belief and Technique, were found to correlate with and predict schizotypy in the present study (see results),

replicating Claridge and Blakey (2009). CSQ-R Senses also positively correlated with positive ($r = 0.44, p < .01$) and asocial ($r = .31, p < 0.05$) schizotypy and negatively correlated with negative schizotypy ($r = -.27, p < .05$), and it was also the main negative predictor of IntAn. Moreover, Claridge and Blakey (2009) found Senses correlated with UnEx. These findings indicate that Senses is an important scale of the CSQ-R in relation to schizotypy so should be considered in future research. Furthermore, FinalProduct was positively correlated to ImpNon ($r = .31, p < .05$), showing that it is negatively related to creativity, which supports the idea that creative people are intrinsically motivated (Amabile, 1985). These findings show that self-reported measures found the acknowledged link between creativity and schizotypy more than DT, confirming H1, H2 and H3 and implying that self-reported measures of creativity should be used in preference to DT tests for future research.

Additionally, the two findings that CSQ-R Technique was a main predictor of positive schizotypy and that DT related to different types of creativity, are significant. Nettle (2006) suggested that the differences between artistic and scientific creativity could be found in the type of schizotypy, however this was not found in the present study. Instead, differences between measures, in relation to types of creativity, were found. This would suggest that it is the measures that relate differentially to schizotypy when measuring artistic and scientific creativity, thus rendering creativity styles as significant, as Claridge and Blakey's (2009) findings seem to show. Therefore different types of creativity should be considered in future research despite previous claims that scientific and artistic creativity are the same (Sass, 2000-2001; Weisberg, 2006).

This study also looked at the effect of age on schizotypy. Results showed that older participants scored significantly lower on ImpNon, which was not found by previous studies (Mason et al, 1995; Mason and Claridge, 2006). Yet, consistent with Mason and Claridge (2006), was the finding that all the scores for the scales decreased with age, except for IntAn which increased, partially supporting H4. However, Mason and Claridge's (2006) significant finding of IntAn with age may be due to gender differences as gender was significantly related to IntAn and they had uneven numbers of males and females in their age groups. In the present study, the numbers of males and females in the older group was reasonably even (males=10, females=11) so this effect does not seem to be confounded by gender.

As ImpNon is related to anti-social behaviour and lack of self-control, this would suggest, unsurprisingly, that older participants were more self-controlled than the younger participants who were all students. This may shed some light on the types of symptoms older schizophrenics may experience, however, there are many variables involved in the possibility of anti-social or violent behaviour following hospitalisation for schizophrenia (Hodgins, 2009). Nevertheless, including age in future studies of schizotypy may highlight important implications in personality traits for schizophrenic symptoms. Differences found suggest age is a significant, and possibly confounding, variable thus future research should not target students exclusively when measuring schizotypy. However, there were unequal numbers of age-ranges within the sample, which may have confounded these results. This occurred as age-ranges were created post-hoc thus, in further studies, specific age-ranges should be targeted a priori so that an even distribution of ages is given.

In relation to creativity, age had a significant effect on DT ($F(2,64) = 15.068, p < .001$) where older participants scored significantly higher than younger subjects. This could be related to intelligence, which has previously been linked to DT. Batey et al (2009) found that crystallised

intelligence, as representative of abilities used in the organisation and conceptualisation of information, was the most powerful predictor of DT fluency. As older participants presumably have a higher intellect, particularly in this study as many of them had post-graduate qualifications (see appendix 7), it is possible that intelligence was a confounding variable on DT scores. Crystallised intelligence, as the ability to organise information, may also explain the significant negative correlation observed between DT scores and CogDis, especially when considering differences in scientific and artistic creativity (Nettle, 2006). However, it may also be simply due to having more life experience and familiarity of using divergent thinking. Nonetheless, this finding insinuates intelligence is another component that DT measures thus it may be that it is a creative intelligence that is measured rather than an intelligence corresponding to schizotypy.

Additionally, the effect of age on DT could also be due to gender as gender also had a significant effect on overall DT scores ($t(65) = 2.92, p < .005$) where males scored higher. This was also found by Burch et al (2006), yet they had an uneven number of males and females in their study, which may also explain this finding in the present study as there were more males in the older group ($n=10$) than the younger group ($n=4$). Thus, gender should be controlled for when looking at age and DT.

The effect of age found on three subscales of the CSQ-R was contrary to DT findings as older participants scored lower than the younger group. This is consistent with the concept that self-reported measures of creativity are not reliant on intellect (Batey and Furnham, 2008) in opposition to Miller and Tal (2007). In light of this, older participants may actually score lower due to knowledge (Weisberg, 1999) and education as found by Simonton (1984). As previously mentioned, many older participants had some form of post-graduate training therefore if this is associated with lower levels of eminence, it may suggest why older participants scored lower on these self-reported scales. However, there was no age effect found on BICB scores. Additionally, when age was entered into regressions in relation to schizotypy, it was not found to be a predictor, suggesting that creativity strongly predicts schizotypy regardless of age. Nevertheless, the effects of age discussed highlight its individual influence upon both schizotypy and creativity and thus should be considered in future studies. Moreover, it emphasises differences between DT and self-reported as measures of creativity and accentuates the notion that they map onto different aspects of creativity (Claridge and Blakey, 2009), consolidating it as a multidimensional construct.

In conclusion, this study has shown that self-reported measures are better correlated to schizotypy than DT tests and that self-reported creativity is positively associated with positive and asocial schizotypy, and negatively associated to negative schizotypy. Despite these observed relationships, self-reported creativity did not account for much variance when examined individually. This suggests that other factors are involved and, as creativity styles (which relate to personality) have been recognised of importance, it seems variables such as this should be considered for future research. Additionally, the discussion of DT results shows that previously found ambivalence in DT scores relating to schizotypy is because of differences in creative styles.

In light of these findings, there were a number of limitations to be considered. There was a relatively small sample size due to restrictions of an undergraduate project, thus an unequal range of ages was studied. There were also more males in the older group than the younger, which may have confounded DT scores as older participants scored higher, although gender differences on DT have previously not been found (Baer and Kaufman, 2008; Kuhn and Hollig, 2009). There may also be superior ways to measure DT, such as only accounting for fluency (Batey et al, 2009)

which was not considered because of the contamination solution initiated in the method (Glover et al, 1989). Additionally, there may be order effects as the procedure followed was the same for all participants therefore counterbalancing should be implemented in future. Lastly, significant relationships may have been observed due to the acknowledged overlap between self-reported measures, which may ensue in methodological problems, yet this limitation does not account for the absent correlations between DT and schizotypy. These limitations should be rectified in future.

The findings of this study imply that creative styles are undoubtedly significant, situating creativity as a complex construct. To elucidate these differing styles further and to assess how they are related to schizotypy, cognitive and personality traits should be considered which could be measured by the Creative Personality Scale (Gough and Helibrun, 1980), as these seem to correspond to creativity styles (Claridge et al, 1998). Self-report measures of creativity should be used which appear to test both scientific and artistic creativity as they were both included in the present study, albeit in unequal numbers, whereas it can be seen that DT may be more exclusive in what it measures, e.g. only artistic creativity (Burch et al, 2006; Nettle, 2006). Research looking at the differences between convergent and divergent thinking in relation to schizotypy and autism (Claridge and McDonald, 2009) suggested that cognitive and personality styles relate differently to negative and positive schizotypy. It was concluded that schizotypy should be revised to include all psychotic traits and relabelled 'psychoticism' akin to Claridge (2009). More research into creative styles, then, may enlighten the concept of schizotypy. Thus, in a broader sense, creative styles could be assessed in schizophrenic patients in relation to schizotypal traits to shed light on symptoms. Creative styles could also be used diagnostically and may have implications for therapeutic treatments.

Overall, this study has shown that there are different types of creativity but that as a general rule creative people, and specifically those with a disposition of schizotypal traits, have a stronger belief in unconscious processes and use more techniques to be creative. These types of creativity are measured in different ways, which in turn relate differentially to schizotypy and it is self-reported measures that seem to map on to these various creative styles.

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