Thinking Skills and Creativity 6 (2011) 114–121

Contents lists available at ScienceDirect

Thinking Skills and Creativity

journal homepage: http://www.elsevier.com/locate/tsc

Individual difference predictors of creativity in Art and Science students

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ARTICLE INFO

Article history:
Received 30 April 2010
Received in revised form
25 September 2010
Accepted 26 January 2011
Available online 1 April 2011

Keywords:
Creativity
Divergent thinking
Intelligence
Personality
Art
Science
Domain-specificity

ABSTRACT

Two studies are reported that used multiple measures of creativity to investigate creativity differences and correlates in arts and science students. The first study examined Divergent Thinking fluency, Self-Rated Creativity and Creative Achievement in matched groups of Art and Science students. Arts students scored higher than Science students on two of the three measures. Regression analysis indicated that the educational domain demographic variable was the most consistent predictor of all three measures of creativity. The second study compared natural science, social science and arts students on two performance and two preference measures of creativity, whilst controlling for the effects of general intelligence. Results indicated only Self-Rated Creativity displayed significant group differences, with the regression analysis suggesting a stronger role of personality variables. The differences between the groups and implications for the measurement of creativity are considered.

1. Introduction

There has long been an interest in the different thinking styles of those in Arts from those in Science. This debate was structured by C. P. Snow in his 1959 lecture entitled *The Two Cultures*. He stressed the differences and poor communication between those in the sciences and those in the humanities. This debate has continued for 50 years (Cohen, 2001; de Melo-Martin, 2010; Williamson, 2011).

It was the work of Hudson (1966) that arguably stimulated psychological research in this area. Hudson (1966) was inspired by the book *Creativity and Intelligence* (Getzels & Jackson, 1962). He suggested that those with a bias towards convergent thinking moved towards the physical sciences, whilst those with a divergent thinking bias moved towards the humanities (Hudson, 1973). The book became a citation classic receiving 225 citations up to 1980 (Hudson, 1980) and many hundreds more since then.

The Hudson book and its conclusion attracted criticism (Krisbourne, 1968) but also replication and extension (Child & Smitters, 1973; Hartley & Beasley, 1969; Hocevar, 1980). Hartley and Greggs (1997) gave four groups of students: Pure arts, arts and social science, social science and science, and pure science some divergent thinking tests. The hypothesis that divergent thinking would decline along the arts – science continuum found support in that arts students as a whole scored significantly higher than science students on the four tests.

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doi:10.1016/j.tsc.2011.01.006

Researchers have tested the idea that personality and thinking style differences between arts and science students account for differences in the creativity (Haller & Courvoisier, 2010). However a recent study of 116 British undergraduates found small learning styles differences and no problem solving differences in arts and science students leading the author to conclude that modern students have a more balanced educational profile than their more specialised predecessors (Williamson, 2011).

The question of the domain specificity of creativity continues to attract attention (Kaufman & Baer, 2005) as well as the relationship between creativity and mental illness in arts and science (Claridge & McDonald, 2009; Ludwig, 1998). Baer and Kaufman (2005) noted "perhaps the reason that some researchers find significant correlations between divergent thinking test scores and actual creative performance whilst others find no relationship between the two is due to confusion about the two different meanings of divergent thinking. If we think of divergent thinking as a variety of different skills applicable in different domains, then scores on divergent thinking tests may or may not correlate with creative performance, depending on which domain is being examined and the nature of the divergent thinking test itself. If both the creative performance task and the divergent thinking test happen to focus on the same domain, they will be correlated; but if the task and the test come from very different domains, they may not be correlated at all, or they may have a very minor correlation. At the same time, it may be true that divergent thinking of *some kind* is an important contributor to creativity in virtually all domains, and in that sense divergent thinking could fairly be thought of as a general factor relevant to creative performance in all domains" (p. 318). The notion that divergent thinking is a central component of creativity is accepted by most researchers in the area (Amabile, 1996; Batey & Furnham, 2006; Kaufman, 2009; Runco, 2007), though there are many tests of divergent thinking (Kuhn & Holling, 2009; Tekin & Tasgin, 2009).

This paper aims to investigate divergent thinking as a measure of creativity in the arts and sciences, but more besides. All researchers on creativity accept problems with both the definition and measurement of creativity (Batey & Furnham, 2006; Cropley & Cropley, 2008; Kaufman, 2009). Most researchers recommend and use multiple measures of creativity of which divergent thinking is one (Furnham & Bachtiar, 2008; Furnham, Batey, Anand, & Manfield, 2008). In both studies in this paper, multiple measures of creativity will be used to examine differences between students of arts and science. However, both studies will also measure individual difference correlates of creativity.

Various studies and reviews have looked at personality correlates of creativity (Barron & Harrington, 1981; Batey & Furnham, 2008; Furnham, Crump, Batey & Chamorro-Premuzic, 2009). The two dimensions most consistently shown to relate to creativity are Psychoticism (from the Eysenckian Big 3: Extraversion, Neuroticism, Psychoticism) and Openness (from the widely accepted Big 5: Extraversion, Neuroticism, Openness, Agreeableness, Conscientiousness). It has also been established that personality traits predict, in part, along with abilities and values the courses that students choose (Furnham, 2008). Therefore, differences between creativity in the arts and sciences may be a function of differences in ability or personality or indeed thinking style which is related to both.

The two studies reported here are concerned essentially with differences in creativity across students of Arts vs Science with salient individual difference factors controlled for. However, both will also be concerned with personality and ability predictors of different measures of creativity. Whilst there is general agreement about the psychometric validity of cognitive ability and personality tests used in this study, there is less agreement about the validity of all creativity tests. Hence, in both studies, more than one creativity test is used.

This is also a two-study paper to attempt to replicate results over slightly different populations and using different tests.

It should be recorded that classifying disciplines as arts and science is not always that simple. For instance economics or sociology could be classified as either depending on what is taught and how it is taught. Further some students change course from a science to an arts discipline or do a combined subject degree like French and Engineering which combines both arts and science. This is a limitation of most studies that attempt to contrast arts and science groups that are heterogeneous in the sense that they have people from both arts and science.

2. Study 1

The first study utilised three commonly used measures of creativity (Divergent Thinking, Self-Reported Creativity and Creative Achievement), one of personality (Big Five) and two groups (Art and Science). This study had three hypotheses all based around the three creativity measures and one with respect to personality.

H1: Art students will score significantly higher on the DT Fluency test than Science students.
H2: Art students will score significantly higher on the Self-Reported Creativity measure than Science students.
H3: Art students will score significantly higher on the Creative Achievement measure than Science students.
H4: Openness will be the strongest personality correlate of all three measures of creativity.

2.1. Method

2.1.1. Participants

Participants were 108 adult undergraduate students (81 females and 27 males) aged between 18 and 56 (mean = 22.80; SD = 6.48). The students were from Imperial College London, University College London and University of the Arts. Sixty-five participants (51 females and 14 males) were completing their education in the field of science (Natural, Biological and Social