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Self-Reported Differences in Creativity by Ethnicity and Gender

JAMES C. KAUFMAN*

Learning Research Institute, California State University at San Bernardino, USA

SUMMARY

Creativity assessment has been proposed as a supplement to intellectual testing, in part because of reduced differences by ethnicity; creativity testing might also specifically help reduce stereotype threat. Recent trends in creativity research point to a domain-specific view challenging the more traditional generalist view. With these trends in mind, the current study assessed creative self-perceptions of 3553 students and community members in 56 different possible domains distributed across five factors (as determined by principal components analysis). African Americans were less likely to fall prone to gender stereotypes in creativity. In addition, African Americans and Native Americans tended to rate themselves as more creative than other ethnicities. Specific trends in the factors and implications for future research are discussed. Copyright © 2006 John Wiley & Sons, Ltd.

Minority students are both historically and currently very under-represented in gifted programs, making the identification and nurturance of gifted minority students an essential task (Gordon & Bridglall, 2005; Kaufman & Sternberg, in press). The primary way that students are identified as being gifted, however, is through standardized tests. Critics of standardized cognitive tests point to significant differences that occur between ethnic groups on various tests of aptitude or ability.

Indeed, a wide variety of measures of intelligence and ability have shown lower scores for African Americans and Hispanic Americans than for European Americans (see Kaufman & Lichtenberger, 2006; Loehlin, 1999, for overviews). Standardized tests such as the SAT, ACT, GRE, and AP exams show similar ethnic differences (Camara & Schmidt, 1999; Morgan & Maneckshana, 1996). In addition, males tend to outscore females on the SAT, GRE, and GMAT, particularly on the quantitative sections (Coley, 2001).

One of the common alternates or supplements proposed to ability or achievement tests is creativity (see Kaufman, 2005; Sternberg, 2003). Indeed, creativity is an important component of most major theories of intelligences, including Guilford's (1967) Structure of Intellect model, as divergent production; the Cattell-Horn-Carroll (CHC) model (see McGrew, 2005), as an array of narrow abilities subsumed under the broad ability of Long-Term Storage and Retrieval or Glr (e.g. Ideational Fluency, Associational Fluency, and Originality/Creativity); and Sternberg's (1996) Triarchic theory of Successful Intelligence.

*Correspondence to: James C. Kaufman, Department of Psychology, Learning Research Institute, California State University at San Bernardino, 5500 University Parkway, San Bernardino, CA 92407, USA.
E-mail: jkaufman@csusb.edu

Although creativity has been found to be significantly associated with psychometric measures of intelligence (especially verbal intelligence), this relationship is not a particularly strong one (see Barron & Harrington, 1981). Creativity's correlation with IQ is maintained up to a certain level (often reported to be approximately an IQ of 120), but the relationship is not strong at higher levels of ability (Fuchs-Beauchamp, Karnes, & Johnson, 1993; Getzels & Jackson, 1962; Harris, 2004). A recent study has delved deeper into the intelligence-creativity relationship by specifically examining fluid versus crystallized intelligence. Crystallized intelligence (the breadth and depth of a person's accumulated knowledge of a culture and the ability to use that knowledge) showed the same relationship to creativity as past studies. In contrast, fluid intelligence—the ability to apply a variety of mental operations to solve novel problems—shows the *opposite* pattern. IQ and creativity were significantly correlated for the high IQ group, but they were not significantly correlated for people with average IQs (Sligh, Conners, & Roskos-Ewoldsen, 2005).

CREATIVITY ACROSS ETHNICITIES: WHAT WE KNOW

If creativity or other related non-cognitive constructs are highly correlated to traditionally conceived measures of intellectual abilities, then the same ethnicity differences would also likely be found on these measures as on the common IQ test. Studies of the magnitude or scope of the intelligence studies have yet to be conducted, but the last 25 years have seen many smaller studies take place that form a compelling argument: that there are few significant differences in creative abilities across ethnicities (Kaufman, 2005).

Most creativity researchers have found few differences between African Americans and European Americans. These findings have been fairly consistent regardless of the type of measurement. The Torrance Tests of Creative Thinking (TTCT; Torrance, 1966, 1974) and other divergent thinking measures, with verbal and figural forms, have been used extensively in these studies (e.g. Glover, 1976; Iscoe & Pierce-Jones, 1964; Kaltsounis, 1974; Knox & Glover, 1978; Torrance, 1971, 1973). Other studies that found no differences have used questionnaires measuring creative accomplishments (Stricker, Rock, & Bennett, 2001) and have looked at the ability to be trained on creativity tasks (Moreno & Hogan, 1976). Kaufman, Baer, and Gentile (2004) studied poems, stories and personal narratives written by African American and European American 8th grade students. There were no differences in creativity scores assigned by expert judges.

Indeed, some of the only differences that have been found tend to favour African Americans. Torrance (1971, 1973) found that African American children scored higher on the TTCT than European American children on the Figural tests in fluency, flexibility and originality; European Americans scored higher on Figural elaboration and all Verbal subtests. The initial sample compared African American children in Georgia with higher-socioeconomic status children in Minnesota; when a subsequent study used European Americans also from Georgia, all differences were significantly reduced. Kaltsounis (1974) also found that African Americans received higher fluency and originality scores on the TTCT. Troiano and Bracken (1983) gave measures of creative thinking to three kindergarten classes (Dutch Americans, African Americans and Native Americans). They found that African Americans and Native Americans scored approximately one standard deviation higher on creative thinking, particularly in fluency, than the Dutch Americans.

Studies of creativity in Hispanic Americans and European Americans tend to find different results depending on whether the creativity measure is verbal or non-verbal. For

example, Argulewicz and Kush (1984) found that European Americans scored higher than Hispanic Americans on three of four TTCT Verbal forms, but found no significant differences on the Figural forms. Studies using only non-verbal assessments have typically found no differences (e.g. Argulewicz, Elliott, & Hall, 1982) or show a slight advantage for bilingual Hispanic Americans (Kessler & Quinn, 1987; Price-Williams & Ramirez, 1977).

Results are less clear for Asian Americans. Artwork produced by American college students was rated as more creative than art produced by Chinese students by both American and Chinese raters (Niu & Sternberg, 2001). Yet a similar study that compared American and Chinese drawings of geometric shapes found that the two groups were rated similarly for creativity by both American and Chinese raters (Chen et al., 2002). There were no differences in rated artwork between Chinese and British school children, except for the higher ratings earned by Chinese children who attended a weekend art school (Cox, Perara, & Fan, 1998). Another study found Japanese children produced higher rated drawings than British children (Cox, Koyasu, Hiranuma, & Perara, 2001).

Studies of the TTCT often show Western cultures outperforming Eastern cultures. American college students scored higher on the TTCT than Japanese college students in one study (Saeki, Fan, & Van Dusen, 2001), and Americans from five different age groups scored higher than similar individuals from Hong Kong (Jaquish & Ripple, 1984). School children in Hong Kong scored higher on the Figural form of the TTCT than their counterparts in Taiwan, Singapore and America, but lower than German children; on the Verbal form, the results were in the opposite order (Rudowicz, Lok, & Kitto, 1995). Malaysian students scored higher than American, Indian and Hungarian students on one self-report measure of creativity, but American students scored higher than Malaysian students on a different self-report measure (Palaniappan, 1996).

However, fewer studies have compared Asian *Americans* to Americans of different ethnicities. Rostan, Pariser, and Gruber (2002) studied Chinese American and European American students' artwork, with two groups in each culture: students with additional art training and classes and students with no such classes. Each group's artwork (one drawing from life and one drawing from imagination) was judged by both Chinese and American judges. There were no significant differences between cultures from either set of judges, only between art students versus non-art students. Niu and Sternberg (2003) found no significant differences on collage-making and drawing tasks between Asian American students and non-Asian Americans. Chen et al. (2005) studied Asian Americans and non-Asian Americans and found no differences in measures of verbal, mathematical and artistic creativity.

CREATIVITY ACROSS GENDER: WHAT WE KNOW

Most studies have found no gender differences in creativity, and those that have found differences have not found any consistent pattern of differences (Baer, in press; Baer & Kaufman, 2006; Kogan, 1974). For example, one repeated finding has been to find females scoring higher on verbal and males scoring higher on figural creativity (DeMoss, Milich, & DeMers, 1993; Fichnova, 2002). Yet the exact opposite results have been found elsewhere (e.g. Chan et al., 2001; Dudek, Strobel, & Runco, 1993).

CREATIVITY ACROSS ETHNICITIES AND GENDER: WHAT WE STILL NEED TO KNOW

As can be seen by the review of what we know about creativity across ethnicities, most studies have used the TTCT, which limits the study of creativity to two domains (verbal and figural). There is a continuing and unresolved dispute among creativity researchers regarding the validity of divergent thinking tests. Many of these debates focus on whether creativity can truly be measured across one or two domains (Baer, 1993; Plucker, 1999), and whether the complex construct of creativity can be measured validly by 'narrow' psychometric tests (e.g. Baer, 1994; Clapham, 2004).

The future of creativity testing—which might make it a viable supplement for gifted programs to adopt as an admissions tool—may well lie with measuring creativity in multiple domains to get a fuller picture of the individual's strengths (see Kaufman & Baer, 2006). The obvious question then becomes: Which domains should be used?

There are many possible ways of selecting which domains to use. One way could be to select those domains that may help reduce stereotype threat. Many studies have found evidence that individuals feel stress when placed in a situation where they run the risk of confirming a negative stereotype about their group (e.g. ethnicity). This stress often causes poor performance (Steele, 1997; Steele & Aronson, 1995). Stereotypes about intelligence are widely known, even among people who are targets of the stereotypes and who do not endorse them (Devine, 1989). Whereas there are stereotypes about creativity (e.g. the stereotype of the mad genius; see Kaufman, 2001), these stereotypes tend not to focus on ethnicity. People who may experience stereotype threat with a traditional assessment of intellectual abilities may avoid this stress in creativity-related assessments.

If we find out how different ethnicities perceive their own creativity across multiple domains, then we can find out where possible stereotype threat may occur. It is the goal of this study, therefore, to assess a wide group of individuals across different ethnicities on a self-report measure of creativity. In this measure, the individuals will be asked to estimate their own creativity across a large number of domains. The domains that show no difference (or domains that show under-represented groups excelling) may warrant a closer look for inclusion in eventual creativity tests.

METHOD

Participants

A total of 3553 people participated in the study. The majority of the participants were college students, as follows: 1848 students were recruited from psychology classes at a California university, 321 students were recruited from education classes in a New Jersey university, 71 students were recruited from theatre classes in a California university, 64 students were recruited from history classes in a Massachusetts university and 58 students were recruited from advanced biology classes in a California university. In addition, the following groups (all in California) were recruited to complete the survey: 532 members of two local churches, 282 high school students, 122 people randomly asked in front of a movie theatre and in a mall, 94 nurses, 79 school teachers, 42 professional psychologists with an advanced degree and 40 counsellors working at a group home.

Students were recruited by flyers and by researchers speaking to classes. Some students received extra credit for their participation. Non-students were recruited by student

Table 1. Breakdown of gender and age by ethnicity

	Males	Females	Mean age
European American	349	1069	26.0
African American	222	531	31.4
Hispanic American	214	636	23.9
Asian American	54	158	25.1
Native American	20	41	30.0
Mixed Ethnicity	59	139	24.2
Total	918	2574	26.6

assistants who knew people who worked at the respective places (hospital, school, etc.), and obtained permission to distribute and collect flyers.

Based on self-report, there were a total of 1418 European Americans, 754 African Americans, 855 Hispanic Americans, 216 Asian Americans, 61 Native Americans and 199 participants of mixed ethnicity. Fifty participants did not list their ethnicity. There were 924 males and 2583 females, with 46 participants not listing gender. The mean age was 26.5, with a standard deviation of 10.9 years (age range = 14–86 years). Table 1 presents a breakdown of gender and age by ethnicity.

Materials

Participants completed the Creativity Domain Questionnaire (see Appendix 1) and demographic questions. The domains were an extension and expansion of the domains studied in an earlier study (Kaufman & Baer, 2004). For the 56 domains, participants rated their creativity on a 1 to 6 scale, as follows: Not at all creative (1), Not very creative (2), A little creative (3), Somewhat creative (4), Very creative (5), and Extremely creative (6). They were also given the opportunity to mark Not applicable, which was scored as missing data.

Participants used their own definitions or concepts of creativity, which is consistent with Amabile's (1996) work on creativity ratings. Indeed, layperson perceptions of creativity tend to vary little from expert opinions (e.g. Sternberg, 1985).

The demographic information included gender, ethnicity, age, and level of education (Some high school, Completed high school, Some college, Completed college, Some post-college and Completed post-college).

RESULTS

A Principal Components analysis was conducted to identify the meaningful constructs that underlie the 56 domains listed in Appendix 1. Varimax Normalised rotation was conducted with an eigenvalue of 1.0 used to identify meaningful components or factors. In the initial analysis, 11 factors emerged. A decision was made to increase the eigenvalue requirement to 1.5 for two reasons. First, because of the large number of variables, it is possible that an eigenvalue of 1.0 could emerge by chance. Second, the initial analysis of 11 variables was not interpretable from a theoretical perspective. Using an eigenvalue of 1.5, five factors emerged, as shown in Table 2. Loadings of 0.40 and above are in bold. The science-analytic factor included all elements of math and science, as well as general analytic thinking. The

Table 2. Factor analysis using principal components analysis and varimax normalized rotation

	Factor				
	1	2	3	4	5
Domain	Science	Social	Visual art	Verbal art	Sports
Accounting	0.38	0.26	0.03	−0.10	0.12
Acting	0.03	0.15	0.38	0.36	0.30
Advertising	0.22	0.19	0.30	0.17	0.23
Algebra	**0.59**	0.07	0.00	−0.11	0.06
Animals (working with)	0.18	0.15	0.20	0.22	0.08
Architecture	0.36	−0.01	**0.48**	0.10	0.10
Ballet	0.05	0.10	**0.48**	0.16	0.17
Business	**0.44**	0.17	0.14	0.13	0.18
Chemistry	**0.66**	−0.09	0.11	0.07	0.04
Computers	**0.50**	0.07	0.18	−0.04	0.08
Cooking	0.10	0.31	0.38	−0.08	−0.05
Crafts	0.07	0.15	**0.66**	0.01	−0.12
Earth Science	**0.54**	0.02	0.20	0.12	−0.09
Emotions	−0.05	**0.50**	0.20	0.17	−0.13
English	0.10	0.30	0.14	**0.49**	−0.14
Fashion	0.01	0.20	**0.58**	0.11	0.05
Film	0.12	0.07	**0.44**	**0.43**	0.12
Geometry	**0.43**	0.01	0.03	−0.04	0.03
Graphic Design	**0.42**	−0.02	0.39	0.11	0.14
History	**0.45**	0.02	0.04	0.32	0.01
Horticulture	0.34	0.14	0.32	0.15	−0.10
Humor	0.07	0.29	0.17	0.21	0.26
Interacting with children	−0.17	**0.59**	0.25	−0.10	0.06
Interact with friends/family	−0.21	**0.63**	0.21	−0.11	0.07
Interacting with strangers	−0.03	**0.55**	0.20	0.06	0.12
Interior design	0.03	0.26	**0.63**	0.04	−0.06
Law	**0.46**	0.11	0.10	0.23	0.10
Life sciences	**0.64**	0.02	0.07	0.13	−0.05
Logic	**0.54**	0.29	0.01	−0.10	0.01
Mechanical	**0.59**	0.11	0.13	0.03	0.15
Medicine	**0.56**	0.04	0.15	0.17	−0.01
Music composition	0.22	−0.07	0.32	0.37	0.29
Natural sciences	**0.53**	0.08	0.07	0.23	0.03
Painting	0.17	0.07	**0.55**	0.12	0.06
Personal problems	0.08	**0.67**	0.03	0.07	0.01
Personnel management	0.16	**0.52**	0.10	0.10	0.23
Photography	0.10	0.23	**0.42**	0.15	0.12
Physics	**0.60**	−0.12	0.07	0.20	0.12
Playing music	0.20	−0.05	0.23	0.33	0.24
Political science	**0.52**	0.01	−0.07	0.32	0.13
Problem solving	0.38	**0.46**	−0.07	0.09	0.02
Psychotherapy	0.23	**0.45**	−0.01	0.31	−0.12
Social science	0.22	**0.48**	−0.03	0.28	−0.20
Spatial visual	0.25	**0.43**	0.15	0.10	0.08
Speech	0.16	**0.45**	0.04	0.37	0.17
Spirituality	0.09	**0.41**	0.05	0.26	0.12
Sports performance	0.17	0.18	0.04	0.03	**0.75**
Sports strategy	0.21	0.16	0.03	0.05	**0.75**

(Continues)

Table. 2 (Continued)

	Factor				
	1	2	3	4	5
Domain	Science	Social	Visual art	Verbal art	Sports
Teaching	−0.02	**0.50**	0.17	0.05	0.10
Textiles	0.17	0.11	**0.47**	0.16	−0.01
Travel	0.10	0.38	0.23	0.21	0.02
Vocal performance	0.11	−0.01	0.33	**0.42**	0.25
Wood or metal working	**0.43**	−0.06	0.26	0.19	0.23
Writing fiction	0.10	0.18	0.15	**0.71**	−0.02
Writing non-fiction	0.10	0.20	0.07	**0.70**	−0.02
Writing Poetry	0.06	0.14	0.23	**0.64**	0.10

Factor loadings of 0.40 and greater are in bold.

social-communications factor included domains such as emotions and interacting with people. The visual-artistic factor has both elements of handicraft (such as crafts and textiles) and traditional art (such as painting and photography). The three writing variables and other related domains loaded on the verbal-artistic factor. The sports factor consisted solely of the two sports-related domains.

Factor scores were then computed for each person by averaging the mean of that person's ratings on all domains contained within a factor. So, for example, factor scores for the science-analytic factor were computed by adding up the person's ratings on the 17 domains that loaded at 0.40 or higher, and then taking the mean score of those domains. As noted, 'Not applicable' ratings were permitted and treated as missing data. Missing data were excluded from the computation of mean scores. Therefore, factor scores for some people on the science-analytic factor, for example, were based on fewer than the 17 items that loaded 0.40 or higher. Because the sports factor was composed of only two items, the factor scores were not computed for individuals with missing data on either item. For this factor, the sample size was reduced to 3144 for all analyses that involved comparison of factor scores.

A MANOVA was conducted on the effect of gender and ethnicity on the factor scores. The main effect for ethnicity was significant [$F(25, 12\,127) = 13.04$, $p < 0.01$],.the main effect for gender was significant [$F(5, 3264) = 39.71$, $p < 0.01$], and the interaction was significant [$F(25, 12\,127) = 4.47$, $p < 0.01$]. Follow-up univariate ANOVAs examined the interaction of gender and ethnicity on factor scores and found a significant interaction at $p < 0.01$ in science-analytic and visual-artistic, and a significant interaction at $p < 0.05$ in the other three factors. Post hoc tests of Tukey's Honestly Significantly Differences ($p < 0.01$) were conducted for all five factors. Results for ethnicity are shown in Table 3 and results for gender are summarised in Table 4. As can be seen in Table 3, African Americans tended to rate themselves higher than other ethnicities on all factors, and Asian Americans tended to rate themselves lower than other ethnicities on all factors. Native Americans rated themselves significantly higher than other ethnicities on the science-analytic factor. As shown in Table 4, women rated themselves higher than men on social-communication and visual-artistic and men rated themselves higher than women on science-analytic and sports.

Table 3. Differences by ethnicity using mean factor scores

Factor	European American	African American	Hispanic American	Asian American	Native American	Mixed Ethnicity
Science	2.89	3.41[a,c,d,f]	2.90	2.96	3.26[a,c,d,f]	2.88
Social	3.97[d]	3.99[d]	3.92[d]	3.67	3.88	3.90[d]
Visual art	3.23	3.66[a,c,d,f]	3.29	3.24	3.43	3.33
Verbal art	3.15	3.71[a,c,d,f]	3.06	3.06	3.32	3.22
Sports	3.54	3.79[a,d]	3.58	3.28	3.95	3.60

[a]The mean difference is higher than European Americans at the 0.01 level.
[b]The mean difference is higher than African Americans at the 0.01 level.
[c]The mean difference is higher than Hispanic American at the 0.01 level.
[d]The mean difference is higher than Asian American at the 0.01 level.
[e]The mean difference is higher than Native American at the 0.01 level.
[f]The mean difference is higher than Mixed Ethnicity at the 0.01 level.

Table 4. Differences by gender using mean factor scores

Factor	Males	Females
Science	3.24[b]	2.86
Social	3.79	3.99[a]
Visual art	3.24	3.48[a]
Verbal art	3.22	3.29
Sports	4.06[b]	3.43

[a]The mean difference is higher than males.
[b]The mean difference is higher than females.

Table 5 presents the results from the interaction between gender and ethnicity. As can be seen, African Americans were more likely to rate themselves higher in non-gender stereotypic ways across all factors. In other words, African American men were more likely to rate themselves high on factors showing a gender difference in favour of women, and African American women were more likely to rate themselves high on factors showing a gender difference in favour of men.

DISCUSSION

There are a few striking findings from this study. One notable trend is that African Americans in this study were less likely to fall prone to gender stereotypes than were other ethnic groups. The visual-artistic factor is stereotypically female and was generally rated higher by women than men, yet African American men rated themselves as significantly more creative in these areas than European American, Hispanic American and Asian American men. The science-analytic and sports factors are stereotypically male and were generally rated higher by men than women. Yet African American women rated themselves higher than European American, Hispanic American and Asian American women. Native American women also rated themselves as more creative on the science-analytic factor.

This finding is supported by the research on gender stereotyping across ethnicity. Several studies have found that African Americans are less likely to use traditional gender stereotypes than European Americans (Millham & Smith, 1981; Smith & Midlarsky, 1985).

Table 5. Tukey's honestly significant difference post hoc tests for gender × ethnicity interaction using mean factor scores

	Male	Female
Science analytic		
European American	3.16[g,i,j,l]	2.61
African American	3.55[a,c,f,g,h,i,j,l]	3.28 [g,i,j,l]
Hispanic American	3.17 [g,i,j,l]	2.63
Asian American	3.23 [g,i,j,l]	2.70
Native American	3.24[g]	3.28 [g,i,j,l]
Mixed Ethnicity	3.09[g,j]	2.68
Social communication		
European American	3.88	4.06[a,c,j]
African American	3.97[j]	4.02[j]
Hispanic American	3.82	4.02[j]
Asian American	3.70	3.64
Native American	3.64	4.13[j]
Mixed Ethnicity	3.72	4.07[j]
Visual artistic		
European American	3.00	3.46[a,c]
African American	3.66[a,c,d]	3.65[a,c,d,f,g,i,j]
Hispanic American	3.13	3.45[a,c]
Asian American	3.13	3.35[a]
Native American	3.29	3.57[a]
Mixed Ethnicity	3.23	3.43[a]
Verbal Artistic		
European American	3.09	3.20[i]
African American	3.75[a,c,d,f,g,i,j]	3.67[a,c,d,f,g,i,j]
Hispanic American	3.16	2.97
Asian American	3.12	3.01
Native American	3.11	3.53
Mixed Ethnicity	3.07	3.37[i]
Sports		
European American	4.02 [g,i,j,l]	3.38
African American	4.02 [g,i,j,l]	3.69[g,i,j]
Hispanic American	4.19[g,h,I,j,l]	3.36
Asian American	3.94[j]	3.03
Native American	4.33[j]	3.73
Mixed Ethnicity	3.95[j]	3.43

[a]The mean difference is higher than European American males.
[b]The mean difference is higher than African American males.
[c]The mean difference is higher than Hispanic American males.
[d]The mean difference is higher than Asian American males.
[e]The mean difference is higher than Native American males.
[f]The mean difference is higher than Mixed Ethnicity males.
[g]The mean difference is higher than European American females.
[h]The mean difference is higher than African American females.
[I]The mean difference is higher than Hispanic American females.
[j]The mean difference is higher than Asian American females.
[k]The mean difference is higher than Native American females.
[l]The mean difference is higher than Mixed Ethnicity females.

It is argued that one reason behind this trend is in many African American families, children are grouped together more by age or ability than by gender. In other words, boys and girls may be more likely to play together or be taught together. Masculinity and femininity are often seen as working in tandem (Dade & Sloan, 2000).

A second finding is the exploration of significant differences and similarities in creativity self-perception across domains. African Americans rated themselves as significantly higher than at least one other ethnicity on all factors. All ethnicities except for Asian Americans rated themselves higher than another ethnicity on at least one factor. Each gender rated itself higher on two factors. All ethnicities and both genders gave higher scores to the social-communication factor and lower scores to the science-analytic factor.

Males and females tended (with the earlier noted exception of African Americans) to assess their creativity across traditionally stereotypic lines. Females rated themselves higher on social-communications and visual-artistic, while males rated themselves higher on science-analytic and sports. The only factor that did not show a significant difference was verbal-artistic, in part because the components of the verbal-artistic factor are more split between traditional male and female domains. For example, writing poetry is a domain traditionally associated with females or feminine qualities, whereas writing non-fiction is a domain traditionally associated more with males. Similar gender stereotypes were found in Costa, Terracciano, and McCrae's (2001) deeper analysis of the components behind Openness to Experience.

It is important to note that it is unknown if people conceived of creativity as the same construct across all domains. People may have had a difficult time imagining what it meant to be creative in certain domains (such as the sciences). In addition, some people may have conflated their skill in a domain with their creativity in that domain. Another possibility is that some people or groups simply showed a tendency to use the lower or upper ends of the Likert scale. For example, African Americans may have simply been more likely to use the upper end of the Likert scale and Asian Americans may have been more likely to use the lower end of the Likert scale.

Taken together, the findings discussed here offer support to the idea that a sophisticated creativity measure that incorporates multiple domains could increase fairness as a supplement to intellectual assessment. Much of what will now be discussed will focus on creativity and ethnicity, in part because the question of fairness in intellectual assessment is more salient in this area.

The literature discussing African American creativity has already been highlighted, including some findings that point to higher creativity in African Americans (e.g. Torrance, 1971, 1973; Troiano & Bracken, 1983). Issues of self-esteem and academic self-concept would also seem to be related to self-perceptions of creativity, and there have been studies on ethnic differences in these areas. African Americans have been shown to have both higher academic self-concept and higher self-esteem than European Americans (Cokley, 2002) and Hispanic Americans (Negy, Shreve, Jensen, & Uddin, 2003). In addition, African Americans may have a cultural value of, and tendency toward, creativity. Shade's (1986) research with cognitive style tests found that African Americans were more likely than European Americans to be spontaneous, flexible and open-minded. In contrast, European Americans were more regulated and structured. Open-mindedness has been often linked with creativity, including as measured with self-report (Griffin & McDermott, 1998).

It is interesting to note the strong rating on the science-analytic factor by Native Americans. There has been very little work on creativity in Native Americans. Although programs to better assess Native American creativity were proposed nearly 20 years ago (Tonemah, 1987), the number of studies in this area remains small. Abernathy-Tannehill (1998) found that members of the Cherokee tribe had comparable scores to the norms on the TTCT and other psychometric creativity tests. Frank (2001) studied creativity in the

Kootenai Indian nation, and one of the four creativity perceptions she found was that creativity should come from nature. This finding is certainly consistent with the higher Native American self-ratings on the science-analytic factor.

African Americans and Native Americans tended to rate themselves as more creative and European Americans and Asian Americans tended to rate themselves as less creative in the present study. This trend is consistent with results of creativity tests. Perhaps of more interest, however, is that this trend is, in general, *opposite* to the results of traditional intelligence tests (in which European Americans and Asian Americans tend to earn higher scores). Layperson theories of creativity tend to de-emphasize analytical abilities, which are usually associated more with IQ tests, and emphasise more such characteristics as unconventionality, inquisitiveness, imagination and freedom (Sternberg, 1985). Members of ethnicities that have traditionally scored lower on IQ tests may experience 'disidentification' in this domain—in other words, they gradually remove this domain (in this case, analytic and other 'IQ test' type abilities) from their conception of self (Crocker & Major, 1989; Steele, 1997). Instead of identifying themselves with these types of abilities, some people may instead identify themselves with other important cognitive abilities that are not associated with IQ tests—such as creativity. Being able to tap into these abilities may be one way to combat the aforementioned problem of stereotype threat.

If intelligence or achievement tests were to incorporate creativity in some manner, then two positive outcomes might occur. First, stereotype threat may be reduced in traditionally underperforming groups, allowing test scores to better reflect a person's actual abilities. Second, based on past performance-based research, there would likely be fewer differences by ethnicity on creative-oriented tasks.

It is important to note that self-perceptions of creativity are not the same thing as actual creativity, and this distinction limits the degree to which the results of this study can be applied directly to the notion of fairness. Self-report measures tend to correlate highly with each other (e.g. Fleenor & Taylor, 1994; Goldsmith & Matherly, 1988; Kaufman & Baer, 2004). However, studies that examine self-report measures of creativity with performance or psychometric measures of creativity have found varied results. Lee, Day, Meara, and Maxwell (2002), for example, used three measures of creativity (verbal, pictorial and self-report), and found little relationship among the three measures. Park, Lee, and Hahn (2002), however, found self-reported creativity to significantly correlate with all scores on the Torrance Tests of Creative Thinking except for fluency.

It is also worth pointing out that any discussion that compares self-perceptions of creativity with actual performance on IQ tests is not ideal. However, the relationship between self-report and measured intelligence is a stronger one than the relationship between self-report and measured creativity. The correlations between perceived and actual intelligence typically range from 0.30 to 0.50 (e.g. Chamorro-Premuzic, Furnham, & Moutafi, 2004; Furnham & Chamorro-Premuzic, 2004; Paulhus, Lysy, & Yik, 1998). Unfortunately, there have been no studies that specifically look at self-rated intelligence or analytic ability across race/ethnicity in the United States. Furnham, Callahan, and Akande (2004) studied White and Black South Africans and found that Whites gave higher estimates for their own intelligence, as well as their parents' and siblings' intelligence, than Blacks.[1]

[1]Whites and Blacks are used here instead of European American and African American because these participants were not American; I am using the same categories used in the paper.

Research on gender and self-reported intelligence is consistent with the current results on gender and self-reported creativity. Across several different cultures, women tend to rate themselves lower on general intelligence and spatial and mathematical ability and rate themselves higher on interpersonal, intrapersonal and emotional intelligence (Furnham & Buchanan, 2005; Furnham & Rawles, 1995; Furnham, Shahidi, & Baluch, 2002; Furnham & Ward, 2001; Petrides & Furnham, 2000).

Right now, it has been suggested that creativity does not benefit African Americans on intelligence tests and may even hurt them. Some researchers have proposed that differences on some IQ or achievement subtests, such as those involved in remembering the details of a story, may show larger African American–European American differences in part because African Americans approach the task differently (Heath, 1983; see Manly et al., 1998). This theory argues that European Americans approach the task as the test-makers intended—by trying to memorise as many appropriate details as possible and stick to the presented story; in contrast, African Americans may put more emphasis on telling the story creatively. Indeed, another possible negative outcome is that African Americans will be penalized for creative behaviour in the classroom. Baldwin (1985, 2003) argues that teachers and other authority figures may mistake creativity in African American students as unruly or disruptive behaviour.

This call for increased creativity assessment is tempered by the awareness that creativity tests as currently available are problematic. Psychometric tests have been criticised as being narrow, easily faked and easily trained (e.g. Baer, 1993, 1994; Clapham, 2004; Lissitz & Willhoft, 1985); these criticisms do have merit. Other ways of measuring creativity are either prone to the same flaws or else designed for research and would not likely stand up to the practical demands of any wide-scale testing effort (e.g. Baer, Kaufman, & Gentile, 2004).

Yet the promises of improved creativity assessment are many, and one of these promises is the possibility of a less-biased assessment. If measures of creativity can be used to create a fuller picture of a student or an employee, then these measures can also help minimise errors in decision-making regarding which students to accept or which applicants to hire. If, as indicated by this study, underperforming groups consider themselves to be creative, then creativity assessment may help reduce stress and avoid stereotype threat. These possibilities make better creativity assessments an even more attractive goal.

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APPENDIX

Please rate your **creativity** in the following domains. Some of these domains may seem to overlap. Do not worry about this; rather, try to think about your creativity in each specific domain as you understand it, without worrying about how it may overlap with other domains listed. For domains that you are not personally familiar with, feel free to check 'Not Applicable'. Thank you!

How creative are you in:

	Not applicable	Not at all creative	Not very creative	A little creative	Somewhat creative	Very creative	Extremely creative
Accounting/Money Management	O	O	O	O	O	O	O
Acting/Performance	O	O	O	O	O	O	O
Advertising/Sales	O	O	O	O	O	O	O
Algebra/Trigonometry	O	O	O	O	O	O	O
Architecture/Design	O	O	O	O	O	O	O
Ballet/Dance/Gymnastics/ Creative Movement	O	O	O	O	O	O	O
Business/Entrepreneurial Abilities	O	O	O	O	O	O	O
Chemistry	O	O	O	O	O	O	O
Computers/Computer Science	O	O	O	O	O	O	O
Cooking	O	O	O	O	O	O	O
Crafts/Sculpture/'Folk' Art	O	O	O	O	O	O	O
Earth Sciences	O	O	O	O	O	O	O
Emotions	O	O	O	O	O	O	O
English Literature/Criticism	O	O	O	O	O	O	O
Fashion/Working with Clothing	O	O	O	O	O	O	O
Film and/or Theatrical Writing/Direction	O	O	O	O	O	O	O
Geometry	O	O	O	O	O	O	O
Graphic Design/Multimedia	O	O	O	O	O	O	O
History/Historical Analysis	O	O	O	O	O	O	O
Horticulture/Gardening	O	O	O	O	O	O	O
Humor/Comedy	O	O	O	O	O	O	O
Interacting/Communicating with Children	O	O	O	O	O	O	O
Interacting/Communicating with Friends and Family	O	O	O	O	O	O	O
Interacting/Communicating with Strangers	O	O	O	O	O	O	O
Interior Design/Decorating	O	O	O	O	O	O	O
Law/Legal Skills	O	O	O	O	O	O	O
Life Sciences/Biology	O	O	O	O	O	O	O
Logic/Puzzles/'Everyday Math'	O	O	O	O	O	O	O
Mechanical Abilities	O	O	O	O	O	O	O
Medicine	O	O	O	O	O	O	O
Music Composition	O	O	O	O	O	O	O
Naturalistic Science/Resource Management	O	O	O	O	O	O	O
Painting/Drawing	O	O	O	O	O	O	O
Personnel Management/ Leadership	O	O	O	O	O	O	O
Photography	O	O	O	O	O	O	O
Physics	O	O	O	O	O	O	O
Playing a Musical Instrument	O	O	O	O	O	O	O
Political Sciences (inc. Economics)	O	O	O	O	O	O	O
Problem Solving	O	O	O	O	O	O	O
Psychotherapy/Psychiatry	O	O	O	O	O	O	O
Social Sciences (inc. Psychology, Anthropology, Sociology)	O	O	O	O	O	O	O
Solving Personal Problems	O	O	O	O	O	O	O

(Continues)

APPENDIX (Continued)

	Not applicable	Not at all creative	Not very creative	A little creative	Somewhat creative	Very creative	Extremely creative
Spatial-Visual Abilities	O	O	O	O	O	O	O
Speech/Debate/Verbal Abilities	O	O	O	O	O	O	O
Spirituality/Religious Thought	O	O	O	O	O	O	O
Sports Performance	O	O	O	O	O	O	O
Sports Strategy	O	O	O	O	O	O	O
Teaching/Education	O	O	O	O	O	O	O
Textiles/Fabrics	O	O	O	O	O	O	O
Travel/Interacting with Different Cultures	O	O	O	O	O	O	O
Vocal Performance/Singing	O	O	O	O	O	O	O
Wood/Metal Working	O	O	O	O	O	O	O
Working with Animals/Animal Training and Management	O	O	O	O	O	O	O
Writing Fiction/Prose	O	O	O	O	O	O	O
Writing Non-Fiction/Journalism	O	O	O	O	O	O	O
Writing Poetry	O	O	O	O	O	O	O

