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Counting the Muses: Development of the Kaufman Domains of Creativity Scale (K-DOCS)

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If one takes a domain-specific approach to studying creativity, 1 key question is to determine the most important domains to measure. One approach is to look at common perceptions of creativity. Building on past studies that used self-report questionnaires, this study presents a new instrument, the Kaufman Domains of Creativity Scale. A factor analysis of 2,318 college student responses led to 50 items and 5 broad domains: Self/Everyday, Scholarly, Performance (encompassing writing and music), Mechanical/Scientific, and Artistic. Coefficient alphas and coefficients of congruence were generally strong. Correlations between the 5 creativity domains and the Big Five personality factors were consistent with past research, lending evidence of convergent validity.

Keywords: creativity, assessment, creative self-perceptions, creative domains, creativity tests

> I wonder if there are as many genuine Muses as the traditional nine; I cannot help thinking that one or two of them have been counted twice over.
>
> —Robert Graves (1922, p. 19)

It can be argued that the ancient Greeks were as fascinated by the idea of creativity across different domains as are current psychological researchers. The nine muses, according to mythology, were goddesses who helped inspire those mortals who would attempt to be creative in the arts or sciences. Reflecting the emphasis of the times, five muses represented different types of poetry (epic, lyric, love, sacred, and pastoral), with additional muses symbolizing history, tragedy, dance, and astronomy (D'Aulaire & D'Aulaire, 1992).

In more modern days, our choices of muses may differ. Gardner (1999), famously, has proposed eight intelligences; although they are usually interpreted as aspects of intellectual ability, they could equally as well serve as areas of creative achievement (e.g., Gardner, 1993). His eight areas are bodily kinesthetic, interpersonal, intrapersonal, language, logical-mathematical, musical, naturalistic, and spatial. Holland's (1997) model of vocational interests could also apply to creative interests; his six categories are realistic, investigative, artistic, social, enterprising, and conventional. Feist (2004) uses the phrase "domains of mind," and has proposed seven: psychology, physics, biology, linguistics, math, art, and music.

Within creativity research, there first exists the basic debate of whether domains exist in the first place. Can creativity be thought of as "c," a single construct, perhaps analogous to intelligence's "g"? Or is creativity domain-specific, with performance in different creative tasks poorly correlated with each other (Ivcevic, 2007)? This question has fueled numerous debates in the literature (Baer, 1998; Kaufman & Baer, 2005; Plucker, 1998), although the two alternate sides have been converging into a happy medium, with several models offering some general and some domain-specific aspects (Baer & Kaufman, 2005; Plucker & Beghetto, 2004). Given that the most common measures of creativity are primarily domain-general (e.g., Torrance, 2008), how do we ascertain which are the key creative domains? This question speaks to the very structure of creativity itself.

One proposed framework is the Amusement Park Theoretical (APT) model, a hierarchical theory that presents domain-general initial requirements for creativity (such as a basic level of intelligence and motivation) and domain-specific outcomes (Baer & Kaufman, 2005). The APT model suggests general thematic areas (such as writing or science), then domains (such as poetry or fiction), and then microdomains (such as Haikus or free verse). Each thematic area may have its own profile of personality traits or cognitive patterns that lead to optimal creativity. For example, a creative actor may need to be extraverted, but a creative scientist may need to be conscientious (Kaufman, 2009).

Given practical issues (such as time), it is difficult to test creative performance across enough different domains to determine the main thematic areas. One alternative has been to look at how people view and report their own creativity. Generally, lay-person perceptions of the construct of creativity tend to be close to expert opinions (e.g., Sternberg, 1985). Several studies have explored the structure of creativity based on reported behaviors, ratings, and self-assessments. However, most self-report creativity scales do not focus on specific domains, instead taking a generalist perspective. These tests may emphasize personality (Gough,

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1979), idea generation (Runco, Plucker, & Lim, 2001), or identity (Jaussi, Randel, & Dionne, 2007). Other self-report scales focus on creative activities. As reviewed by Silvia, Wigert, Reiter-Palmon, and Kaufman (2012), the Biographical Inventory of Creative Behaviors (BICB; Batey, 2007) and Creative Behavior Inventory (CBI; Dollinger, 2006; Hocevar, 1979, 1980) show fine reliability and agreement with other scales—yet they produce only an overall score.

Carson, Peterson, and Higgins' (2005) Creativity Achievement Questionnaire (CAQ) measures 10 domains that load on two factors: the Arts (Drama, Writing, Humor, Music, Visual Arts, and Dance) and Science (Invention, Science, and Culinary). The 10th domain, Architecture, did not load on a factor. The CAQ emphasizes specific, notable accomplishments (e.g., "I have had a showing of my work in a gallery"). Although responses are binary (yes or no), each additional statement is assigned a higher weight, so that "I play one or more musical instruments proficiently" is scored as 1 point and "My compositions have been critiqued in a national publication" is scored as 7 points. The test is frequently used and shows strong validity and reliability (Silvia et al., 2012). Although often used as a measure of everyday creativity, the CAQ is more aimed at high levels of creativity (i.e., Pro-c or professional creativity; see Kaufman & Beghetto, 2009).

Other domain-based self-assessments ask participants for their own opinions of their creativity. For example, Kaufman and Baer's (2004) Creativity Scale for Diverse Domains (CSDD) asked college students to rate themselves on their own creativity across nine domains (science, interpersonal relationships, writing, art, interpersonal communication, solving personal problems, mathematics, crafts, and bodily/physical movement). They found three factors from these nine domains: Creativity in Empathy/Communication (creativity in the areas of interpersonal relationships, communication, solving personal problems, and writing), "Hands On" Creativity (art, crafts, and bodily/physical creativity), and Math/Science Creativity (creativity in math or science). These three factors correspond reasonably well to those found in the area of student motivation—writing, art, and problem solving (Ruscio, Whitney, & Amabile, 1998). Rawlings and Locarnini (2008) replicated the factor structure, and found that professional artists scored higher on the "Hands On" factor and professional scientists scored higher on the Math/Science factor. A study of Turkish undergraduates on the same nine domains found a slightly different factor structure, with an Arts factor (art, writing, crafts), an Empathy/Communication factor (interpersonal relationships, communication, solving personal problems), and a Math/Science factor (math, science). Bodily/kinesthetic was not associated with any factor (Oral, Kaufman, & Agars, 2007).

The CSDD has been used in several research studies. Silvia, Nusbaum, Berg, Martin, and O'Conner (2009) found that openness to experience was related to all factors except Math/Science; in addition, Math/Science and Empathy/Communication were negatively related to neuroticism. Empathy/Communication was also positively correlated with conscientiousness. Similarly, Silvia and Kimbrel (2010) found that people high in Empathy/Communication were lower in social anxiety. Silvia and Nusbaum (in press) found that arts majors were more likely than nonarts majors to rate themselves low on the Math/Science factor and high on the "Hands On" factor.

Expanding on this work, Kaufman and colleagues (Kaufman, 2006; Kaufman, Cole, & Baer, 2009) developed the Creativity Domain Questionnaire (CDQ), which consisted of 56 different creative domains. More than 3,500 people completed the CDQ, and Kaufman, Cole, and Baer (2009) found seven factors, which they dubbed Artistic-Verbal, Artistic-Visual, Entrepreneur, Interpersonal, Math/Science, Performance, and Problem Solving. These seven factors were found as hierarchical second-order factors. In other words, there was evidence that some type of "c" existed; however, a single-factor solution was not the best fit for the data. The seven domains represented separate (albeit related) factors. Some domains were strongly related to "c," such as Performance and Artistic/Visual, whereas others (such as Math/Science) were less related. Tan and Qu (in press) administered the CDQ to Malaysian undergraduates and found only five factors; the two Artistic components loaded together, and Entrepreneur was spread across other factors. A shorter, revised CDQ was then created with 21 items and was found to have four factors: (a) Math/Science (algebra, chemistry, computer science, biology, logic, mechanical), (b) Drama (acting, literature, blogging, singing, dancing, writing), (c) Interaction (leadership, money, playing with children, selling, problem solving, teaching), and (d) Arts (crafts, decorating, painting; Kaufman, Waterstreet, et al., 2009; Silvia et al., 2012).

Kerr and Vuyk (in press) developed five creative profiles of gifted adolescents: verbal/linguistic creativity, mathematical/scientific inventiveness, interpersonal/emotional creativity, musical and dance creativity, and spatial visual creativity. Ivcevic and Mayer (2006) used creativity checklists and personality measures to derive five "types": Conventional, Everyday Creative Individuals, Artists, Scholars, and Renaissance Individuals. Next, Ivcevic and Mayer (2009) compiled a comprehensive assessment of creativity across specific behaviors. Factor analysis of these behaviors resulted in three second-order dimensions. The first factor, called the Creative Lifestyle, included crafts, self-expressed creativity, interpersonal creativity, sophisticated media use, visual arts, and writing. The second factor was dubbed Performance Arts and encompassed music, theater, and dance. The third factor, Intellectual Creativity, represented creativity in technology, science, and academic pursuits.

These studies using behavioral inventories, self-assessed ratings, or accomplishment checklists continue to evoke consistent patterns. Laypeople seem to be able to distinguish creativity in the broad domains of everyday or interpersonal, intellectual or scientific, and the arts (encompassing, perhaps, verbal, visual, and performance areas). As mentioned earlier, most of the commonly used creative self-assessments, however, use a domain-general perspective.

The goal of this study was twofold. The first goal was to build on past work and use ratings of creative behaviors to analyze layperson perceptions of the structure of creativity. The second goal was to create a self-report, behavior-based creativity rating scale that reflects a domain-specific perspective of everyday creativity, the Kaufman Domains of Creativity Scale (K-DOCS). A five-factor personality measure was also included as a measure of convergent validity.

Method

Participants

Participants were undergraduate students at a public state university in California. There were 2,318 participants, with 1,862 women, 421 men, and 35 who declined to list their gender. The age range was 18–66 years old, with a mean age of 23.85 years (SD = 7.14). There were 1,012 Hispanic Americans (43.7%), 654 Caucasians (28.2%), 262 African Americans (11.3%), 208 Asian Americans (9.0%), 81 people of mixed or biracial ethnicity (3.5%), 25 Middle Easterners (1.1%), 22 Native Americans (0.9%), and 54 people who declined to list their ethnicity (2.3%).

A subsample of 132 participants was administered the K-DOCS a second time after 2 weeks to establish test–retest reliability.

Instruments

Kaufman Domains of Creativity Scale (K-DOCS). The K-DOCS was created for this study. A list of 94 creative behaviors was identified as follows: First, items from all three versions of the CDQ were translated into behaviors. So, for example, if the CDQ asked someone to rate creativity in the domain of blogging, the item was rewritten to present a specific behavior ("Keeping an interesting journal or blog"). Items were primarily adapted from earlier CDQs (Kaufman & Baer, 2004; Kaufman, Cole, & Baer, 2009; Kaufman, Waterstreet, et al., 2009), with additional items adapted from Ivcevic and Mayer (2009) and Carson et al. (2005).

Instructions were as follows: "Compared to people of approximately your age and life experience, how *creative* would you rate yourself for each of the following acts? For acts that you have not specifically done, estimate your creative potential based on your performance on similar tasks."[1] Participants rated themselves on a 5-point Likert scale, with 1 being *much less creative* and 5 being *much more creative*. The original 94-item scale can be seen in Table 1.

Big Five Factor Markers from the International Personality Item Pool (Goldberg, 1999; Goldberg et al., 2006). This 50-item scale is designed to measure Goldberg's (1999) adjective-derived five-factor personality theory: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience. In the Big Five Factor Markers, participants rate how well each statement describes themselves on a Likert scale from 1 (*very inaccurate*) to 5 (*very accurate*). Sample statements include "Am the life of the party," "Feel little concern for others," "Am always prepared," "Get stressed out easily," and "Have a rich vocabulary." The items were presented in a random order with positive and negative keying. For this sample, Cronbach's alpha reliabilities were as follows: Extraversion (.85), Agreeableness (.87), Conscientiousness (.82), Emotional Stability (.86), and Openness to Experience (.82).

Data Analysis

The 94 items developed for the K-DOCS were analyzed using exploratory factor analysis. Principal factor analysis was conducted, with iterations, using an orthogonal varimax solution with Kaiser normalization to identify simple structure. The sample was randomly divided in half. The first half (computation sample, n = 1,174) was factor analyzed to identify the best factor structure. Eigenvalues of unrotated factors were examined using Cattell's scree test to provide a good estimate of the appropriate number of factors to extract, but the ultimate criterion was the psychological sense of the solution. The second half of the sample (cross-validation sample, n = 1,144) was then used to extract the same number of factors that were judged to be psychologically meaningful in the first analysis. Coefficients of congruence (Harman, 1976) were computed between factors assigned the same name in each analysis to determine whether each factor was replicable (i.e., "real" and not due to chance fluctuations). Following these analyses, I conducted principal factor analysis with varimax rotation using the total sample (N = 2,318), and this latter solution was used to select items for the K-DOCS. Coefficient alphas were computed for each separate scale for the total sample and for each half-sample separately.

Results

Principal factor analysis of the computation sample yielded five factors with eigenvalues >2.0 and 18 with values >1.0. The scree plot suggests that either five or six factors are appropriate to rotate. Both the five-factor and six-factor varimax solutions were examined. In the six-factor solution, the last factor was small, with only two variables loading .45 or greater. By contrast, each of the first five factors had anywhere from seven to 14 variables with loadings ≥ .45. In addition, the first five factors in the six-factor solution were virtually identical to the five factors extracted in the five-factor solution. More important, each of the five factors makes psychological sense from the perspective of creativity research and theory. Table 1 presents the varimax-rotated factor loadings for the five-factor solution based on data for the computation sample.

Factor 1 had its highest loadings by "Teaching someone how to do something" (.59), "Understanding how to make myself happy" (.58), "Choosing the best solution to a problem" (.56), "Being able to work through my personal problems in a healthy way" (.55), "Helping other people cope with a difficult situation" (.55), and "Getting people to feel relaxed and at ease" (.55). This factor has been labeled Self/Everyday Creativity (including interpersonal and intrapersonal creativity), which seems to best capture the essence of the items that define it.

The highest loading items on Factor 2 were "Coming up with a new way to think about an old debate" (.62), "Debating a controversial topic from my own perspective" (.57), "Gathering the best possible assortment of articles or papers to support a specific point of view" (.56), "Being able to offer constructive feedback based on my own reading of a paper" (.55), and "Figuring out how to integrate critiques and suggestions while revising a work" (.55). This factor involves creative analysis, debate, and scholarly pursuits and has been named Scholarly Creativity.

[1] Participants were asked to estimate their creativity for activities they had not performed due to the sometimes specific nature of some of the items. Past work (e.g., Kaufman, Cole, & Baer, 2009) has found that scores were consistent for domains that participants were likely to have done (such as interacting with people) and domains that participants were less likely to have done (such as practicing medicine). However, future work should examine how the accuracy of creativity estimates varies based on past expertise.

Table 1
Rotated Factor Matrix, Computational Sample

Item	Factor				
	1	2	3	4	5
Capturing my feelings in a letter or verse	—	.38	.26	—	.21
Writing a poem	—	.33	**.49**	—	.29
Making up rhymes	—	.21	**.65**	—	—
Keeping an interesting journal or blog	—	.34	.28	—	.31
Making up an original story	—	.42	.38	—	.30
Writing a nonfiction article for a newspaper, newsletter, or magazine	—	**.51**	.22	—	.22
Making up lyrics to a funny song	—	—	**.68**	—	—
Writing amusing e-mails	—	.34	.33	—	—
Writing fan-fiction about pre-existing characters (like “Star Trek”)	—	.30	.37	.33	.26
Writing a letter to the editor	—	**.54**	.22	—	—
Creating a crossword puzzle	—	—	—	.31	.25
Thinking of a good metaphor, simile, or analogy	—	**.53**	.30	—	—
Creating a tasty meal out of scattered leftovers	.33	—	.23	—	—
Figuring out a new way home to avoid traffic	.40	—	—	—	—
Finding something fun to do when I have no money	**.51**	—	.21	—	—
Figuring out new ways to save money each month	.40	—	—	.23	—
Thinking up new rules or a new strategy to play a game	.34	.23	.25	.24	—
Developing a new and efficient filing system for my CDs or clothing	.41	—	—	—	.28
Tinkering with a recipe	.32	—	—	—	—
Cutting out some foods and eating new ones in order to lose (or gain) weight	.40	—	—	—	—
Finding new ways to motivate myself to do something unpleasant	.35	.24	—	—	—
Making a witty remark	.27	.40	.21	—	—
Cracking a joke	.31	.28	.40	—	—
Fixing something with duct tape (or something similar)	.34	—	—	—	—
Thinking of new (and legal) income tax deductions	—	.23	—	**.47**	—
Composing an original song	—	—	**.63**	.28	—
Making up dance moves	—	—	**.50**	—	.22
Learning how to play a musical instrument	—	—	.43	.27	—
Singing a popular song by myself	.38	—	.34	—	—
Shooting a fun video to air on YouTube	—	—	**.47**	.22	.23
Singing in harmony	—	—	**.48**	—	—
Giving a presentation in class or at work	—	.37	—	—	—
Delivering a toast or a speech in front of other people	—	.41	.31	—	—
Spontaneously creating lyrics to a rap song	—	—	**.68**	.25	—
Playing music in public	—	—	**.53**	.21	—
Acting in a play	—	.22	**.47**	—	—
Delivering a punch line of a joke	.26	.29	.43	—	—
Entertaining a small child	**.50**	—	—	—	—
Communicating with people from different cultures	.40	.23	—	—	—
Helping other people cope with a difficult situation	**.55**	.30	—	—	—
Persuading someone to buy something	.31	—	—	—	—
Wooing and flirting with someone I am attracted to	.37	—	—	—	—
Leading a group project	.40	.40	—	—	—
Teaching someone how to do something	**.59**	.22	—	—	—
Thinking of a polite way to tell someone about a flaw or bad habit	.36	.24	—	—	—
Planning a trip or event with friends that meets everyone’s needs	**.53**	—	—	—	—
Mediating a dispute or argument between two friends	**.50**	.30	—	—	—
Delegating other work to people and inspiring them to complete it	.43	.38	—	—	—
Getting people to feel relaxed and at ease	**.55**	.28	—	—	—
Drawing a picture of something I’ve never actually seen (like an alien)	—	—	.30	.26	**.51**
Creating or modifying my own clothing	.26	—	.28	—	.40
Decorating a room	**.45**	—	—	—	**.50**
Sketching a person or object	—	—	.27	.28	**.55**
Making interesting PowerPoint presentations	.30	.26	—	—	.24
Doodling/drawing random or geometric designs	—	—	.22	—	**.46**
Designing a personal website (not programming, but rather the aesthetics)	—	.24	.24	.37	.31
Carving something out of wood or similar material	—	—	.25	**.52**	**.46**
Making a scrapbook page out of my photographs	.40	—	—	—	**.46**
Constructing something out of metal, stone, or similar material	—	—	.26	**.54**	.42
Taking a well-composed photograph using an interesting angle or approach	.28	.21	—	—	.43
Making a sculpture or piece of pottery	—	—	.24	.30	**.59**

(*table continues*)

Table 1 (*continued*)

Item	Factor				
	1	2	3	4	5
Thinking of a new invention	—	.32	.31	**.48**	.24
Figuring out how to fix a frozen or buggy computer	—	—	—	**.54**	—
Writing a computer program	—	—	.33	**.62**	—
Solving math puzzles	.24	—	—	**.56**	—
Taking apart machines and figuring out how they work	—	—	—	**.67**	—
Building something mechanical (like a robot)	—	—	.26	**.69**	—
Helping to carry out or design a scientific experiment	—	.31	—	**.57**	—
Figuring out what illness a person might have based on their symptoms	—	.29	—	.25	—
Designing a way to test a hypothesis	—	.42	—	**.54**	—
Solving an algebraic or geometric proof	.26	—	—	**.56**	—
Analyzing an argument	.34	**.51**	—	—	—
Researching a topic using many different types of sources that may not be readily apparent	—	**.46**	—	.29	—
Comparing two different points of view	.40	**.52**	—	—	—
Debating a controversial topic from my own perspective	.31	**.57**	—	—	—
Gathering the best possible assortment of articles or papers to support a specific point of view	.22	**.56**	—	—	—
Arguing a side in a debate that I do not personally agree with	—	**.49**	—	.21	—
Figuring out how to integrate critiques and suggestions while revising a work	.24	**.55**	—	—	—
Being able to offer constructive feedback based on my own reading of a paper	.30	**.56**	—	—	—
Thinking of many different solutions to a problem	.42	.39	—	.25	—
Coming up with a new way to think about an old debate	—	**.62**	—	.28	—
Thinking of new ways to help people	**.54**	.32	—	—	—
Choosing the best solution to a problem	**.56**	.23	—	—	—
Responding to an issue in a context-appropriate way	.33	**.51**	—	—	—
Maintaining a good balance between my work and my personal life	**.51**	—	—	—	—
Understanding how to make myself happy	**.58**	—	—	—	—
Being able to work through my personal problems in a healthy way	**.55**	—	—	—	—
Appreciating a beautiful painting	.34	.32	—	—	.36
Analyzing the themes in a good book	.21	**.52**	—	—	—
Coming up with my own interpretation of a classic work of art	—	.38	.22	—	.44
Enjoying an art museum	.27	.36	—	—	.39
Thinking about how a movie or television show could be improved	.30	.30	—	—	—
Discovering new music	.34	—	.35	—	—
Burning a mix CD to introduce a friend to new songs	**.45**	—	—	—	—

Note. Factor loadings below .20 are represented by a dash (–). Factor loadings above .45 are in boldface. Extraction method: Principal axis factoring. Rotation method: Varimax with Kaiser normalization.

Factor 3 had its highest loadings by "Making up lyrics to a funny song" (.68), "Spontaneously creating lyrics to a rap song" (.68), "Making up rhymes" (.65), "Composing an original song" (.63), and "Playing music in public" (.53). Factor 3 has been labeled Performance Creativity; although both music and writing are part of the factor, much of the emphasis is on public presentation.

The following items loaded highest on Factor 4: "Building something mechanical (like a robot)" (.69), "Taking apart machines and figuring out how they work" (.67), "Writing a computer program" (.62), "Helping to carry out or design a scientific experiment" (.57), and "Solving an algebraic or geometric proof" (.56). These items emphasize mechanical ability and interest in science and math. Factor 4 was labeled Mechanical/Scientific Creativity.

Factor 5 had its highest loadings by "Making a sculpture or piece of pottery" (.59), "Sketching a person or object" (.55), and "Drawing a picture of something I've never actually seen (like an alien)" (.51). This factor was named Artistic Creativity.

The five-factor varimax-rotated principal factor analysis was then repeated with the cross-validation sample (data not shown). The same five factors emerged, although the order in which they emerged differed slightly (Performance emerged second and Scholarly emerged third). However, the five factors from each solution were essentially the same as attested by coefficients of congruence of .90 or greater for each factor: 1—Self/Everyday Creativity (.96), 2—Scholarly Creativity (.92), 3—Performance Creativity (.93), 4—Mechanical/Scientific Creativity (.96), and 5—Artistic Creativity (.91).

Because the factors were so convergent in the computational and cross-validation half-samples, I decided to factor analyze the full sample to help make decisions about selecting items to compose each of the five scales. I decided to reduce the item pool by about half. Items were eliminated that loaded poorly on all factors ($<.40$) or that loaded about equally well on more than one factor. That still left a substantial number of "good" items, with a disproportionate number of items on Self/Everyday Creativity and Scholarly Creativity. The decision was made to have a 50-item test with about 10 items per scale. Factor loadings were the primary consideration, but correlations between each item and the factor on which it loaded were also used to make item selections. Ultimately, only nine items were defensible for 5—Artistic Creativity, so I decided to retain 11 items for 1—Self/Everyday Creativity and keep 10 items for the other three scales. The final K-DOCS is presented in the Appendix.

Coefficient alpha reliabilities are shown in Table 2 for the five scales for the total sample and each half-sample. All values are at

Table 2
Coefficient Alpha Reliabilities for Kaufman Domains of Creativity Scale (K-DOCS)

Scale	1st half	2nd half	Total
Self/Everyday	.86	.86	.86
Scholarly	.86	.86	.86
Performance	.87	.87	.87
Mechanical/Scientific	.87	.86	.86
Artistic	.83	.82	.83

least .80, indicating adequate internal consistency reliability for each of the five scales. Factor analysis was not conducted for the K-DOCS composed of 50 items because the present sample was used to develop the scales. It is desirable that the construct validity of the 50-item K-DOCS be obtained with a fresh sample of adults.

For the 132 participants who were administered the K-DOCS a second time after 2 weeks, correlation coefficients were as follows: Self/Everyday, $r = .80$; Scholarly, $r = .76$; Performance, $r = .86$; Mechanical/Scientific, $r = .78$, and Artistic, $r = .81$. All domains showed acceptable test–retest reliability (Nunnally, 1978).

Finally, bivariate correlations between the five personality factors and the five creativity factors are presented in Table 3. As can be seen, openness to experience significantly correlated with all creativity domains but Mechanical/Scientific and extraversion significantly correlated with all domains but Mechanical/Scientific and Artistic. Agreeableness and conscientiousness were both positively correlated with Scholarly and Performance but negatively correlated with Mechanical/Scientific and Self/Everyday, respectively. Emotional stability was the least related to creativity, with only a significant positive relationship with Mechanical/Scientific.

Discussion

The K-DOCS produced five factors of self-assessed creative behaviors: Self/Everyday, Scholarly, Performance (encompassing writing and music), Mechanical/Scientific, and Artistic. Coefficient alphas and coefficients of congruence were generally strong. In addition, the correlations between the five creativity domains and the five personality factors were consistent with past research, lending some evidence of convergent validity. For example, openness to experience correlated with four of the five creativity domains, similar to past work (e.g., King, Walker, & Broyles, 1996; McCrae, 1987). The only domain that did not correlate with openness to experience was Mechanical/Scientific, consistent with the Silvia et al. (2009) findings. Other consistent findings include Mechanical/Scientific being significantly negatively correlated with agreeableness (e.g., Feist, 1993; Silvia, Kaufman, Reiter-Palmon, & Wigert, 2011) and positively correlated with emotional stability (Silvia et al., 2009), and Performance being significantly correlated with extraversion (e.g., Kaufman, Cole, & Baer, 2009; Silvia, Kaufman, & Pretz, 2009).

Past studies using domain questionnaires found separate factors for both writing and problem solving (Kaufman, Cole, & Baer, 2009). In this study, writing was split between nonfiction (in Scholarly) and fiction/poetry (subsumed into Performance). Similarly, problem solving was subsumed into Scholarly and Mechanical/Scientific.

The five creative domains reflect past theory and research. Self/Everyday, for example, includes Gardner's (1999) ideas of interpersonal and intrapersonal intelligence, Ivcevic and Mayer's (2009) creative lifestyle, and Kerr and Vuyk's (in press) interpersonal/everyday creativity. Scholarly would encompass Gardner's linguistic intelligence, Feist's (2004) linguistics, Kerr and Vuyk's verbal/linguistic creativity, and Ivcevic and Mayer's intellectual creativity. Both Gardner's bodily kinesthetic and musical intelligence would fall under Performance, as would Carson and colleagues' (2005) Arts factor, Ivcevic and Mayer's performance arts, Feist's music, and Kerr and Vuyk's musical/dance creativity. Mechanical/Scientific would cover Gardner's logical-mathematical and naturalistic intelligences, Carson and colleagues' Science factor, Kerr and Vuyk's mathematical/scientific inventiveness, many of Feist's factors, and Ivcevic and Mayer's intellectual creativity. The final factor, Artistic, reflects Gardner's spatial intelligence, Carson and colleagues' Arts factor, Kerr and Vuyk's spatial visual creativity, Feist's art, and Ivcevic and Mayer's creative lifestyle.

One domain-specific approach to studying creativity, as outlined by the APT model (Baer & Kaufman, 2005), is to study the characteristics and abilities associated with different types of creativity. The model proposes that factors such as motivation, personality, and intelligence will come into play in different ways for creativity in different areas. The five creative domains from this

Table 3
Bivariate Correlations Between Five Factors of Personality and Domains of Creativity

Factor	1	2	3	4	5	6	7	8	9	10
Creativity										
1. Self/Everyday	—									
2. Scholarly	.04	—								
3. Performance	.00	.11*	—							
4. Mechanical/Science	.06	.04	−.04	—						
5. Artistic	.09*	.03	.03	.06	—					
Personality										
6. Extraversion	.19*	.13*	.24*	.00	.01	—				
7. Agreeableness	−.03	.10*	.40*	−.13*	.06	.39*	—			
8. Conscientiousness	−.11*	.12*	.21*	.03	.03	.19*	.46*	—		
9. Emotional Stability	.02	.01	.16	.12*	.02	.29*	.33*	.26*	—	
10. Openness to Experience	.15*	.42*	.31*	.05	.19*	.42*	.55*	.42*	.27*	—

* $p < .001$.

study offer one way of approaching such studies. For example, intellectual ability may be more important to success in the Scholarly domain, whereas emotional intelligence may be more essential for Self/Everyday.

Research of this type has already been conducted; Jeon, Moon, and French (2011), for example, compared predictors of creative performance in art and math. They found that domain knowledge was more important than divergent thinking for math creativity; the reverse pattern was found for art. Ruscio et al. (1998) focused on characteristics that were related to creativity across three domains (problem solving, art, and writing). They also found several domain-specific patterns; assuredness, for example, was related to creativity in the art task but not in the other two.

Other studies have looked at different majors. Haller and Courvoisier (2010) compared visual art, music, and psychology students and found higher levels of extraversion in music students and higher levels of neuroticism and openness to experience in visual art students. Furnham (2012) compared arts and science students on intelligence and personality tests and found strong differences. Arts students had stronger verbal ability but weaker numerical ability. They were warmer and more sensitive, trusting, abstract, open to change, and relaxed, whereas science students were more rule conscious and perfectionist. Silvia and Nusbaum (in press) found that arts majors scored higher on both openness to experience and arts knowledge and preference. The current study adds a possible framework for future studies of this ilk.

As interest in nurturing everyday creativity continues to rise (Beghetto & Kaufman, 2007; Richards, 2007), the K-DOCS offers researchers a short, free tool to assess self-perceptions of creative ability. There are strong behaviorally based measures already in existence, such as the CAQ (Carson et al., 2005), the BICB (Batey, 2007), and the CBI (Dollinger, 2006; Hocevar, 1979). All three, however, simply ask participants whether they have performed certain creative behaviors, emphasizing either frequency (BICB, CBI) or levels of creative accomplishments (CAQ).

The K-DOCS is more focused on self-beliefs about one's abilities than a straightforward reporting of participation. In this way, the K-DOCS also incorporates the idea of creative self-efficacy, which can be a core facet of lower levels of creativity (Beghetto, 2006; Beghetto, Kaufman, & Baxter, 2011). Most measures of creative self-efficacy or self-rated creativity tend to be very short and produce a global score (e.g., Furnham, 1999; Furnham, Zhang, & Chamorro-Premuzic, 2006). The domain-specific nature of the K-DOCS allows a more in-depth instrument for studying beliefs, perceptions, and metacognition. In addition, unlike the BICB and the revised CBI,[2] the K-DOCS assumes a domain-specific perspective, thereby offering researchers who subscribe to this view the chance to use a measure that gives multiple scores and not one overall number.

There are several limitations of the study and the instrument. Some items that did not clearly load on a factor in the initial analysis (i.e., "Appreciating a beautiful painting" and "Enjoying an art museum") ended up on the final scale because of subsequent analyses; in general, the Artistic factor is the weakest of the five. Some items on the initial scale may have seemed too convergent (i.e., "Figuring out what illness a person might have based on their symptoms"), too ambiguous (i.e., "Leading a group project"), or too esoteric ("Creating a crossword puzzle" or "Developing a new and efficient filing system for my CDs or clothing"). It is possible, for example, that music and writing would have split into their own factors with differently worded items.

Most notably, the K-DOCS needs significant further validation. How does this measure correlate with other self-report creativity measures and performance-based tests? The current sample of undergraduate students allows only a certain amount of extrapolation to the general population. If the K-DOCS is a valid instrument, then specific populations should score higher on different domains (i.e., scientists should score higher on Mechanical/Scientific). Similarly, people with higher scores on the K-DOCS domains should theoretically score higher on objective tests in these areas.

However, it is worth highlighting that perceptions of creativity can be quite different from actual ability. Research on creative metacognition indicates that people do not necessarily have sharp self-insight into their own creativity (see Kaufman, Evans, & Baer, 2010; Lee, Day, Meara, & Maxwell, 2002; Priest, 2006; Reiter-Palmon, Robinson-Morral, Kaufman, & Santo, 2012). People may have a high opinion of themselves because they are creative or because they have unusually high levels of self-esteem (or narcissism; see Goncalo, Flynn, & Kim, 2010).

In addition to further validation work, another line of possible future work could be to determine whether the factor structure is consistent across cultures. Most cross-cultural work that contrasts perceptions of creativity emphasizes which concepts are most associated with creativity. For example, Western conceptions tend to emphasize unconventionality, inquisitiveness, imagination, humor, and freedom (Murdock & Ganim, 1993; Sternberg, 1985). Eastern conceptions are more likely to encompass moral goodness, societal contributions, and connections between old and new knowledge (Niu & Sternberg, 2002; Rudowicz & Hui, 1997; Rudowicz & Yue, 2000). It would be interesting to see how these different cultures view creativity by domain. Cheung and Yue (2007) found that Chinese students viewed scientists as more creative than other professions. Such comparable preferences and beliefs may result in different patterns for different cultures.

If one conceives of creativity as being domain-specific, it can be difficult to measure or operationalize. In an ideal world, a full creativity assessment might consist of tasks across hundreds of areas, from preparing legal briefs to cooking casseroles to managing a baseball team. In the real world, researchers have a limited amount of time to assess someone's creativity. The first step is determining which domains should be measured. This study offers five broad areas as a starting point: Self/Everyday, Scholarly, Performance (encompassing writing and music), Mechanical/Scientific, and Artistic.

[2] The original CBI was domain-specific, although Plucker (1999) argued that a one-factor solution was a better fit for the data.

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(*Appendix follows*)

Appendix

Kaufman Domains of Creativity Scale (K-DOCS)

Instructions: Compared to people of approximately your age and life experience, how creative would you rate yourself for each of the following acts? For acts that you have not specifically done, estimate your creative potential based on your performance on similar tasks.

1	2	3	4	5
Much Less Creative	Less Creative	Neither More nor Less Creative	More Creative	Much More Creative

1. Finding something fun to do when I have no money _____
2. Helping other people cope with a difficult situation _____
3. Teaching someone how to do something _____
4. Maintaining a good balance between my work and my personal life _____
5. Understanding how to make myself happy _____
6. Being able to work through my personal problems in a healthy way _____
7. Thinking of new ways to help people _____
8. Choosing the best solution to a problem _____
9. Planning a trip or event with friends that meets everyone's needs _____
10. Mediating a dispute or argument between two friends _____
11. Getting people to feel relaxed and at ease _____
12. Writing a nonfiction article for a newspaper, newsletter, or magazine _____
13. Writing a letter to the editor _____
14. Researching a topic using many different types of sources that may not be readily apparent _____
15. Debating a controversial topic from my own perspective _____
16. Responding to an issue in a context-appropriate way _____
17. Gathering the best possible assortment of articles or papers to support a specific point of view _____
18. Arguing a side in a debate that I do not personally agree with _____
19. Analyzing the themes in a good book _____
20. Figuring out how to integrate critiques and suggestions while revising a work _____
21. Being able to offer constructive feedback based on my own reading of a paper _____
22. Coming up with a new way to think about an old debate _____
23. Writing a poem _____
24. Making up lyrics to a funny song _____
25. Making up rhymes _____
26. Composing an original song _____
27. Learning how to play a musical instrument _____
28. Shooting a fun video to air on YouTube _____
29. Singing in harmony _____
30. Spontaneously creating lyrics to a rap song _____
31. Playing music in public _____
32. Acting in a play _____
33. Carving something out of wood or similar material _____
34. Figuring out how to fix a frozen or buggy computer _____
35. Writing a computer program _____
36. Solving math puzzles_____
37. Taking apart machines and figuring out how they work _____
38. Building something mechanical (like a robot) _____

(*Appendix continues*)

39. Helping to carry out or design a scientific experiment_____

40. Solving an algebraic or geometric proof _____

41. Constructing something out of metal, stone, or similar material _____

42. Drawing a picture of something I've never actually seen (like an alien) _____

43. Sketching a person or object _____

44. Doodling/drawing random or geometric designs _____

45. Making a scrapbook page out of my photographs _____

46. Taking a well-composed photograph using an interesting angle or approach _____

47. Making a sculpture or piece of pottery _____

48. Appreciating a beautiful painting _____

49. Coming up with my own interpretation of a classic work of art _____

50. Enjoying an art museum _____

Scoring: all items should be randomized.
Items 1–11 comprise 1
Items 12–22 comprise 2
Items 23–32 comprise 3
Items 33–41 comprise 4
Items 42–50 comprise 5

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