

Mapping Dimensions of Creativity in the Life-Space

Zorana Ivcevic and John D. Mayer

University of New Hampshire

Three studies examined content dimensions of creativity. A life-report questionnaire was developed to measure everyday, artistic, and intellectual creativity. Multiple life areas were assessed, including self-presentation, education and work, arts and crafts, culture and media consumption, everyday relations and activities, and memberships in groups that encourage creativity. Study 1 indicated that everyday creativity could be empirically distinguished from artistic creativity. Factor analyses in Studies 2 and 3 identified three broad dimensions of creativity in college students and professional adults: creative life-style, arts, and intellectual achievement. Both similarities and differences among these dimensions were observed in relation to gender and personality traits.

The term *creativity* evokes associations to painters such as Vincent Van Gogh, scientists such as Albert Einstein, or other eminent historical figures. Indeed, much research has focused on creativity that changes a domains of work, such as the arts, sciences, technology, and business (Csikszentmihalyi, 1996; Gardner, 1993). However, creativity can be also manifest in everyday behaviors, such as in devising a recipe for a dinner party and decorating one's living environment (Richards, Kinney, Benet, & Merzel, 1988; Torrance, 1988). Creativity research should therefore examine both everyday activities and relations and more formal professional or semiprofessional activities. The present studies aim to provide a map of content dimensions of creativity in such diverse behaviors.

How should we identify and measure creativity? One possible approach is to survey multiple areas in a person's life-space (Brackett, 2003; Mayer, Carlsmith, & Chabot, 1998). We define the life-space as different aspects of a person's identity, behavior, and environment as they may be observed from the outside, such as education, work, and relationships. A conceptual model of the life-space can be used as a guide for

identifying behaviors relevant for creativity in multiple domains.

Three studies mapped the content dimensions of creativity. Study 1 sampled everyday and artistic creativity in the life-space and tested whether it was possible to distinguish them in a factor analysis. Study 2 revised and extended measurement of everyday and artistic creativity, and added intellectual creativity. Factor analyses identified areas within everyday, artistic, and intellectual creativity and subjected them to a second order factor analysis to identify broader dimensions. These dimensions were then related to gender and the Big Five personality traits. Finally, Study 3 tested whether dimensions of creativity identified in college students could be replicated in professional adults.

WHAT IS CREATIVITY?

One common definition states that creativity is the generation of products or behaviors that are both original and appropriate (Barron, 1988; Lubart, 1994). An advantage of this definition is in its ability to incorporate both creative potential and creative behavior. On one hand, creativity refers to the capacity for originality, and on the other hand, it refers to products and behaviors that result from this capacity.

Multiple kinds of data can be used to assess creative potential, such as self-reports of creative personality

We thank Rebecca Warner for her comments on an earlier version of this article.

Correspondence should be sent to Zorana Ivcevic, Department of Psychology, Conant Hall, 10 Library Way, University of New Hampshire, Durham, NH 03824. E-mail: zivcevic@unh.edu

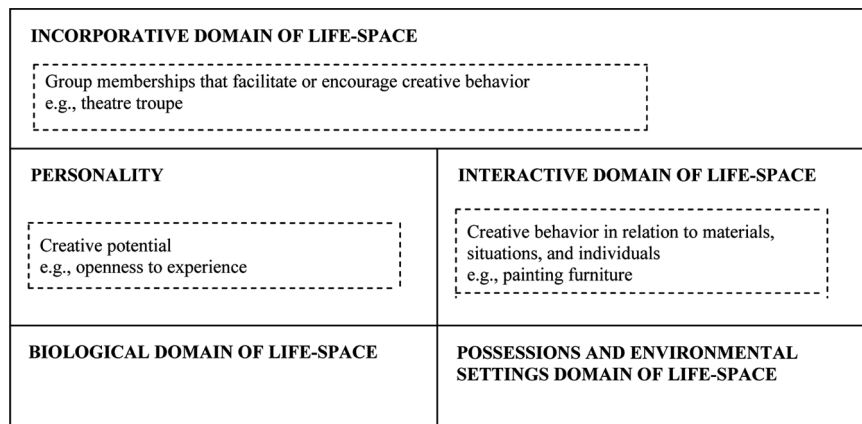


FIGURE 1 Domains of life-space and personality systems with an emphasis on the distinction between creative behavior and creative potential.

(e.g., Dollinger, Dollinger, & Centeno, 2005) and ability tests (e.g., Torrance, 1988). Several classes of data can also be used to assess creative behavior. Some examples include peer nominations (e.g., McKinnon, 1975), ratings of products created in the laboratory (e.g., Amabile, 1996), and citations in biographical dictionaries (e.g., Simonton, 1992). In this article, however, we focus on life-report data (Funder, 2001; Mayer, 2004), which refer to people’s self-reports of their life circumstances and behaviors. As such, life-report data includes biodata (Mael, 1991), act-frequency scales (Buss & Craik, 1981), experience sampling (Larson & Csikszentmihalyi, 1983), and behavior checklists (Paunonen, 2003). This measurement approach has been used before in creativity research—whenever a person has been asked about their creative activities and accomplishments (e.g., Guastello & Shissler, 1994; Hocevar, 1976, 1979; Holland & Nichols, 1964; Holland & Richards, 1965).

In this research, life-report questions will ask about frequencies of specific instances of behavior, rather than preferences or behavior tendencies. These questions require minimal interpretation or subjectivity. For example, one question might ask how many times in the previous year a person has visited an art museum and offer response options from zero to four or more times. A similar approach was used in a number of previously developed measures of creative behavior (Hocevar, 1979; Holland & Nichols, 1964; Holland & Richards, 1965). In contrast, a typical self-report inventory question would ask whether a person enjoyed visiting art museums and an item assessing behavioral tendencies would ask respondents to rate whether they visited art museums *rarely*, *occasionally*, or *frequently*. The meaning of people’s responses to these latter type of items is not completely clear; we do not know whether a person who enjoys visiting art museums actually visits them, nor can one be certain what an answer *frequently* means for different people.

Life-space—the sphere targeted by life-report data—includes the entirety of a person’s life (Mayer, 2005). Because this realm is very large, it is useful to define domains and areas within the life-space to ensure that it is sampled properly. At a most general level, it is possible to define four broad domains of the life-space: (a) biological, (b) social settings (i.e., possessions and locations), (c) interactions, and (d) group memberships (Mayer, 2005). Narrower areas can be defined within each domain, such as exchanges with people, materials, and situations in the interactive domain. The life-space model has been successfully applied to the study of personality traits and mental abilities (Brackett, 2003; Brackett, Mayer, & Warner, 2004; Mayer et al., 1998).

Interactive and group membership domains of the life-space are most relevant to creativity (see Figure 1). Regarding creativity, the interactive domain refers to original and appropriate behavior in relation to people, materials, and situations (e.g., completing a painting, surprising a significant other with a gift). Many measures have focused on some aspects of the interactive domain (Guastello & Shissler, 1994; Hocevar, 1979; Holland & Nichols, 1964; Holland & Richards, 1965). The domain of group memberships refers to participation in groups and organizations that support, promote, and acknowledge creativity (e.g., choir, science honors society). Sometimes, creativity has been operationalized in terms of memberships in organizations that indicate achievement in one’s profession (e.g., National Academy of Sciences; Feist & Barron, 2003). At a more global level, creativity has been defined in some research as membership in certain professions (e.g., artists and scientists; Feist, 1998).

CONTENT DOMAINS AND AREAS OF CREATIVITY

Creativity is expressed in multiple domains of work and more specialized areas within these domains.

The domain of artistic creativity, for instance, includes areas of visual and performing arts (Barron, 1972), music (Deutsch, 1999), and writing (Kaufman, 2002). Theoretical discussions of creativity also assume its existence in the domain of everyday life (Cropley, 1990; Maslow, 1971; Ripple, 1989; Runco, 2004). Everyday creativity concerns original and appropriate expressions in common life settings and interactions, such as managing interactions with significant others.

Although much research has focused on creativity in formal domains of work, little attention has been devoted to everyday creativity. Research on implicit theories of creativity showed that lay people recognize everyday creativity as distinct from artistic and scientific creativity (Runco & Bahleda, 1986). Similarly, Ivcevic (2007) used an act-frequency approach and showed that lay people are able to identify specific acts performed by everyday and artistically creative individuals, and that they are able to reliably judge how prototypical different acts are of respective domains of creativity. Content analysis of prototypical acts showed that everyday creativity referred to self-expression in structuring one's environment and relationships (e.g., painting furniture, surprising a friend), and artistic creativity concerned creation of works of art and achievement in the arts (e.g., completing a painting, winning an award in an art contest).

The sampling of behaviors in the present studies was based on interactive and group membership domains of the life-space and included areas of self-presentation, education and work, arts and crafts, culture and media consumption, everyday relations and activities, and memberships in groups that encourage creativity (Brackett, 2003). Some of these areas concerned generation of creative products (e.g., arts and crafts activities), whereas others referred to expressions of creative interests and values (e.g., culture and media consumption). Previous research has indicated that artistic and intellectual interests were related to creative achievement (Helson, 1999; Root-Bernstein & Root-Bernstein, 2004). Moreover, measures of aesthetic preferences, such as the Barron-Welsh Art Scale, have been used as criteria for creativity (e.g., Dollinger, 2003; Eysenck, 1994). The present studies asked how behavioral measures of such interests and preferences relate to creative behavior in artistic, intellectual, and everyday domains.

Everyday activities and interests assessed in these studies concerned creativity in interpersonal relationships (e.g., cheering a friend with a scrapbook of mementos from a vacation), self-expression (e.g., designing one's own jewelry), and cultural life (e.g., organizing a recital). Artistic creativity assessed production of works of art,

presentation of these works in public, and recognition for those works (e.g., completing a painting, winning an art contest). Intellectual creativity assessed one's activities in pursuit and creation of knowledge in education, science, and technology.

Previous research showed that creativity measured by life-report data could be described by one or a small number of broad dimensions. For example, Plucker (1999) reanalyzed three data sets that used creativity checklists, including Holland and Nichols' (1964) study of high school finalists in the National Merit program, Holland and Richards' (1965) study of first year students from 24 colleges, and Hocevar's (1976) study of undergraduates in California. All studies measured creativity by multiple item scales and assessed multiple areas of creativity, such as music, literature, and science. It was possible to extract three factors for the males and two factors for females in the Holland and Nichols (1964) study. These factors were heterogeneous in content for both genders, suggesting a level of generality; for example, science loaded on the same factor with fine arts and music. The other two studies yielded a single factor that explained 40–50% of the variance. Plucker (1999) explained the difference among three studies in terms of dissimilarity of samples (high achieving vs. a general sample of students) and in terms of increased reliability of measurement in later studies. However, these studies did not assess everyday creativity and it remains unclear whether everyday creativity constitutes a distinct dimension.

Different dimensions of creativity should show both similarities and differences in relation to psychological traits. Openness to experience was defined as a personality disposition towards creativity in different domains (Feist, 1998). Therefore, different dimensions of creativity should show convergent validity in relation to openness to experience. However, individual dimensions of creativity also should have specific descriptors. For instance, everyday creativity should be greater in females: time use studies showed that females spend more time on personal care, reading and writing, and crafts activities (McHale, Kim, Whiteman, & Crouter, 2004); invest more in personal relationships; and have more mature identities in relation to sexuality and friendship (Archer, 1993; Marcia & Friedman, 1970). Some research suggested that everyday creativity could be related to extraversion (e.g., activity, sociability; Ivcevic, 2007; Runco & Bahleda, 1986). Among formal domains of work, artistic creativity is related to emotional sensitivity and greater incidence of mood disorders (e.g., Jamison, 1993), and scientific creativity is related to self-confidence (e.g., Feist, 1999).

INTRODUCTION TO PRESENT STUDIES

Three studies mapped content dimensions of creative behavior and interest in the life-space. Study 1 tested the feasibility of distinguishing everyday from artistic creativity. Studies 2 and 3 divided creativity into multiple domains on an a priori basis. Those latter studies included intellectual as well as everyday and artistic creativity in college students and professional adults. These studies first identified areas within three domains of creativity and then analyzed these areas to identify broad dimensions of creative behavior. Obtained dimensions were examined in relation to gender and personality traits.

PRELIMINARY STUDY

A preliminary study gathered potential items for a questionnaire of everyday and artistic creativity. Several methods for gathering behaviors were used. First, open-ended questionnaires were administered to 47 college students (10 males and 37 females). The survey inquired about different areas within the interactive life-space, including self-presentation, education and work, arts and crafts, culture and media consumption, and everyday relations and activities. For example, participants were asked about something original they did to surprise a friend or a significant other.

Second, additional items were gathered through a focus group discussion. Participants in a focus group were undergraduate research assistants who were presented a list of life-space areas, and asked to comment on the existing questionnaire items and to add new ones. Finally, we reviewed existing creativity checklists (Guastello, 1991; Hocevar, 1979; Holland & Nichols, 1964), literature on leisure activities (Tinsley & Eldredge, 1995), and Web sites devoted to arts and crafts.

This process enabled us to expand on existing measures of artistic creativity and to develop an extensive set of items relevant for everyday creativity. Everyday creativity was previously mostly neglected in creativity assessment (e.g., Holland & Nichols, 1964), or measured only in crafts activities (e.g., Hocevar, 1979). In this research, items of everyday creativity referred to self-presentation (e.g., designing one's own clothes), crafts activities (e.g., scrapbooking), investment in interpersonal relationships (e.g., compiling a mixed tape or CD for a friend), and culture and media consumption (e.g., visiting art museums). Items of artistic creativity concerned visual arts, writing, music, dance, and theater. Items asked about the frequency of artistic activity (e.g., number of times in the previous year a person has painted or sculpted) and about achievement in the arts (e.g., exhibiting artwork in public).

STUDY 1

Methods

Participants

Participants were 122 students (26 males and 96 females) who participated in a lab component of the course in Personality Psychology. All subjects received course credit for their participation. Most participants were of traditional college age (95.1% between ages 17 and 22). Most students were Caucasian (97.5%) and from middle-class families (73.8% reported family household incomes above \$60,000).

Materials

Everyday and artistic creativity measures. Life-space questionnaire. A total of 174 items was included in the questionnaire and organized in groups of thematically related activities (e.g., visual arts, crafts, music, theater, and writing). The number of response options varied depending upon the item content. Some items had a dichotomous response format (e.g., whether or not a participant designed a personal Web site), some could be answered informatively on a 3-point scale (e.g., 0, 1, 2 or more art classes outside the university), and others were answered on a 5-point scale (e.g., times a person has expressed emotions through art in the previous month, ranging from 0 to 4 or more). The decision about response format for different questions was based on item content and judged frequency of behaviors.

Act-frequency scales (Ivcevic, 2007). The act-frequency scales were composed of 25 items of prototypical everyday and artistic creativity. Participants indicated whether or not they performed each of the acts in the previous 6 months. Scores were computed by summing the number of different acts endorsed for everyday and artistic creativity.

Personality trait measures: NEO PI-R (Costa & McCrae, 1992). The Big Five personality traits were assessed with the 240-item NEO-PI-R. Scores were obtained for five broad dimensions: extraversion ($\alpha = .88$), agreeableness ($\alpha = .88$), conscientiousness ($\alpha = .89$), neuroticism ($\alpha = .91$), and openness to experience ($\alpha = .87$). Participants gave self-ratings on a 5-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Procedure

All measures were administered in group settings as a part of a laboratory component of a course in Personality

Psychology. Personality trait measures were administered in the beginning of the semester and the creativity measures were administered during the final weeks of the semester. In order to minimize possible biases in students' responses, measures were administered before the discussion of Big Five personality traits and creativity in class. Participants signed an informed consent and were assigned a code to match response sheets from different sessions. Students received feedback on their Big Five traits as a part of educational experience in Personality Psychology.

Results and Discussion

Identifying Dimensions of Creativity

All life-space items were entered into a principal components analysis with oblique rotation. The number of extracted factors was determined on the basis of a joint scree plot and meaningfulness criteria. Items were considered to define a factor if their loadings were above $\pm .30$ in a pattern matrix (as recommended by Tabachnick & Fidell, 2001). Items with loadings on multiple factors were included on the factor with the higher loading.

Using the above described criteria, two factors were extracted. Together they explained 17.53% of the variance and were interpreted as Artistic Creativity and Everyday Creativity (see Table 1). The relatively low percentage of variance explained likely is due to two

influences. First, life-report data are distinct from traditional self-report data, where the relative coherence of self-perceptions (as opposed to reports of more atomistic behaviors) likely increases the accounted-for variance. Second, a larger number of specific factors that could have been retained held less theoretical relevance. A more complete description of the data could be provided by an approach that first aims to identify narrower areas of creativity and then examines these areas in a higher order analysis.

Artistic creativity was defined by 49 items ($\alpha = .92$). The highest loading items referred to involvement in visual arts, music, and an active cultural life (e.g., painting, composing music, visiting an art Web site). Everyday creativity was defined by 36 items ($\alpha = .89$). The highest loading items concerned originality in self-expression and personal relationships (e.g., making scrapbooks of memories for a friend or significant other, collecting quotes or poetry, making bulletin boards). These results replicated earlier descriptions of everyday and artistic creativity identified through the act-frequency approach (Ivcevic, 2007). However, unlike the act-frequency approach in which lay judges nominated and evaluated creative behaviors, in this study, behaviors were sampled according to the life-space model and dimensions of creativity were empirically identified.

Distinctiveness of Everyday and Artistic Creativity

Act-frequency and life-space scales for everyday and artistic creativity were highly correlated, $r_s = .61$ and $.70$, thus supporting their convergent validity (see Table 2). However, moderate to high correlations were also obtained across everyday and artistic creativity. The mean correlation between everyday and artistic creativity (within and across types of measurement) was $.52$. Although relatively high, these correlations suggested that two types of creativity could be empirically distinguished.

Convergent and discriminant validity were evaluated in relation to gender and personality traits (see Table 3).

TABLE 1
Principal Components Analysis of the Life-Space Creativity
Questionnaire: Highest Loading Items in the Domains of Artistic
and Everyday Creativity in College Students (Study 1)

	<i>Artistic Creativity</i>	<i>Everyday Creativity</i>
Cartooning	.75	
Song writing	.73	
Composing music	.72	
Writing lyrics	.70	
Working on art instead of going to party	.67	
Visiting art Web site	.66	
Practicing music instrument	.65	
Singing in choir/band	.65	
Painting	.60	
Teaching self to play instrument	.60	
Making collages		.67
Making scrapbook of memories for friend		.63
Collecting quotes/poetry in journal		.61
Making bulletin boards		.58
Scrapbooking		.56
Wearing different hairstyles		.55
Making picture frames		.53
Taking photographs		.53
Making cards		.50
Publishing in literary magazine		.49

Note. Only loadings greater than $\pm .30$ are shown.

TABLE 2
Correlations Among Everyday and Artistic Creativity on Life-Space
and Act-Frequency Scales in College Students (Study 1)

	<i>Life-Space</i>		<i>Act-Frequency</i>	
	<i>Everyday</i>	<i>Artistic</i>	<i>Everyday</i>	<i>Artistic</i>
Life-space				
Everyday	.89			
Artistic	.58***	.92		
Act-frequency				
Everyday	.61***	.45***	.68	
Artistic	.51***	.70***	.53***	.74

Note. Values in the diagonal are alpha reliability coefficients.
*** $p < .001$.

TABLE 3
Correlations Between Dimensions of Creativity, Gender, and Big Five Personality Traits in College Students (Study 1)

	<i>Life-Space</i>		<i>Act-Frequency</i>	
	<i>Everyday</i>	<i>Artistic</i>	<i>Everyday</i>	<i>Artistic</i>
Gender	.45***	-.01	.32***	.09
Big Five traits				
Extraversion	.32***	-.06	.23*	-.04
Agreeableness	.09	.08	.00	.00
Conscientiousness	.06	-.05	.23*	.17
Neuroticism	.12	.12	.00	.03
Openness	.30***	.46***	.33***	.40***

Note. * $p < .05$. *** $p < .001$.

Based on previous research, convergent validity should be demonstrated in relation to openness to experience (Griffin & McDermot, 1998; Wolfradt & Pretz, 2001). As hypothesized, self-reported openness to experience was significantly correlated with both life-space and act-frequency measures of everyday and artistic creativity (r s between .30 and .46).

On the other hand, discriminant validity was expected to be manifest in relation to gender and extraversion. As hypothesized, everyday creativity was higher in women (r s = .45 and .32 for life-space and act-frequency scales, respectively). Also, self-reported extraversion was correlated with everyday creativity (r s = .32 and .23 for life-space and act-frequency, respectively), and it was not significantly related to artistic creativity.

STUDY 2

Methods

Participants

Participants were 416 students (115 males and 300 females; 1 participant did not indicate gender) enrolled in lower level psychology courses at the University of New Hampshire. All students received course credit as compensation for completing the study. The sample was largely of traditional college age (97.8% between 17 and 22 years) and at the beginning of their college studies (87% in the first or second year in college). Most students were Caucasian (95%) and from middle-class families, with 71.6% reporting household incomes above \$60,000. A high percentage of participants were from highly educated families; 47.5% of the mothers and 52% of the fathers held bachelors degree or higher.

Measures

Creativity measures: Life-space questionnaire. The life-space questionnaire employed in Study 1 was expanded here to include items in underrepresented

areas of everyday and artistic creativity, as well as to cover the additional domain of intellectual creativity.

Some new items were obtained by reviewing the criteria for creativity used in previous research (Amabile, Hill, Hennessey, & Tighe, 1994; Griffin & McDermott, 1998). Next, in order to obtain items that adequately represented the experience of college students, open-ended questionnaires were administered to 6 advanced undergraduate students enrolled in an independent study in psychology of creativity. Each of these students was personally involved in creative activity, including dance, music, visual arts, and problem solving.

In addition to creative activities, questions about membership in groups that promote creativity were included in the questionnaire. A list of academic clubs and organizations (e.g., engineering clubs) and art groups (e.g., dance teams) was obtained from the university catalog. Since many of the participants were in their first year in college, it was expected that they might not have joined student organizations at college. Therefore, membership in both high school and college organizations was measured.

The final questionnaire consisted of 244 items: 222 items assessing creative activities and 22 items assessing group membership. The questionnaire was divided conceptually into distinct areas of creative performance (e.g., visual arts, writing, and performing arts).

Personality trait measures: Big Five personality traits. Personality traits were assessed by the 44-item Big Five Inventory (John, Donahue, & Kentle, 1991). Participants responded using a 5-point scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores were obtained for extraversion (e.g., "full of energy"; $\alpha = .85$), agreeableness (e.g., "helpful and unselfish with others"; $\alpha = .78$), conscientiousness (e.g., "does a thorough job"; $\alpha = .74$), neuroticism (e.g., "can be moody"; $\alpha = .83$), and openness to experience (e.g., "ingenious, a deep thinker"; $\alpha = .79$).

Results and Discussion

Areas of Everyday, Artistic, and Intellectual Creativity

First, life-space items were conceptually divided into domains of everyday, artistic, and intellectual creativity. Then, items were factor-analyzed within each domain to identify content areas of creativity.

Everyday creativity items were defined as those pertaining to the adaptation or creation of objects for everyday use, behavior in social relationships, and interests in intellectual and artistic activities. Artistic creativity items pertained to the production of works of art, the presentation or performance of art in public, and recognition for one's art. Intellectual creativity items referred

to science, technology, and pursuit of advanced academic interests. As in Study 1, behavior reports were analyzed through principal components analyses with oblique rotations.

Everyday Creativity

A factor analysis of the 121 items of everyday creativity yielded 5 factors that explained 23.68% of the variance (see Table 4 for an overview). The first factor, *crafts*, described the area of everyday and practical artistry (e.g., making photo collages and ornaments). Two factors described everyday artistic and intellectual interests: *cultural sophistication* referred to reading and to the pursuit of events in arts and music (e.g., reading books, visiting museums) and *refined media consumption* concerned the use of media resources related to one's interests (e.g., reading music reviews, researching a topic of interest on the Internet). Two factors of everyday creativity described behaviors that make statements about one's personal identity and social style: *self-expressive creativity* referred to originality in self-presentation (e.g., painting clothes, wearing self-made jewelry) and *interpersonal creativity* concerned original expression in

social interaction (e.g., surprising a friend with gift or gesture, animating a party). Each area was described by 11 to 20 behaviors and constituted factor-based scales with α reliability coefficients between .68 and .88. Scores for everyday creativity scales were approximately normally distributed, supporting the validity of these scales as measures of behavior that is to some extent exhibited by many people (Runco, 2004).

Artistic Creativity

Another factor analysis was performed on the 91 items of artistic creativity and 5 factors were extracted, collectively explaining 32.31% of the variance (see Table 4). Factors of artistic creativity differentiated involvement in different content areas of the arts: visual arts (e.g., number of paintings completed, exhibiting artwork in public); music (e.g., playing music in public, composing music); dance (e.g., dancing in a ballet production, choreographing a dance); theater (e.g., acting on stage, practicing lines for a play); and writing (e.g., entering writing in a contest, publishing a story). Each area included between 10 and 21 behaviors and created highly reliable factor-based scales, with α s between .79 and .89.

TABLE 4
Overview of Areas Identified in Factor Analyses of Everyday, Artistic, and Intellectual Creativity Behaviors in College Students (Study 2)

Areas	Scale Items
<i>Everyday creativity (121 items)</i>	
Crafts	Made collages (.68), made photo collages (.68), made picture frames (.66), made scrapbook (.64), made posters (.58)
Cultural refinement	Total books read (.66), novels read (.64), visited art museum (.63), nonfiction books read (.54), visited museum (other than art) (.52)
Self-expressive creativity	Painted clothes (.48), invented recipe (.48), watched art program on TV (.41), watched foreign language program on TV (.40), died hair unusual color (.38)
Interpersonal creativity	Made self center of attention (.59), told joke (.51), laughed out loud (.50), took spontaneous trip with friend (.49), animated party (.49)
Sophisticated media consumption	Read national newspaper (.57), read local newspaper (.45), read music magazines (.44), researched internet on topic of interest (.44), read music reviews (.43)
<i>Artistic creativity (91 items)</i>	
Visual arts	Number of painting completed (.74), number of drawings completed (.73), time painting (.69), time sculpting (.66), time drawing (.64)
Music	Practiced instrument (.68), played music in public (.66), received money for music performance (.63), played in band (.62), member of music groups in college (.62)
Dance	Danced ballet in production (.80), choreographed dance (.75), modern dance in production (.75), entered dance competition (.74), member of dance team in high school (.70)
Theater	Acted on stage (.72), practiced lines for play (.66), member of acting club in high school (.61), staged play (.55), member of choir in high school (.52)
Writing	Published in art magazine (.64), entered writing in contest (.64), published short story/poem (.63), published in newspaper/ magazine (.55), award for writing in previous year (.53)
<i>Intellectual creativity (30 items)</i>	
Science achievement	Entered science competition (.71), participated in science fair (.70), presented at scientific conference (.58), constructed scientific apparatus (.58), designed experiment (.56)
Academic orientation	Participated in International Research Opportunity Program (.79), independent study in social sciences (.68), study abroad (.59), published paper in undergraduate journal (.34), independent study in natural sciences (.33)
Technology	Constructed radio device (.74), entered math competition (.61), robotics project (.58), wrote software (.58), designed video game (.50)

Note. Factor loadings are shown in parentheses.

Scores for scales of artistic creativity were positively skewed; areas of dance and theater had more than two-thirds of participants reporting none or extremely low frequencies of behavior. These low frequencies of artistic behavior were similar to rates reported in nationally representative studies of time use (Robinson & Godbey, 1999). In these studies, between .1 and .9% of respondents reported public performance in music or acting and between 7 and 12% reported public or nonpublic participation in visual arts and writing at least once in the previous year. Collectively, these results indicate that artistic creativity is rather rare.

Intellectual Creativity

A further factor analysis was conducted for the domain of intellectual creativity. Three factors were retained from an analysis of the 30 items of intellectual creativity, which accounted for 30.51% of the variance (see Table 4). The first factor was labeled *science* and it described involvement and accomplishment in the sciences (e.g., designing an experiment, winning an award in science). The second factor, *academic orientation*, referred to an active pursuit of advanced educational opportunities that offer a chance for creation and development of one’s interests (e.g., independent study project, study abroad). Finally, the third factor, *technology*, described behaviors related to mathematics and engineering (e.g., entering a mathematics competition, completing a robotics project). Intellectual creativity areas were defined by 5 to 9 behaviors, and factor-based scales had α reliabilities between .60 and .72. Although somewhat lower than standard, these

reliabilities are still acceptable for scales based on behavior reports (Guastello & Shissler, 1994).

In much previous research, creativity checklists did not distinguish involvement in science and other areas of intellectual production, such as technology (e.g., Hocevar, 1979; Holland & Nichols, 1964). Therefore, this study can be viewed as a demonstration of the possibility of differentiating areas within this domain. Future work will have to include a greater number of behaviors and also assess creativity in samples with greater opportunities to manifest these behaviors.

Dimensions of Creativity

Correlations among areas of the three domains of creativity were statistically significant (see Table 5): areas of everyday creativity correlated between .21 and .55 (mean $r = .37$), areas of artistic creativity correlated between .16 and .51 (mean $r = .27$), and areas of intellectual creativity correlated between .20 and .35 (mean $r_s = .31$). Across domains, everyday and artistic creativity correlated between .01 and .60 (mean $r = .26$), intellectual and artistic creativity correlated between .01 and .18 (mean $r = .06$), and intellectual and everyday creativity correlated between .00 and .24 (mean $r = .14$). Similar correlations were observed in previous research with creativity checklists (Guastello & Shissler, 1994; Hocevar, 1976).

In order to identify major dimensions of creativity, scores on the 13 areas of creativity were entered in a principal components analysis with oblique rotation. Three second-order factors were identified, collectively accounting for 51.7% of the variance (see Table 6).

TABLE 5
Correlations Among Areas of Everyday, Artistic, and Intellectual Creativity in College Students (Study 2)

	<i>Everyday Creativity</i>				<i>Artistic Creativity</i>					<i>Intellectual Creativity</i>			
	1	2	3	4	5	6	7	8	9	10	11	12	13
Everyday													
1. Crafts	.88												
2. Cultural refinement	.39***	.83											
3. Self-expressive	.41***	.35***	.68										
4. Interpersonal	.55***	.40***	.46***	.81									
5. Sophisticated media use	.21***	.41***	.27***	.22***	.69								
Artistic													
6. Visual art	.60***	.46***	.48***	.34***	.19***	.89							
7. Music	.08	.26***	.15**	.18***	.01	.16***	.87						
8. Dance	.33***	.13**	.30***	.24***	.12*	.21***	.20***	.85					
9. Drama	.19***	.25***	.15**	.21***	.07	.19***	.32***	.26***	.78				
10. Writing	.37***	.38***	.46***	.32***	.20***	.51***	.27***	.33***	.27***	.84			
Intellectual													
11. Science	.09	.16***	.24***	.21***	.22***	.11*	.06	.00	.05	.08	.72		
12. Academic	.00	.04	.24***	.14**	.14**	.02	.01	.18***	.04	.07	.20***	.60	
13. Technology	-.05	.08	.23***	.12*	.14**	.02	.01	.07	-.01	.13**	.37***	.35***	.67

Note. Values in the diagonal are alpha reliability coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

TABLE 6
Principal Components Analysis: Dimensions of Creativity in College Students (Study 2)

	<i>I</i> <i>Creative Life-Style</i>	<i>II</i> <i>Intellectual Achievement</i>	<i>III</i> <i>Performing Arts</i>
Crafts	.83		
Visual arts	.80		
Cultural refinement	.67		
Interpersonal creativity	.64		
Self-expressive creativity	.61		
Writing	.52		.37
Sophisticated media use	.50		
Technology		.80	
Academic orientation		.71	
Science achievement		.63	
Music			.74
Theatre			.71
Dance			.55

The three dimensions were labeled Creative Life-Style, Intellectual Achievement, and Performing Arts.

Creative Life-Style was described by five areas of everyday creativity, as well as the visual arts and writing areas of artistic creativity ($\alpha = .81$). An individual high on this dimension behaves in original ways in a wide variety of daily activities, relationships, and self-presentation, and is involved in visual arts and writing, as two artistic areas that might be most readily associated with creativity by lay people. Scores on Creative Life-Style were approximately normally distributed, suggesting that this dimension identified a general behavioral style found to some extent in the population.

The next two dimensions described behavior in formal domains of work. The Intellectual Achievement dimension contained three areas of intellectual creativity ($\alpha = .60$). This dimension described an active pursuit of academic knowledge. The dimension labeled Performing Arts included music, dance, and theatre ($\alpha = .51$). Scores on Intellectual Achievement and Performing Arts were positively skewed, indicating the relative rarity of these behaviors in college

students, especially in the early stages of their academic careers.

Distinctiveness of Dimensions of Creativity

The hypotheses about the similarities and differences among dimensions of creativity were largely supported (see Table 7). Openness to experience was significantly correlated with all three dimensions of creativity, r s between .12 and .38. Furthermore, creative life-style was greater in females and intellectual achievement was greater in males (r s = .24 and $-.19$, respectively). Both creative life-style and performing arts were significantly correlated with extraversion and agreeableness (r s between .14 and .20) and intellectual achievement was significantly correlated with neuroticism ($r = -.10$). Thus, a description emerged of both creative life-style and performing arts as related to imagination and originality (traits of openness to experience), activity and enthusiasm (i.e., extraversion), and warmth and kindness (i.e., agreeableness). Previous research did not find a correlation between artistic creativity and traits of extraversion and agreeableness (Feist, 1998).

TABLE 7
Correlations Between Dimensions of Creativity, Gender, and Big Five Personality Traits in College Students (Study 2)

	<i>Creative Life-Style</i>	<i>Performing Arts</i>	<i>Intellectual Achievement</i>
Gender	.24***	.06	-.19***
Big Five traits			
Extraversion	.20***	.14**	.06
Agreeableness	.14**	.14**	-.02
Conscientiousness	.07	.01	.01
Neuroticism	.05	.02	-.10*
Openness	.38***	.23***	.12*

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

STUDY 3

Methods

Participants

Participants were 295 professional adults (101 males and 187 females; 7 participants did not report their gender). The mean age of the sample was 36.06, with the range from 20 to 72 years. Most participants were Caucasian (93.2%). The sample was highly educated, with 53.5% participants holding graduate degrees and an additional 36.2% participants holding 4-year college degrees. Most

participants were professionals working in science and engineering (41.4%); health, human services, and education (23.8%); arts and humanities (14.9%); and business or administration (11.9%). Also, 4.1% participants reported working in multiple areas.

Measures

Creativity measures: Life-space questionnaire. To elicit greater participation, a brief, 59-item questionnaire asked about behaviors in 3 domains: everyday creativity (including areas of crafts, self-expression, interpersonal creativity, sophisticated media use, and cultural refinement), artistic creativity (areas of visual arts, music, dance, theatre, and writing), and intellectual creativity (areas of science, technology/engineering, and teaching).

Personality trait measures: Big Five personality traits. The Big Five personality traits were assessed with the Ten Item Personality Inventory (TIPI; Gosling, Rethfrow, & Swann, 2003). Participants responded using a 6-point scale, from 1 (*strongly disagree*) to 6 (*strongly agree*). Scores were obtained for extraversion (e.g., extraverted, enthusiastic), agreeableness (e.g., sympathetic, warm), conscientiousness (e.g., dependable, self-disciplined), neuroticism (e.g., anxious, easily upset), and openness to experience (e.g., open to new experiences, complex). In validation studies, this questionnaire showed high test-retest reliabilities, convergent validity in relation to commonly used Big Five measures, and predictive validity in relation to a diverse set of external criteria (Gosling et al., 2003).

Procedure

Measures were administered in an Internet-based survey using a snowball recruiting method (Berg, 1988). Initially, a group of 38 professionals working in physical and social sciences, engineering, arts, and crafts was contacted by e-mail and invited to take part in a study on professional and leisure activities. The study was described as involving “people who are creative in any area of life, from professionals in arts, sciences, or technology, to people who are creative in their everyday lives.” The invitation e-mail contained a link to the Web site administering the survey and it asked potential participants to nominate creative people they know and ask them to participate in the study. The survey started with an informed consent explaining the task, and it ended with a debriefing form explaining the purpose of the study. The Web site was available for one month. The initial 38 professionals contacted several colleagues or

acquaintances who also completed the survey and sent it to several other colleagues, resulting in a final sample of 295 participants.

Results and Discussion

Preliminary Analyses

Distributions of scores in the areas within everyday, artistic, and intellectual creativity closely replicated those observed in college students. Scores for areas of everyday creativity were approximately normally distributed, and scores for areas of artistic and intellectual creativity were positively skewed. A related question concerned the distribution of creative behavior most relevant for people’s profession. The group of professional scientists was large enough to allow such analysis ($N = 122$ out of 295 participants). The most professionally relevant behaviors for this group concerned conducting research, publishing research reports, and obtaining grants for research. In the group of scientists, these behaviors were normally distributed. Thus, it appears that creativity in formal domains is rare in the general population, but normally distributed in individuals considered creative in their professions.

Dimensions of Creativity

Table 8 shows correlations among areas of creativity. Replicating findings with college students, scores on 13 areas of creativity were weakly to moderately correlated, with mean correlations among areas within one domain from .21 for artistic creativity, .26 for intellectual creativity, to .28 for everyday creativity (ranging from .00 to .45 within one domain). Correlations across domains were generally low; correlations between areas of everyday and artistic creativity ranged between .00 and .60 (mean $r = .19$), correlations between intellectual and artistic creativity areas were between .01 and .16 (mean $r = .06$), and correlations between intellectual and everyday creativity were between $-.14$ and .21 (mean $r = .01$).

A principal components analysis with oblique rotation identified three broad dimensions, accounting for 47.2% of the variance (see Table 9). These three dimensions largely replicated those identified in the study of college students and were labeled Creative Life-Style, Intellectual Achievement, and Arts. The first dimension, Creative Life-Style, was described by five areas of everyday creativity and also the area of writing from the domain of artistic creativity ($\alpha = .69$). The second dimension, Intellectual Achievement, contained 3 areas of intellectual creativity ($\alpha = .52$), and the third dimension, Arts, included areas of music, dance, theatre, and visual arts ($\alpha = .51$).

TABLE 8
Correlations Among Areas of Everyday, Artistic, and Intellectual Creativity in Professional Adults (Study 3)

	Artistic Creativity												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Everyday													
1. Crafts	.63												
2. Cultural refinement	.22***	.48											
3. Self-expressive	.30***	.25***	.35										
4. Interpersonal	.31***	.34***	.44***	.57									
5. Sophisticated media use	.16**	.39***	.24***	.20***	.58								
Artistic													
6. Visual art	.60***	.31***	.24***	.26***	.05	.72							
7. Music	.18**	.12*	.18**	.11	.08	.13*	.74						
8. Dance	.14*	.05	.24***	.19***	.02	.16**	.27***	.79					
9. Drama	.20***	.15**	.14*	.19***	.00	.27***	.17**	.36***	.76				
10. Writing	.17**	.30***	.18**	.28***	.28***	.24***	.20***	.08	.20***	.69			
Intellectual													
11. Science	-.08	-.01	-.12*	.08	.12*	-.11	-.04	.09	-.08	.09	.80		
12. Teaching	.13*	.11	.06	.21***	.15**	.06	-.03	.02	-.05	.16**	.45***	.83	
13. Technology	-.05	-.13*	-.14*	-.11	-.02	-.04	-.02	.09	.01	-.04	.26***	.08	.69

p* < .05. *p* < .01. ****p* < .001.

Distinctiveness of Dimensions of Creativity

All participants were judged to be creative by their colleagues and acquaintances. To the extent that creativity judgments are based on perceived personality traits, the sample could be skewed on personality variables. Indeed, mean scores indicated rather high levels of all five personality traits: *M* = 4.17 (*SD* = 1.37) for extraversion, *M* = 4.33 (*SD* = 1.02) for agreeableness, *M* = 4.65 (*SD* = 1.07) for conscientiousness, *M* = 2.86 (*SD* = 1.21) for neuroticism (indicating high emotional stability), and *M* = 5.04 (*SD* = .84) for openness to experience. Thus, the sample could be described as very

high on openness to experiences (imaginative, original), emotionally stable (not easily upset, calm), conscientious (hard-working, organized), and agreeable (warm, sympathetic). Although these traits can be valid descriptors of creative professional adults, negatively skewed scores on personality traits limit the size of correlations with positively skewed measures of creativity.

In spite of the skewness of personality trait scores, our hypotheses were largely supported (see Table 10). Creative life-style and arts were significantly correlated with openness to experience (*r* = .29 and .21, respectively). Intellectual achievement was not significantly correlated with openness. However, mean scores for openness to experience were high in the overall sample. Furthermore, in a sample of 122 participants working in science and engineering (who were expected to be the highest on the dimension of intellectual achievement), mean openness score was 5.00 on a 6-point scale and

TABLE 9
Principal Components Analysis: Dimensions of Creativity in Professional Adults (Study 3)

	I <i>Creative Life Style</i>	II <i>Intellectual Achievement</i>	III <i>Arts</i>
Cultural refinement	.71		
Sophisticated media use	.67		
Interpersonal creativity	.62		
Writing	.55		
Self-expressive creativity	.51		
Crafts	.43		.40
Science achievement		.85	
Teaching	.40	.65	
Technology		.57	
Dance			.75
Theatre			.69
Music			.50
Visual arts	.38		.44

Note. Only loadings greater than ±.30 are shown.

TABLE 10
Correlations Between Dimensions of Creativity, Gender, and Big Five Personality Traits in Professional Adults (Study 3)

	<i>Creative Life-Style</i>	<i>Performing Arts</i>	<i>Intellectual Achievement</i>
Gender	.14*	.10	-.20***
Big Five traits			
Extraversion	.15**	.05	.06
Agreeableness	.19**	.03	-.18**
Conscientiousness	.04	.07	.07
Neuroticism	.00	.02	.03
Openness	.29***	.21***	.06

Note. **p* < .05. ***p* < .01. ****p* < .001.

the range of scores was restricted from 3 to 6. This indicated that openness to experience is an important descriptor of intellectual achievement, but within a restricted range of high scores, greater openness is not correlated with creativity.

As hypothesized, creative life-style was greater in women and intellectual achievement was greater in men ($r = .14$ and $-.20$, respectively). Also, creative life-style was correlated with extraversion and agreeableness ($r = .15$ and $.19$), replicating findings with college students. Finally, intellectual achievement correlated negatively with agreeableness ($r = -.18$), suggesting a greater critical attitude and arrogance that might be a significant descriptor of intellectual achievement in professional adults, but not in college students.

GENERAL DISCUSSION

The three studies in this article had a goal of mapping content dimensions of creativity. Together, these studies developed the means for comprehensive assessment of everyday, artistic, and intellectual creativity and investigated the structure of creativity in college students and professional adults. Factor analyses identified 13 areas and three broad dimensions of creativity—creative life-style, arts, and intellectual achievement.

Advantages of the Life-Space Approach to Creativity

It was proposed that the life-space offers a powerful model for defining creativity both in formal work domains and everyday life. Creativity was measured in relation to self-presentation, arts and crafts, education and work, culture and media consumption, and everyday relations and activities. A conceptual definition of the content areas in people's life offered a tool to identify creative activities that were previously neglected. With 244 items measuring 13 areas of creative behavior and interest, the questionnaire developed in these studies represents a richer description of creativity. The areas of artistic creativity identified in these studies replicated those assessed in past research, including visual arts, music, dance, theatre, and writing (Hocevar, 1979). In the domain of intellectual creativity, the present studies extended the existing research and in addition to commonly studied area of science (Hocevar, 1979; Holland & Nichols, 1964), distinguished areas of technology and academic orientation.

Most notably, present studies explicitly defined and assessed everyday creativity. Although many researchers have argued for existence of creativity in everyday life (Richards et al., 1988; Ripple, 1989; Runco, 2004), no empirical investigation to date has studied it systematically.

Areas of everyday creativity identified in this research were similar to, and built on, earlier concepts in creativity

research, such as creative style of living achievements (Torrance, 1988) and avocational creativity (Richards et al., 1988). Creative style of living achievements and avocational creativity referred to non-professional activities or products and ideas that have not received social recognition (Richards et al., 1988; Torrance, 1988). The present studies defined everyday creativity as behaviors that are personally expressive (e.g., scrapbooking) or that are likely to co-occur with creativity in formal domains of work, but are distinct from them (e.g., artists often visit art museums, but visiting art museums does not make one an artist). Applying the life-space model of relevant areas for everyday creativity, we sampled behavior related to practical artistry, self-presentation, interpersonal relationships, and appreciation of art and culture. This approach identified five areas of everyday creativity, including crafts, self-expressive creativity, interpersonal creativity, cultural refinement, and sophisticated media use.

Questionnaire items were designed to assess behavior, rather than preferences or behavior tendencies (approach also used by Hocevar, 1979; Holland & Nichols, 1964). Also, most questions asked about behaviors that could have been performed during extended periods of time. This is particularly important in the study of creativity, as creative achievement requires commitment to an activity over long periods of time (Gardner, 1993). For instance, one item asked about the number of paintings a person completed. In the process of creating these paintings, the person was free to select the content of work and materials used in work, they did not have a time limit for completion of the paintings, and they were free to revise their work. By contrast, laboratory measures of creativity, such as collages or poems produced on demand in an experimental testing situation are more restrictive (Amabile, 1996; Lubart & Sternberg, 1995). Although these measures are very valuable for the study of creative processes and creativity in organizations such as schools, they are less appropriate for the study of the structure of spontaneously occurring creativity.

One legitimate concern when evaluating measures such as those used in the present studies is whether they adequately reflect real-world behavior. Although this study did not provide data to demonstrate the accuracy of behavior-reports, there are several lines of research that support their validity. Similar reports have been shown to correlate highly with peer-reports of behavior (Paunonen, 2003). Furthermore, questions about specific behaviors are less susceptible to social desirability and show predictive validity independent of self-report measures of preferences or interests (Mael & Hirsch, 1993).

Dimensions of Creativity

The present studies differentiated one rather general dimension of creative life-style from two smaller and

more specialized dimensions of arts and intellectual achievement. Creative life-style does not require formal training, or as much technical skill and knowledge as the arts and intellectual achievement. These latter kinds of creativity require domain specific learning, and imply a certain level of recognized accomplishment (e.g., passing auditions to act on stage or dance in a production).

The results of these studies have great relevance for the debate over domain specificity and generality in creativity. The results suggest that both are present. Results of previous studies can be reconciled if we analyze the criteria for creativity they employed.

Major supporters of domain-specificity of creativity have primarily relied on laboratory performance measures. Baer (1993) found that creativity on tasks in the same area (e.g., writing poems and short stories) does not highly correlate, and argued that creativity is task specific. Such laboratory assessments ask participants to create a product, but they do not allow them to choose a topic or review and modify their work. The results obtained with these assessments might be limited to situations in which a person has limited choices (such as schools).

On the other side of the debate, Plucker (1999) reanalyzed three different data sets employing creativity checklists and concluded that creativity can be described by a single dimension. However, the data sets he analyzed assessed mostly artistic creativity. For example, one data set contained measures of creativity in six areas, four of which concerned artistic creativity (i.e., drama, writing, music, and art; Holland & Nichols, 1964). Only one scale represented intellectual achievement (i.e., science). Another data set in this re-analysis similarly included four areas of artistic creativity (i.e., fine arts, performing arts, literature, and music), one area of intellectual creativity (i.e., math/science), and one area of everyday creativity (i.e., crafts; Hocevar, 1976). Although these studies made an important first step in multivariate investigation of creativity, Plucker (1999) warned that a more comprehensive assessment was necessary to adequately assess the structure of creativity. The studies reported in this research measured at least three areas in the domains of everyday, artistic, and intellectual creativity, thus enabling emergence of distinct dimensions.

It can be hypothesized that certain group memberships and personality traits influence the development of specific kinds of creativity. All three dimensions of creativity were related to openness to experience, indicating that perceptions of one's self as imaginative and full of ideas are a common attribute of different kinds of creativity. On the other hand, creative life-style behaviors were higher in women. Indeed, there are more stereotypically female creative life-style behaviors, such as decorating one's living environment or designing

clothes. Women are also often described as more attentive to relational aspects of their identities and therefore more likely to engage in interpersonal creativity (Archer, 1993; Marcia & Friedman, 1970). Intellectual achievement was higher in males, supporting findings on gender differences in achievement and career decisions (Halpern, 2004; Levine & Ornstein, 1983). Also, creative life-style was related to higher extraversion, reflecting the requirements of these behaviors for energy, spontaneity, and willingness for self-expression in social settings. Future research will have to address developmental, social, and motivational mechanisms related to these differences.

REFERENCES

- Amabile, T. M. (1996). *Creativity in context*. Boulder, CO: Westview Press.
- Amabile, T. M., Hill, K. G., Hennessey, B. A., & Tighe, E. M. (1994). The work preference inventory: Assessing intrinsic and extrinsic motivational orientations. *Journal of Personality and Social Psychology*, 66, 950–967.
- Archer, S. L. (1993). Identity in relational contexts: A methodological proposal. In J. Kroger (Ed.), *Discussions on ego identity* (pp. 75–99). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Baer, J. (1993). *Creativity and divergent thinking: A task-specific approach*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Barron, F. (1972). *Artists in the making*. New York: Seminar Press.
- Barron, F. (1988). Putting creativity to work. In R. J. Sternberg (Ed.), *Nature of creativity* (pp. 76–98). Cambridge, MA: Cambridge University Press.
- Berg, S. (1988). Snowball sampling. In S. Kotz & N. L. Johnson (Eds.), *Encyclopedia of statistical sciences* (pp. 529–532). New York: Wiley.
- Brackett, M. A. (2003). *Conceptualizing and measuring the life-space and its relation to openness to experience*. Unpublished doctoral dissertation. University of New Hampshire.
- Brackett, M. A., Mayer, J. D., & Warner, R. M. (2004). Emotional intelligence and its expression in everyday behavior. *Personality and Individual Differences*, 36, 1387–1402.
- Buss, D. M., & Craik, K. H. (1981). The act-frequency analysis of interpersonal dispositions: Aloofness, gregariousness, dominance, and submissiveness. *Journal of Personality*, 49, 175–192.
- Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five Factor Inventory (NEO-FFI) Professional Manual*. Odessa, FL: Psychological Assessment Resources.
- Cropley, A. (1990). Creativity and mental health in everyday life. *Creativity Research Journal*, 3, 167–178.
- Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York: Harper Collins.
- Deutsch, D. (1999). *The psychology of music*. San Diego, CA: Academic Press.
- Dollinger, S. J. (2003). Need for uniqueness, need for cognition and creativity. *Journal of Creative Behavior*, 37, 99–116.
- Dollinger, S. J., Dollinger, S. M., & Centeno, L. (2005). Identity and creativity. *Identity*, 5, 315–339.
- Eysenck, H. J. (1994). Creativity and personality: Word association, origence, and psychoticism. *Creativity Research Journal*, 7, 209–216.
- Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review*, 2, 290–309.

- Feist, G. J. (1999). The influence of personality on artistic and intellectual creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 273–298). Cambridge, UK: Cambridge University Press.
- Feist, G. J., & Barron, F. X. (2003). Predicting creativity from early to late adulthood: Intellect, potential, and personality. *Journal of Research in Personality, 37*, 62–88.
- Funder, D. C. (2001). *The personality puzzle*. New York: Norton.
- Gardner, H. (1993). *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.
- Gosling, S. D., Rethfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big Five personality domains. *Journal of Research in Personality, 37*, 504–528.
- Griffin, M., & McDermott, M. R. (1998). Exploring a tripartite relationship between rebelliousness, openness to experience, and creativity. *Social Behavior and Personality, 26*, 347–356.
- Guastello, S. J. (1991). *Artistic and scientific activities survey*. Unpublished test.
- Guastello, S. J., & Shissler, J. E. (1994). A two-factor taxonomy of creative behavior. *Journal of Creative Behavior, 28*, 211–221.
- Halpern, D. F. (2004). A cognitive-process taxonomy for sex differences in cognitive abilities. *Current Directions in Psychological Science, 13*, 135–139.
- Helson, R. (1999). A longitudinal study of creative personality in women. *Creativity Research Journal, 12*, 89–102.
- Hocevar, D. (1976). Dimensionality of creativity. *Psychological Reports, 39*, 869–870.
- Hocevar, D. (1979, April). *The development of the Creative Behavior Inventory*. Paper presented at the Annual Meeting of the Rocky Mountain Psychological Association.
- Holland, J. L., & Nichols, R. C. (1964). Prediction of academic and extracurricular achievement in college. *Journal of Educational Psychology, 55*, 55–65.
- Holland, J. L., & Richards, J. M. (1965). Academic and nonacademic accomplishment: Correlated or uncorrelated. *Journal of Educational Psychology, 56*, 165–174.
- Ivcevic, Z. (2007). Artistic and everyday creativity: An act-frequency approach. *Journal of Creative Behavior, 41*, 271–290.
- Jamison, K. R. (1993). *Touched with fire: Manic-depressive illness and the artistic temperament*. New York: Free Press.
- John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory—Versions 4a and 4b* [Technical report]. Berkeley, CA: Institute of Personality and Social Research, University of California.
- Kaufman, J. C. (2002). Dissecting the golden goose: Components of studying creative writers. *Creativity Research Journal, 14*, 27–40.
- Larson, R., & Csikszentmihalyi, M. (1983). The experience sampling method. *New Directions for Methodology of Social and Behavioral Science, 15*, 41–56.
- Levine, D. U., & Ornstein, A. C. (1983). Sex differences in ability and achievement. *Journal of Research and Development in Education, 16*, 66–72.
- Lubart, T. I. (1994). Creativity. In R. J. Sternberg (Ed.), *Thinking and problems solving* (pp. 289–332). San Diego, CA: Academic Press.
- Lubart, T. I., & Sternberg, R. J. (1995). An investment approach to creativity: Theory and data. In S. M. Smith, T. B. Ward, & R. A. Finke (Eds.), *The creative cognition approach* (pp. 269–302). Cambridge, MA: MIT Press.
- Mael, F. A. (1991). A conceptual rationale for the domain and attributes of biodata items. *Personnel Psychology, 44*, 763–792.
- Mael, F. A., & Hirsch, A. C. (1993). Rainforest empiricism and quasi-rationality: Two approaches to objective biodata. *Personnel Psychology, 46*, 719–738.
- Marcia, J. E., & Friedman, M. L. (1970). Ego identity status in college women. *Journal of Personality, 38*, 249–263.
- Maslow, A. H. (1971). *The farther reaches of human nature*. New York: Penguin Books.
- Mayer, J. D. (2004). A classification system for the data of personality psychology and adjoining fields. *Review of General Psychology, 8*, 208–219.
- Mayer, J. D. (2005). A tale of two visions: Can a new view of personality help integrate psychology. *American Psychologist, 80*, 294–307.
- Mayer, J. D., Carlsmith, K. M., & Chabot, H. F. (1998). Describing the person's external environment: Conceptualizing and measuring the life-space. *Journal of Research in Personality, 32*, 253–296.
- McHale, S. M., Kim, J. Y., & Whiteman, S. (2004). Links between sex-typed time use in middle childhood and gender development in middle adolescence. *Developmental Psychology, 40*, 868–881.
- McKinnon, D. W. (1975). IPAR's contribution to the conceptualization and study of creativity. In I. A. Taylor & J. W. Getzels (Eds.), *Perspectives in creativity* (pp. 60–89). Chicago, IL: Aldine.
- Paunonen, S. V. (2003). Big Five factors of personality and replicated predictions of behavior. *Journal of Personality and Social Psychology, 84*, 411–424.
- Plucker, J. A. (1999). Reanalysis of student responses to creativity checklists: Evidence of content generality. *Journal of Creative Behavior, 33*, 126–137.
- Richards, R., Kinney, D. K., Benet, M., & Merzel, A. P. C. (1988). Assessing everyday creativity: Characteristics of the Everyday Creativity Scales and validation with three large samples. *Journal of Personality and Social Psychology, 54*, 467–485.
- Ripple, R. E. (1989). Ordinary creativity. *Contemporary Educational Psychology, 14*, 189–202.
- Robinson, J. P., & Godbey, G. (1999). *Time for life: The surprising ways Americans use their time*. University Park, PA: Pennsylvania State University Press.
- Root-Bernstein, R. S., & Root-Bernstein, M. (2004). Artistic scientists and scientific artists: The link between polymathy and creativity. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realization* (pp. 127–151). Washington, DC: American Psychological Association.
- Runco, M. A. (2004). Everyone has creative potential. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realization* (pp. 21–30). Washington, DC: American Psychological Association.
- Runco, M. A., & Bahleda, M. D. (1986). Implicit theories of artistic, scientific and everyday creativity. *Journal of Creative Behavior, 20*, 93–98.
- Simonton, D. K. (1992). The social context of career success and course for 2,026 scientists and inventors. *Personality and Social Psychology Bulletin, 18*, 452–463.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*. Boston, MA: Allyn and Bacon.
- Tinsley, H. E. A., & Eldredge, B. D. (1995). Psychological benefits of leisure participation: A taxonomy of leisure activities based on their need-gratifying properties. *Journal of Counseling Psychology, 42*, 123–132.
- Torrance, E. P. (1988). The nature of creativity as manifest in its testing. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 43–75). Cambridge, MA: Cambridge University Press.
- Wolfradt, U., & Pretz, J. E. (2001). Individual differences in creativity: Personality, story writing, and hobbies. *European Journal of Personality, 15*, 297–310.

Copyright of Creativity Research Journal is the property of Lawrence Erlbaum Associates and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.