Creativity 10

Key Terms

Alternate Uses Test
brainstorming
convergent thinking
divergent thinking
investment theory
overinclusive thinking
Remote Associations Test
three-ring theory of giftedness
threshold theory of creativity and intelligence
Torrance Test of Creativity and Thinking

Chapter Outline

10.1 INTRODUCTION

Some people are more able to surprise us with original thoughts and novel solutions that are simply unexpected. These people seem to stand out in the crowd and are capable of innovating – in fact, they seem to prefer innovation to imitation and may often choose to defy the crowd. What makes these people capable of generating new ideas and discovering unknown paths? The study of individual differences in creativity attempts to answer this question.

In the present chapter, I examine the concept of creativity. Although this topic has a longstanding history in differential

psychology (dating back to the very beginnings of intelligence testing more than 100 years ago), creativity researchers have constituted a minority within individual differences and have often pointed out that more attention should be given to the field (Guilford, 1950; Sternberg & Lubart, 1996). Despite growing research in the area and explicit economic interests, creativity has indeed been absent from the individual differences curricula, though it has often been discussed, peripherally, with regard to personality and intelligence. Thus creativity is associated with a wide range of concepts, such as motivation, imagination, metacognition, social influence, intuition, potential, leadership, humor, and mental illness (Runco, 2004).

In a sense, it would almost be impossible to introduce the concept of creativity without reference to either personality or intelligence theories, but, then again, this is true for virtually any topic in differential psychology. Accordingly, the core of this chapter will focus on the relationship of creativity with established personality and ability constructs. On the other hand, if creativity deserves its own chapter in this book (and, of course, I think it does), it is because it represents *something other* than individual differences in personality and intelligence. It should therefore be noted that comparisons between creativity and personality or intelligence are useful to *define away* creativity from established individual difference constructs. In fact, in many passages of this chapter, it should become clear that creativity may differ from intelligence and that it cannot be explained merely in terms of known personality traits.

Figure 10.1 presents a conceptual map of the contents of this chapter, which begins by introducing definitions and approaches to creativity and follows this up by focusing on differential approaches, in particular the relationship of creativity with intelligence and personality traits. The final sections of this chapter discuss the role of creativity in different contexts of everyday life.

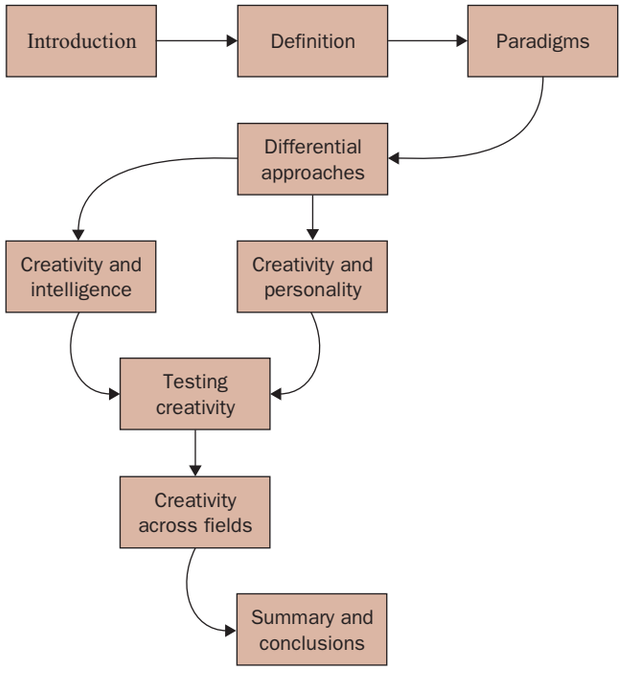


Figure 10.1 Conceptual map of the contents of chapter 10.

10.2 DEFINITIONS AND CONCEPTUALIZATIONS OF CREATIVITY

What is creativity? Like other individual difference constructs, creativity is part of everyday vocabulary and most people have a rather good idea of what creativity is about. In fact, one need not be an expert in the field to rate creativity in others, or even in oneself: for instance, I tend to think of myself as a highly creative individual but others tend to disagree!

That said, the term "creative" is used so widely that it is indispensable to define it and refine its meaning. There are creative and uncreative people, behaviors, and works. Moreover, there seem to be creative professions, such as writer, actor, or musician, and uncreative ones, such as police officer, accountant, and lawyer, though creativity may help police officers to capture a criminal, accountants to avoid taxes, and lawyers to win a legal case. Creativity, then, seems to be associated with a wide range of phenomena, from a football pass to a piano concerto, from a hairstyle to a mathematical theory, from a cooking recipe to a game of chess, hence it is used to characterize individuals, groups, and even societies.

One theoretical approach to overcome the multiplicity of meanings underlying the concept is to conceptualize creativity as a *syndrome* or complex rather than a single phenomenon. Accordingly, "creativity" can be used to refer to individuals, processes, products, and environments alike (see Figure 10.2). In this book, I shall focus on the individual perspective of creativity, which is particularly relevant for understanding individual differences.

Very often creativity is simply defined in terms of *originality*, though this is merely one aspect of creativity. Thus creative behaviors and works are original, but not all original behaviors and works are considered creative. For example, an exact replica (if that were possible) of Leonardo Da Vinci's *Mona Lisa* would

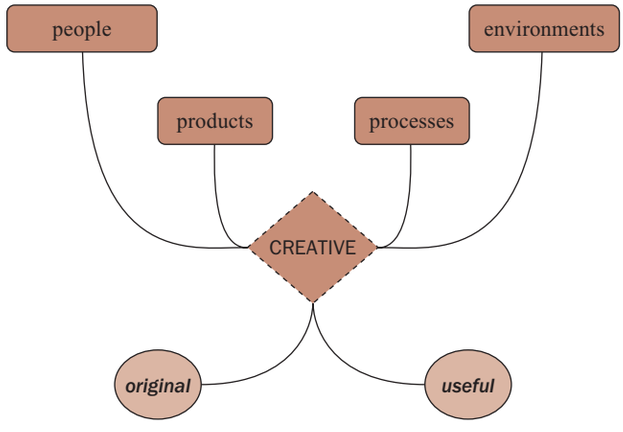


Figure 10.2 Defining the creativity syndrome.

not be considered creative, but my version of that painting would rarely be considered creative, even though it would not look like it at all.

Critics of the conceptualization of creativity as originality have observed that "creativity has finished up by being evaluated simply as an oddity or bizarreness of response relative to the population mean or as output of words per minute, etc. This indeed comes close to mistaking the shadow for the substance" (Cattell, 1971a, p. 409). Creative products, then, should not only be original but also useful. Accordingly, a more accurate definition of creativity may be that of "the production of an idea or product that is both novel and useful" (Sternberg & O'Hara, 2000, p. 611).

Unfortunately, there are problems with this definition, too. First, few ideas are effectively "new." Even the most groundbreaking scientific discoveries tend to derive from previously considered ideas rather than appear from out of the blue. Some philosophical systems, such as the dialectics of G. W. F. Hegel (1770–1831) and Karl Marx (1818–83), explained in great detail how new ideas tend to evolve from old ones. This would also apply to scientific discoveries. The philosopher of science Karl Popper (1902–94) argued that scientific knowledge can only advance through testing existing hypotheses, which is what we do in psychological research. This explains why it is rarely possible to publish research that is completely original in peer-reviewed scientific journals.

On the other hand, the "usefulness" of an idea may depend on a subjective or personal evaluation: useful for whom? For example, what is the usefulness of Picasso's *Guernica* painting? Is Beethoven's 9th Symphony more useful than Einstein's relativity theory? Is Einstein's relativity theory more useful than a pair of designer shoes? Is a pair of designer shoes more useful than a religious doctrine? Are creative things ever useful? In his introduction to *The Picture of Dorian Gray*, Oscar Wilde (1854–1900) famously claimed that "*all art is quite useless*."

Thus definitions of creativity will depend on whether one refers to socially valuable products or intrinsically creative processes, such as dreams, thoughts, and even naïve curiosity (Barron & Harrington, 1981). The latter conceptualization is less relevant in regard to performance, but still important for understanding individual differences in creative thinking.

Other definitions of creativity have focused on the level of difficulty, aesthetic value, or impact of creative products, but there are limitations to these approaches, too. Assessing the level of difficulty may be subjective and there are no objective parameters to establish interdisciplinary comparisons (for example, is it more difficult to compose a piano concerto or to create a sculpture?). Beauty is equally subjective and depends not only on individual taste but also on chronological factors. For instance, Van Gogh's paintings were only considered beautiful long after his death and many of Bach's compositions were equally unsuccessful during his lifetime. Thus creative impact may depend on factors other than creativity, such as networking, marketing, promotion, and politics.

10.3 CREATIVITY ACROSS DIFFERENT PSYCHOLOGICAL PARADIGMS

Approaches to creativity may be classified in terms of psychological paradigms, such as evolutionary, biological, cognitive, and differential, and are summarized in Figure 10.3. The differential approach is the focus of this chapter and is examined in more detail in section 10.4.

The *behavioral* paradigm conceptualizes creativity in terms of novel associations and tries to identify the behavioral correlates of novel learning processes. One example is the concept of "insight," which has a longstanding history in psychology and refers to spontaneously synthesized learned associations. Behaviorists are especially interested in the effects of experience on insight and how these benefit creative thinking. However, the notion of creativity as a latent (not directly observable) variable is largely incompatible with the behavioral approach to creativity.

The *biological* paradigm, on the other hand, looks at the physiological correlates of creative thinking and how these processes may be manifested at the level of brain structure and neural processes. A central issue here is the extent to which creativity can be mapped onto either right or left hemispherical activity. Even though early research suggested that original ideas are caused by lower levels of cortical arousal, which enable defocused attention (Martindale & Hasenfus, 1978), more recent findings indicate that creativity requires both hemispheres to be involved (Katz, 1997). Thus creative thinking would involve as much rational as intuitive processes.

The *clinical* paradigm looks at the extent to which creativity is associated with abnormal behavior, either as a cause or consequence of psychological disorders. A well-known idea that emerged from this area is the "mad genius" hypothesis (Becker,

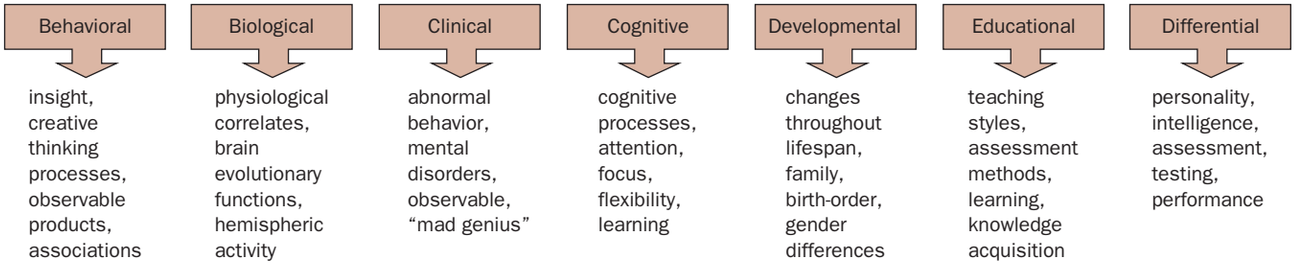


Figure 10.3 Creativity across different paradigms.

1978), which prescribes a connection between insanity and artistic creativity. Established psychological theories, such as Eysenck's (1999), postulate a relationship between creativity and mental disorders. This link is examined in section 10.6.1.

The *cognitive* paradigm (as you may have guessed!) emphasizes the role of cognitive processes, such as attention and memory, in regard to creativity. For instance, Wallach (1970) found that broader rather than focused attention is beneficial for creativity as it enables individuals with a wider range of stimuli and memory traces to produce ideas (see also Martindale & Greenough, 1973). Studies have also reported that broader attention is more likely to occur in the absence of pressure (for example, during evaluations or examinations), as it leads individuals to divide attentional resources between task-relevant and task-irrelevant stimuli (Smith, Michael, & Hocevar, 1990).

Other cognitive studies examined the link between creativity and previous knowledge and reported a negative correlation between these constructs (Hayes, 1978; Simon & Chase, 1973). Thus expertise is detrimental for creative thinking, probably because it reduces flexibility. This may explain why it is usually more difficult to convince experts to change their minds than novices (Frensch & Sternberg, 1989). Along these lines, the technique of **brainstorming**, which requires a group of individuals to say everything that comes to mind about a certain topic (without censoring any ideas), attempts to postpone judgment in order to increase fluency of responses and originality, although Rickards and deCock (1999) concluded that brainstorming is ineffective.

brainstorming a technique for generating ideas in a group setting which involves individuals saying everything that comes to mind about a topic, without self-censorship or inhibition

The *developmental* approach attempts to identify changes in creativity throughout the lifespan and how certain characteristics of the family (e.g., size, age, birth order) may affect levels of creativity. It has, for instance, been shown that middle-born children tend to be more rebellious than their siblings and are thus more likely to have creative personalities (Sulloway, 1996). Gender (as opposed to sex) is also associated with creativity as androgynous individuals – i.e., those low in both masculinity and femininity – tend to be more flexible and more creative than stereotypically masculine or feminine people.

The *educational* paradigm looks at creativity in the context of formal education (e.g., primary school, secondary school, university) and attempts to assess how different teaching modalities may influence students' creativity. To the extent that educational methods may partly determine the development of creativity, the identification of the causes of high and low creativity would provide important information for policy and designing interventions. Traditionally, educational settings such as primary and secondary school tend to praise **convergent thinking** rather than **divergent thinking** or originality, requiring pupils to provide "correct" rather than "unique" answers. For example, school teachers are more likely to ask pupils what the capital of France is than what name *they* would give to the capital of France (if the answer weren't Paris).

convergent thinking the generation of a response to a problem that requires a single, "correct" answer, e.g., "Paris" for the question "What is the capital of France?" (compare with **divergent thinking**)

divergent thinking widely regarded as an aspect of creativity, divergent thinking refers to the generation of multiple, "unique" answers to a problem, e.g., "Find as many uses as you can for a piece of string" (compare with **convergent thinking**)

The *differential* or psychometric paradigm represents the leading approach to the study of creativity. Although the concept of creativity developed in the context of early intelligence theories and preliminary attempts to predict academic performance, it soon expanded to the field of personality traits and eventually became consolidated as an independent area of individual differences. There are four major perspectives by which differential psychologists conceptualize creativity (Rhodes, 1961/1987; see also Runco, 2004). These approaches are discussed below.

10.4 DIFFERENTIAL APPROACHES TO CREATIVITY

There are four main differential approaches to creativity, namely:

1. The *person* approach, which attempts to identify the major characteristics of creative individuals, looking primarily at the personality traits and ability levels of creative people. As such, it is comparable to the *dispositional* approach to personality (which focuses on the individual rather than the situation or context), although it also deals with the relationship between creativity and established ability constructs.
2. The *process* approach to creativity, on the other hand, aims at conceptualizing the cognitive mechanisms underlying the process of creative thinking, for example, associative and divergent thinking. Unlike the person approach, process approaches to creativity are not aimed at distinguishing between creative and non-creative individuals but try to explain the general process of creative thinking in all individuals alike. They are thus concerned with actual creativity rather than creative individuals and draw heavily from cognitive psychology. In fact, the process approach to creativity is best represented by the collaborative effort between cognitive and differential psychologists.
3. The *product* approach to creativity studies the characteristics of creative outcomes or products, such as art works (e.g., paintings, designs, sculptures) and scientific publications (e.g., theories, experiments, discoveries). The product approach is closely related to the study of *aesthetics*, which is a classic area of philosophy. Accordingly, it is largely concerned with productivity and achievement and focuses on individuals' creations rather than their personalities or the processes facilitating creative production (Simonton, 2004).
4. Finally, the *press* approach to creativity looks at the relationship between individuals as creators and their environments. It therefore deals with the contextual determinants of creativity, resembling the *situational* rather than dispositional

approach to personality. For example, "freedom, autonomy, good role models and resources (including time), encouragement specifically for originality, [and] freedom from criticism" (Runco, 2004, p. 662) are all contextual factors that can be expected to boost creative production and facilitate creative thinking.

Although I have examined several paradigms and approaches to creativity, such distinctions do not always hold in practice. Creativity is a multidisciplinary field and current progress is very much dependent on the integration of different paradigms and opportunities to exchange knowledge between different approaches. Thus there are several journals, such as *Intelligence*, *Journal of Creative Behavior*, *Gifted Child Quarterly*, *Journal of Mental Imagery*, and *Creativity Research Journal*, that encourage researchers to combine different methods and approaches to study creativity. Those of you interested in the topic may also consult the comprehensive handbooks of creativity compiled by Sternberg (1999) and Runco (1998, 2003a, 2003b).

10.5 CREATIVITY AND INTELLIGENCE

> To repeat what others have said, requires education; to challenge it, requires brains.
>
> Mary Pettibone Poole

As said, early studies on creativity were closely aligned with the study of intelligence (see chapters 5 and 6). According to Gardner (1993), the reason for this was that creativity researchers had already established careers as intelligence psychometricians. The most salient example was no doubt Guilford (see section 5.7), who quickly became the first leading figure in creativity research. In 1950, Guilford highlighted the importance of increasing creativity research after noting that only 186 of the 121,000 psychological studies in databases had dealt with creativity.

By the 1950s, differential psychologists had provided sufficient evidence in support of the validity and reliability of ability tests, consolidating intelligence as an important psychological construct (see section 5.3.3). Thus any attempt to conceptualize, understand, and measure creativity would have to take into account established ability constructs. This led differential psychologists to explore the relationship between creativity and intelligence, which was the focus of much creativity research until the 1980s and progressively waned thereafter (Barron & Harrington, 1981; Runco, 2004), though there is still much to know about the link between intelligence and creativity.

In an attempt to instill some order in the literature, Sternberg and O'Hara (2000) considered five possible ways in which creativity and intelligence may be related:

a) Theories conceptualizing creativity as part of intelligence.
b) Theories conceptualizing intelligence as part of creativity.
c) Theories conceptualizing creativity and intelligence as identical constructs.
d) Theories conceptualizing creativity and intelligence as unrelated constructs.
e) Theories conceptualizing creativity and intelligence as related constructs.

These hypotheses are summarized in Figure 10.4 and discussed in the forthcoming sections.

In addition, several researchers have conceptualized creativity as an aspect of personality rather than intelligence. Thus Torrance (1979) pointed out that "educators and psychologists have tried to make an issue of whether creativity is essentially a personality syndrome that includes openness to experience, adventuresomeness, and self-confidence" (p. 360). The inclusion of creativity in the realm of personality traits is discussed in detail throughout sections 10.6.1 and 10.6.2.

Despite the significant increase in studies investigating creativity since the 1950s, Guilford's plea for more creativity research has been echoed by experts on several recent occasions (e.g., Runco, 2004; Sternberg & Lubart, 1996).

10.5.1 Creativity as a form of intelligence

The idea that creativity may be a subset or form of intelligence is not new. Binet's early attempts to design an IQ test (see Brown,

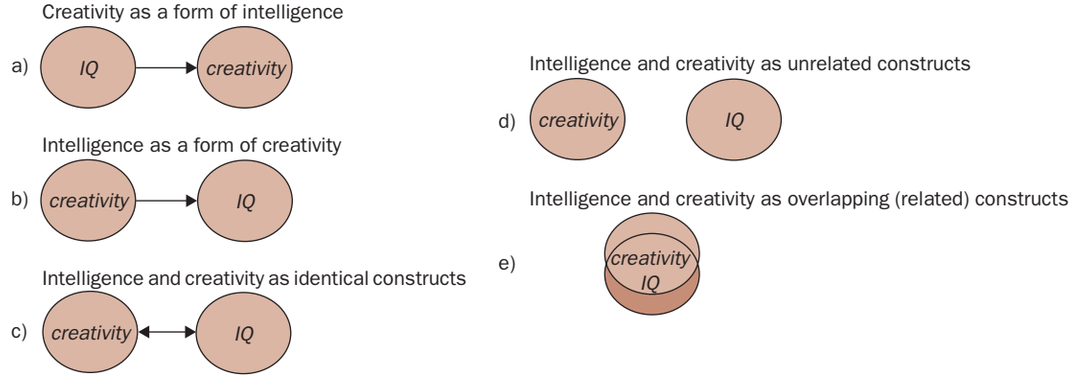


Figure 10.4 Creativity and intelligence.

1989) included open-ended items to measure children's imagination (see section 5.3.3), though these were soon dropped because of unsatisfactory reliability.

Until the 1980s, many differential psychologists viewed creativity as an aspect of intelligence. For example, in Barron and Harrington's (1981) review of the literature, the authors still refer to creativity as "an *ability* manifested by performance in critical trials, such as tests, contests, etc." (p. 442, italics added). Moreover, insofar as creativity is associated not only with novel but also with *appropriate* responses, there is arguably a clear component of intelligence in creative thinking (Sternberg & Lubart, 1995).

The most explicit attempt to demonstrate that creativity is a component of intelligence was that of Guilford (1967), who proposed a comprehensive, multi-dimensional model of intelligence that encompassed more than 120 abilities (see section 5.7). Crucially, one of the intellectual operations described in this model is *divergent production*, which refers to an individual's production of multiple solutions to problems rather than the identification of a single, correct response. If divergent production represents an aspect of intelligence, creativity would be a subset of intelligence, too.

Unfortunately, and unlike convergent thinking, the very definition of divergent thinking implies that it cannot be measured by multiple-choice items, making objective scoring almost impossible. However, Guilford (1975) did identify a number of important aspects of creativity such as *flexibility*, *problem identification*, *fluency*, and *originality* that would set the foundations for later creativity tests (see section 10.7). Although Guilford is undoubtedly the most influential creativity researcher in differential psychology, his intelligence model (discussed in section 5.7) had a relatively minor impact in the field, with most researchers favoring one-dimensional models such as Spearman's theory of general intelligence (discussed in section 5.3.4).

Another theory that conceptualized creativity as a form of intelligence was that of R. B. Cattell (1971a). In particular, Cattell viewed creativity as a combination of primary skills, such as sensitivity, motor speed, musical rhythm, timing, and judgment, which he considered a subset of *fluid intelligence* (*gf*) (see again section 5.4 for an overview of Cattell's intelligence theory). Interestingly, Cattell argued that personality traits were also important to determine and explain individual differences in creative performance, thus integrating personality and intelligence approaches to creativity (see also Chamorro-Premuzic & Furnham, 2005).

Finally, the view of creativity as an essential aspect of intelligence is also supported by Gardner's (1993) theory of *multiple intelligences* (see section 8.3.1), which comprises eight independent abilities, namely *intrapersonal*, *logical-mathematical*, *spatial*, *bodily-kinesthetic*, *interpersonal*, *musical*, *naturalistic*, and *linguistic*. In a series of case studies, Gardner examined the lives of individuals who excelled at each of these intelligences and made exceptionally creative contributions to the fields of music (Igor Stravinsky), poetry (T. S. Eliot), psychology (Sigmund Freud), politics (Mohandas Ghandi), and others. According to Gardner, the creative achievement of these individuals can be explained as much by their unusually high levels of domain-relevant abilities as by their unusually low levels of other domain-irrelevant abilities. For instance, Gardner notes that Freud had very high verbal ability but very low spatial and musical abilities. In any case, no combination of ability levels would be sufficient to explain creative achievement because personality characteristics such as focus, persistence, and passion would play an equally important role in determining creativity levels.

10.5.2 Intelligence as a form of creativity

The conception of intelligence as a form or expression of creativity posits that one of the aspects of intelligence is the ability to shape one's environment (Ochse, 1990). A paradigmatic model that regards creativity as the precondition for intelligence is Sternberg and Lubart's (1995, 1996) **investment theory**, named after the idea that creative individuals have an extraordinary ability to invest in ideas, "buying low and selling high" (Sternberg & O'Hara, 2000). The authors also posit that creativity is an important determinant of intelligent thinking and intelligent behavior because it enables individuals to "think differently" and "defy the crowd." For example, if a large number of individuals are buying property in a specific area or city, creative individuals may interpret this as a bad investment opportunity and avoid buying at already high prices, hence creativity would be beneficial for solving practical problems effectively.

investment theory theory according to which creative individuals have an exceptional ability to invest in ideas; thus, creativity is seen as a precondition of intelligence and a determinant of intelligent thinking and behavior

Likewise, creativity may help individuals to "redefine" problems. As Sternberg and O'Hara (2000) observed, "Einstein redefined the way physicists and others understand physical laws and how they function in the universe. Darwin redefined the way we view the development of organisms over the aeons. Picasso redefined the way we perceive possibilities for artistic expression" (p. 615). Thus creativity would enable individuals not just to solve problems, but to do so in new ways.

Figure 10.5 presents a graphical depiction of Sternberg and Lubart's (1995) model in which six different factors converge to determine creativity, namely *intelligence*, *knowledge*, *thinking styles*, *personality*, *motivation*, and the *environment*. When psychometrically assessed, each of these factors can be regarded as proxy measures of creative thinking and creative behavior. Thus the arrows are pointed in the direction of the criterion variable – creativity – stemming from the predictors. Theoretically, this implies that the latent variable of creativity operates as a superset of the other factors.

Sternberg argued that three aspects of intelligence underlie individual differences in creativity, namely, *synthetic*, *analytical*, and *practical* intelligences. Synthetic intelligence is used to combine different cognitions and produce novel associations, such as in the case of insight. Analytical intelligence is important because it enables creative individuals to judge the value or appropriateness of an idea. Last but not least, practical intelligence would be

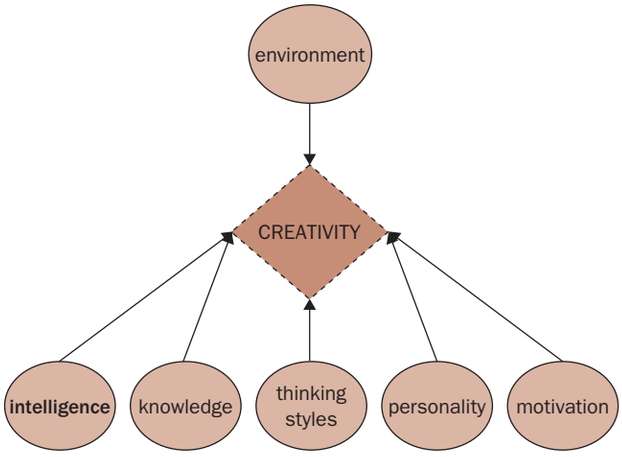
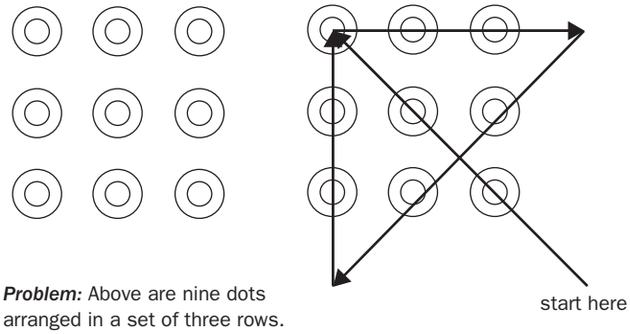


Figure 10.5 Sternberg and Lubart's (1995) model: creativity as a superset of intelligence.



Problem: Above are nine dots arranged in a set of three rows. Your challenge is to draw *four* straight lines which go through the middle of *all* of the dots (once) without taking the pencil off the paper.

Solution: Think outside the box!

Figure 10.6 Thinking "outside the box": when intelligent and creative solutions are the same thing.
Source: Based on Weisberg & Alba (1981).

advantageous for applying creative ideas in everyday life and "selling" them to others (see Sternberg & O'Hara, 2000, for a review of Sternberg's creativity theory).

10.5.3 Creativity and intelligence as identical constructs

Some theorists have argued that creativity and intelligence are merely two different names for the same construct. This would require psychometric scores on creativity and intelligence measures to be highly intercorrelated, though since intelligence and creativity measures are not perfect, both types of tests may be tapping on different but related aspects of the same underlying variable. Accordingly, Haensly and Reynolds (1989) conceptualized creativity and intelligence as a "unitary phenomenon" in which creativity would be regarded as the ultimate manifestation of intellectual ability.

Based on the theoretical similarities between the processes underlying creative and intelligent problem solving, Weisberg and Alba (1981) (see also Perkins, 1981) argued that no qualitative differences exist between creativity and intelligence. Rather, the same cognitive mechanisms are employed when solving both creativity and intelligence problems.

The famous *nine-dot problem*, shown in Figure 10.6, is often used as an example of there being no real differences between creative and intelligent thinking, as the "correct" solution is also the "creative" solution. Intelligent people, then, would also be more able to "think outside the box." This is consistent with Barron's (1963) idea that "[t]he very difficult and rarely solved problem requires by definition a solution that is original" (p. 219).

10.5.4 Creativity and intelligence as unrelated constructs

A fourth interpretation for the relationship between creativity and intelligence is that they are completely unrelated constructs. As is often the case in psychology, two conflicting views can coexist on theoretical or empirical grounds, mainly due to ambiguous empirical evidence. The view of creativity and intelligence as unrelated variables is the complete opposite of the hypothesis examined in section 10.5.3.

Conceptually, the independence of creativity from intelligence would be supported by the fact that, whilst intelligence refers to adaptation to existing environments, creativity involves *changing* existing environments to create new ones (Sternberg, 1985). In that sense, creativity and intelligence would almost be mutually exclusive: if a response is intelligent, it cannot be creative, and if behavior is creative, it cannot be intelligent. Along these lines, Sternberg and O'Hara (2000) noted that "the ability to adapt to the environment – to change oneself to suit the environment – typically involves little or possibly no creativity and may even require one to suppress creativity. For example, adaptation to a school or job environment can in some instances mean keeping one's creative ideas to oneself or else risking a low grade or job evaluation" (p. 611).

Empirically, low or non-significant correlations between creativity and intelligence would be needed to support the idea that both constructs are unrelated. However, most findings reported significant and positive correlations between both measures. These are reviewed in the forthcoming sections.

10.5.5 Creativity and intelligence as overlapping (related) constructs

The most widely held view on the relationship between creativity and intelligence is that both constructs are related. In psychometric terms, this means that creativity and intelligence share a substantial amount of variance; in plain English, this means that creativity and intelligence have much in common. Whether the relationship between creativity and intelligence reflects the influence of the former on the latter or vice versa, or whether

third-order variables (e.g., personality, motivation, educational level) may be affecting both constructs, are questions that cannot be answered by correlational studies. If, nonetheless, one is to support the claim that creativity and intelligence are related constructs, it is necessary to find positive correlations between measures of creativity and intelligence, and that is what differential psychologists have largely attempted to do.

Early attempts to document the relationship between intelligence and creativity were based on biographical measures of creativity and intelligence. A well-known series of studies by Cox (1926) retrospectively estimated intelligence scores and creative impact level of a total of 301 eminences who lived between 1450 and 1850. Their level of impact was measured in terms of encyclopedic space (length of biographical article), whilst their IQ was estimated on the basis of biographical accounts, i.e., information about their intellectual achievements. For instance, Francis Galton's IQ was estimated at 200 points because he could read books at the age of 2, speak Latin and French at the age of 4, and memorize pages of Shakespeare after a single read at the age of 7.

Although there are obvious limitations underlying this methodology, Cox's data provided interesting preliminary evidence for the relationship between creativity and intelligence. The correlation between eminence or level of creative impact and intelligence was significant but modest (in the region of $r = .16$), leading Cox to conclude that "high, but not the highest intelligence" was associated with achievement, and that personality variables such as persistence may play a more substantial role (the relationship between personality and creativity is discussed in sections 10.6.1 and 10.6.2).

More direct evidence for the relationship between creativity and intelligence derived from Barron (1963), who administered divergent thinking and cognitive ability tests to students, army officers, writers, artists, and businessmen. Barron also asked "experts" on each domain to rate the creativity level of participants within that group in order to test whether creativity may manifest itself differently across domains.

Results showed correlations between creativity and intelligence measures in the region of $r = .40$. Although such correlations suggest that there is a significant overlap between creativity and intelligence, Barron noted that when participants' IQ was higher than 120, IQ scores were a poor predictor of creativity. For example, in a sample of army officers with an average IQ of 100, creativity and intelligence correlated in the vicinity of $r = .30$, but in a sample of architects with an average IQ of 130, the correlation between intelligence and creativity was only $r = -.08$.

Subsequent studies reported rather variable correlations between intelligence and creativity, ranging from as little as $r = -.05$ up to $r = .30$ (Barron & Harrington, 1981), though correlations between intelligence and divergent thinking tend to be higher, averaging $r = .30$ (Horn, 1976; Richards, 1976). At best, then, creativity and intelligence are related but *distinct* constructs. In an attempt to differentiate between creativity and intelligence, Shouksmith (1973) argued that intelligence is needed to provide "correct" responses to problems, whilst creativity would be required to provide "good" responses. If, however, good responses are also correct, creative responding is also intelligent and intelligence would be conceptualized as a prerequisite of creativity. This idea, often referred to as the **threshold theory of creativity and intelligence**, implies that a minimum level of intelligence is required to be creative (Guilford, 1967). For example, Guilford and Christensen (1973) found students with lower intelligence scores to score significantly lower in creativity, but those with higher intelligence scores were neither significantly higher nor lower in creativity. Thus intelligence is necessary but not sufficient for creative thinking (Schubert, 1973).

threshold theory of creativity and intelligence the idea that a minimum level of intelligence is required in order to be creative, but that intelligence does not of itself determine creative thinking

In support of the threshold theory, studies indicated that the correlation between creativity and intelligence tends to drop when IQ scores are higher than 120 (Getzels & Jackson, 1962). Conversely, other studies reported that creative artists, scientists, mathematicians, and writers all tend to score higher than average on IQ tests (e.g., Bachtold & Werner, 1970; Barron, 1969; Cattell, 1971a; Helson, 1971; Helson & Crutchfield, 1970).

Part of the variability in these correlations may be explained by the different ability and creativity domains examined. For instance, fluid intelligence is likely to play a greater role in mathematics and physics than in music, fine arts, and humanities. Correlations between intelligence and creativity are also likely to vary depending on the type of creativity measure employed. For instance, Mednick and Andrews (1967) found correlations as high as $r = .55$ between the WISC (see section 6.2) and a Remote Associations Test (Mednick & Mednick, 1967), which requires participants to provide the correct answer for each problem (see section 10.7).

A more conceptual approach to the possible overlap between creativity and IQ has been considered by Renzulli (1978, 1986). This model, often referred to as the **"three-ring" theory of giftedness**, is represented in Figure 10.7 and conceptualizes giftedness at the crossroads between creativity, IQ, and task commitment, which may be understood in terms of motivation, conscientiousness, determination, and passion.

three-ring theory of giftedness model that conceptualizes an overlap between creativity and intelligence, arguing that giftedness lies at the intersection between creativity, IQ, and task commitment (level of motivation, conscientiousness, determination, and passion)

It has also been noted that creativity may be related more to "perceived" than to "actual" intelligence, though higher correlations between other-estimates of intelligence and creativity may simply result from the broader conception of intelligence held by non-experts. Thus laypeople may confound the meaning of creativity and intelligence, thinking they are the same thing. Accordingly, Sternberg (1985) asked people to estimate both the intelligence and creativity of imaginary targets and found a correlation of $r = .69$ between people's creativity and intelligence ratings.

Finally, it has also been argued (e.g., Simonton, 1994; Sternberg, 1999) that intellectual ability (as measured by IQ tests) may hinder rather than enhance creative performance. This hypothesis has been postulated on the basis of the lower incentives that higher IQ individuals may have to seek novel rather

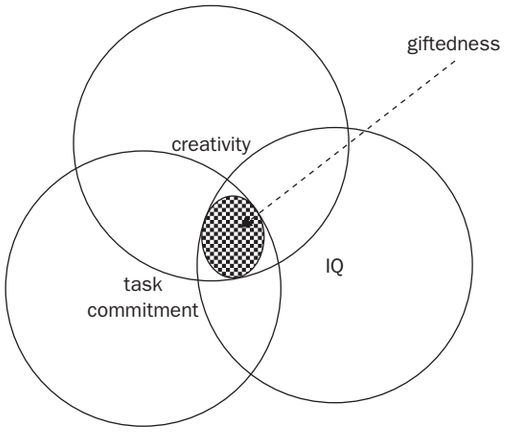


Figure 10.7 Renzulli's (1986) "three-ring" model of giftedness.

than correct responses. Furthermore, to the extent that higher IQ is associated with higher levels of knowledge, individuals with higher IQ would be less motivated and in addition likely to defy the status quo and come up with original solutions. Despite the theoretical soundness of this argument, negative correlations between creativity and intelligence have rarely been reported. On the contrary, most studies report a positive correlation between creativity and intelligence, leaving little room for the idea that intellectual ability is a disadvantage for creativity, though the threshold view of creativity and intelligence is not totally at odds with this idea.

10.6 CREATIVITY AND PERSONALITY TRAITS

> The creation of something new is not accomplished by the intellect but by the play instinct acting from inner necessity. The creative mind plays with the objects it loves.
>
> Carl Jung (1875–1961)

Soon after examining the link between intelligence and creativity, differential psychologists began to search for personality correlates of creativity in the hope of accounting for unique variance in creativity over and above intelligence. However, the lack of consensus on the identification of the main personality traits needed to describe individual differences (see section 2.10) meant early attempts to identify the personality correlates of creativity included a random and extensive list of personality adjectives comprising many overlapping dimensions.

Barron (1963) was one of the first to emphasize the personality differences between creative and non-creative individuals, particularly those with higher and lower intellectual ability. Whilst creative individuals with lower intellectual ability could be portrayed as "affected, aggressive, demanding, dependent, dominant, forceful, impatient, taking initiative, outspoken, sarcastic, strong, and suggestive," those with higher intelligence but lower creativity scores were better classified as "mild, optimistic, pleasant, quiet, unselfish" (p. 22). This description was later expanded (see Box 10.1).

Creative individuals are also thought to be more *intrinsically* motivated (see section 9.4.8) than their non-creative counterparts. This means they tend to engage in activities and tasks because they enjoy doing them rather than because of the rewards for performing such tasks. Conversely, non-creative individuals tend to be involved in activities they enjoy, not necessarily per se but for their benefit, e.g., high salary, social recognition, and are thus *extrinsically* motivated. Furthermore, extrinsic interests may hinder creative thinking because evaluations may constrain freedom of choice (Amabile, 1990).

10.6.1 Creativity in abnormal behavior (psychopathology)

> There is a thin line between genius and insanity.

The idea that creative behavior may be a consequence or the cause of psychopathology has been considered for several centuries (see Figure 10.8) and was emphatically expressed in the late work of Eysenck (1999), who believed that there is a substantial overlap between the processes underpinning creative and psychopathological thinking. Furthermore, Eysenck's Psychoticism

Box 10.1

Creative personality (Barron & Harrington, 1981)

In a seminal review of the literature, Barron and Harrington (1981) noted that creative individuals could be described in terms of their "high valuation of aesthetic qualities in experience, broad interests, attraction to complexity, high energy, independence of judgment, autonomy, intuition, self-confidence, ability to resolve antinomies or to accommodate apparently opposite or conflicting traits in one's self-concept, and finally, a firm sense of self as 'creative' " (p. 453). Further adjectives included "active, alert, ambitious, argumentative, artistic, assertive, capable, clear thinking, clever, complicated, confident, curious, cynical, demanding, egotistical, energetic, enthusiastic, hurried, idealistic, imaginative, impulsive, independent, individualistic, ingenious, insightful, intelligent, interested widely, inventive, original, practical, quick, rebellious, reflective, resourceful, self-confident, sensitive, sharp-witted, spontaneous, unconventional, versatile, and *not* conventional and *not* inhibited" (p. 454).

Figure 10.8 Creativity and mental illness. From top left (*clockwise*): Schumann, Tchaikovsky, Van Gogh, Hemingway, Poe, and Newton. All experienced psychopathological symptoms.
Sources: POPPERFOTO/Alamy; © Lebrecht Music and Arts Photo Library/Alamy; Library of Congress, Washington, DC, USA/The Bridgeman Art Library; Library of Congress, LC-USZ62-10610; akg-images/Nimatallah.

trait (see section 2.6) was thought of as a predictor of creativity, though that trait may refer to both normal and abnormal personalities.

Eysenck thought most forms of psychoses – mental disorders characterized by detachment from reality – were characterized by the same cognitive processes underlying creative thinking. The best example of such shared processes is **overinclusive thinking**, which is the tendency to use irrelevant information in problem-solving (see Al-issa, 1972). Thus Barron and Harrington (1981) noted that "the tendency to introduce complexity in perception goes both with creativity and with schizophrenia" (p. 462).

overinclusive thinking the tendency to use irrelevant information or to introduce complexity in solving problems, characteristic of both creative and psychopathological thinking

Conversely, humanistic psychologists such as Maslow (1971) and Rogers (1980) have argued that creativity is associated with psychological health rather than mental disorders. Furthermore, they believed that creative individuals have a greater sense of *self-actualization* (see section 9.4.9) and longevity, implying that creativity is also associated with good physical health. This assumption runs counter to several studies where creativity was positively correlated with alcoholism (Nobel, Runco, & Ozkaragoz, 1993), suicide (Lester, 1999), and stress (Carson & Runco, 1999).

Overall, the literature shows a relatively inconsistent pattern of results for the relationship between creativity measures and diverse indicators of abnormal behavior, though associations between creativity and mental disorders have been frequent. For example, Heston (1966) studied 47 children of American schizophrenic mothers who were raised by foster parents. Although half of them exhibited psychosocial disability, they possessed elevated artistic talents and demonstrated imaginative adaptations to life which were uncommon in a control group.

Other studies have looked at the link between creativity (or at least proxy measures of it) and Eysenck's Psychoticism trait (see

section 2.6). For example, Farmer (1974) found that Psychoticism was highly correlated with divergent thinking, whereas Woody and Claridge (1977) reported positive correlations between Psychoticism and self-reported creativity in a sample of 100 undergraduate students. In addition, *fluency* or quantity of ideas was positively correlated with Psychoticism (in the range of $r = .32$ to $r = .45$), and so was *originality* or quantity of unique ideas. Indeed, correlations between originality and Psychoticism were substantial, ranging from $r = .61$ to $r = .68$. Other personality variables were not found to be significantly correlated with any indicators of creativity.

Studies looking at the possible psychopathological aspects of creativity have analyzed not only student samples but also artists. In a well-cited study, Götz and Götz (1979a) showed that professional artists tended to have significantly higher scores on Psychoticism than a control group had. The authors conducted a follow-up study to compare the Psychoticism scores of successful versus unsuccessful professional artists and found that, as predicted, successful artists tended to be significantly more psychotic than their counterparts. No significant differences were found on other personality traits, such as Extraversion and Neuroticism (Götz & Götz, 1979b).

Several researchers failed to replicate the significant association between Psychoticism and creativity. For example, Kline and Cooper (1986) measured creativity through flexibility of closure, spontaneous flexibility, ideational fluency, word fluency, and originality, but found no significant correlations between any of these measures and Psychoticism (except for fluency in males). When Eysenck and Furnham (1993) tested the relationship between personality and creativity using the EPQ and the Barron-Welsh Art Scale (Barron & Welsh, 1952), they found no significant correlation between creativity and Psychoticism, though psychotic students were more likely to dislike art works than were their less psychotic counterparts. Thus Psychoticism may relate to aesthetic preference rather than creative output.

Researchers have also considered the possibility of a curvilinear relationship between creativity and psychopathology, whereby a moderate level of originality is indicative of normal creativity, whereas extremely high levels of originality may refer to Psychoticism or mental disorders such as schizophrenia (see Gough, 1976; Upmanyu, Bhardwaj, & Singh, 1996). In their study, Upmanyu et al. (1996) found that extremely unique word associations were related to Psychoticism and psychopathic deviation, whilst moderately unusual responses were indicators of creativity and verbal ability. Accordingly, Psychoticism contributes towards creativity in that it predisposes individuals to reject existing norms. This would explain the link of Psychoticism with antisocial behavior and lack of conformity.

More recent studies have often failed to replicate significant correlations between Psychoticism and creativity. For instance, Martindale and Dailey (1996) used several measures of personality (EPQ: Eysenck & Eysenck, 1975; NEO-PI: Costa & McCrae, 1985) and creativity (Fantasy story composition, Alternate Uses Test, and Remoteness of Association), but found low and non-significant correlations between these scales.

When creativity and personality are examined across different occupational domains, Psychoticism levels are significantly higher in "creative" professions. For example, Merten and Fischer (1999) compared actors, writers, and schizophrenics with a control group. They used a word association test requiring common and uncommon responses (Merten, 1995), two tests of verbal creativity (Schoppe, 1975), and two story-writing tasks as measures of creativity. Actors and writers scored higher on Psychoticism and original word associations than the control group. Artists (writers and actors) did not produce any response repetitions in the unusual response conditions, whereas schizophrenics did.

Despite the conceptual and psychometric associations between creativity and different forms of psychopathology, such as schizophrenia, there are no doubt salient features that differentiate creative from mentally ill individuals; such features should not be undermined. Perhaps the most important element to distinguish between creativity and psychopathology is the manifestation of *symptoms*. Whilst creative products may – at least in a metaphorical sense – be regarded as the symptoms of creativity, the psychopathological conception of symptoms refers to the expression of unbearable, painful, and uncontrollable psychological or physical outcomes (see sections 4.2, 4.7).

Thus creative individuals may have every intention to produce original associations, whilst psychotic individuals may have little alternative and control over their original, unusual, or eccentric ideas. Accordingly, Barron interpreted creativity as a form of controlled weirdness. Mental patients, on the other hand, may not even be aware of the creative nature of their ideas (Merten & Fischer, 1999, p. 941).

10.6.2 Creativity in normal behavior (the Big Five)

Early studies on creativity and personality were characterized by the lack of convergence in the personality traits assessed. Since the acceptance of the Big Five model (see section 2.11), psychologists have found a common language to report findings on the relationship between creativity and personality traits and assess the extent to which creativity may be explained in terms of individual differences in normal behavior. Moreover, the Big Five model also enables researchers to retrospectively interpret the significant personality correlates of creativity by translating different traits into the Big Five personality dimensions (see Figure 10.9).

The most important personality correlate of creativity is Openness to Experience, a trait referring to individual differences in aesthetic preferences, values, fantasy, feeling, actions, and ideas related to novelty and intellectual experiences. Some have even argued that Openness should be interpreted as a self-reported measure of creativity, and consequently prefer the label of "Creativity" for this trait (Chamorro-Premuzic & Furnham, 2005; Matthews & Deary, 1998). Regardless of the labels we use, studies have found consistent positive links between Openness and different indicators of creativity.

Dollinger and Clancy (1993) reported a positive association between participants' Openness and their ability to improvise autobiographical story-essays on the basis of pictures. "Richness" of essays was mostly correlated with *aesthetic openness* in men and *ideas* in women. Furthermore, amongst females, richness was

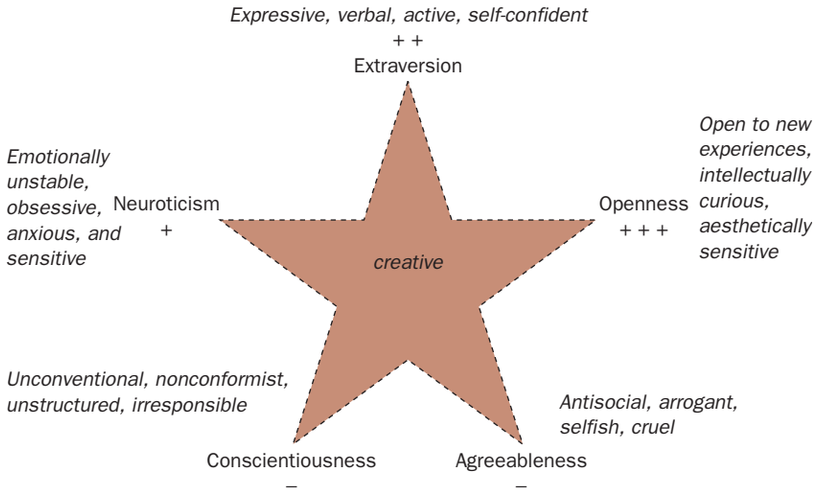


Figure 10.9 The creative personality and the Big Five.

also positively correlated with Neuroticism. King, Walker, and Broyles (1996) found that verbal creativity was positively correlated with Extraversion and Openness to Experience, and negatively with Agreeableness. Multiple regression analysis revealed that Openness was the most significant predictor of creativity, a finding replicated by Furnham (1999).

Openness has also been found to be beneficial for creative performance in work settings (George & Zhou, 2001), particularly when there are many ways of performing a task or solving a problem. In that sense, Openness would have the reverse effect of Conscientiousness, which favors performance on structured, predefined tasks and is thus detrimental for creativity.

In what is usually regarded as the first comprehensive meta-analysis of the creativity literature, Feist (1998) investigated the role of creativity and personality in the arts and sciences. In order to analyze the disparate collection of personality data, data from 83 experiments were recoded into the Big Five taxonomy. Three main groups were compared, (1) scientists vs. non-scientists, (2) creative vs. less creative scientists, and (3) artists vs. non-artists. Results indicated that Openness, Extraversion, and Conscientiousness could be used to accurately distinguish between scientists and non-scientists. The traits that most strongly distinguished the creative from less creative scientists were Extraversion and Openness. Artists, on the other hand, were approximately one standard deviation lower on Conscientiousness and half a standard deviation higher on Openness than non-artists.

A year later, Feist (1999) summarized the findings on the link between personality and creative achievement in the arts and in sciences. He concluded that some personality traits are equally expressed in artists and scientists. For instance, creative scientists and artists were both found to be more open to new experiences, less conventional, less conscientious, more self-confident, more self-accepting, more driven, more ambitious, more dominant, more hostile, and more impulsive than their less creative counterparts. However, artists were found to be more affective, less emotionally stable, less socialized, and less accepting of group norms than the scientists, who tended to be more conscientious than the artists. If creativity is manifested in different personality traits across disciplines or academic domains, the idea of an overarching creative personality may be elusive.

Feist and Barron (2003) conducted a 55-year longitudinal study on personality and creativity on a sample of 80 male graduates from 14 different academic departments, looking at possible changes in the correlation between creativity and personality throughout adulthood. They hypothesized that personality would predict variance in creative achievement over and above the measures of ability and potential. Although complete personality data were only available for 43 participants, results indicated that personality traits at the age of 27 predicted originality and creative achievement until the age of 72, even when potential and ability were taken into account.

In a recent review of the literature, Chamorro-Premuzic and Furnham (2005) organized the Big Five personality traits according to whether they were positively or negatively related to creativity. They concluded that Neuroticism, Extraversion, and notably Openness to Experience are positively linked to creativity, whereas Agreeableness and Conscientiousness are negatively correlated with creativity (see Figure 10.9). However, the authors argued that a combination of both personality and intelligence is needed to explain and predict individual differences in creativity.

10.7 TESTING CREATIVITY

The first attempts at measuring creativity date back to the beginnings of IQ testing, when Binet developed open-ended tests such as sentence completion and interpretation of ink blots (Binet & Henri, 1896). Due to the difficulties associated with implementing an objective scoring system for these tests – an issue that continues to pose methodological challenges for creativity researchers today – open-ended problems were soon replaced by multiple-choice questions, which have since represented the common approach to intelligence testing. Whereas multiple-choice

- **Originality:** Each response is compared with all other responses from all of the people to whom you gave the test. Responses that were given by only 5 percent of the sample are unusual (1 point), responses that were given by only 1 percent of your group are unique (2 points).
- **Fluency:** Quantity regardless of quality (the higher the fluency, the higher the originality; this "contamination" problem can be corrected by using the formula originality = originality/fluency).
- **Flexibility:** Use of different categories.
- **Elaboration:** Amount of detail, for example, "a doorstop" = 0 whereas "a doorstop to prevent a door slamming shut in a strong wind" = 2 (one for explanation of door slamming, two for further detail about the wind).
- **Appropriateness:** How useful (according to experts) the response is.

Figure 10.10 Scoring methods for the Alternate Uses Test.

questions are useful to measure abilities, they are poor predictors of creativity as they require participants to provide a single, predefined correct response.

However, several scoring mechanisms have been devised to increase the reliability of open-ended creativity measures. For example, the **Alternate Uses Test** requires individuals to "name all the things you can do with *x* object (e.g., hammer, brick, chair)" and can be scored in terms of *originality*, *fluency*, *flexibility*, and *elaboration*. Some have argued that it is also important to consider the *appropriateness* of responses, as creative ideas should not only be original but also useful (Runco & Charles, 1993). All scoring methods are explained in Figure 10.10 (see also Figure 1.10).

Alternate Uses Test a **divergent thinking** test that requires individuals to name all the things that can be done with a specified object, e.g., a chair

Another widely used measure of creativity is Mednick and Mednick's (1967) **Remote Associations Test**. This 30-item psychometric test is based on items with a single correct response rather than open-ended questions. Mednick's idea was that remote or unusual associations would be indicative of an individual's capacity for generating novel ideas, as remote combinations are generally more original. For example, participants may be asked to identify a fourth word that is associated with each of the following triads of words:

Remote Associations Test psychometric test that requires participants to identify the correct associations between word groups; remote or unusual associations indicate individuals' capacity for generating novel or original ideas

a) rat–blue–cottage–*???*
b) railroad–girl–class–*???*
c) surprise–line–birthday–*???*
d) wheel–electric–high–*???*
e) out–dog–call–*???*

Even if you guessed the answers (see p. 140), you may have noticed that there is still a degree of subjectivity in the choice of "correct" responses, more so than in standard IQ test items. Ultimately, the quality of creativity tests, and the extent to which we believe that such tests actually measure creativity, will depend on statistical indicators of validity and reliability.

Validation of creativity tests is no different than in ability or IQ measures. Thus *predictive* validity refers to the extent to which scores on creativity measures predict real-life indicators of creativity. *Incremental* validity refers to the extent to which creativity tests account for unique variance in selected outcomes beyond, say, personality and ability measures. *Discriminant* validity, on the other hand, refers to the extent to which creativity tests measure a unique construct, different from established personality and ability traits. Reliability is a more complex issue as it usually involves consensus between different judges, for instance on how "appropriate" a creative response may be. Reliability can be achieved through expert or majority consensus and is a necessary but not sufficient condition for validity.

Tests of divergent thinking represent the most widely employed measure of creativity and have been reported to be good predictors of creative achievement across a variety of settings (Barron & Harrington, 1981; Harrington, 1972) and at all levels of education (Anastasi & Schaefer, 1971; Torrance, 1974; Vernon, 1971). However, associations are often weak and "there is little reason to expect any randomly selected divergent thinking test to correlate with creative achievement in any randomly selected domain" (Barron & Harrington, 1981, p. 448). Besides, several factors, from time of day to type of instructions, may affect the correlation between creativity tests and indicators of creative achievement. For example, asking people to "be creative" will normally improve their performance on divergent thinking tests (Datta, 1963).

To this day, the best regarded test of creativity is the **Torrance Test of Creativity and Thinking** (TTCT) (Torrance, 1974), which is based on the earlier version of Torrance's (1966) creativity test. The test measures divergent production of semantic units, e.g., "name all the things you can think of that are red and edible," alternative relations, e.g., "in what different ways are dogs and cats related," and production of systems, e.g., "write as many sentences you can using the words 'rain,' 'station,' and 'summer.'"

Torrance Test of Creativity and Thinking test that measures creative thinking using picture-based and word-based exercises to assess fluency, flexibility (number of different categories of response), originality, and elaboration (amount of detail)

Torrance spent several decades conducting follow-up studies and reanalyzing datasets to validate his test. Longitudinal studies have shown that the aggregated creativity score provided by the different sections of the TTCT correlated in the region of $r = .51$ with creative achievement measures (Torrance, 1975). Torrance's review of creativity studies also led him to conclude that intelligence and creativity are only moderately associated: "No matter what measure of IQ is chosen, we would exclude about 70% of our most creative children if

- **Consequences Test** (Guilford, 1954): "Imagine what might happen if all laws were suddenly abolished."
- **Remote Associations Test** (Mednick, 1962): Find a fourth word which is associated with each of these three words: (a) rat–blue–cottage; (b) wheel–electric–light; (c) surprise–line–birthday.
- **Unusual Uses Test** (Guilford, 1954): "Find as many uses as you can think of for (a) toothpick; (b) brick, (c) paperclip.
- **Word Association Test** (Getzels & Jackson, 1962): Write as many meanings as you can for the following (a) duck; (b) sack; (c) pitch.
- **Creative Test Battery:** *Torrance Test of Creative Thinking* (TTCT): Three picture-based exercises and six word-based exercises (figural and verbal). Does a good job of identifying gifted students.

Figure 10.11 Salient creativity measures.

IQ alone were used in identifying giftedness" (Torrance, 1963, p. 182). For an overview of traditional measures of creativity, see Figure 10.11.

In more recent years there have been some interesting innovations in creativity testing, notably by Sternberg and colleagues. For example, Sternberg's (1982) adaptation of the Goodman (1955) induction riddle requires participants to manipulate imaginary concepts such as "bleen" (blue until 2004, but green after that year), or "grue" (green until the year 2004, and blue after that). In a similar fashion, Sternberg and Gastel (1989) designed a test that requires individuals to evaluate logically valid but factually false statements, such as "lions can fly." Assuming that these items are useful to test individuals' flexibility, Sternberg's tests of induction are measuring an important component of creativity. Indeed, moderate correlations between these measures and fluid ability tests may be indicative of the discriminant validity of Sternberg's tests. Whether these tests measure creativity, flexibility, or something else is a matter of interpretation, however.

10.8 CREATIVITY IN DIFFERENT FIELDS (FROM ARTS TO SCIENCE)

Feist (1998) noticed that research into personality and creativity could be divided into two forms. The first attempts to identify significant personality differences *between groups*, such as artists versus scientists. The second is based on an analysis of *within-group* differences and aims at comparing the personality profiles of highly creative and non-creative individuals working in the same field. According to Feist, scientists show larger variation in creativity ratings because they are frequently involved in "very routine, rote, and prescribed" tasks, in addition to the few scientists engaged in "revolutionary" work, whereas "anyone who makes a living at Art has to be more than one step above a technician" (Feist, 1998, p. 291). Thus within-group variance is markedly different for artists and scientists.

One of the biggest challenges to creativity researchers is to "bridge the gap" between "between-group" and "within-group" studies on creativity. This, however, would require the identification of the essential components of creativity, as well as appropriate measures to conceptualize and quantify individual differences in creativity within and across domains. Accordingly, the same measure would be used to distinguish between more and less creative professions or jobs, as well as more and less creative individuals within each profession or job, just as in ability research, i.e., IQ.

10.9 SUMMARY AND CONCLUSIONS

In this chapter, I have looked at the construct of creativity, which, despite its longstanding history, has only recently emerged as an important topic of differential psychology. As seen:

1. Creativity is a complex and multi-determined psychological construct that has rarely been measured through objective means. Differential approaches to creativity comprise various, often conflicting, theories.
2. Rapid technological advances are creating an increasingly complex world where adaptation to changing environments is crucial. This cultural evolution demands more flexibility from individuals than ever before. Given that creativity contributes to greater flexibility (Flach, 1990; Runco, 1986), creative individuals may be more prepared to adapt to the changes in everyday life and remain flexible in their responses to the environment. Thus "creativity is a useful and effective response to evolutionary changes [. . .] because older adults tend to rely on routines and, unless intentionally creative, become inflexible" (Runco, 2004, p. 658). This may explain why several studies found creativity indicators to be significantly correlated with late-life adaptation and growth (e.g., Dudek & Hall, 1991; Gott, 1992).
3. Whereas personality and intelligence are important to explain some of the characteristics of creative and non-creative individuals, individual differences in creativity cannot be explained merely in terms of personality and ability factors but may also depend on individuals' interests, self-belief, and motivation. Even if these variables are considered, it may still be impossible to predict a person's level of creative achievement because there are few objective criteria to determine such a thing.

In chapter 11, I introduce another growing concept in the field of differential psychology, namely, leadership.

CHECK YOUR ANSWERS

Correct answers were: a) cheese, b) working, c) party, d) chair or wire, e) house. All items taken from Sternberg and O'Hara (2000).

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