
Dissecting the Golden Goose: Components of Studying Creative Writers

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ABSTRACT: *What does it take to be a great creative writer? What components are important for analyzing and comparing writers? Research on creativity, in general, has increased over the past few decades, but there are still many questions to be answered about creative writing. A model of creativity proposed by Sternberg and Lubart (1995, 1996) was used as a theoretical framework to examine 6 variables: motivation, intelligence, personality, thinking styles, knowledge, and environment. Empirical research on each of these variables was compared and discussed. After reviewing the literature on the creative individual, certain components stood out as being especially important. The pattern of internal variables (e.g., intrinsic motivation, instability, impulsivity) was more relevant than were the external variables (e.g., environment).*

Poetry indeed seems to me more physical than intellectual. A year or two ago, in common with others, I received from America a request that I would define poetry. I replied that I could no more define poetry than a terrier can define a rat, but that I thought we both recognized the object by the symptoms it provokes in us.

—A. E. Housman, *The Name and Nature of Poetry* (1933)

What does it take to be a great creative writer? This may sound more like a subject for the pages of *Writer's Digest* than a psychology journal, yet the question is appropriate for both. The question was posed by none other than Sigmund Freud (1908/1959) in his essay "Creative Writers and Day-dreaming" when he wrote, "We laymen have always been curious to know . . . from what source that strange being, the creative writer, draws his material, and how he manages to make such an impression on us with it . . ." (p. 143).

Yet although much subsequent theoretical and empirical research has been conducted on creativity,

relatively little emphasis has been placed on creative writers. Wehner, Csikszentmihalyi, and Magyari-Beck (1991) found education, business, and economics to be the dominant fields, and history, psychology, history of science, sociology, political science, and health sciences all were studied in a higher percentage of articles about creativity than literature. In addition, the research that has been done on creative writing (and, indeed, on anything in the arts) has tended to be one-sided—beneficial to science, perhaps, but not reciprocally beneficial to the arts (Lindauer, 1998).

Although the amount of research being done on creative writing has increased since 1991, it still suffers in comparison with other areas of research in creativity. Significantly more research, for example, has been conducted on distinguishing creative people from people who are not as creative. Professionals have offered tips and advice on how to improve one's creativity (e.g., Csikszentmihalyi, 1996; Sternberg & Lubart, 1995), but comparatively little research has

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focused on creative writing. Most studies that incorporate creative writing do so merely to use writing as a way of studying larger issues in creativity (e.g., Amabile, 1996).

These issues are important in and of themselves. What distinguishes creative writers (in this article, this term will be used for all writers of fiction, poetry, plays, and other literary forms of expression) from people who may not write at all, yet are considered to be creative and verbal and intelligent? What makes some bright, creative people who love literature try to write fiction or poetry, while others pursue a more scholarly, critical path? Why do some talented writers pursue journalism, while others try to write for the theater? To answer these questions, a much more basic query must be addressed first: What are the psychological components of creative writers that can be studied?

Unlike most review articles on creativity, the focus of this article is solely on creative writing and related fields. However, to ignore the larger field of creativity would be foolish. Much of the research conducted on creativity as a general issue can be easily applied to the more narrow focus of creative writing. In addition, in reviewing the literature, a few findings have consistently and specifically been found to particularly apply to creative writers. These will be highlighted throughout the review and summarized in the conclusion.

In presenting this review of the creativity literature, specific attention was paid to the following types of studies: landmark or quintessential studies by major researchers in the field, studies that exemplify a specific point, and studies that specifically focus on writers. Before delving into the psychology of creative writers, we should choose a model of creativity around which to organize the discussion. The various aspects of creativity make more sense and are easier to understand when a larger theory serves as a framework.

Models of Creativity

Using the appropriate components, we can compare creative writers with those who also love literature but do not create it (i.e., English literature students), or with those who write, but do not write fiction, poetry, or plays (i.e., journalists). Researchers

have studied the process of creativity, but they have devoted less attention to the creative product. This may be because the creative product and the culture and society in which it is produced are tightly interwoven (cf., Tardiff & Sternberg, 1988), or perhaps because it is difficult to adequately appraise creative performance (Mullin & Sherman, 1993). Yet when people think about creative writers, it is usually their finished products that count. A fish that gets away or a baseball phenom who injures his arm may be long remembered, but a writer endowed with brilliant creative processes who never picks up a pen will remain unknown. A new theory of creative propulsion focuses exclusively on the products (Sternberg, 1999); application of this theory may result in more empirical research on creative products.

Common wisdom says that poets are born, not made. So will the answer be found by examining the glucose metabolism of Kurt Vonnegut's frontal lobe? Such methods are currently being used in the study of intelligence (e.g., Haier & Benbow, 1995), and their application to the study of creativity, although tenuous, may be forthcoming (Plucker, 1994; Plucker & Renzulli, 1999). For instance, Martindale and his colleagues (1977, 1990, 1999; Martindale & Greenough, 1973) have studied the relationship between creativity and such biological constructs as increased cortical arousal, basal skin conductance, and EEGs. Results have been promising, with positive correlations found between higher skin conductance and higher arousal and higher measured amounts of creativity. Yet although neurological research may produce insight into the chemical makeup of a writer, the cognitive and emotional makeup of a writer are also essential. Some may claim that trying to study the creative mind is impossible, but as Feist (1999) argued, studying the behavioral dispositions of the creator is not. Certainly, many attempts have been made to study the minds of geniuses (Albert, 1975).

A theory that looks at such variables as intelligence and personality would be desirable; however, more components are needed. Csikszentmihalyi (1988, 1996, 1999) presented a systems model, in which he defined creativity as an interaction of domain, field, and person. He defined domain as "a set of symbolic rules and procedures" (1996), such as mathematics. These domains can be more specific (e.g., number theory), and are part of the wider domain of culture. The field is comprised of the

people in charge of the domain—teachers, editors, critics, and so on. Finally, the person is the individual who produces a creative idea or product that is accepted by the field into the domain. Csikszentmihalyi's views are certainly conducive to studying creative writers; the domain of writing (which can be narrowed to novels, stories, plays, poems, and then to specific genres and styles) is especially prone to the likes and dislikes of a very elite field. However, reducing the personal aspect of creativity to one small aspect of an overall theory minimizes individual differences to a negative extreme.

Amabile (1983, 1988, 1996) presented a componential framework, which focuses on task motivation (such as external stimulus or internal stimulus; see section to follow on Motivation for more information), domain-relevant skills (such as storage of relevant information), and creativity-relevant skills (such as tolerance of ambiguity, self-discipline, and orientation toward risk-taking). There are several empirical studies validating this model (e.g., Conti, Coon, & Amabile, 1996; Ruscio, Whitney, & Amabile, 1998). This theory certainly encompasses many variables that are essential to the field of creativity: intelligence, knowledge, motivation, and personality. More variables were suggested by Runco and Albert (1990; cf. Runco & Okuda, 1988). They distinguished four areas of focus: personality and family, motivation and personal histories, ecology and culture, and pragmatics and cognitive processes. Both Amabile (1996) and Runco and Albert (1990) presented components of creativity that must be taken into account.

Although other theories abound (e.g., Albert, 1990; R. T. Brown, 1989; Martindale, 1995; see Feldhusen & Goh, 1995, for an overview), some basic components keep recurring in these models. The model of creativity proposed by Sternberg and Lubart (1995, 1996; expanded from Sternberg, 1988b) is especially appealing because it encompasses nearly all of the key components raised by these earlier theories. This is the model that serves as the underlying structure for this review of the creativity research. This model was selected in part because of its thoroughness; all six elements of the Sternberg–Lubart model have been well researched as individual aspects of creativity. These six elements are: motivation, intelligence, personality, knowledge, thinking styles, and environment. Each of these components are explored in detail.

Components

Motivation

The research of Amabile and her colleagues (Amabile, 1979, 1982, 1996; Amabile & Gitomer, 1984; Amabile, Hennessey, & Grossman, 1986; Amabile, Hill, Hennessey, & Tighe, 1994) suggests that motivation is a key concept for understanding the creative process. They argue that creativity will increase if one's motivation is intrinsic (performing an activity out of enjoyment), rather than extrinsic (performing an activity for an external reason, such as a reward; see Deci & Ryan, 1980, 1985; Lepper, Greene, & Nisbett, 1973). Research supports the assertion that intrinsic motivation yields a more creative product. Extrinsically motivated people have been found to be less flexible and more rigid (Garbarino, 1975); these traits would certainly be most noticeable if a person wanted to write creatively.

The issue of motivation is especially applicable to creative writers. Amabile (1985) examined the effects of an intrinsic versus extrinsic motivational orientation on 72 creative writing graduate and undergraduate students. Participants in this study first had to write a poem to establish a baseline of creative writing. She then gave them a list of reasons for writing. One group received lists that stressed extrinsic motivation (i.e., "You want your writing teachers to be favorably impressed with your writing talent," "You know that many of the best jobs available require good writing skills"), whereas another group received lists that emphasized intrinsic motivation (i.e., "You enjoy the opportunity for self-expression," "You like to play with words"). Amabile had the students rank-order these reasons, and then write a second poem. Outside raters evaluated both poems. The students who were given the list of intrinsic reasons to rank, as well as a control group that received no lists, showed no significant difference in the ratings of creativity. The students given the extrinsic list, however, were rated significantly lower on their second poem.

Ruscio et al. (1998) examined which task behaviors best predicted creativity in three domains (problem solving, art, and writing). The most important indicator was found to be a participant's involvement in the task, as measured through behavioral coding and think-aloud protocol analysis. Other predicting factors differed by domain. In the domain of writing, which

was measured with a haiku poem-writing task, the other central indicator of creativity was a factor called striving. Striving was comprised of difficulty, transitions, questioning how to do something, repeating something, and positive and negative exclamations.

In addition, Amabile et al. (1986) looked at the effect of reward (perhaps one of the most significant extrinsic motivators). They tested 115 elementary school children in a 2×3 design, varying them on levels of reward (reward or no reward) and task label (work, play, or no label). In the reward condition, the children were offered the use of a Polaroid camera, a desirable activity for these children, if they would promise to tell a story later. In the no reward condition, the children were also allowed to use a Polaroid camera, but this was presented as merely another task, not as a reward for future activity. After the children in all conditions took photographs, they were then asked to tell a story, based on a picture book. In the work condition, the storytelling task was labeled “work,” whereas in the play task it was labeled “play.” The no label condition did not use a label for the storytelling activity. These stories were then judged by outside raters. Amabile et al. found that children told more creative stories if they were in the no reward condition, and no significant effect was found for the task labeling condition.

A new study by Joussemet and Koestner (in press) found that 61 student gymnasts produced less creative pictures when offered a reward for performing a separate, earlier task. However, the negative effects of reward were minimized in children who received intrinsic motivation training (such as directed discussion sessions that focused on intrinsic reasons for performing the task in question) before performing a task and receiving a reward (Hennessey, Amabile, & Martinage, 1989). Although extrinsic motivation can impair creativity, intrinsic motivation can enhance creativity: Greer and Levine (1991) found that students given an intrinsic motivation introduction wrote poems that were judged to be more creative than those produced by a control group.

Recently, however, some reviews of the motivation research have challenged the assertion that intrinsic motivation is linked to higher performance (and increased creativity). Cameron and Pierce (1994) conducted a meta-analysis of 96 experimental studies involving the effects of reward on intrinsic motivation. They found that the only negative effect came

from a reward being tangible, expected, and given for the performance of a simple task. Eisenberger and Cameron (1996) argued that rewards (which result in extrinsic motivation) are not necessarily detrimental to performance. They stated that the detrimental effects occur under restricted and avoidable conditions and that reward can often have a positive effect on creativity. Eisenberger and Selbst (1994) found that intrinsic motivation and creativity were not negatively affected—and indeed could be improved—if a reward was presented in a less salient manner, especially in tasks requiring divergent thinking. Eisenberger, Armeli, and Pretz (1998) found that creativity could be increased if students received training in divergent thinking, or if instructions emphasized the need for creativity.

The issue of the benefits of intrinsic motivation and the potential harm of extrinsic motivation is a hotly debated one (e.g., Cameron & Pierce, 1996; Ryan & Deci, 1996). Certainly, research has established the necessity for examining intrinsic versus extrinsic motivation as a component of creativity.

Intelligence

Although motivation is one component to be considered in studying the creative writer, it is certainly not the only one. For instance, Finke, Ward, and Smith (1992) suggested that looking at one’s cognitive capacities and abilities can provide some insight into the puzzle of creativity. They proposed a Geneplore model of creative cognition that takes into account, and distinguishes between, generative and exploratory cognitive processes. In this model, Finke et al. focused on three components: the generation of preinventive structures, the preinventive exploration and interpretation, and then how both of these are affected by product constraints. Put simply, the generative phase involves the initial creation of an idea, then the exploratory phase takes this idea and examines and interprets it in different ways. At this point, the only constraints are the real-life ways in which the eventual product may be limited. Using an example, Finke et al. could focus on synthesis (a generative process), which would lead to mental blends (a preinventive structure). These mental blends would have preinventive properties such as meaningfulness. Functional interference (the exploratory process

associated with synthesis) then occurs, and then the only step left is to examine the features (the product constraints for synthesis).

The central distinction between generative and exploratory processes is an important one, especially when studying the cognitive abilities of writers, who must possess both generative cognition (developing new ideas for stories) and exploratory cognition (executing the ideas, as well as determining which ideas are best to pursue). Finke et al. (1992; see also Finke & Slayton, 1988) examined a variety of processes that comprise generative and exploratory cognitive processes, from memory retrieval and analogical transfer to functional inference and hypothesis testing. Many of the ideas proposed are most appropriate to studying creative problem solving, but there is some application to creative writing (e.g., Ward, 1991, suggested that a writer might enhance his or her creativity by violating inherent assumptions). Mumford and Supinski (1993) cautioned against relying too much on laboratory findings when the complexity of the real world can rarely be truly duplicated in such a constrained setting. However, this critique can be applied to nearly any laboratory experiment.

The generative process may be even more widespread than merely affecting creative production. Both Bruner (1986, 1997) and McAdams (1993) proposed models in which autobiographical memory is stored in a person's mind in the form of a narrative. If this is the case, then everyone generates stories about their lives. Creative writers, however, can translate and modify these narratives into a fictional form to produce an artistic work. Doyle (1998), after interviewing five creative writers, found a commonality of a "seed incident" occurring. These incidents were outside of the writers' narrative understanding and consequently stimulated them to explore further.

Some of the cognitive research has focused specifically on writing. Kellogg (1994) applied Neisser's (1976) cycle of cognition to writing, which traces a circular relationship between exploration, the environment, and schemata. Zwick (1985) described this as a link between inspiration and product; inspiration leads to a product, which can then lead to more inspiration.

Barron and Harrington (1981), in a review of the creativity and intelligence literature, found many (if often weak) correlations between measures of intelligence and creative achievement. One aspect of intelligence that is often found to be correlated with creativ-

ity is verbal abilities (Bhattacharya, 1982; Qureshi & Qureshi, 1990). In addition to being a central component of intelligence, verbal abilities are also often involved in the act of writing.

Coefficients of correlations, however, are sometimes misleading about the true nature of a relationship. For example, some research has shown that too much intelligence can be irrelevant, and perhaps even a negative factor. Although intelligence is a necessary (but not sufficient) condition for creativity and achievement, the relationship between intelligence and creativity is only true up to approximately an IQ of 120 (Getzels & Jackson, 1962; Guilford, 1964, 1968; MacKinnon, 1962). Once a person's IQ reaches 120, the chances are small that any further advances in IQ will add to his or her creativity or achievement. It most likely will not hurt, and it may help. But in extreme cases, Simonton (1994) hypothesized, a very high-IQ person may not be able to communicate his or her ideas (creative or otherwise) in an effective manner to other people. Indeed, Hollingworth (1942) found several instances of this inability of high-IQ individuals to function well in their environment. This lack of communication may result in their ideas never being implemented, regardless of how brilliant these ideas may be.

Personality

Csikszentmihalyi's (1996) research, among many others, demonstrated the need for personality to factor into the creativity equation. He introduced his concept of *flow*, or *optimal experience*, which he believed is the sensations and feelings that come when an individual is actively engaging in an intense, favorite pursuit—which could be anything from rock climbing to playing the piano (Csikszentmihalyi, 1990; Csikszentmihalyi & Csikszentmihalyi, 1988). Csikszentmihalyi (1996) interviewed 91 celebrated creative individuals, ranging from Linus Pauling and Jonas Salk to Madeleine L'Engle and Nadine Gordimer. He asked them a variety of questions about such topics as their relationships, priorities, habits, and insights. In synthesizing all the responses, several important personality characteristics stood out, such as perseverance, flexibility, and curiosity. Csikszentmihalyi (1996) also mentioned 10 dimensions in which he believes creative individuals are especially complex, and these

range from a balance of playfulness versus responsibility to the struggle between traditional and rebellious behavior. Although Csikszentmihalyi raised some very interesting points, he employed no control groups and conducted no statistical analysis in his study of creative individuals. Although there are many philosophical observations based on the anecdotal evidence presented, there are few specific scientific advances that can be made. And he devoted an entire chapter to analyzing the creative writer, yet he based his analysis on the profiles of four writers. This approach provides some interesting insights into the nature of the creative personality, but it is merely a starting point for further research.

Luckily, much additional empirical research has been done on the link between personality and the creative mind. Feist (1999) reviewed the literature on the personality of creative artists and found that numerous studies specified (a) openness to experience/imaginative/fantasy-orientation; (b) impulsivity/lack of conscientiousness; (c) anxiety/affective illness/emotional sensitivity; (d) drive/ambition, norm-doubting/non-conformity/independence; and (e) hostility/alooness/unfriendliness/lack of warmth as traits that distinguished the creative, artistic personality. To illustrate the practical implications, an artist would be much more likely to be an open, impulsive, anxious, driven, and hostile person than would a nonartist. Feist also reviewed the literature on the personality of the creative scientist and found that artists and scientists differed in significant ways. Artists tended to be more affective and emotionally unstable, and less socialized and conforming. Scientists tended to be more conscientious. These variables are important and will be examined in detail, but it should be noted that as is true of most studies that focus on personality and creativity, the central distinctions made are between "artists" and "nonartists," or "artists" and "scientists." The gray lines that may exist within the category of artist, however, are not as often explored.

Despite these limitations, specific examination of some of these empirical studies is warranted. Martin-dale and Dailey (1996) found a relationship between extraversion on the NEO Personality Inventory and creativity (as measured by the Alternate Uses test and a word association test); Sen and Hagtvet (1993) found a similar relationship. Zhiyan and Singer (1996–1997) found that openness to experience, as measured by the NEO-FFI (Costa & McCrae, 1992), was positively

correlated with positive, constructing daydreaming. Domino (1974) found that a group of cinematographers (traditionally a more creative occupation) frequently sought out new experiences, and Roy (1996) compared 51 fine artists to 235 nonartists (teachers, bank managers, and physicians) and found the artists to be more introverted, dominant, and tender-minded on the 16 Personality Factor Questionnaire (Cattell, Weber, & Tatsuoka, 1970). Walker, Koestner, and Hum (1995) compared prominent artists to prominent figures in other areas and found the artists to demonstrate more impulsivity and less conscientiousness than the control figures.

Ludwig (1995), in studying more than 1,000 eminent professionals, found that all forms of psychopathology were more commonly found in artistic professions than in all others. Andreasen and Glick (1988) studied 30 writers and 30 controls and found that the writers were more likely than control participants to suffer from affective disorders (specifically bipolar disorder), but there was no difference on nonbipolar depression. Andreasen (1987) found that not only did writers suffer from a higher rate of mental illness, but their first-degree relatives were more likely to suffer from mental illness than the first-degree relatives of matched controls. Jamison (1996) also argued that mood disorders, especially manic-depression, are associated with artistic creativity. Kaufman (1999) found that female poets were significantly more likely than male writers and female fiction writers to suffer from mental illness.

However, there is a question as to the cause-and-effect relation between the writing process and emotional volatility. According to Lubart and Getz (1997), emotion has a central role in the creative process itself, specifically metaphor generation. Perhaps the phenomenon is one of causality: Creative writers may not necessarily be unstable; perhaps being unstable is a factor that may help produce creative output.

Another interesting effect was identified by Leith (1972), who found that extraverted individuals produced both a greater number of responses and more original responses, and that there was a significant interaction between the individuals' extraversion and the conditions of the experiment being stressful or nonstressful. Perhaps one function of extraversion in creative individuals is to allow them to respond positively and more creatively in high-pressure situations.

Research has also been conducted on the personality determinants of artists, specifically analyzing how

these determinants interact with an artists' commitment to the profession of art. Dudek, Berneche, Berube, and Royer (1991) administered the Adjective Check List (Gough & Heilbrun, 1983) to 17 professional artists and to 50 art students. Of the 50 students, 33 were still pursuing art after 2 years and were tested again. Dudek et al. (1991) found significant differences between mature artists and uncommitted students (the students who were no longer pursuing art after 2 years) on measures of both motivation and self-image (such as ability to set goals and attitudes toward self). However, these differences were not found between mature artists and committed students (those who were still studying art after 2 years).

Helson (1996), in a review of the creativity and personality literature, concluded that "creativity takes place in diverse contexts, and we cannot expect the personalities of people who create in different domains to be the same, or to differ in the same ways from comparison subjects" (p. 303). However, although Helson said that generalizing about the creative personality is difficult, she ended up generalizing herself when discussing the issue. She stated that the creative personality is often "(a) organized around a symbolic interest pattern, (b) in the service of some kind of power motive, and (c) related to a social identity" (p. 303).

What consistencies have emerged from the literature regarding the creative personality? Taking into account Helson's (1996) warning against too much generalizing, the bulk of the studies concerning personality and creativity reveal a tendency for creative people to be impulsive yet sensitive, and to possess a strong self-image despite being prone to anxiety and affective disorders. There is conflicting research about whether creativity is associated more with extraversion or introversion, echoing the dichotomy (discussed in Csikszentmihalyi, 1996) between two stereotypes: the creative person as being gregarious and outgoing, and the artist as being introverted and reclusive. The creative artist falls between these two areas, and perhaps the competing findings reflect the competing aspects of the personality of a creative artist: part friendly extravert and part hostile introvert.

Thinking Styles

Sternberg (1990, 1994a, 1994b, 1997) has long emphasized the importance of taking into account the

variable of thinking styles, especially when analyzing creativity. Sternberg (1985, 1988b) developed a model of thinking styles, called mental self-government (MSG), that has three primary components: legislative, executive, and judicial. According to this theory, legislative thinkers prefer to create things individually, with little inherent structure. Executive thinkers prefer to follow directions and carry out orders with a great deal of structure. Judicial thinkers like to judge and evaluate things.

Sternberg and Grigorenko (1993) found that thinking styles, as measured by the MSG Thinking Styles Inventory (Sternberg & Wagner, 1991), were not correlated significantly with such measures of intelligence as IQ, grade point average, or the SAT verbal score. This lack of relationship indicates that the contribution that thinking style makes to a creative personality is most likely separate from the contribution made by intelligence (Sternberg & Lubart, 1995).

Other theories of thinking styles include Jung's (1923) types, with sensing versus intuitive styles being important for studying creativity. Sensing types tend to be less creative, whereas intuitive types tend to be more creative (e.g., Hall & MacKinnon, 1969; Myers & Myers, 1980). The Myers-Briggs Type Indicator (MBTI; Myers, 1962; Myers & McCaulley, 1992) uses many of Jung's ideas to measure thinking style and personality. The MBTI measures along four dimensions: Extraversion-Introversion, Sensing-Intuition, Thinking-Feeling, and Judgment-Perception, producing 16 different MBTI patterns. MacKinnon and colleagues (Hall & MacKinnon, 1969; MacKinnon, 1962, 1965; Myers & McCaulley, 1992) administered the MBTI to highly creative people in creative fields. They also found intuition to be a key factor in distinguishing highly creative people from the general population. In addition, they found that very creative writers tended to fall into several MBTI patterns: Extraverted-Intuitive-Feeling-Perceptive was the most common pattern for writers, whereas Introverted-Intuitive-Feeling-Judging, Introverted-Sensing-Thinking-Judging, Introverted-Intuitive-Thinking-Judging, and Extraverted-Intuitive-Thinking-Perceptive were the other common patterns (Hall & MacKinnon, 1969; Myers & McCaulley, 1992). A follow-up study 25 years later by Dudek and Hall (1991) found that these thinking styles and personality characteristics, at least for the architects initially studied, remained "remarkably stable" (p. 213). Feist's (1999) review of the personality

literature also revealed a stability of traits from childhood throughout adulthood.

Kim and Michael (1995) used the Your Style of Learning and Thinking test (YSLT; Torrance, Reynolds, Riegel, & Ball, 1977) to investigate right-brain thinking style, left-brain-thinking style, and integrated left-right-brain thinking style. Right-brain style (also known as right-hemisphere) involves non-verbal, visuospatial, spatial, synthetic, and intuitive styles, whereas left-brain style (also known as left-hemisphere) involves verbal, sequential, logical, analytical, and rational styles (Sperry, 1968; Springer & Deutsch, 1993). Kim and Michael (1995) found that Korean high school students with a right-brain dominance scored higher on tests of creativity than students either classified as left-brain or left-right-brain. Al-Sabaty and Davis (1989) uncovered similar results, finding that scores on the How Do You Think inventory were positively correlated with right-brained thinking styles, and scores were negatively correlated with left-brained thinking styles. Masten, Khatena, and Draper (1988) duplicated these results with gifted students, and the results (right-brained styles showing higher creativity than left-brained styles) were constant even in groups that had been given a creativity training program. Jausovec (1985a) found that creative individuals (28 eminent writers and 28 music and art students) preferred right-hemispheric tasks, whereas noncreative individuals (28 students with low creativity test scores) preferred left-hemispheric tasks. The results were reproduced (Jausovec, 1985b) with a population of 19 painters and sculptors and 28 writers serving as the artist group and 52 medium-creative individuals and 23 low-creative individuals serving as the control group.

Torrance and Frasier (1983) assessed 49 graduate students on the YSLT (Torrance et al., 1977) and the Biographical Inventory of the YSLT. They found that right-hemispheric thinking style was positively related to biographical measures of creativity and artistic potential. Torrance (1982) found that the negative relationship between a left-hemispheric thinking style and creativity was stronger than the positive relationship between a right-hemispheric thinking style and creativity.

Rothenberg (1991) investigated the relationship between creativity and two different types of processes, janusian (so named after the two-faced Roman god Janus) and homospatial. Janusian processes are defined as “actively conceiving multiple opposites or antitheses

simultaneously” (Rothenberg, 1996, p. 207), whereas homospatial processes are concerned with the practice of juxtaposing two distinct entities to create a new concept (Rothenberg, 1990b; Rothenberg & Sobel, 1990). Both the janusian and homospatial processes are related to creativity, especially in adolescence (Rothenberg, 1990a). Homospatial processes in particular (e.g., examining superimposed images) were found to elicit creativity more than images presented side by side (Rothenberg, 1988). Mobley, Doares, and Mumford (1992) gave 160 individuals a series of category exemplar problems in which they were asked to combine categories to produce a new category that could account for an exemplar. They found that the more diverse the categories presented, the more creative the new categories created.

Feist (1991) compared thinking styles in 122 undergraduates who were considered to either be art-oriented or science-oriented. He compared their synthetic thinking (integrating concepts) and analytic thinking (differentiating concepts) before, during, and after solving tasks (both groups were randomly assigned either to art-oriented tasks or science-oriented tasks). Feist found that the thinking styles were surprisingly similar. Although the predicted differences of art-oriented students using more synthetic thinking and of science-oriented students using more analytic thinking did occur, “at some time periods, some forms of thinking of art students and science students are similar” (pp. 152–153).

Baer’s (1991) findings tended toward the opposite direction, however. He tested 50 eighth-grade students on artistic tasks (writing poems and stories) and on mathematical tasks (solving equations and word problems). Controlling for IQ, reading achievement, and math achievement, Baer found that creativity scores within the two domains (as rated by outside experts) were not correlated. Subsequent follow-up studies with elementary school students and adults reproduced the original findings. Finally, critical thinking skills (Gadzella & Penland, 1995) and problem-solving skills (Mumford, Connelly, Baughman & Marks, 1994) have also been linked to higher levels of creativity.

Knowledge

Knowledge is a fifth component that should be entered into the creativity equation. To produce cre-

ative work in a given domain, one must be knowledgeable about that domain (Sternberg & Lubart, 1995). An extreme example is a science such as nuclear physics—it would be virtually impossible for anyone without sufficient knowledge of nuclear physics to make any kind of creative contribution in that domain. But even in the arts, it is essential to have an intimate knowledge of the domain in question.

Some theorists claim that possessing too much knowledge about a domain would prevent truly novel and original thoughts. Frensch and Sternberg (1989) found that expert bridge players found it more difficult to adjust to changes in the rules of the game than novices (both surface changes and conceptual changes, more notably the latter). Minsky (1997) theorized that a great deal of our knowledge is geared toward avoiding negative experiences—and yet it is these very negative experiences that may result in creative production.

Weisberg (1993, 1999) dubbed this theory the “tension” view, but suggests an alternative, which he called the “foundation” view. This line of research has tried to demonstrate that creativity can build from knowledge. Hayes (1981, 1989) empirically studied a wide range of artists, including composers and painters. After analyzing the biographies of 76 prominent composers, he found that it took approximately 10 years of experience before a composer produced a notable work or a masterpiece. Hayes (1989) illustrated this “10-year phenomenon” through the case of child prodigy Wolfgang Mozart, who began adding to the canon of great work while only a teenager. Whereas Mozart did indeed start producing at a remarkably young age, he first “entered the field” when he began composing at age 4—approximately 10 years earlier! A similar time lag was found in 131 eminent painters, who painted a first masterpiece after an average of 6 years in the field (Hayes, 1989). In addition, Gardner (1993) found that of the seven creative geniuses he profiled, nearly all of them first made a significant contribution approximately 10 years after they first entered the field. The time spent toiling in the field appears to be increasing for creative writers, according to literary critic John Aldridge (1992), who observed that modern writers have spent much more time studying writing, especially in academic settings, than did their predecessors.

Benton, Corkill, Sharp, Downey, and Khramtsova (1995) asked 106 high school and college students to

write a story about baseball, then tested them for both interest in baseball and knowledge about baseball. The participants’ knowledge about baseball was found to be a better indicator of the thematic maturity and interest level of the stories they produced than their interest in baseball. Williams (1966) found that engineering students who scored higher on creativity tests had a higher than average amount of knowledge.

One characteristic that often accompanies learned knowledge is firsthand knowledge, or experience, with a task. Research has found, not surprisingly, that those with more experience outperform novices on tasks such as writing haiku poetry (Blasko, Merski, & Heberlein, 1997) or producing metaphors (Williams-Whitney, Mio, & Whitney, 1992). Sometimes aspects of a creative task that may take a novice a long time to produce may be simple procedural knowledge in a creator with more experience. Ericsson and Charness (1994) argued that experience and extended practice account for much of what distinguishes elite performers.

Environment

The final variable to consider in the Sternberg–Lubart model of creativity is that of environment. One obvious factor is that creative writers will find it hard to flourish if they are born to abusive parents, or into a family that does not appreciate or encourage literary interests. A poor background, however, can still produce quality creative writers with appropriate intervention (such as the Chicopee Writing Project for low-socioeconomic-status women; see Powell, 1994). Mellou (1996) wrote that with the presence of appropriately creative school environments and teachers, a child’s creative behavior can be influenced and nurtured, and Esquivel (1995) emphasized the importance of teacher behavior on the development of children’s creative abilities.

Many insights into the effect of environment on creativity have been found using historiometric research, such as in Simonton’s (1977) oft-cited study of 10 classical composers. Simonton divided the lives of 10 eminent composers (Bach, Beethoven, Mozart, Haydn, Brahms, Handel, Debussy, Schubert, Wagner, and Chopin; selection based on Farnsworth, 1969) into 5-year periods and measured each composer’s productivity based on both their works and their themes. Simonton then analyzed these patterns

of productivity to discover such findings as (a) quality of work was a “probabilistic consequence” of quantity of work; (b) productivity is affected by such variables as age and illness; and (c) productivity is not significantly affected by such external variables as social reinforcement, the occurrence of a war, or personal stress. Cassandro (1998) offered an interesting expansion on the second point: Creative writers, as a group, tend to die significantly younger than would be expected, and die younger than other eminent individuals in different fields.

There are some other interesting notes that should be made on the importance of environment to creativity, and creative writing specifically. One variable is the importance of birth order. Notable and eminent individuals are much more likely to have been the firstborn child (Roe, 1952; Simonton, 1987), which is consistent with Zajonc’s (1983) confluence model. However, in Sulloway’s (1996) historical analysis, he found that although the firstborn child does indeed have advantages and a propensity for power and privilege, later-born children often display more openness to experience to make up for this discrepancy.

Other studies have found a significantly large number of firstborn children among eminent composers (Schubert, Wagner, & Schubert, 1977a) and writers (Joubert, 1983). Schubert, Wagner, and Schubert (1977b) found that significantly fewer firstborn males volunteered for creativity training, but significantly more middle-born males volunteered (with no birth order effects found for women). This latter result can be interpreted in one of two ways, however: Either firstborn males had less interest in creativity training, or they simply did not feel the need for creativity training, as they already considered themselves creative. Ludwig (1995) found that whereas poets were more likely to be firstborn, nonfiction writers and fiction writers were more likely to be later born.

The early death of a parent is also found in an inordinate number of eminent and creative individuals (Albert, 1980). In the general population, approximately 8% of people have had a parent die before they are 16. One study, however, showed a figure of 55% for poets and writers (F. Brown, 1968)! More recently, however, Ludwig (1995) did not find significant differences between artistic professionals and all other professionals for age at mother or father’s death.

Michel and Dudek (1991) administered creativity tests to young children and then interviewed their

mothers. Children who scored high on the creativity tests had mothers who were not as emotionally involved with their children, were less likely to be overprotective, and less likely to deny hostile feelings directed at their children. The mothers tended to be more self-confident and had higher occupational levels than other mothers. Runco and Albert (1986) found that parents of gifted adolescent boys displayed higher levels of divergent thinking.

Conclusion

There is still ample exciting work to be done. The Sternberg and Lubart (1995) theory of creativity combines many variables in one extensive equation, but this theory only opens the door for more research to be done that also brings together all the variables that have been singled out as important. Decades of intense theoretical and empirical work have shown the creativity researcher which variables must be examined, and the trends that may be expected or predicted in these variables. Indeed, in reviewing the literature on the creative individual, a few conclusions can be drawn specifically about the creative writer. Intrinsic motivation is especially important to the process of creative writing, to the point that many studies use the act of writing as the experimental activity. Writers are prone to manic-depression and to many of the personality traits that are associated with bipolar disorder, such as instability and impulsivity. And as seems to be true for all of the arts, experience at writing is essential at distinguishing expert writers from novices, and the surrounding environment is less important. In essence, the study of creative writers should focus on internal forces, rather than external forces.

One next step in the pursuit of studying the creative writer could be a series of comprehensive studies that test all of these distinct components and try to find each unique pattern of traits and abilities. With sufficient empirical testing, the variables that best distinguish the creative writer from the creative nonwriter could be extracted. This line of study could then be expanded to testing within the creative writer, distinguishing between different types of writing. The practical application has an obvious starting point: writing programs. Young and aspiring writers could have a tool to help them determine both if the writing career

is best suited for them, and if so, the best way for them to pursue this. And writing is merely the first of many creative fields that could be studied in this manner.

As the number of venues for a verbal, creative, and artistic person to express himself or herself keep increasing—from film and theater to the Internet and the Web to old-fashioned print literature—there are more possibilities than ever to explore. The research to date has laid a wonderful groundwork for future investigations. In 1908, Freud (1908/1959) could view a creative writer as a “strange beast.” Today we at last possess the tools to truly understand this once-mythical process and product.

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