
What Is the Common Thread of Creativity?

Its Dialectical Relation to Intelligence and Wisdom

Robert J. Sternberg
Yale University

Creativity refers to the potential to produce novel ideas that are task-appropriate and high in quality. Creativity in a societal context is best understood in terms of a dialectical relation to intelligence and wisdom. In particular, intelligence forms the thesis of such a dialectic. Intelligence largely is used to advance existing societal agendas. Creativity forms the antithesis of the dialectic, questioning and often opposing societal agendas, as well as proposing new ones. Wisdom forms the synthesis of the dialectic, balancing the old with the new. Wise people recognize the need to balance intelligence with creativity to achieve both stability and change within a societal context.

So many threads, so few clearly emergent patterns. Such might be a characterization of the articles on creativity that make up this special section of the *American Psychologist*. Yet I argue that one common thread emerges. That common thread is the role of creativity in the dialectical progression of ideas. The basic idea underlying this article is that all cultures—including the cultures that comprise fields of knowledge—generate a dialectical process (Hegel, 1807/1931) in which intelligence represents a thesis, creativity an antithesis, and wisdom a synthesis.

Intelligence

Although definitions of intelligence differ (Sternberg, 2000b), virtually all of these definitions view intelligence as the ability to adapt to the environment (see, e.g., "Intelligence and Its Measurement," 1921; Sternberg & Detterman, 1986, for multiple definitions of intelligence by experts; and Sternberg, 1985; Sternberg, Conway, Ketron, & Bernstein, 1981, for multiple definitions of intelligence by laypeople). Intelligent people are those who somehow acquire the skills that lead to their fitting into existing environments. Some theorists believe that such skills are relatively domain-general (see, e.g., Carroll, 1993; Jensen, 1998; see also essays in Sternberg & Grigorenko, in press), whereas others believe that they are relatively domain-specific (see, e.g., Ceci, 1996; Gardner, 1983, 1999; see also essays in Sternberg & Grigorenko, in press). Still others believe that such skills have both domain-specific and domain-general properties (see, e.g., Sternberg, 1997a, 1999d). But these diverse views have in common the proposition that the skills constituting intelligence lead people, on average, to be rewarded in terms of whatever the reward structure of a society is. What is considered intelligent in one

place may not be in another, as cultural psychologists have appreciated in their studies of intelligence (see, e.g., Serpell, 2000). Intelligent people are rewarded, on average, precisely because they adapt and often can adapt in multiple environments.

Contemporary U.S. society is one of many societies around the world that allocates resources in part on the basis of the perceived intelligence of its members. People easily can make the step from the existence of this reward system to the justification of the reward system (Herrnstein & Murray, 1994). However, it is important to realize that it is no coincidence that this system exists: Societies define intelligence largely on the basis of individual differences to account for the fact that some people are more successful than others in school, in life, or elsewhere. As McNemar (1964) pointed out, a concept of intelligence, at least in the sense of what has been measured by psychometric tests of intelligence, might never have arisen in the absence of individual differences. Experimental psychologists historically have been less interested in intelligence than have been differential psychologists, perhaps in part because of the former's lesser interest in individual differences.

Creativity

Definitions of creativity, like definitions of intelligence, differ (Sternberg, 1999b), but they have in common their emphasis on people's ability to produce products that are not only high in quality but also novel. Products fashioned by intelligent people are high in quality but not necessarily novel. Creativity thus seems in some way to go beyond intelligence.

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Correspondence concerning this article should be addressed to Robert J. Sternberg, Yale University, The Yale Center for the Psychology of Abilities, Competencies, and Expertise, 340 Edwards Street, P.O. Box 208358, New Haven, CT 06520-8358. Electronic mail may be sent to robert.sternberg@yale.edu.

Many highly creative individuals “defy the crowd” (Sternberg & Lubart, 1991, 1995); that is, they produce products that are good but that are not exactly, and often not even approximately, what other people expect or desire. This view implies that creativity is always a person–system interaction: Creativity is meaningful only in the context of a system that judges it, and what is creative in one context may not be in another (Csikszentmihalyi, 1996; Sternberg & Lubart, 1995). Hence, creativity must be viewed as a property of an individual as that individual interacts with one or more systems. For example, painters who originated the idea of painting Cubist paintings, such as Picasso or Braque, were highly creative in a given time and a given place but might be viewed as less creative today because such an idea is no longer particularly novel. Consider the individuals whose contributions are reviewed in this special section.

Linus Pauling’s “valence-bond theory transformed chemistry” (see Nakamura & Csikszentmihalyi, 2001, p. 339, this issue) and represented a creative breakthrough that defied contemporary views in the field of chemistry. Some of Pauling’s other ideas, such as with regard to the structure of DNA (a triple helix) and with regard to the value of Vitamin C in fighting colds, also were crowd-defying, but the ideas were simply wrong, and hence their novelty was not matched by their quality, with the result that they had a short half-life. Charles Darwin’s evolutionary proposal turned on their head not only many scientific ideas but also many religious ideas (see Gruber & Wallace, 2001, this issue). As a result, Darwin was vilified by many during his lifetime, and he continues to be vilified today by certain religious and other ideological groups. Thomas Young’s theory of light as a wave was so controversial that, from the standpoint of the physics of 1910, it might be viewed as a “negative contribution” (see Martindale, 2001, this issue). Yet later it would be recognized that this prickly idea was in large part correct because light has properties both of a wave and of a particle. Amabile (2001, this issue) noted how the fiction of John Irving has been described as “‘wildly inventive’” and as “‘bearing little similarity to other recent fiction’” (p. 334). In a similar manner, Stephen Donaldson pulled off a unique combination in the world history of literature when he devised his *Thomas Covenant* series on the basis of the combination of ideas of a character who is a leper and an unbeliever (see Ward, 2001, this issue). Finally, in helping formulate Impressionism, Claude Monet changed what were the current constraints of the domain of painting by imposing his own novel ones, for example, in dealing with “how light breaks up on things” (see Stokes, 2001, p. 357, this issue).

Creative people often feel underappreciated and attacked for their ideas (Sternberg & Lubart, 1995), which is to be expected because their crowd-defying ideas are incompatible with conventional ways of thinking and vested interests. Many contemporaries are not thrilled to hear that not only their work but also the assumptions on which their work is based are being questioned (Kuhn, 1970). The creative people are correct: Time and again, their work and even they are attacked. What these individuals may fail to

realize, however, is their own role in producing these attacks: By serving as an antithesis to one or more societal theses, they are essentially not only creating their own work but also generating their own opposition. An antithesis is, by its nature, oppositional.

Much of the greatest creative work, including all of that reviewed in this special section, is paradigm-rejecting (Kuhn, 1970) or of a kind that has been referred to as “redirecting” or “reinitiating” a field; however, some creative work is, in some respects, less novel and basically forward-increments current ideas (Sternberg, 1998b, 1999c; Sternberg, Kaufman, & Pretz, in press). Such work is less likely to generate opposition, and its nature is closer to that of work representing the products of intelligence: It is adaptive within existing paradigms, whether in science, literature, art, or elsewhere. Parents, teachers, supervisors, and others who appreciate creative work are more likely to appreciate the forward-incremental type of creativity that builds on existing ideas than they are to appreciate the redirecting or reinitiating kinds of creativity that defy existing ideas. On occasion, though, people become known not for inventing new paradigms (crowd-defying creativity) but for working extremely well within existing paradigms. Mozart would probably be a good example of someone whose creativity was largely within, rather than in defiance of, existing paradigms.

If much major creativity is defined by its antithetical, crowd-defying nature, what can be said about the psychological ingredients of creativity? It is clear that intelligence is a prerequisite for creativity (see, e.g., Simonton, 1984) because creative products are high in quality. As pointed out by Pauling (see Nakamura & Csikszentmihalyi, 2001, this issue), creative people not only generate a lot of ideas but also analyze those ideas and discriminate (intelligently) between their better and their worse ideas. But beyond intelligence and other abilities, creativity appears to be in large part a decision (Sternberg, 2000a): Some people use their intelligence to please the crowd, others to defy it. The most traditionally intelligent ones hope to lead the crowd not only by accepting the presuppositions of the crowd but also by analyzing next steps in thinking and by reaching those next steps before others do (Sternberg, 1998b).

Highly creative people decide, among other things, to redefine problems (e.g., as did Monet), analyze their ideas (as did Pauling), attempt to persuade others of the value of their ideas rather than expecting others readily to accept them (as did Darwin), take sensible risks (as has Irving in defying modern novelistic conventions), seek bizarre connections between ideas that others do not seek (as has Donaldson), and realize that existing knowledge can be a hindrance as much as it is a help in generating creative ideas (as did Young; Sternberg, 2000a). An implication of this view of creativity as being, in part, a decision is that anyone can adopt a creative attitude (Schank, 1988) and think creatively. For a variety of reasons, however, people will not typically reach the heights of creativity of the individuals whose contributions are reviewed in this special section. Among these reasons are different degrees of compatibility between where people’s thinking is and where a field is at a given time in history (see

Nakamura & Csikszentmihalyi, 2001, this issue). For example, someone who today spontaneously generates the ideas underlying Impressionism was perhaps born too late to have the impact that Monet, Renoir, and other great Impressionists had at an earlier time.

Wisdom

Wisdom represents a synthesis of the thesis of intelligence (as traditionally defined) and the antithesis of creativity. Wise individuals balance the need for change (creativity) with the need for stability and continuity (intelligence) in human affairs. They thus are more divergent or legislative in their style of thinking than are many intelligent people, but at the same time, they are more convergent and even conservative in their style of thinking than are many highly creative people (see Sternberg, 1997b). They are perhaps most effective and sought after in positions of leadership because they are likely to balance the need for change (or shaping of the environment) with the need for stability (or adaptation to the environment; Sternberg, 1998a). Indeed, in a study of people's implicit theories, it was found that individuals in business see wisdom and creativity as inversely related (Sternberg, 1985), perhaps because of creative people's refusal, at times, to recognize the need for stability as well as for change.

People can be intelligent without being wise. For example, they may do very well in school and on cognitive tests, but they may make a total mess not only of their own lives but also of the lives of others (Sternberg, 1997a). Robert McNamara, a principal architect of the Vietnam War, was arguably more intelligent than he was wise. As Gardner (1993) pointed out, many creative people as well are not wise, and they may even be foolish in their dealings with other people. The wise person must show, in some degree, both intelligence and creativity, as well as an emergent wisdom from that intelligence and creativity.

If things go well, wisdom prevails, and some balance between the old and the new is accepted, moving a field forward in its quest for knowledge and understanding. But this forward movement never reaches a final point (Kuhn, 1970). The nature of the dialectic is such that the synthesis becomes the next thesis, and ideas move forward to the next step (Hegel, 1807/1931; Sternberg, 1999a). So the fate of ideas forms a spiral: The ideas of today's intelligence will be questioned by the ideas of tomorrow's creativity, only to be synthesized by the ideas of posttomorrow's wisdom. These ideas, in turn, will become the ideas of later intelligence, which still later will be questioned by creativity, and on the spiral will go through time.

REFERENCES

Amabile, T. M. (2001). Beyond talent: John Irving and the passionate craft of creativity. *American Psychologist, 56*, 333-336.
 Carroll, J. B. (1993). *Human cognitive abilities: A survey of factor-analytic studies*. New York: Cambridge University Press.
 Ceci, S. J. (1996). *On intelligence* (Expanded ed.). Cambridge, MA: Harvard University Press.
 Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York: Harper Collins.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.
 Gardner, H. (1993). *Multiple intelligences: The theory in practice*. New York: Basic Books.
 Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York: Basic Books.
 Gruber, H. E., & Wallace, D. B. (2001). Creative work: The case of Charles Darwin. *American Psychologist, 56*, 346-349.
 Hegel, G. W. F. (1931). *The phenomenology of mind* (2nd ed.; J. B. Baillie, Trans.). London: Allen & Unwin. (Original work published 1807)
 Herrnstein, R. J., & Murray, C. (1994). *The bell curve*. New York: Free Press.
 Intelligence and Its Measurement: A symposium. (1921). *Journal of Educational Psychology, 12*, 123-147, 195-216, 271-275.
 Jensen, A. R. (1998). *The g factor: The science of mental ability*. Westport, CT: Praeger/Greenwood.
 Kuhn, T. S. (1970). *The structure of scientific revolutions* (2nd ed.). Chicago: University of Chicago Press.
 Martindale, C. (2001). Oscillations and analogies: Thomas Young, MD, FRS, genius. *American Psychologist, 56*, 342-345.
 McNemar, Q. (1964). Lost: Our intelligence? Why? *American Psychologist, 19*, 871-882.
 Nakamura, J., & Csikszentmihalyi, M. (2001). Catalytic creativity: The case of Linus Pauling. *American Psychologist, 56*, 337-341.
 Schank, R. C. (1988). *The creative attitude*. New York: Macmillan.
 Serpell, R. (2000). Intelligence and culture. In R. J. Sternberg (Ed.), *Handbook of intelligence* (pp. 549-580). New York: Cambridge University Press.
 Simonton, D. K. (1984). *Genius, creativity, and leadership*. Cambridge, MA: Harvard University Press.
 Sternberg, R. J. (1985). Implicit theories of intelligence, creativity, and wisdom. *Journal of Personality and Social Psychology, 49*, 607-627.
 Sternberg, R. J. (1997a). *Successful intelligence*. New York: Plume.
 Sternberg, R. J. (1997b) *Thinking styles*. New York: Cambridge University Press.
 Sternberg, R. J. (1998a). A balance theory of wisdom. *Review of General Psychology, 2*, 347-365.
 Sternberg, R. J. (1998b). Costs and benefits of defying the crowd in science. *Intelligence, 26*, 209-215.
 Sternberg, R. J. (1999a). A dialectical basis for understanding the study of cognition. In R. J. Sternberg (Ed.), *The nature of cognition* (pp. 51-78). Cambridge, MA: MIT Press.
 Sternberg, R. J. (Ed.). (1999b). *Handbook of creativity*. New York: Cambridge University Press.
 Sternberg, R. J. (1999c). A propulsion model of types of creative contributions. *Review of General Psychology, 3*, 83-100.
 Sternberg, R. J. (1999d). The theory of successful intelligence. *Review of General Psychology, 3*, 292-316.
 Sternberg, R. J. (2000a). Creativity is a decision. In A. L. Costa (Ed.), *Teaching for intelligence II* (pp. 85-106). Arlington Heights, IL: Sky-light Training.
 Sternberg, R. J. (Ed.). (2000b). *Handbook of intelligence*. New York: Cambridge University Press.
 Sternberg, R. J., Conway, B. E., Ketron, J. L., & Bernstein, M. (1981). People's conceptions of intelligence. *Journal of Personality and Social Psychology, 41*, 37-55.
 Sternberg, R. J., & Detterman, D. K. (1986). *What is intelligence?* Norwood, NJ: Ablex.
 Sternberg, R. J., & Grigorenko E. L. (Eds.). (in press). *The general factor of intelligence: How general is it?* Mahwah, NJ: Erlbaum.
 Sternberg, R. J., Kaufman, J. C., & Pretz, J. E. (in press). *The creativity conundrum: A propulsion model of kinds of creative contributions*. Philadelphia: Psychology Press.
 Sternberg, R. J., & Lubart, T. I. (1991). An investment theory of creativity and its development. *Human Development, 34*, 1-31.
 Sternberg, R. J., & Lubart, T. I. (1995). *Defying the crowd: Cultivating creativity in a culture of conformity*. New York: Free Press.
 Stokes, P. D. (2001). Variability, constraints, and creativity: Shedding light on Claude Monet. *American Psychologist, 56*, 355-359.
 Ward, T. B. (2001). Creative cognition, conceptual combination, and the creative writing of Stephen R. Donaldson. *American Psychologist, 56*, 350-354.