

# The Genius of Everyman (1)

## DISCOVERING CREATIVITY

A mythology of genius still haunts the otherwise secular institutions of modern scholarship. Like fantastic Medieval legends that obscured the lives of the saints, an aura of glamor is still cast upon the accomplishments of leaders in the arts and sciences, which only blurs the image of their personalities and blinds the viewer to their struggles. Now, slowly, this mythology is crumbling before the onslaught of psychological research, which is uncovering the various components of creativity and revealing their potential for development in all of us.

The cult of genius, as we know it, originated in the Renaissance, inspired in part by the strong personalities of such men as Michelangelo and Leonardo da Vinci. It reached a height in the Romantic era, when John Keats proclaimed, "Men of genius are ethereal chemicals operating on the mass of neutral intellect." Even a contemporary psychiatrist has written a book describing creativity as a "Magic Synthesis."

This view of genius as something more than highly developed talent, a peculiar gift of a few superior individuals, is actually a historical anomaly. Comparably great achievements by individuals in Eastern cultures, for example, have inspired respect, but not this sort of mystical adulation. And now the time has apparently come in our own society when the myth of genius has not only failed the test of evidence but also outlived its usefulness.

Creativity is sometimes conceived as a "property of the genius which mysteriously accounts for his uncommon ability and which, by definition, the common man cannot understand or possess," says Taher A. Razik, education professor at the State University of New York at Buffalo. Such a conception, he says, only serves to block new educational programs aimed at fostering creative potential.

Some changes in traditional attitudes toward creativity and genius can already be detected. Dominance in science, for example, continues to shift from a few individuals, once called "geniuses," to interdisciplinary teams of people whose accomplishments are not diminished by saying they are the products of "talent" and hard work. Even the arts, whose language of excellence has long been inflated by the efforts of professional critics, may be changing. Art historian Vytautas Kavolis writes that in the affluent, leisure society predicted for the future, "well-

### Research is revealing untapped creative abilities in each of us

BY JOHN H. DOUGLAS

*The first article in a two-part series discusses recent research into creativity and the theories that have resulted from it. A second article will deal with attempts to improve an individual's capacity to create.*

trained amateurs might again, as in the past in China, begin producing art of respectable quality."

The origin of changing scientific attitudes toward creativity can be traced to J. P. Guilford and his 1950 presidential address to the American Psychological Association. Creativity, he said, should be considered in terms of a multitude of discrete abilities, which in turn are part of an even larger set of abilities, called "intelligence." This "Guilford Model of Intelligence" eventually contained 120 separate abilities, of which only six or eight were supposedly measured on conventional IQ tests. The model itself remains very controversial, but Guilford's initiative opened the floodgates to further experimentation and speculation.

One particularly useful distinction made in the Guilford model was that between "convergent" and "divergent" thinking. Convergent thinking moves toward a single goal, using rules of logic—this is the "intelligence" measured by IQ tests. Divergent thinking, on the other hand, moves away from set patterns and goals, and involves such abilities as fluency of ideas, originality, and the ability to elaborate. Many so-called "creativity tests" have been devised to measure these divergent thinking abilities, and include such questions as "Write down all the uses you can think of for junked automobiles." (A list of 6 to 14 separate uses is considered average; a score of 15 or greater supposedly indicates superior originality.)

Recent discovery of separate functions for the two hemispheres of the brain (SN: 4/3/76, p. 218) would seem to offer a physiological basis for Guilford's intuitive distinction between convergent and divergent abilities. Speech, logic, reading, mathematical analysis and sequential memory (convergent abilities) appear to be controlled by the brain's left hemi-

sphere. The right hemisphere seems to be involved in recognizing spatial relationships, in carrying out holistic and symbolic thought processes, and in recognizing faces (divergent abilities). A high degree of cooperation takes place between the two hemispheres, however, and the overall control of brain function is still not well understood.

Recognition of the separateness of divergent and convergent intelligence immediately raises some important—even frightening—questions: Are IQ tests failing to identify students whose divergent thinking abilities or other qualities gave them a high potential for success? And do the new "creativity tests" reveal that traditional education is doing little to develop creative abilities, and might even be suppressing them? The results of two decades research now indicate that, with some qualifications, the answer to both questions is, Yes. The implications of this research for changing school systems are just now beginning to sink in.

When J. W. Getzels and P. W. Jackson administered both IQ tests and their own creativity tests (based on Guilford's model) to students at the University of Chicago Laboratory School in 1962, they found that those who scored highest on the separate tests fell into two distinct groups. Although there was some overlap, the large majority of students scoring in the top 20 percent of the creativity tests did *not* score in the top 20 percent on the IQ tests. Yet school *achievement* tests showed both groups to be equally more advanced than the rest of the students.

One of today's leading creativity tests was developed by E. Paul Torrance, now at the University of Georgia. While he was still at the University of Minnesota, in the early 1960s, he gave IQ tests and creativity tests to elementary school children and concluded that "if we were to identify children as gifted on the basis of the intelligence tests, we would eliminate from consideration approximately 70 percent of the most creative." He also tested high school students and reported in 1972 that a 12-year follow-up study showed that "creativity tests administered during the high school years *can* predict real-life adult creative achievements."

Other researchers, particularly Michael A. Wallach of Duke University, have questioned the validity of such time-limited, paper-and-pencil tests. He called the results of Getzels and Jackson "uninterpretable" because the difference between

their "high creative" and "high intelligence" groups could have arisen in "any number of accidental ways." Torrance, he wrote, was looking at too many variables and drawing conclusions not really supported by research.

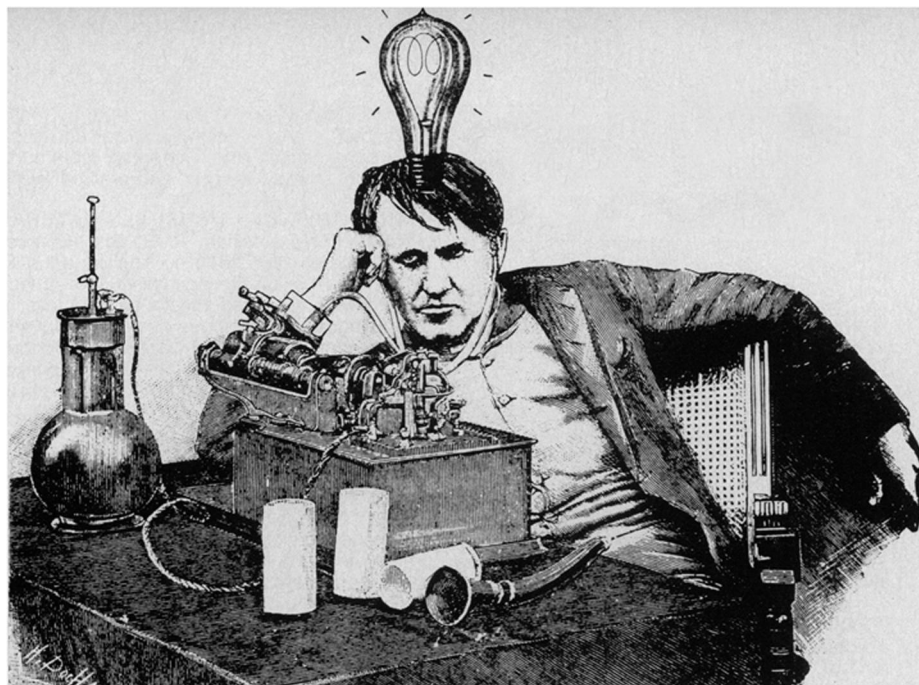
As an alternative approach, Wallach and Nathan Kogan tested children in an informal, game-like atmosphere, with no time limit. Yet they too found that some mental abilities, particularly a fluency of ideas, were apparently independent of traditionally defined intelligence. They also examined personality differences among the children and found that those doing poorly on the creativity tests seemed more cautious, less willing to consider unconventional solutions to problems for fear of being wrong.

While most researchers were concentrating on developing tests for creativity and pondering their implications for education, others were looking at successful adults to see whether traditional predictors of success, such as IQ tests and school grades, were valid as generally assumed. The results of this research approach proved equally disturbing.

University of Utah psychologist Calvin W. Taylor, working with some collaborators that included a medical college dean, devised a set of 77 measures for on-the-job performance of physicians. They then correlated each of these to the doctors' grades during college, during the first two years of medical school, and during the last two years of medical school. They found that grades showed no significant relationship to performance for 97 percent of the correlations, and for the remaining three percent, the majority of correlations were *negative*. Concluded the dean: "This is a somewhat shocking finding for a medical educator like myself who has spent his professional life selecting applicants for admission to medical school. . . . It has also compelled me to re-examine my own concepts of the basic objectives of medical education."

With other collaborators, Taylor also studied scientists at the National Aeronautics and Space Administration and found that certain biographical indicators—such as participation in a summer science program as a high school student—were better predictors of creativity as an adult scientist than were classroom grades. The discovery hardly surprised him, for he pointed out that "the relationship of undergraduate college grade-point average to success as a scientist has been shown by many investigations to be at best low."

As creativity research has become more popular, scientists from a wider variety of fields have begun to participate. As a result, more old myths have fallen, particularly the one about creativity being related to madness. "There is no great genius without a touch of dementia," said Seneca nearly 2,000 years ago. "Hogwash," replies modern psychiatry.



The first empirical surveys of brilliant people to see whether they showed an unusual incidence of mental illness were conducted early in this century. The surveys revealed an unusual amount of persistence and drive among these people, but little incidence of psychosis. Nevertheless, the creative process, to the extent it involves divergent thinking, often relies on the subconscious mind and free indulgence in fantasy. Freud believed that the motive force behind such fantasies was wish fulfillment, "a correction of unsatisfying reality." But while this conscious turning away from reality might be considered verging on the neurotic, Freud carefully pointed out that the successful writer or artist separates his fantasies from reality—"the same as the child at play"—and even uses them to work through his emotional conflicts.

More recent research has underscored this theme of creativity as a *balance* between the forces of rational and nonrational thought—with irrationality (mental illness) considered as an entirely separate entity. British psychologist Liam Hudson sees life as "continual and unresolved tension between the forces of self-expression and those of control." This tension, he says, "governs, in very considerable detail, the nature of creative work." The American psychiatrist and author Rollo May goes one step further: "We express our being by creating," he says. "Creativity is a necessary sequel to being." Since being implies risk, he says, creativity requires courage. The creative person is thus one who dares to encounter blank reality and seek to bring it form.

Again, as biological research has become more sophisticated, evidence of a physiological basis for this observed behavior has been discovered. Colin Martindale, a psychologist at the University of Maine, has observed different patterns of brain waves for highly creative people, compared to those who are less creative. While resting, he says, high creatives ap-

pear to be more aroused and aware of their surroundings. Their brains produce fewer alpha waves (which increase with relaxation), and they are more easily disturbed by sudden noises. Yet these same creative people immediately produce *more* alpha waves when assigned a creative task—that is, they seem to relax more while facing a challenge in an area in which they excel. Less imaginative subjects kept the same level of alpha waves when assigned a creative task.

Martindale says he found this result "stunning." It offers physiological support, he says, to the hypothesis that "confronted with novelty, whether in design, music or ideas, creative people get excited and involved, while less creative people turn suspicious or even hostile."

As research into creativity continues, more links will probably be revealed between fundamental biological processes and abilities long shrouded in a cloak of mystery. This disclosure promises to be a rather hopeful one for the average person, for the previous sense of mystery has generally only served to repress development of individual creative abilities. The discoveries under discussion, moreover, suggest that each of us possesses creative power not previously recognized, much less encouraged. And while some genetic component is probably involved in determining the extent of these abilities, research also suggests that environment exercises a considerable influence.

Unfortunately, a severe schism has arisen among the scientists most intimately involved in creativity research. Recent interviews with *SCIENCE NEWS* have revealed that some of these scientists not only don't speak to each other, but refuse even to publish in the same journals.

One school of thought still bears allegiance to the Guilford model of intelligence, and its adherents might be described as "factor analysts." Few would defend Guilford's original formulation of intelligence as a composite of exactly 120

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## ... Creativity

separate variables—much less claim to be able to measure all of them. But factor analysts do see creativity in terms of several independent abilities, which can be applied to tasks in many areas. Factor analysts concentrate a great deal of energy on devising tests that can measure the proposed abilities separately, and their results are likely to appear in the *JOURNAL OF CREATIVE BEHAVIOR*.

One leader of this school is E. Paul Torrance, who told *SCIENCE NEWS* that "the facts do not support Wallach's contention" that many of the abilities measured by Torrance's creativity test are simply not independent variables, unrelated to IQ. Torrance admits his test is not "factor pure," but says the abilities he measures are independent of IQ. These abilities can also be taught, he says, in a "disciplined approach to problem solving" that can increase a person's creativity for many applications.

The opposing school of thought is less cohesive, but generally shares the idea that abilities worthy of being called distinctly "creative" are very few. Adherents spend little time on developing creativity tests and are skeptical about how well such tests relate to achievement

in the real world. Finally, they say that creative abilities mastered in one field are probably not much help in preparing one to be creative in another field.

Michael Wallach calls this group (to which he belongs) the "achievement-centered" school. He says that he declines to publish in the *JOURNAL OF CREATIVE BEHAVIOR* because he sees it as the "specialized outlet" of a group of "true believers," who have their own preconceived notions about what creativity means. Rather than relying on tests, scientists should investigate creative accomplishments in the real world, he maintains. When they do, he says, they find only specific sets of creative abilities for each task—not generalized problem-solving skills. These narrow abilities can still be taught, but not by training students in "general mind-wandering."

Such strongly held differences of opinion are, of course, common in science, and provide its strongest attraction as a spectator sport. However, the evident breakdown of communication between opposing sides in this issue and their apparent lack of mutual respect seem particularly ironic among researchers dedicated to exploring the creative impulse.

Divided as they are, the two schools nevertheless have some important tenets in common. The first is that at least some creative abilities (particularly fluency of ideas) are independent of IQ and have thus been missed in efforts to spot "gifted" children. Second, there is a shared conviction that creative ability—however conceived—can be learned, and that society has only begun to till the ground for nurturing creativity. Finally, an unaccustomed humility has settled over the whole field of intelligence testing. Some researchers have even proposed a "threshold model" of intelligence, saying that IQ doesn't really matter above a certain level (which would be different for each individual line of work). Above this level, they say, success depends almost entirely on other factors, creative and emotional.

Donald W. MacKinnon, at the University of California at Berkeley, for example, concluded that there was generally little connection between adult IQ and adult achievement above an IQ level of about 120. Specifically, he found that a scientist with an IQ of 130 was as likely to win a Nobel Prize as one with an IQ of 180. (Wallach concludes that the evidence does not so much support a threshold model of real intelligence as simply indicate that IQ tests aren't very accurate at their upper extreme.)

Whichever school eventually triumphs, society is clearly faced with an immediate challenge to identify "gifted" children, whose creative abilities have previously gone undetected, and to help all people recognize and develop their creative potential. In this way we may someday hope to tap the spark of genius that apparently lies in each of us. □

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