Creativity

ORIGINAL IDEAS HAVE CHANGED THE COURSE OF HUMAN HISTORY. MUCH OF WHAT WE NOW TAKE FOR GRANTED IN ART, MEDICINE, MUSIC, TECHNOLOGY, AND SCIENCE WAS ONCE REGARDED AS RADICAL OR IMPOSSIBLE. HOW DO CREATIVE THINKERS ACHIEVE THE BREAKTHROUGHS THAT CARRY US INTO NEW REALMS? CREATIVITY IS ELUSIVE. NEVERTHELESS, PSYCHOLOGISTS HAVE LEARNED A GREAT DEAL ABOUT HOW CREATIVITY OCCURS AND HOW TO PROMOTE IT.

WE HAVE SEEN THAT PROBLEM SOLVING MAY BE MECHANICAL, INSIGHTFUL, OR BASED ON UNDERSTANDING. TO THIS WE CAN ADD THAT THINKING MAY BE INDUCTIVE (GOING FROM SPECIFIC FACTS OR OBSERVATIONS TO GENERAL PRINCIPLES) OR DEDUCTIVE (GOING FROM GENERAL PRINCIPLES TO SPECIFIC SITUATIONS). THINKING MAY ALSO BE LOGICAL (PROCEEDING FROM GIVEN INFORMATION TO NEW CONCLUSIONS ON THE BASIS OF EXPLICIT RULES) OR ILLLOGICAL (INTUITIVE, ASSOCIATIVE, OR PERSONAL).

WHAT DISTINGUISHES CREATIVE THINKING FROM MORE ROUTINE PROBLEM SOLVING? CREATIVE THINKING INVOLVES ALL OF THESE THINKING STYLES, PLUS FLUENCY, FLEXIBILITY, AND ORIGINALITY. LET’S SAY THAT YOU WOULD LIKE TO FIND CREATIVE USES FOR THE MILLIONS OF AUTOMOBILE TIRES DISCARDED EACH YEAR. THE CREATIVITY OF YOUR SUGGESTIONS COULD BE RATED IN THIS WAY: FLUENCY IS DEFINED AS THE TOTAL NUMBER OF SUGGESTIONS YOU ARE ABLE TO MAKE. FLEXIBILITY IS THE NUMBER OF TIMES YOU SHIFT FROM ONE CLASS OF POSSIBLE USES TO ANOTHER. ORIGINALITY REFERS TO HOW NOVEL OR UNUSUAL YOUR IDEAS ARE. BY COUNTING THE NUMBER OF TIMES YOU SHOWED FLUENCY, FLEXIBILITY, AND ORIGINALITY, WE COULD RATE YOUR CREATIVITY, OR CAPACITY FOR DIVERGENT THINKING (BAER, 1993).

DIVERGENT THINKING IS WIDELY USED TO MEASURE CREATIVITY. IN ROUTINE PROBLEM SOLVING OR THINKING, THERE IS ONE CORRECT ANSWER, AND THE PROBLEM IS TO FIND IT. THIS LEADS TO CONVERGENT THINKING (LINES OF THOUGHT CONVERGE ON THE ANSWER). DIVERGENT THINKING (SEE FIGURE 1, PAGE W–6) IS THE REVERSE, IN WHICH MANY POSSIBILITIES ARE DEVELOPED FROM ONE STARTING POINT (BAER, 1993). (SEE TABLE 1, PAGE W–6, FOR SOME EXAMPLES.) RATHER THAN REPEATING LEARNED SOLUTIONS, CREATIVE THINKING PRODUCES NEW ANSWERS, IDEAS, OR PATTERNS (MICHALKO, 1998).

THERE IS AN ACTIVE RESEARCH AREA INVESTIGATING POSSIBLE LINKS BETWEEN CHILDREN’S PLAY AND CONVERGENT OR DIVERGENT THINKING. FOR EXAMPLE, BRONWEN LLOYD AND NINA HOWE AT CONCORDIA UNIVERSITY IN MONTREAL STUDIED CHILDREN IN SOLITARY PLAY WITH EITHER OPEN-ENDED OR CLOSE-ENDED TOYS. CLOSE-ENDED TOYS ARE THOSE WHICH ARE INTENDED FOR A SPECIFIC PURPOSE, SUCH AS WIND-UP TOYS. OPEN-ENDED TOYS SUCH AS BLOCKS, IN CONTRAST, ALLOW MANY POSSIBLE USES. LLOYD AND HOWE DISTINGUISHED BETWEEN SOLITARY ACTIVE PLAY (INVOLVING FANTASY AND PRETENCE) AND SOLITARY PASSIVE PLAY (EXPLORING OBJECTS TO LEARN MORE ABOUT THEM). CHILDREN WHO ENGAGED IN MORE SOLITARY ACTIVE PLAY CHOSE OPEN-ENDED TOYS MORE THAN CLOSE-ENDED TOYS. THEY ALSO USED TOYS IN NON-INTENDED WAYS MORE THAN CHILDREN WHO PREFERRED SOLITARY PASSIVE PLAY. LLOYD AND HOWE FOUND A POSITIVE CORRELATION BETWEEN FREQUENCY OF SOLITARY ACTIVE PLAY AND FREQUENCY OF DIVERGENT THINKING. THE FREQUENCY OF SOLITARY PASSIVE PLAY WAS NOT RELATED TO EITHER CONVERGENT OR DIVERGENT THINKING (LLOYD & HOWE, 2003). FURTHER WORK IS NECESSARY, BUT THESE DATA SUGGEST THAT SOLITARY PLAY CAN BE USEFUL IN DEVELOPMENT, AND IMAGINATIVE PLAY THAT GIVES PRACTICE INVOLVING NEW WAYS OF USING OBJECTS MAY FOSTER CREATIVE THINKING.
Tests of Creativity

There are several ways to measure divergent thinking. In the Unusual Uses Test, you would be asked to think of as many uses as possible for some object, such as the tires mentioned earlier. In the Consequences Test, you would list the consequences that would follow a basic change in the world. For example, you might be asked “What would happen if everyone suddenly lost the sense of balance and could no longer stay upright?” People try to list as many reactions as possible. If you were to take the Anagrams Test, you would be given a word such as creativity and asked to make as many new words as possible by rearranging the letters. Each of these tests can be scored for fluency, flexibility, and originality. (For an example of other tests of divergent thinking, see Figure 2.) Tests of divergent thinking seem to tap something quite different from intelligence. Generally, there is little correlation between creativity tests and IQ test scores (Wallach, 1985).

Creativity tests have been useful, but they are not the whole story. If you want to predict whether a person will be creative in the future, it helps to look at two more kinds of information (Feldhusen & Goh, 1995):

The products of creative thinking (such as essays, poems, drawings, or constructed objects) are often more informative than test results. When creative people are asked to actually produce something, others tend to judge their work as creative.

A simple listing of a person’s past creative activities and achievements is an excellent guide to the likelihood that she or he will be creative in the future.

Isn’t creativity more than divergent thought? What if a person comes up with a large number of useless answers to a problem? A good question. Divergent thinking is an important part of creativity, but there is more to it. To be creative, the solution to a problem must be more than novel, unusual, or original (see Figure 3). It must also be practical if it is an invention and sensible if it is an idea (Finke, 1990). This is the dividing line between a “hare-brained scheme” and a “stroke of genius” (see Figure 4, page W–8). In other words, the creative person brings reasoning and critical thinking to bear on new ideas once they are produced (Feldhusen, 1995).

Stages of Creative Thought

Is there any pattern to creative thinking? Typically, five stages occur during creative problem solving:

1. Orientation. As a first step, the person defines the problem and identifies its most important dimensions.
2. Preparation. In the second stage, creative thinkers saturate themselves with as much information about the problem as possible.
3. Incubation. Most major problems produce a period during which all attempted solutions will be futile. At this point, problem solving may proceed on a subconscious level: While the problem seems to have been set aside, it is still “cooking” in the background.

Unusual Uses Test A test of creativity in which subjects try to think of new uses for a common object.
Consequences Test A test of creativity in which subjects try to list as many consequences as possible that would follow if some basic change were made in the world.
Anagrams Test A test of creativity in which subjects try to make as many new words as possible from the letters in a given word.
4. **Illumination.** The stage of incubation is often ended by a rapid insight or series of insights. These produce the “Aha!” experience, often depicted in cartoons as a light-bulb appearing over the thinker’s head.

5. **Verification.** The final step is to test and critically evaluate the solution obtained during the stage of illumination. If the solution proves faulty, the thinker reverts to the stage of incubation.

Of course, creative thought is not always so neat. Nevertheless, the stages listed are a good summary of the most typical sequence of events.

You may find it helpful to relate the stages to the following more or less true story. Legend has it that the king of Syracuse (a city in ancient Greece) once suspected that his goldsmith had substituted cheaper metals for some of the gold in a crown and kept the extra gold. Archimedes, a famous mathematician and thinker, was given the problem of discovering whether the king had been cheated.

Archimedes began by defining the problem (orientation): “How can I tell what metals have been used in the crown without damaging it?” He then checked all known methods of analyzing metals (preparation). All involved cutting or melting the crown, so he was forced to temporarily set the problem aside (incubation). Then one day as he stepped into his bath, Archimedes suddenly knew he had the solution (illumination). He was so excited he is said to have run naked through the streets shouting, “Eureka, eureka!” (I have found it, I have found it!).

On observing his own body floating in the bath, Archimedes realized that different metals of equal weight would displace different amounts of water. A kilogram of brass, for example, occupies more space than a kilogram of gold, which is denser. All that remained was to test the solution (verification). Archimedes placed an amount of gold (equal in weight to that given the goldsmith) in a tub of water. He marked the water level and removed the gold. He then placed the crown in the water. Was the crown pure gold? If it was, it would raise the water to exactly the same level. Unfortunately, the purity of the crown and the fate of the goldsmith are to this day unknown!
The preceding account is a good general description of creative thinking. However, creative thinking can be highly complex. Some authors believe that truly exceptional creativity requires a rare combination of thinking skills, personality, and a supportive social environment. This mix, they believe, accounts for creative giants such as Edison, Freud, Mozart, Picasso, Tolstoy, and others (Tardif & Sternberg, 1988).

### The Creative Personality

What makes a person creative? According to the popular stereotype, highly creative people are eccentric, introverted, neurotic, socially inept, unbalanced in their interests, and on the edge of madness. Although some artists and musicians cultivate this public image, there is little truth in it. York University researcher Elizabeth Ralevski asked exactly this question in her doctoral dissertation. She measured aspects of personality, creativity of word associations, and emotional tone (for example, tendency to moodiness, irritability, or depression) in 80 successful European and North American artists and 34 control subjects. She found that success among the artists was related to narcissism and isolation. In addition, more depressed artists gave more original responses on the word association test, but this was not true for the controls (Ralevski, 2001). (See Clinical File: “Madness and Creativity” for additional insights into this issue.)

1. For people of normal intelligence, there is a small positive correlation between creativity and IQ. In other words, smarter people have a slight tendency to be more creative. But, for the most part, at any given level of IQ, some people are creative and some are not. An average IQ is 100. The average college graduate has an IQ of 120. This is more than high enough to allow a person to write novels, do scientific research, or pursue other creative work (Finke, 1990). IQs above 120 do not seem to add anything more to creative ability (Sternberg & Lubart, 1995).

2. Creative people usually have a greater-than-average range of knowledge and interests, and they are more fluent in combining ideas from various sources. They are also good at using mental images and metaphors in thinking (Riquelme, 2002).

3. Creative people are open to a wide variety of experiences. They accept irrational thoughts and are uninhibited about their feelings and fantasies (McCrae, 1987). They tend to use broad categories, to question assumptions, and to break mental sets, and they find order in chaos. They also experience more unusual states of consciousness, such as vivid dreams and mystical experiences (Ayers, Beaton, & Hunt, 1999).

4. Creative people enjoy symbolic thought, ideas, concepts, and possibilities. They tend to be interested in truth, form, and beauty, rather than in fame or success. Their creative work is an end in itself (Sternberg & Lubart, 1995).

5. Highly creative people value their independence and prefer complexity. However, they are unconventional and nonconforming primarily in their work; otherwise they do not have unusual, outlandish, or bizarre personalities.

Could film director David Cronenberg manage the Edmonton Oilers? Probably not. It is widely accepted that people tend to be creative in particular skills or pursuits. For example, a person who is a creative writer might be an uncreative artist or businessperson. Perhaps this is because creativity favours a prepared mind. Those who are creative in a particular field often build on a large store of existing knowledge (Kaufman & Baer, 2002). Yoshiro Nakamats, a Japanese inventor who holds more than 2,000 patents, sees such preparation as a way to gain the freedom to think creatively.
Can creativity be learned? It is beginning to look as if some creative thinking skills can be taught. In particular, you can become more creative by practising divergent thinking and by taking risks, analyzing ideas, and seeking unusual connections between ideas (Baer, 1993; Sternberg, 2001).

A notable exception to the preceding conclusion concerns mood disorders. A person with a mood disorder may be manic (agitated, elated, and hyperactive), depressed, or both. (See Chapter 12 for more information.) Many of history’s renowned artists, writers, poets, and composers apparently suffered from mood disorders (Jamison, 1999). For example, the composer Robert Schumann wrote most of his music during several “high” periods when he was mildly manic. When he was depressed, his output plunged. Similar patterns marked the work of Vincent van Gogh, Edgar Allan Poe, Emily Dickinson, Ernest Hemingway, and many others (Jamison, 1999; McDermott, 2001).

The connection between mood swings and creativity may be mainly a matter of productivity. It’s easy to understand why creative persons would more actively paint, write, or compose when they are manic and have boundless energy. Also, people who are manic tend to have illogical thoughts. Such thinking can enhance creativity by promoting unusual connections among ideas (Anderegg & Gartner, 2001).

Again, it is important to emphasize that most creative people are not mentally disturbed, and most mentally disturbed people are not creative. Nevertheless, a few talented (and often miserable) individuals do appear to ride an emotional roller coaster to highs and lows of creativity (Kaufman, 2001).

**STUDY BREAK Creative Thinking**

**RELATE**

Make up a question that would require convergent thinking to answer. Now do the same for divergent thinking.

Which of the tests of creativity described in the text do you think you would do best on? (Look back if you can’t remember them all.)

To better remember the stages of creative thinking, make up a short story that includes these words: orient, prepare, in Cuba, illuminate, verify.

**LEARNING CHECK**

1. Fluency, flexibility, and originality are characteristics of
   a. convergent thought  b. deductive thinking  c. creative thought  d. trial-and-error solutions

2. List the typical stages of creative thinking in the correct order.
   ______________ ______________ ______________ ______________ ______________

3. Reasoning and critical thinking tend to block creativity; these are non-creative qualities. T or F?

4. To be creative, an original idea must also be practical or feasible. T or F?

5. Intelligence and creativity are highly correlated; the higher a person’s IQ, the more likely he or she is to be creative. T or F?

**ANSWERS**

1. c 2. orientation, preparation, incubation, illumination, verification 3. F 4. T 5. F
REFERENCES


