A Behavioral Analysis of Creativity

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I. WHY DO A BEHAVIORAL ANALYSIS OF CREATIVITY?

A. VAGUENESS IN THE TERM "CREATIVITY" LEAVES A WAY OUT

How does one define an ambiguous term? What is the problem in answering a vague question? The answers to these questions share a similar concept. When vagueness is found in the question itself, the questioner can contend that the answer to the question is: "Not what I mean by my original (vague mentalistic) concept." When an individual with a vague, mentalistic, inferential concept of creativity asks another person what they mean by creativity, whatever the answer is, the mentalist can reply: "But that's not what I mean when I talk of creativity." What is the best behavioral way out of this problem? In a sense, it was this type of ambiguity that lead J. B. Watson to form the school of psychology called “behaviorism”. Defining ambiguities or vague terms is a complete waste. You don't have to buy into the vague, useless terms being proposed. When the Easter Bunny is offered as a proposed cause of behavior, spend your time doing something useful instead of trying to develop a definition of the Easter Bunny.

B. CREATIVE BEHAVIOR = f(x)

Functional relationships are expressed in formulas such as B = f (x). This formula is read as: behavior is a function of (in everyday language, is "caused by") the variable(s) x. In the analysis we are proposing, creativity becomes a matter of change in the environment. The job of a society trying to generate creative behavior is to find environmental events that are functionally related to creative behavior. We cannot change the fictional state of "creativity" itself. If we are to design ways of generating creativity, we must find variables that control it. We gain nothing by stating someone is creative because he/she has creativity. Rearranging the environment is the way to get people to learn the behaviors we are defining as creative.

C. DETERMINISM ENCOURAGES SEARCH

A deterministic cause for creativity has been a useful assumption because it encourages a search for causes. A chemist who believes that an event is occurring capriciously will not look for the cause, just as one who believes behavior occurs capriciously is not apt to look for causes. The parent who contends his child is creative by some inner faculty will not look for the conditions under which creative behavior occurs. Few things we value have resulted from accident or ignorance. “Creativity” as it is defined objectively is not an exception to this. Creativity does not happen through accidents or ignorance.

D. CARBON COPY ISSUE

A behavioral approach does not encourage all people to be carbon copies. A missile fired under correct conditions will take a given path regardless of the color of the projectile, its place of manufacture, its size, its weight, its particular mechanics, and so on. Since the cause and effect relationship is a relationship between variables, it

is not required that all the features be duplicated in order to produce the same kind of effect. It is quite obvious that the human population would be in bad shape if all people were the same. A world of only auto mechanics or psychologists would not make for a very lively society. Some implications of this section that could be used are:

1. Teach people to go where data takes them in spite of monetary implications.
2. A person needs a reinforcement history where creative behavior has been followed by positive reinforcement.
3. Following up serendipity related discoveries becomes a part of the individual.

E. RULES OF CREATIVITY

In a discussion of creativity, the conversation will usually come around to a historical figure we do not know much about in terms of a specific learning history. For example, some contend Michelangelo modified his learning with his brush. Why would one not contend he had learned these modifications, relationships, or rules? One must also look to the contingencies in his environment. For a painting, rules learned for one person might include, but are not limited to:

1. Paint figures upside down.
2. Paint like it looks in fog.
3. Paint using symbolic colors such as red is anger, white is purity, etc.
4. Don't use real figures in the painting. Only use symbols that will offend many.

One might argue that, "These little rules are not the way Michelangelo worked." He made new rules, unpredictable ones. They are unpredictable only to those who do not know his learning history. What creative things have you or I done that was not put into us by our environment? It is only in ignorance of a person's learning history that mysterious mentalistic creativity exists.

II. BEHAVIORAL DEFINITION OF CREATIVITY

People who are called creative have characteristics such as:
1. They have learned competency.
2. They closely edit their own behavior.
3. Certainly, they are not victims of society, but they are attuned to society enough for society to call their work creative.
4. They can get a hold of a segment of the world they live in and use it to its maximum.
5. They don't run to or from novelty, but their work models it.
6. The "creative person" generalizes.

If someone tags this creativity, fine. Let us look behaviorally at such a definition of creativity. How can you talk about the characteristics of creativity, which keep in contact with the behavior? What is being called “creative”?

A. LEARNS (a mnemonic device to aid in the learning of the definition of creativity)

LEARNED COMPETENCY- learned competency in area of specialty
EDITING AND CRITICAL ANALYSIS- of both his/her own and other's work
ATTUNED TO SOCIAL CONTROL- so as to make the product useful
REARRANGES ENVIRONMENT- against themselves and produces new things
NOVEL BEHAVIOR- novelty not enough by itself
STIMULUS GENERALIZATION GRADIENT- has a high probability of occurrence

As an aid to learning the definition of creativity, the mnemonic device, LEARNS, is introduced. Each letter stands for a factor important in what is called creative. This definition permits a person to program the environment to generate creativity. The probability of creative behaviors is increased by reinforcing and shaping those behaviors which have a high probability of producing discoveries. It takes more than a flash of creative genius to program in another individual a flash of creative behavior.

B. LEARNED COMPETENCY

Maslow, who is not known for his Behaviorist view, has stated, "A first rate soup is more creative than a second rate painting." The first component of creativity is being good or competent. Trying to find out the inner dynamics of a creative individual's mind appears to be a less productive approach than asking what the specific competencies are that define a behavioral repertoire we call “creative”. Certainly, competence is not all that is involved in creativity. Many people are competent in their area of expertise and are not considered creative. Some questions which appear relevant to finding “creativity” can be stated by involving environmental stimuli, for example:

1. "Does this similarity occur elsewhere in a different form?"
2. "What are the alternatives?"
3. "In what other area of study can I find an analogy?"
4. "If there is a cause, What is it?"
5. "What am I seeing in terms of what is really happening; not what someone told me is happening?"
6. "Now let me look at what I have just found, and check it against what I have found in the past."
7. "How can I translate what is happening into overt behavior and avoid calling it a covert phenomenon?"
8. "Look over the data continually for questions."
9. "Let the data, not conjecture, lead me to discoveries"
10. "Grouping data and material into subgroups, may enable me to make other useful groupings." (This paper for example, which looks at thinking in a slightly different dimension, resulted from a review of filing system of notes the author accumulated on certain categories.)
11. "I must try to manipulate the environment against myself in novel ways." In the same way the writer must generate novel plots by shaping stock characters in stock situations, just as the composer may generate new melodies or rhythms by changing the setting on paper, or by allowing his cat to walk across the keyboard. (See Skinner, Science and Behavior, for further developments of this topic.)
12. "The law of parsimony must be ever present. Can I find a parsimonious explanation?"
13. "If I knew the literature better, would I see new angles?" James Watt's invention of the steam engine seems much less miraculous when all is learned about the earlier forms of the engine upon which his

contribution was based.(Skinner, Science and Human Behavior, PP 255 & 256).
14. "To be creative, I must develop the related skills: reading, listening, computer use, math, memory devices, filing, note taking, experimental skills; all of which implement creative problem solving techniques."

C. EDITING ONE'S OWN BEHAVIOR

Analysis of self and others is a characteristic often attributed to a creative person. The individual called “creative” is critical of what has been proposed as a standard solution to a problem. Below we are using a matrix analogy to describe what goes on in creativity: One could conceptualize editing in creativity in a matrix format where 1, 2, 3, etc. are one variable (e.g. levels of a severe drought causing the ocean's water level to drop, and A, B, C, etc. are another set of variables (e.g., water available, farming issues, government considerations, people living by the ocean front, the economy, transportation, etc.) In this matrix analogy one is just combining one variable along the vertical axis with one on the horizontal axis.

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etc.
3
2
1
  A B C etc.
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In this matrix example, the last number and letter on each axis has an infinite input into the use of a random number table or any use of a changing input as a variable, or the latest basic research finding, etc.

D. ATTUNED TO SOCIAL REINFORCERS

There is a segment of people in any given culture who reinforce the new "thing," by calling it “creativity”, and do it because it appears useful. Behavior, in addition to being original, must be useful in some sense if it is to be called creative. The delusions of the psychotic are individual and usually original, but they are generally not desired. A nightmare is possibly creative or unique. Cultures tend to punish deviant behavior. To merely be different or unique is not necessarily worthwhile. This novel and competent behavior must also tie in with the accepted or favorable consequated positively reinforced behavior of the community in order for it to be cited as creative.

E. REARRANGE ENVIRONMENT

One can work and rearrange the environment systematically against him or herself, looking for alternatives as they work through the environment. What will happen if a variable changes? Some techniques which have been used in working the environment against oneself are systematic routines like the analogy item described below. It pushes a person to change the environment the way they view this situation.

1. Personal Analogy: This refers to asking oneself how someone or something else would view the object. This is accomplished to get a new

stimulus viewpoint on the problem, e.g. "How does the rat look at this situation?"

2. Direct Analogy: This is used to make a real comparison between similar facts in different disciplines, e.g. "For a process to convert salt to clean water, is it possible we could learn something from how a seagull lives on salt water?"

3. Symbolic Analogy: This is another way of looking for other stimuli. It is an association of metaphors, e.g. "I need to find something like a rope that would stiffen like a pole to hold something."

4. Fantasy Analogy: This makes the improbable connection between the world as we have learned about it and one where anything is possible as long as it can be stated. Within this pattern, anything is valid regardless of known natural and physical laws. e.g. "If we used rats trained on the property of numbers, what kind of self-powered desk calculators could we build?

a. Train for serendipity responses by the random presentation of stimuli evoking associative responses. This is the manner of discovery which is popularly told of such inventions as the X-ray, and such discoveries as penicillin. Some train them on serendipity as a method by placing slips of paper, which each have a fact in the new area of interest, in a bowl. Randomly draw pairs of these facts from the bowl and look for new and useful combinations, and methods to put these items together.

b. Looking for common elements involves generalized responses evoked through common stimulus elements. This is useful in those areas where the use of symbols (verbal, mathematical, chemical, etc.) are used. For example, in an exercise for creativity by Frank Barron, the students were trained to work the environment against themselves in the following ways. The task described below should be simplified if the person taking the test had been trained to look for the implications of the major categories. The problem is: "The mean levels of the oceans have been lowered five feet. This change has occurred at the rate of two inches a day during the period of a month and has not resulted in any significant change in the tides. Assume the water has simply disappeared. What will be the consequences?" Here are the responses of a person judged to be creative. Each segment is introduced by the word or expression the person is supposed to address, and creatively state how the problem will impact that area.

1. Science - The scientists at all institutions interested in such phenomena are enormously frustrated at their inability to explain the amazing vanishing of such huge amounts of water.

2. Transportation - The great harbors of the world are unable to handle major ocean transport.

3. Government - Controversies have risen among the nations of the world over who shall have rightful claim to the areas of new land.

4. Population - There is panic in Texas over the possibility that it may no longer be the largest state in the Union. (Some of the coastal states may be larger if they win their claim to the areas of new land.

5. Legal - Bootlegging (water) scams begin.

6. Fishing - Fish are easier to catch.

7. Appearance of People - New York City becomes filled with bearded men (they stop shaving).

8. News Coverage - Reader's Digest published an article telling us how important water is to our daily needs.

9. Economics - A reduction in the production of beer is ordered, and social unrest ensues.

10. Supply & Demand - Land values tumble in crowded residential areas on the coast.

11. Children - Children enjoy not taking baths.

12. Religious - Some are heard to remark that the end of the world is in sight.

13. War - Sabotage is suspected in America, and American sabotage is suspected by the enemies of the United States.

F. NOVEL BEHAVIOR (NOVELTY)

Novelty is a characteristic of creative behavior, but it is not enough, e.g., schizophrenics are novel, but not generally called creative by our society. Novelty with competence is also not enough, for many psychotics are competent in a novel way and we do not call this creative. The novel and competent behavior must tie in with the favorable consequences or positive reinforcements of the community and the other features of creativity. 952 is quite an original answer to the problem; "How much is 12 + 12?" However, to most, this answer is only creative when it becomes useful. The mere fact that a thing is unique should not be a goal in itself. Every tick of a clock is a unique event, for no two ticks can be the same. With the respect solely to uniqueness, each tick is equal to any great event in one's history.

In Elementary Principles of Behavior, Malott gives an example of reinforcement in a novel behavior. Karen Pryor used food to reinforce novel behaviors in dolphins. They were reinforced for doing anything different from behaviors they had previously engaged in. "Karen said, “They became real nuisances; opening gates, stealing props, and inventing mischief".

Another study of novel behavior is a study by Elizabeth Goetz and Donald Baer. The participants were four year old girls. When the girls built novel buildings with blocks they were reinforced with verbal praise. No praise was given when they made or built a normal building. The behavior increased from .33 novel buildings per session during baseline to 1.5 novel buildings per session during reinforcement.

G. STIMULUS GENERALIZATION

This principle has been defined as the occurrence of a response in the

presence of a stimulus that was not present in the exact form during the conditioning of the response. This principle of learning is one that can account for flexibility or novel behavior. When one views any concept as a generalization within a class of stimuli and discrimination between other classes, one can see implications relevant to creativity.

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