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CREATIVITY : PROCESS AND PERSONALITY
SIX CASE-STUDIES OF EMINENT PSYCHOLOGISTS

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I. Definition: Creativity: Process, Personality^{*}

In examining various definitions of the creative process, one is struck by certain assumptions that are common to most and by a basic disagreement which divides these definitions into two groups.

The common assumptions are that products which are novel for a person or a culture and are considered valuable are "creative". The process that produces them is termed the "creative process" and is viewed as a distinct cognitive process, often involving distinct perceptual processes. A typical definition might be, then:

"Creativity is that process which results in a novel work that is accepted as tenable or useful or satisfying by a group at some point in time". (Stein, 1955)

Here, however, the agreement ends. The next step in some definitions is the proposition that creativity is a unique cognitive process, fundamentally different from all other forms of cognition, although it possesses certain similarities. Others propose instead that creativity is a special form of the cognitive process known as problem-solving, which, although it has certain distinct characteristics, is not essentially different from all other forms of "non-creative" problem-solving.

The first question that one must answer in order to proceed is whether these two positions are indeed, as they seem at first glance, irreconcilable. In order to resolve this we must discover if, in fact, they are describing the same process in the first place.

The Dichotomy

The way I went about this was to find two theorists who had each formulated one of these positions, and see what they really meant. The formulations that I

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A slightly altered version of this section, entitled "Toward a Definition of creativity", will appear in the Journal of Individual Psychology.

chose, although I certainly did not exhaust the possibilities, were those of Milton Rokeach (1962) and Herbert Simon (Newell, Shaw & Simon, 1962. This is not exclusively Simon's work, but he holds, here and elsewhere, the views presented in the paper, and I consider him the clearest representative of this position.) My next step was to compare the characteristics that each proposed as defining the creative process. These were as follows:

Proposition A (Rokeach): The creative process is that sequence of thinking leading to ideas or products which, sooner or later, will be recognized as novel and worthwhile because (1) it is an activity characterized by the capacity to cognitively distinguish information from source and to evaluate them separately on their own merits which, in turn (2) frees the person to be receptive to, acquire, integrate, and transform new beliefs into new belief systems which violate previously held beliefs and belief systems, (3) all such activity being driven and guided from beginning to end by tension states arising from significant questions put to oneself, significance being cognized as that which has implications or consequences for the ideas, products, feelings, and welfare of other human beings, (1962).

Proposition B (Simon): Problem-solving is called creative to the extent that one or more of the following conditions are satisfied:

1. The product of the thinking has novelty and value (either for the thinker or for his culture.)
2. The thinking is unconventional, in the sense that it requires modification or rejection of previously accepted ideas.
3. The thinking requires high motivation and persistence, taking place either over a considerable span of time (continuously or intermittently) or at high intensity.
4. The problem as initially posed was vague and ill-defined, so that part of the task was to formulate the problem itself, (1962).

A comparison of the above reveals that both theorists listed similar characteristics of the "creative process". Can we then conclude that, because of this similarity, the two propositions reflect nothing more than a superficial disagreement and believe an essential agreement? This is tempting, but presumptuous in light of the exact nature of these definitions and other statements made by these men. However, these very statements may offer a solution. Rokeach presents a specific objection to the approach taken by Simon:

Where to look for this something "over and above" which characterizes the creative process and no other thought process? It is fruitless to look for an answer to this question from empirical research on problem solving or thinking or research on the computer simulation of thinking (Newell, Shaw & Simon, 1958) because all such research contains a basic methodological flaw in respect to the study of the creative process. Such research always requires the subject (or the computer) to produce an answer but not a question. There is a division of labor; the researcher provides the question, the subject provides the answer. The researcher sometimes studies the subject to ascertain by what process he arrives at the answer. A full and complete description of this process, even if it were forthcoming, can never be a full and complete description of the creative process because all creative work begins with a formulation, a question the creator necessarily puts to himself, (1962, my italics).

Resolving the dichotomy

This, I think, is the key to solving the dilemma of an apparent dichotomy. Research here indicates that Simon is beginning by assuming the problem to be formulated and observing the process of arriving at a solution. His view, on the other hand, is that it is precisely the formulation that is the creative act (he quotes Einstein as saying that to ask a question is to answer it), and he assumes the eventual formulation of significant solutions.

In Simon's work with computer simulation of human behavior (which is the basis for his definition of creativity), he does, indeed, concentrate on the solution of an existing problem, although it is seen as "vague and ill-defined". He admits this weakness:

If we wish to object seriously to calling the Logic Theorist [one of the computer programs] creative, we must rest our case on the way it gets the problems it tackles, and not on its activity in tackling them . . . Perhaps the real creativity lies in the problem-selection. This certainly is the point of the fourth characteristic we listed for creativity (1962, p. 70).

Simon treats creativity primarily as "problem-solving activity characterized by the novelty and the difficulty of the task" (1962, p.115). I think we can say that the fourth characteristic he gives means breaking down or factoring, and thereby formulating more clearly in problem-solving terms, a

larger goal or problem that was not necessarily set in these terms. The larger goal is what Rokeach would consider a significant question. What, then, are the criteria which differentiate the significant from the insignificant?

Creative work, starting with the search for a formulation and ending with a solution, is guided by beliefs, often implicit, un verbalized and un verbalizable, that one is doing is significant because he is extending, relating, interrelating, unifying simplifying, making more elegant, more beautiful, reaching out to the genotypic reality behind the phenotypic appearance, groping for the structure, the form, the process, the function behind the content, (Rokeach, 1962).

Rokeach is emphasizing the formulation of basic questions which have far-reaching implications and embody or relate to assumptions about the nature of reality that are axiomatic. These are the foundation blocks of a world-view, the fundamental axioms accepted without scientific proof, on faith.

In his definition of creativity Rokeach describes significance as "that which has implications or consequences for the ideas, products, feelings, and welfare of other human beings." The emphasis on the usefulness of the creative process in a social framework is characteristic of the psychology of Alfred Adler. For Adler the significance of creative production can only be measured in a social context.

Genius is to be defined as no more than supreme usefulness: It is only when a man's life is recognized by others as having significance for them that we call him a genius. The meaning expressed in such a life will always be, "Life means -- to contribute to the whole". We are not speaking here of professed motives. We are closing our ears to professions and looking at achievements, (Adler, 1958, p.9).

Simon deals with the formulation and solution of sub-problems that are implicit in the major question and are specifically solvable. The difference between the two approaches now seems to be that each one is pointing to a different part of the process as the creative process, and neither is really discussing the whole sequence.

Rokeach emphasizes the part that he considers essentially creative and

unique, although it is an over-simplification to view the rest as a mere derivation from this first part. Simon, limited by his tool of computer simulation to what computers can do well at this point, leaves out the first part and studies the second, deeming it non-unique. What we must do is set the two definitions not in opposition but in succession, and view the creative process as a two part operation consisting, firstly, of the posing of significant questions, and secondly, of finding solutions for specific problems derived from the initial questions.

In all creative works that I have ever done, what has come first is a problem, a puzzle involving discomfort. Then comes concentrated voluntary thought involving great effort. After this a period without conscious thought and finally a solution involving the complete plan of a book. This last stage is usually sudden, (Bertrand Russell, quoted in Hutchinson, 1949, p.112).

Generality of the Unitive Definition

Putting the two definitions together not only results in a superior unitive definition but also places the question of individual creativity in line with some important theories of intellectual evolution. Thomas Kuhn (1962) postulates a general pattern of scientific evolution applicable to all fields of science in all ages. He argues that "normal science" presupposes a conceptual and instrumental framework accepted without question by most of the scientific community. With such a given framework, scientific research tends to fall within the boundaries of existing significant questions, solving the specific problems they indicate rather than formulating new ones. Unexpected novelties can then occur only through a breakdown in the accepted rules. Inevitably the normal mode of scientific research evokes "crises" which cannot be resolved within the pre-established framework. Science afterwards returns to normal only when the community accepts a new conceptual structure. That breakdown and the subsequent transition to a new base for professional research, a new "paradigm", is the process of scientific revolution. Famous paradigmatic revolutions are associated with Copernicus, Galileo,

Newton, and Einstein. Kuhn also maintains that many smaller revolutions have complemented these larger ones, and that the revolutionary process is inherent in the nature of scientific advance.

This revolutionary process can be interpreted as the formulation of significant questions, arising out of new confrontations with reality, the world, etc., and resulting in new paradigms which in turn dictate specific problems to be solved. It is possible to identify such revolutionary processes in any field of intellectual endeavor. In every area we can see recurrent breakdowns and restructurings, recenterings. In social science and economics we might name Darwin, Marx, Freud, and Keynes as the most obvious modern examples. In art these take the form of stylistic innovations, and can be identified with movements, such as Impressionism, Surrealism, Cubism, etc., and with individuals, Giotto, Cezanne, Picasso, etc.

I would claim that this model of intellectual development and scientific evolution is directly applicable to the creative process. Moreover, I think that the creative process is a microcosmic example of the macroscopic process of intellectual evolution.

The first step dealt with by Rokeach is quite similar to the formulation of a paradigm. It is the formulation of questions which have implications basic to grasping the essential nature of whatever is being considered, what Wertheimer would call the main vectors of the problem situation. The second step is the process that Simon deals with, the solution of specific problems within the paradigmatic framework.

We should not limit our conception of the paradigmatic innovation and the formulation of significant questions to a revolutionary replacement of one system for another. It is also possible to identify paradigms which build in concentric form upon existing systems. In other words, such revolutions need not always start from essentials in all respects but may extend further the limits of

existing frameworks.

We can, perhaps, view an individual's creative processes as a series of larger or smaller revolutions, revisions and extensions, and say that these will have correspondingly greater or lesser value for the person and his culture, sooner or later. The more limited the implications of the particular product, the sooner the recognition, I would say. This is because it will not threaten to a great extent the interests vested in the current paradigm. Not everyone who finds a new and revolutionary paradigm, or sees the fatal flaw in the accepted one, will be able to achieve recognition. Many do years of creative work, out of step with their times, only to be recognized after their death. They ask questions that cannot be answered yet, and answer questions that cannot yet be asked.

Independence and Uniqueness

Rokeach emphasizes the creative thinker's ability to distinguish information from its source and evaluate it on its own merits, and to generate novel belief systems which violate former ones. Not only are these the characteristics necessary to effect a revolution in science by recognizing faults in the present paradigm and formulating a new one; they are defining characteristics of a personality and even a cultural type (Hagen, 1962) known as independent or nonconforming. The analysis of creative thought as being opposed to conformity is based on these traits. The ability to form judgments in light of present situations, not relying blindly on the dictates of existing systems and authority, based solely on past situations; and the ability to make the next step and reject belief systems, forming new ones in light of empirical experience -- these are characteristics of healthy or non-neurotic behavior (cf. Kubie, 1958; Maslow, 1954). Wertheimer, similarly, stresses the thinker's ability to center on the problem situation rather than on the self, "the main vectors in genuine thought

often do not refer to the I with its personal interests; rather they represent the structural requirements of the given situation" (1959, p.180). Crutchfield makes the same point, in a way that illuminates Rokeach's suggestion of a continuum from conformity to independence to creativity:

Conformity, involving loss of self-reliance, undermines the person's creative powers by weakening his trust in the essential validity of his own processes of thought and imagination ... Conformity inhibits the person's ability to sense and grasp basic reality, and the loss of this contact with reality is fatal to creative thinking. In short, conformity tends to destroy creativity by alienating the creator both from reliance on his own thought processes, and from contact with basic reality, (1962, p. 120f).

Stressing the mutual exclusiveness of conformity and creativity brings out the distinction between the unique and non-unique aspects of the creative process. The first part is the exclusive trait of the small group who are self-confident and independent enough to be willing and able to discard a belief system and form a new one. There are many levels of belief systems, yet for most people operating within any one level, the only possible mode of perception (through choice, for safety, or for many other possible reasons) is one which is as oblivious to the existence of the basic belief assumptions as we are to the existence of air in the absence of a wind. It is the ability to perceive the air without a disturbing wind, (sometimes even with a wind, for people learn to ignore the wind), that is the unique aspect of the creative process. One must be able, first, to see the handwriting on the wall, and, second, to interpret it; to understand that the existing system, which most people are not even aware of, is wanting and must be replaced.

Once we recognize the existence of the axiom and the fact that it cannot, by definition, be proven but must be accepted on faith, we are free to formulate other axioms which are more fruitful or satisfying. A belief system may become incompatible with experience, or it may have all its implications formulated and worked out. Either way a new one is needed.

Wertheimer's masterful case-study of the formulation of Einstein's theory of relativity is a good example of this process. Starting with a problem that intrigued him for many years, Einstein reached the point where he questioned the fundamental axioms of physics as they existed at that time and was forced to reject the prevailing belief system, classical Newtonian physics, in favor of a new one.

He felt that a certain region in the structure of the whole situation was in reality not as clear to him as it should be, although it had hitherto been accepted without question by everyone, including himself . . . In this troubled situation the question arose: Is this structure itself, in which the Michelson result seems contradictory, really clear to me? This was the revolutionary moment. Einstein felt that the contradiction should be viewed without prejudice, that the time-honored structure should be re-questioned. Was this structure adequate? This led to the decisive step -- the introduction of the velocity of light as the invariant. How would physics look if recentered with this as a starting point? Bold consequences followed one after another, and a new structure of physics was the consequence. . . Every step had to be taken against a very strong gestalt -- the traditional structure of physics, which fitted an enormous number of facts, apparently so flawless, so clear that any local change was bound to meet with the resistance of the whole strong and well-articulated structure. This was probably the reason why it took so long a time -- seven years -- until the crucial advance was made . . . From the moment, however, that he came to question the customary concept of time, it took him only five weeks to write his paper on relativity. (Wertheimer, 1959, p.213-233).

The final working out of the new system is not unique, indeed, as Simon says, it is essentially the same as most problem-solving. Many of the implications of the revolutionary reformulations of Einstein were worked out by other, lesser thinkers. When this problem-solving isolates a sub-problem indicated by the paradigm and is able to generate the heuristics necessary to solve it, then it is likely to be novel and valuable and as such is termed creative.

One need not do both to be creative. The great men of science have frequently, but not always, combined the two. However, as Szilard says, "The most important step in getting a job done is the recognition of a problem. Once I recognize a problem I usually can think of someone who can work it out better than I could." (Quoted by Rokeach).

I think the most common pattern is reflected in the saying that a thinker will usually have only one really important idea. I would interpret this to mean that most thinkers, in the course of their intellectual lives, follow the implications and ramifications of one, more or less paradigmatic, significant question. Their work tends to be unified in essential structure, if not in actual content, around this central preoccupying question. While few are able, or lucky enough to ask a question which will create an intellectual revolution, I think most creative thinkers concentrate on one essential question or area in the majority of their creative efforts. This is something that will be supported to a great extent by the data to be presented in this paper.

Motivation and Personality

Simon describes creative problem-solving as characterized by high motivation and persistence. Rokeach stresses the tension generated by asking significant questions. But what motivates the person to ask the significant question in the first place, to initiate the confrontation with a problem-situation which transcends the limits of existing belief systems? One factor we can identify is the probable existence of high achievement motivation (MacClelland, 1962), but this in itself is not enough to bring someone to question an entire gestalt, a traditional framework. In many ways, achievement is surer within the existing structure.

Maslow has described self-actualizing people as being more able than others to transcend their environment:

They select from American culture what is good in it by their lights and reject what they think bad in it. In a word, they weigh it, and judge it (by their own inner criteria) and then make their own decisions (1931).

The point I wish to stress here is the detachment, the independence, the self-governing character of these individuals, the tendency to look within for the guiding values, and rules to live by, (1962).

Perhaps it is these people who are most likely to ask the questions which callⁱⁿ to scrutiny the basic beliefs of their society, and who can also accept the good.

the suitable aspects of that society without accepting the bad with it. Maslow speaks of a "self-actualizing creativeness" which need not be combined with the special talent that will produce a socially valuable product, but which fosters the very creative process of significant questioning we are dealing with.

An essential aspect of SA creativeness was a special kind of perceptiveness that is exemplified by the child in the fable who saw that the king had no clothes on /and dared to say so, we might add/ (this too contradicts the notion of creativity as products). Such people can see the fresh, the raw, the concrete, the ideographic, as well as the generic, the abstract, the rubricized, the categorized and the classified, (1962, p.129).

This is clearly a good depiction of the sort of personality we are concerned with, that is capable of the independence necessary to ask significant questions. I am not overlooking the matter of talent and ability, for although only those with great ability will ask questions of great, even revolutionary significance, and follow up the implications of their questions, we have already noted that there are many levels of operation, and it is possible to be creative, in this sense, on all of them.

Our definition of the creative process as beginning with a questioning of traditional beliefs not only brings us close to Maslow's discussion of self-actualized creativeness, it also brings out the distinction between creativity and neurosis. For, while we cannot deny that many neurotic, even insane, people have done creative work, there are two respects in which they will usually fall short of the standard we have set. The first is in their inability to respond flexibly to the requirements of the task-situation, tending to remain, rather, consistently self-centered, locked into repetitive patterns of reaction.

The measure of health is flexibility, the freedom to learn from experience, the freedom to change with changing internal and external circumstances, to be influenced by reasonable arguments, exhortations, and the appeal to emotions; the freedom to respond appropriately to the stimulus of reward and punishment, and especially the freedom to cease when sated. The essence of normality is flexibility in all of these vital ways. The essence of illness is the freezing of behavior into unalterable and insatiable patterns", (Kubie, 1938), p.20f.

The neurotic individual is certainly capable of questioning, in certain circumstances, the accepted beliefs of his society. In fact, this may frequently be an important factor in his neurosis. Yet even here, his exclusively self-centered attitude prevents his questioning from taking on the task-centered orientation which might result in a valuable product. Adler, in stressing the difference between the creative and the neurotic, highlights the social interest inherent in true creativity.

It is essential that we make a sharp distinction between reason which has general validity, and which consequently corresponds to the communal, the isolated personal intelligence of the neurotic. "Intelligence" we find in both cases, the failures and normal individuals, but we call reason only the intelligence which is connected with social interest: (Ansbacher, 1956, p.150).

In our view, a man of genius is primarily a man of supreme usefulness. If he is an artist he is useful to culture, giving distinctions and value by his work to the recreative life of many thousands. This value, where it is genuine and not merely empty brilliance, depends upon a high degree of courage and social interest. The origin of genius lies neither in the inherited organism nor in the environmental influences, but in that third sphere of individual reaction, which includes the possibility of socially affirmative action, (Ibid., p.153).

One further point is necessary to fill out an attempt to describe the creative personality, and also to correct a possible misinterpretation of the element of social interest. Adler stresses the social interest of the creative thinker, yet we know also that creativity and altruism are not necessarily co-existent in all cases. Must we view all creative people as unselfish and altruistic? The answer here lies in the point made by Maslow (1962, p.131) that self-actualizing creativeness transcends many of the commonly accepted dichotomies.

Creative people do not distinguish between work and play in the manner that is commonly accepted. For, in most cases, what they do when they are "working", is what they would most like to do, what they would consider "play". (Let us not confuse play and relaxation.) In the same fashion they are not necessarily being altruistic and unselfish when they devote themselves to socially valuable creative

work. On the contrary, they are being selfish insofar as they are doing what most interests them. The dichotomy is clearly transcended, for they are being selfish and altruistic at the same time, and by the same actions. They are being true to others by being true to themselves. The genius need not be a saint, he may love mankind and despise his fellow men. The creative process he engages in affords him great pleasure, and its resulting products contribute to the social welfare. With this understood we can better accept Adler's statement that, "Mankind only calls those individual's geniuses who have contributed much to the common welfare. We cannot imagine a genius who has left no advantage to mankind behind him," (Ansbacher, 1956, p. 153).

Definition

Having proposed that the two definitions offered by Rokeach and Simon be combined into a unitive definition, and having considered the advantages and the generality of this unitive definition, I would like to formulate it in more precise form. This formulation will also take into account the third aspect dealt with here, namely that of the nature of the creative personality, of the person who is able and likely to engage in the creative processes we have postulated.

Axiom: Products which are novel and valuable (for a person or a culture) are produced by a "creative process" which includes the stages of:

Proposition A: "Paradigmatic" formulation of significant questions characterized by: Hypotheses: A1: Independence of judgment, which allows
A2: Generation of novel belief systems, which have
A3: Significance for self and others, and
A3a: Produce motivating tension, and often
A3b: Produce a sense of destiny:

(which are recognized by Rokeach and defined as unique cognitive processes) and also:

Proposition B: "Problem-solving" formulation and solution of significant sub-questions characterized by:

Hypotheses: B1: Unconventionality of thought and

heuristics, and

B2: Persistence and high intensity of work

involving

B3: Difficulty in sub-question formulation;

(Which are recognized by Simon and defined as distinct but non-unique cognitive processes), and depend upon the presence of:

Proposition C: Motivational and personality factors characterized by:

Hypotheses: C1: Psychological health (Mabie, Adler), and

C2: Self-actualization (Maslow), associated

with

C3: Social interest (Adler), as well as

C4: Task-centering rather than self-centering

(Wertheimer), and

C5: Strong achievement motivation (McClelland).