

## The Social Psychology of Creativity: A Componential Conceptualization

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Despite the clear importance of social and environmental influences on creative performance, a social psychology of creativity is yet to be developed. Theory and research have focused almost exclusively on a personality approach to creativity and, to a lesser extent, a cognitive-abilities approach. Following a consideration of the definition and assessment of creativity, a componential framework for conceptualizing creativity is presented here. Including domain-relevant skills, creativity-relevant skills, and task motivation as a set of necessary and sufficient components of creativity, the framework describes the way in which cognitive abilities, personality characteristics, and social factors might contribute to different stages of the creative process. The discussion emphasizes the previously neglected social factors and highlights the contributions that a social psychology of creativity can make to a comprehensive view of creative performance.

A striking feature of many phenomenological accounts of creativity is the degree to which outstandingly creative individuals feel influenced by social and environmental factors. In many cases, these factors are quite ordinary, mundane events; it appears that even seemingly insignificant features of the environment can be detrimental or conducive to creativity in some individuals. For example, in a letter to a friend, Tchaikovsky (1906) described the devastating effect that

simple interruptions could have on his work. The poet Stephen Spender reports (1952) that to write well, Auden had to drink tea constantly, de la Mare had to smoke, and Schiller liked to have the scent of rotten apples nearby.

In other accounts, somewhat more significant features of the environment, particularly the social environment, have been cited. Einstein (1949), for example, described the detrimental effect that external constraints imposed by formal education had on his scientific creativity: "The hitch in this was . . . the fact that one had to cram all this stuff into one's mind for the examinations, whether one liked it or not. This coercion had such a deterring effect upon me that, after I had passed the final examination, I found the consideration of any scientific problem distasteful for an entire year" (p. 17).

Despite the apparent importance of social and environmental influences on creativity, however, there is virtually no research on the social psychology of creativity: the interaction of social/environmental factors with personality characteristics and cognitive abilities and the effects of such factors on observable creativity. Indeed, of nearly 7,000 citations

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included in a bibliography of studies of creativity dating from 1566 to 1974 (Rothenberg & Greenberg, 1976), only 138 were concerned with social or environmental influences, and in many of those the "social variable" was simply social class. Between 1975 and 1980, there were barely half a dozen articles in the *Journal of Personality and Social Psychology* and the *Journal of Experimental Social Psychology* that dealt in some way with the social psychology of creativity. Although there has been some rather sophisticated archival research in this area (e.g., Simonton, 1975, 1977a, 1977b, 1979), experimental studies of social influences on creativity are exceedingly rare.

Perhaps a social psychology of creativity has failed to develop in part because empirical creativity research has long been dominated by a trait approach, an attempt to precisely identify the personality differences between creative and noncreative individuals (Nicholls, 1972). As a result, some potentially important areas of inquiry have been virtually ignored. There has been a concentration on the creative person to the neglect of "creative situations," that is, circumstances conducive to creativity; there has been a narrow focus on intrapersonal determinants of creativity to the neglect of external determinants; and, within studies of intrapersonal determinants, there has been an implicit concern with "genetic" factors to the neglect of contributions from learning and the social environment.

It will be argued here that the trait approach is incomplete, that creativity is best conceptualized not as a personality trait or a general ability but as a behavior resulting from particular constellations of personal characteristics, cognitive abilities, and social environments. This behavior, which is evidenced in products or responses, can only be completely explained by a model that encompasses all three sets of factors.

A social psychology of creativity, then, cannot be proposed as an answer to all questions of creativity any more than a personality approach or a cognitive approach can be proposed as a complete answer. It can be argued, though, that social-psychological issues have been ignored in the study of creativity and that those must be integrated into a general

framework that includes personality and cognition. This article presents such a general framework of creativity, illustrating the place of social psychology in that framework and outlining the contributions that social-psychological research can make to a comprehensive understanding of the creative process.

### The Definition and Assessment of Creativity

Psychologists have a long history of disagreement over the definition of creativity, variously defining it in terms of the creative process, the creative person, and the creative product. For this reason, any discussion of the psychology of creativity must begin with a consideration of the criterion problem.

Many of the earliest definitions of creativity focused on process. Typical of early views of the creative process was the Gestalt position proposed by Wertheimer (1945), who suggested that insight and productive thinking arise when the thinker grasps the essential features of a problem and their relationship to a final solution. More recently, Koestler (1964) proposed that creativity involves a "bisociative process"—the connecting of two previously unrelated "matrices of thought" to produce a new insight or invention. Also, in their list of criteria by which problem solving can be called creative, Newell, Shaw, and Simon (1962) include several characteristics of the problem-solving process.

In a 1949 presidential address to the American Psychological Association that has long been considered a stimulus to modern creativity research, J. P. Guilford defined creativity in terms of the person. Guilford's focus on personality characteristics almost certainly contributed to the long-standing prominence of the trait approach: "In its narrow sense, creativity refers to the abilities that are most characteristic of creative people" (Guilford, 1950, p. 444).

Most contemporary definitions, however, use characteristics of the creative product as the distinguishing signs of creativity. (It should be noted that, typically, *product* is broadly defined to include any observable outcome or response.) For example, Bruner (1962) sees the creative product as anything that produces "effective surprise" in the observer, in addition to a "shock of recognition" that

the product or response, although novel, is entirely appropriate. Barron (1955) stresses two criteria by which acts may be judged as original: The response "should have a certain stated uncommonness in the particular group being studied," and it must be "to some extent adaptive to reality" (pp. 274-275). The product criteria of novelty and appropriateness or value are common in most definitions of creativity (e.g., Newell et al., 1962; Stein, 1974).

Currently, the product definitions are widely regarded as the most useful for creativity research, even among those who attempt to study the creative process or the creative personality (Gamble, 1959). However, assessment methods are seldom directly tied to these definitions. In fact, in most creativity studies performance on creativity tests is used as the criterion product; this performance is rated, ultimately, according to the test constructor's or scorer's subjective view of what is creative and not according to any objective criteria of novelty, appropriateness, value, and so on. Even in studies that directly use subjective ratings of products or persons as creative (e.g., Domino, 1974; Helson & Crutchfield, 1970; MacKinnon, 1962), operational definitions of creativity are rarely made explicit.

It appears, then, that current definitions of creativity are conceptual rather than operational; their conceptualizations have not been translated into actual assessment criteria. Perhaps a solution to this criterion problem can be achieved by the adoption of two complementary definitions of creativity: an operational definition that is readily applicable to empirical research and an underlying conceptual definition that can be used in building theoretical formulations of the creative process.

### *An Operational Definition*

For several reasons, an operational definition of creativity based on the product appears to be most appropriate. First, given the current state of psychological theory and research, a definition based on process would not be feasible. Although some progress has been made in this regard (e.g., Newell et al., 1962), a clear and sufficiently detailed articulation of the process is not yet possible.

Second, and more importantly, identification of a thought process (or subprocess) as "creative" must finally depend on the fruit of that process: a product or response. Likewise, even if it was possible to specify clearly a constellation of personality traits that marks outstandingly creative individuals, the identification of individuals on whom such personality research would be validated must depend in some way on the quality of their work. Thus, the definition that is most likely to be useful for empirical research is one grounded in an examination of products.

Although some theorists (e.g., Ghiselin, 1963) suggest that it is possible to articulate criteria of creativity that are clearly stated and readily translated into assessment, the hope of delineating clear objective criteria is still to be met. Indeed, it can be argued that objective ultimate criteria for identifying products as creative will never be articulated. Just as the judgment of attitude statements as more or less favorable (Thurstone & Chave, 1929) or the identification of individuals as physically attractive (Walster, Aronson, Abrahams, & Rottman, 1966) depends on social judgments, so too does the assessment of creativity ultimately require consensual judgment. Surely there are particular characteristics of attitude statements or persons or products that observers look to in rating them on scales of favorability or physical attractiveness or creativity, but in the final analysis, the choice of those characteristics is a subjective one. Thus, for the purposes of empirical research, it seems appropriate to abandon the hope of finding objective ultimate criteria for creativity and, instead, to adopt a definition that relies on clearly subjective criteria. This is the basis of the consensual definition of creativity (Amabile, 1982):

A product or response is creative to the extent that appropriate observers independently agree it is creative. Appropriate observers are those familiar with the domain in which the product was created or the response articulated. Thus, creativity can be regarded as the quality of products or responses judged to be creative by appropriate observers, and it can also be regarded as the process by which something so judged is produced. (p. 1001)

In an application of this operational definition, several important assumptions are



made about the nature of creativity and creativity judgment. As stated earlier, it is assumed that products or observable responses must ultimately be the hallmark of creativity and that it is not possible *a priori* to specify objective features of new products that are to be considered creative. Rather, criteria for creativity require a historically bound social context. Furthermore, it is assumed that, although creativity in a product may be difficult to characterize in terms of features and although it is difficult to clearly characterize the nature of observers' responses to creative products (Feldman, 1980), creativity is something that people can recognize and often agree on, even when they are not given a guiding definition (Amabile, 1982; Barron, 1965). In addition, it is proposed that there is one basic form of creativity, one basic quality of products that observers are responding to when they call something creative, whether they are working in science or the arts. Finally, it is assumed that there are degrees of creativity, that observers can say with an acceptable level of agreement that some products are more creative or less creative than others. Although this assumption of a continuous underlying dimension is fairly common in psychological theorizing on creativity (e.g., Nicholls, 1972; Thurstone, Note 1), the popular assumption that creativity is a dichotomous trait—that people and things are either creative or not creative—is implicit in much of the creativity literature.

### *A Conceptual Definition*

Despite the present empirical necessity for an operational definition of creativity that relies solely on subjective criteria, such a definition is not, by itself, sufficient for use in a theory of creativity. Although empirical studies of human creativity cannot at this time fruitfully attempt to apply specific criteria for the identification of the creative product or the creative process, any theoretical formulation of creativity must make assumptions about these criteria and their characteristics. To articulate a theoretical model of creativity, it is necessary to make some assumptions about the nature of observers' responses when they call something creative.

The theoretical framework to be presented here is based in a conceptual definition of creativity that comprises two essential elements:

A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct, or valuable response to the task at hand and (b) the task is heuristic rather than algorithmic.

Clearly, this conceptual definition is closely aligned with most of the product definitions described earlier in its inclusion of novelty and appropriateness as two hallmark characteristics of creativity. In addition, however, this definition specifies that the task must be heuristic rather than algorithmic (cf. McGraw, 1978; Taylor, 1960). As typically defined (e.g., Hilgard & Bower, 1975), algorithmic tasks are those for which the path to the solution is clear and straightforward—tasks for which an algorithm exists. By contrast, heuristic tasks are those not having a clear and readily identifiable path to solution—tasks for which algorithms must be developed.<sup>1</sup> In this terminology, *path to solution* is taken in its most general sense; it refers to that set of cognitive and motor operations that lead to an acceptable response or product in the domain of endeavor.

If a chemist applied, step by step, well-known synthesis chains for producing a new hydrocarbon complex, that synthesis would not be considered creative according to the present definition, even if it led to a product that was novel (had not been synthesized before) and appropriate (had the properties required by the problem). Only if this chemist had to develop an algorithm for the synthesis could the result be called creative. Similarly, an artist who followed the algorithm "paint pictures of different sorts of children with large sad eyes and use dark-toned backgrounds" would not be producing creative paintings, even if each painting was unique and technically perfect.

<sup>1</sup> By definition, algorithmic tasks have a clearly identified goal. In contrast, although some heuristic tasks might have a clearly identified goal, for others the problem solver must define the goal itself (and attendant subgoals). Thus, as many theorists have noted (e.g., Campbell, 1960; Getzels & Csikszentmihalyi, 1976; Souriau, 1881), problem discovery is an important part of much creative activity.

Clearly, there is a large class of tasks that may be considered either algorithmic or heuristic, depending on the goal and the level of knowledge of the individual in question. For example, if the goal of a task is simply to bake a cake, a recipe can be followed exactly, and the task would be considered algorithmic. If the goal is to bake a new kind of cake, a recipe has to be invented, and the task would be considered heuristic. Certainly, some tasks may only be algorithmic—for example, the task of solving an addition problem. Other tasks can only be considered heuristic—for example, finding a cure for leukemia—since no one knows the path to the solution. Most tasks, however, can be considered one or the other.

The determination of the label “algorithmic” or “heuristic,” then, depends on the individual performer’s knowledge about the task. If an algorithm for task solution exists but the individual has no knowledge of it, the task can be considered heuristic for that individual. For example, a student who independently proves a well-known theorem in geometry would certainly be said to have solved a heuristic task. In most studies, assumptions can usually be made about the level of knowledge that most subjects bring to the task, thus allowing a determination of whether a task is algorithmic or heuristic. Thus, an experimenter who wishes to present subjects with a creativity task must use a task for which there is no widely familiar algorithm.

It is important to specify the relation between the operational and conceptual definitions. The conceptual definition articulates the notion of creativity that underlies the theoretical framework to be presented here, because a useful conceptualization of creativity must explain how the crucial characteristics of creative products evolve in the process of task engagement. In essence, the conceptual definition is a best guess as to what appropriate observers are looking for when they assign ratings of creativity to products. Clearly, though, the characteristics proposed in that definition cannot be directly translated into an empirically useful definition, because it is not yet possible to specify novelty or appropriateness or straightfor-

wardness in an objective manner. Thus, although it is necessary to articulate a conceptual definition, a satisfactory operational definition must return to the final criterion for creativity assessment—a reliable subjective judgment.

### Preliminary Assumptions and Observations

The conceptualization of creativity to be presented here relies on a number of assumptions about creative production, assumptions based in both formal and informal observation. Most fundamentally, this conceptualization includes some assumptions about the nature of creativity. It is assumed that there is a continuum of creativity from the lower levels of “garden variety” creativity observed in everyday life to historically significant advances in literature, the arts, and science. In contrast to popular views of creativity as an all-or-nothing entity, this perspective proposes that it is at least theoretically possible for anyone with normal cognitive abilities to be creative to some degree in some domain of endeavor. In addition, it is assumed that there can be degrees of creativity within a particular individual’s work; a particular scientist, for example, may produce both more creative and less creative scientific work. Furthermore, it is acknowledged that although different individuals may be quite distinct in their potential for creative performance in a given domain, it does appear to be possible to increase creativity to some extent (Stein, 1974, 1975).

These assumptions are accompanied by a set of related observations about the factors that appear to be necessary for creative behavior: First, at least for high levels of creativity, there often seems to be a “match” between individuals and domains (Feldman, 1980). There appears to be a particularly good fit, for example, between one individual and chess playing and between another individual and musical composition. Second, education and training in cognitive skills are essential, but for high levels of creativity they do not appear to be sufficient by themselves. Third, particular clusters of personality traits may correlate fairly well with consistent creativity in individuals (see Stein, 1974), but

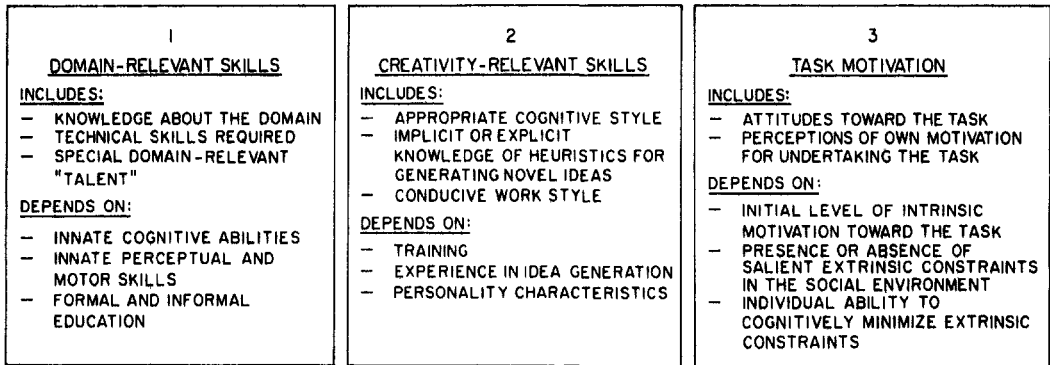


Figure 1. Components of creative performance.

again, they are not sufficient in and of themselves. Certainly, a given individual—describable, perhaps, by a particular personality-trait constellation—is not creative at all times or in all domains, even if he or she does produce notably creative work in some. Fourth, innate abilities (“talents”) in a given domain do appear to be important for noteworthy levels of creativity, but education seems essential in most outstanding creative achievements (Feldman, 1980). Fifth, although an eagerness to work diligently appears to be an essential component of high levels of creativity (Golann, 1963) and although a number of introspective accounts describe the phenomenology of creativity as marked by deep involvement in the activity at hand, these accounts also stress the importance of intellectual playfulness and freedom from external constraints (e.g., Einstein, 1949).

The componential framework of creativity outlined here attempts to account for these fairly well-established creativity phenomena: the importance of talents, education, cognitive skills, innate interests, and personality dispositions, all functioning interactively to influence creative behavior, as well as the apparently contradictory importance of both “work” and “play” in the motivation for creative behavior.

### The Components of Creative Production

The proposed componential framework of creativity includes three major components, as outlined in Figure 1. In keeping with the consensual definition of creativity offered earlier, creativity, as used herein, refers to the

production of responses or works that are reliably assessed as creative by appropriate judges. These three components, then, are presented as factors essential for the production of such responses and works.<sup>2</sup> Although it is proposed that the three main components constitute a complete set of the general factors necessary for creativity, the listing of elements within each component can only be completed gradually, as progress is made in creativity research. The elements included in Figure 1 within each of the components are proposed as examples of the kind of elements that each component contains.<sup>3</sup>

Within the framework, domain-relevant skills can be considered as the basis from which any performance must proceed. They include factual knowledge, technical skills, and special talents in the domain in question. Creativity-relevant skills include cognitive

<sup>2</sup> The term *factor* is used here in the colloquial sense of elements, circumstances, or conditions contributing to a process or outcome. This use is to be distinguished from the more narrowly statistical use of the term in the psychology of intelligence (e.g., Spearman, 1927).

<sup>3</sup> Sternberg (1977a, 1977b, 1978, 1979) has used the term *componential* extensively in his theory of human reasoning. There is a basic commonality between his and the present use of the term; in both conceptualizations, all of the components are seen as necessary, and the set is seen as essentially complete. Sternberg's conceptualization, however, is more highly developed; it is subdivided into hierarchical levels that include performance components, acquisition components, transfer components, retention components, and metacomponents (processes controlling the lower components). Although in Sternberg's model the components are processes, in the present conceptualization the components are sets of elements that control, determine, and enter into processes.

style, application of heuristics for the exploration of new cognitive pathways, and working style. Task motivation accounts for motivational variables that determine an individual's approach to a given task. The three components are proposed to operate at different levels of specificity. Creativity-relevant skills operate at the most general level; they may influence responses in any content domain. Thus, some highly creative individuals may indeed appear to be creative "types," behaving in an eccentric and atypical manner in many domains of behavior. Domain-relevant skills, on the other hand, operate at an intermediate level of specificity; this component includes all skills relevant to a general domain, such as verbal production, rather than skills relevant to only a specific task within a domain, such as writing a Haiku poem on autumn. It is assumed that within a particular domain, skills relevant to any given specific task overlap with skills relevant to any other task. Finally, task motivation operates at the most specific level; motivation may be very specific to particular tasks within domains and may even vary over time for a particular task. Thus, for example, a child may have a high level of motivation for developing various statistics on baseball players but may have a very low level of motivation for working mathematical puzzles in school.

Figure 1 includes several elements within each of the three components. At this point, although all three components are seen as necessary for creativity, it is not proposed that each of the individual elements within a component is necessary for recognizable levels of creativity. It might, for example, be possible for a composer to produce a symphony that observers would agree was rather creative without that composer's having any particular talent for hearing in imagination all the instruments playing together. Of course, it could be that such talent is essential. The point is that only future research can indicate which elements constitute a complete set within any one of the components and which elements are indeed essential.

### *Domain-Relevant Skills*

Domain-relevant skills compose the individual's complete set of response possibili-

ties—response possibilities from which the new response is to be synthesized and information against which the new response is to be judged.<sup>4</sup> This component can be seen as the set of cognitive pathways for solving a given problem or doing a given task. Some of the pathways are more common, well-practiced, or obvious than others, and the set of pathways may be large or small. The larger the set, the more numerous the alternatives available for producing something new, for developing a new combination of steps. As Newell and Simon (1972) poetically described it, this set can be considered the problem solver's "network of possible wanderings" (p. 82).

This component includes familiarity with and factual knowledge of the domain in question: facts, principles, opinions about various questions in the domain, knowledge of paradigms, performance "scripts" (Schank & Abelson, 1977) for solving problems in the domain, and aesthetic criteria. Certainly, it is impossible to be creative in nuclear physics unless one knows something (and probably a great deal) about nuclear physics. The component of domain-relevant skills also includes technical skills that may be required by a given domain, such as laboratory techniques or techniques for making etchings, and special domain-relevant talents that may contribute to creative productivity, such as a composer's ability to hear in imagination all the instruments playing together. It is proposed that this set of components depends on innate cognitive, perceptual, and motor abilities as well as formal and informal education in the domain of endeavor.

<sup>4</sup> Although there is a great deal of overlap between the present conceptualization of domain-relevant skills and Newell and Simon's (1972) conceptualization of "problem space," there are some distinctions to be made. The problem space, as described by Newell and Simon, includes not only what are here called domain-relevant skills (a "set of elements," a "set of operators," and the "total knowledge available to a problem solver"; p. 82) but also information specific to the task (an "initial state of knowledge" and a "problem"; p. 82). Thus, the present conceptualization of domain-relevant skills is limited to a particular individual's more or less permanent store of information in the problem domain. An additional distinction is that Newell and Simon do not explicitly include the technical motor skills or special talents that are here seen as part of domain-relevant skills.



The nature of the domain-relevant information and the manner in which it is stored can make an important difference in creative production. Wickelgren (1979) has argued that "the more we concentrate on . . . heavily contextualized (specific) concepts and propositions, the less capacity we will have available to learn general principles and questions that crosscut different areas and perspectives" (p. 382). In other words, knowledge organized according to general principles is of greater utility than specific, narrowly applicable collections of facts. Likewise, performance information organized according to general approaches to problems rather than blind response algorithms should be more likely to contribute to high levels of creativity. Thus, according to this componential perspective, the popular notion that a great deal of knowledge in a given domain can be detrimental to creativity is incorrect. In general, an increase in domain-relevant skills can only lead to an increase in creativity, provided that the domain-relevant information is organized appropriately. This proposition fits well with the assertion of previous theorists (e.g., Campbell, 1960) that larger stores of properly coded knowledge increase the probability of outstanding responses. In other words, although it is possible to have too many algorithms, it is not possible to have too much knowledge.

There has been virtually no research directly examining the role of domain-relevant skills in the production of creative work, although some indirect evidence may be found in biographical and personality assessments of outstandingly creative persons (e.g., Cox, 1926; MacKinnon, 1962; Roe, 1952). Nonetheless, notions similar to those presented here can be found in the work of several previous theorists. In what is perhaps the most well-known intuitive description of the creative process, Wallas (1926) suggested that the first step is the "preparation" stage, which depends on "the whole process of intellectual education" (p. 92). Similarly, Koestler (1964) referred to the importance of "ripeness" in determining whether the "bisociation" of two different "matrices of thought" takes place: "The statistical probability for a relevant discovery to be made is the greater the more firmly established and well exercised each of the still separate skills, or thought-matrices,

are" (p. 108). Also, Newell et al. (1962) proposed that "there is a high correlation between creativity (at least in the sciences) and proficiency in the more routine intellectual tasks that are commonly used to measure intelligence" (p. 145). To this the present conceptualization adds the qualification that there is a high correlation between creativity and proficiency in the more routine domain-relevant intellectual tasks.

### *Creativity-Relevant Skills*

For individuals with similar domain-relevant skills and task motivation who are working on the same problem, differences in their creativity-relevant skills determine the various ways in which their problem-solving proceeds. Herein lies the "something extra" of creative performance; assuming an appropriate level of motivation, performance will be "good" or "adequate" or "acceptable" if the requisite domain-relevant skills exist. However, even with these skills at an extraordinarily high level, an individual is incapable of producing work that is considered creative if creativity-relevant skills are lacking.

This component includes, first, a cognitive style characterized by a facility in understanding complexities and an ability to break set during problem solving. Several specific aspects of cognitive style appear to be relevant to creativity; these include a number of distinct abilities: (a) *breaking perceptual set* (Boring, 1950; Katona, 1940): Duncker's (1945) studies in "functional fixedness" demonstrated that subjects who solved his problem "creatively" were those who could see a thumbtack box as a platform for a candle rather than as just a container. (b) *Breaking cognitive set, or exploring new cognitive pathways*: Newell et al. (1962) suggested that problem-solving can result in creative solutions when an old set of unsuccessful problem-solving strategies is abandoned and the search, as a result, moves off in a new direction. (c) *Keeping response options open as long as possible*: In a study of student artists, Getzels and Csikszentmihalyi (1976) found that those who approached their canvas without a definite plan produced more creative paintings than those who knew in advance what they were going to do. (d) *Suspending judgment*: This is the cardinal rule of Os-



born's (1963) "brainstorming" program and, apparently, the one facet of that program that is most responsible for positive results (Stein, 1975). (e) *Using "wide" categories*: Individuals who categorize information in "wide" as opposed to "narrow" categories, who see relations between apparently diverse bits of information, may be more likely to produce creative works and responses (Cropley, 1967). (f) *Remembering accurately*: Those who can code, retain, and recall large amounts of detailed information probably have an advantage in creative performance (Campbell, 1960). (g) *Breaking out of performance "scripts"*: It was proposed earlier that domain-relevant skills include performance "scripts" (Schank & Abelson, 1977), set sequences of steps for performing tasks or solving problems in a given domain; these may also be called algorithms. It may be important for creativity to be able to break out of well-used scripts occasionally, or at least to examine them actively, instead of proceeding through them uncritically (Langer, 1978; Langer & Imber, 1979).

The creativity-relevant-skills component also includes knowledge of heuristics for generating novel ideas. A heuristic can be defined as "any principle or device that contributes to a reduction in the average search to solution" (Newell, et al., 1962, p. 152); thus, a heuristic may be considered as a general rule that can be of aid in approaching problems or tasks. Several theorists and philosophers of science have proposed creativity heuristics: (a) "When all else fails, try something counterintuitive" (Newell et al., 1962); (b) "Make the familiar strange" (Gordon, 1961); (c) generate hypotheses by analyzing case studies, use analogies, account for exceptions, and investigate paradoxical incidents (McGuire, 1973). Clearly, creative heuristics are best considered as methods of approaching a problem that are most likely to lead to set-breaking and novel ideas rather than as strict rules that are applied by rote. Although these heuristics may be stated explicitly by the person using them, they may also be known at a more implicit level and used without direct awareness.

A work style conducive to creativity is an essential element of creativity-relevant skills. For example, an ability to concentrate effort for long periods of time may be an important

facet of such a work style (Campbell, 1960; Hogarth, 1980), along with an ability to use "productive forgetting"—the ability to abandon unproductive search strategies and temporarily put aside stubborn problems (Simon, 1966).

In an important way, creativity-relevant skills depend on personality characteristics related to self-discipline, ability to delay gratification, perseverance in the face of frustration, independence, and an absence of conformity in thinking or dependence on social approval (Feldman, 1980; Golann, 1963; Hogarth, 1980; Stein, 1974). In addition, though, creativity-relevant skills also depend on training, through which they may be explicitly taught, or simply on experience with idea generation, through which an individual may devise his or her own strategies for creative thinking. A great deal of previous research has investigated these elements, including work on creativity-training programs, such as brainstorming (Osborn, 1963) and synectics (Gordon, 1961), and research on the "creative personality" (e.g., Barron, 1955; Cattell & Butcher, 1968; MacKinnon, 1962; Wallach & Kogan, 1965).

### **Task Motivation**

Few theorists have dealt at length with the role of motivational variables in creativity, but some have suggested the importance of intrinsic motivation—a motivational state generated by the individual's reaction to intrinsic properties of the task and not generated by extrinsic factors. In essence, these theorists have proposed that freedom from external pressures and controls is essential (e.g., Crutchfield, 1962; Osborn, 1963; Rogers, 1954). In this sense, intrinsic motivation can be viewed as both a state and a trait (although this trait should not be thought of as general and pervasive but as specific to particular classes of activities). Individuals may have relatively enduring levels of interest in particular activities, but levels of interest may be importantly affected by social and environmental variables as well.

Within the present formulation, task motivation includes two elements: the individual's baseline attitude toward the task and the individual's perceptions of his or her reasons for undertaking the task in a given instance.

A baseline attitude toward the task is formed, quite simply, when the individual performs a cognitive assessment of the task and of the degree to which it matches his or her existing preferences and interests. Perceptions of one's motivation for undertaking the task in a given instance, on the other hand, are proposed to depend largely on external social and environmental factors—the presence or absence of salient extrinsic constraints in the social environment. In this context, extrinsic constraints are factors that are intended to control or could be perceived as controlling the individual's performance on the task in a particular instance. As such, the constraint is extrinsic to the task itself; it is not an essential feature of task performance but is introduced by the social environment. A salient extrinsic constraint is one whose controlling implications are clear to the individual during task engagement.

In addition to external constraints, internal factors, such as an individual's ability to minimize cognitively the salience of such extrinsic constraints, might also influence the self-perception of motivation. Thus, the final level of task motivation in a particular instance varies from the baseline level of intrinsic motivation as a function of extrinsic constraints that may be present in the situation and the individual's strategies for dealing with these constraints. According to this formulation, then, creative performance may be seen as analogous to "latent learning": it occurs primarily when task-irrelevant motivation (extrinsic motivation) is low (Kimble, 1961).

The propositions on task motivation presented in this framework derive primarily from social-psychological notions of intrinsic motivation. A person is said to be intrinsically motivated to engage in an activity if such engagement is viewed as an end in itself and not as a means to some extrinsic goal. Several theorists (deCharms, 1968; Deci, 1975; Lepper & Greene, 1978a) have proposed that intrinsic motivation can be affected by environmental factors. Certainly, intrinsic motivation to perform an activity can, theoretically, be present or absent in the ideal case in which no environmental factors operate. If an individual finds an activity unpleasant or boring, there is no intrinsic mo-

tivation to engage in it; if he or she finds another activity stimulating or fun, intrinsic motivation is present. Of greatest importance here, however, are the ways in which environmental factors may alter the "native" state of intrinsic motivation that is presumed to be essential for creativity.

Most recent intrinsic-motivation research has been concerned with the "overjustification" hypothesis, derived from the attribution theories of Bem (1972), Kelley (1967, 1973), and deCharms (1968). These theorists propose that under certain conditions, there is an inverse relation between the salient external constraints imposed on an individual's engagement in an activity and that individual's intrinsic motivation to perform that activity. Several studies, employing a variety of intrinsic constraints—including tangible reward for performance, surveillance, and externally imposed deadlines—have supported this hypothesis (e.g., Amabile, DeJong, & Lepper, 1976; Condry, 1977; Deci, 1971, 1972; Kruglanski, 1975; Lepper & Greene, 1975; Lepper, Greene, & Nisbett, 1973; Ross, 1975).

Thus, it is proposed that any of a wide variety of extrinsic constraints will, by impairing intrinsic motivation, have detrimental effects on creative performance. In other words, a primarily intrinsic motivation to engage in an activity will enhance creativity, and a primarily extrinsic motivation will undermine it. Task motivation can be seen in this context as the most important determinant of the difference between what a person can do and what he or she will do. The former is determined by the level of domain-relevant and creativity-relevant skill; the latter is determined by these two in conjunction with an intrinsically motivated state.

### A Componential Framework for Conceptualizing Creativity

A listing and description of each of the components necessary for creativity illustrates the importance of each of the types of factors mentioned earlier: personality characteristics, cognitive skills, and social/environmental variables. To come to an understanding of the ways in which each of these factors might contribute to creative perfor-

mance, it is important to consider how each component might enter into the creative process.

### *A Proposed Sequence for Response Generation*

Figure 2 presents a schematic representation of a componential framework for the creative process. This framework describes the way in which an individual might assemble and use information in attempting to arrive at a solution, response, or product. In information-processing terms, task motivation is responsible for initiating and sustaining the process; it determines whether the search for a solution will begin and whether it will continue, and it also determines some aspects of response generation. Domain-relevant skills are the material drawn on during operation; they determine what pathways will be searched initially and what criteria will be used to assess the response possibilities that are generated. Creativity-relevant skills act as an executive controller; they can influence the way in which the search for responses will proceed.

The process outlined in Figure 2 is proposed to be the same for both high and low levels of creativity. In many ways, this framework resembles models of the creative pro-

cess proposed by previous theorists. For example, Wallas (1926) presented a fairly informal description of four stages of creative thinking: preparation, incubation, illumination, and verification. Hogarth (1980), proposing a somewhat different set of four stages (preparation, production, evaluation, and implementation), described sets of aids and barriers to each of the stages. The present framework is more detailed than these, however, in its description of the role of each of the three components at each point in the sequence.

Moreover, it is proposed here that the level of creativity of a product or response varies as a function of the levels of each of the three components. Each component is necessary, and not one is sufficient for creativity in and of itself. Thus, although this framework cannot be considered to be a detailed mathematical model of the creative process, it is, in a general sense, a multiplicative model. No component may be absent if some recognizable level of creativity is to be produced, and the level of each component for a given individual's attempt at a given task determines that individual's overall level of creativity therein.

The initial step in the proposed sequence is the presentation of the task to be engaged in or the problem to be solved. Task moti-

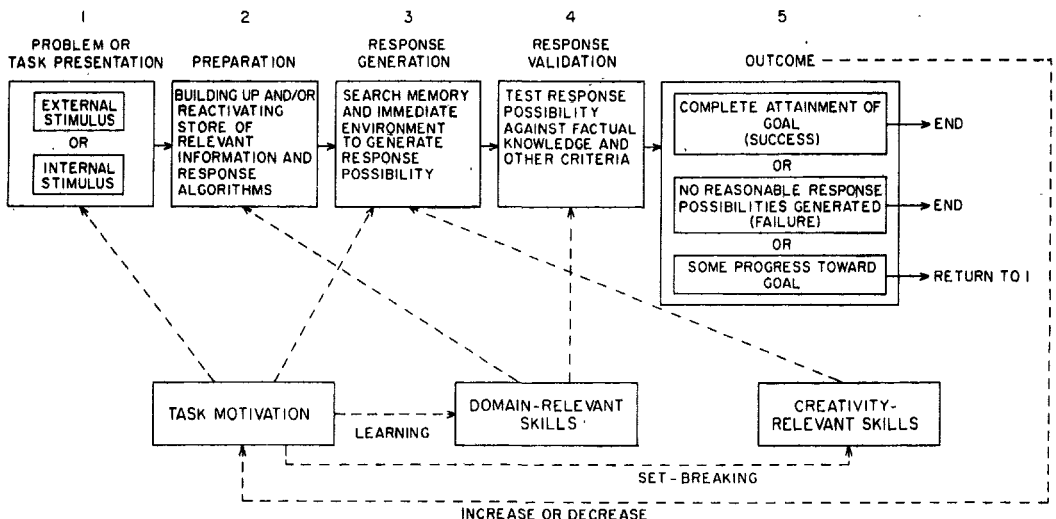


Figure 2. Componential framework of creativity. (Broken lines indicate the influence of particular factors on others. Solid lines indicate the sequence of steps in the process. Only direct and primary influences are depicted here.)

vation has an important influence at this stage; if the individual has a high level of intrinsic interest in the task, this interest will be sufficient to engage the process. Under these circumstances the individual, in essence, poses the problem to her- or himself. In other situations, however, the problem is presented by another individual. It is possible, of course, for someone else to pose a problem that the individual finds particularly interesting; however, it is likely that in many cases an externally posed problem is not intrinsically interesting to the individual.

The second stage may be considered preparatory to actual generation of responses or solutions. At this point, the individual builds up or reactivates a store of information relevant to the problem or task, including a knowledge of response algorithms for working problems in the domain in question. In the case in which domain-relevant skills are rather impoverished at the outset, this stage may be quite a long one during which a great deal of learning takes place (Bain, 1874; Mach, 1896; Poincaré, 1924; Souriau, 1881). On the other hand, if the domain-relevant skills are already sufficiently rich to afford an ample set of possible pathways to explore during task engagement, the reactivation of this already-stored set of information and algorithms may be almost instantaneous, occupying very little real time.

It is in the third stage that the level of novelty of the product or response is determined. Here, the individual generates response possibilities by searching through the available pathways and exploring features of the environment that are relevant to the task at hand. During each "run" through the sequence, the individual follows a particular cognitive pathway to a solution or response. Both creativity-relevant skills and task motivation play an important role at this state. The existing repertoire of creativity-relevant skills determines the flexibility with which cognitive pathways are explored, the attention given to particular aspects of the task, and the extent to which a particular pathway is followed in pursuit of a solution. In addition, creativity-relevant skills can influence the subgoals of the response-generation stage by determining whether a large number of response possibilities will be generated

through a temporary suspension of critical judgment or a decision to keep response options open. Task motivation, if it is intrinsic rather than extrinsic, can add to the existing repertoire of skills a willingness to take risks with this particular task and to attend to aspects of the environment that might not be obviously relevant to attainment of a solution.

When a task is heuristic, necessitating a search of possible pathways, what determines which pathways are explored? It has been suggested (e.g., Campbell, 1960) that possibilities are produced more or less by a blind or random process. Certainly, the search can be narrowed down by various methods. However, it is suggested that some amount of blind search is always required with tasks of this nature. The more possibilities there are to be explored and the better the strategies for exploring them rapidly, the greater the likelihood of producing a novel yet appropriate response. Some degree of luck, however, is always an element (Hogarth, 1980).

Domain-relevant skills again figure prominently in the fourth stage—the validation of the response possibility that has been chosen on a particular trial. Using domain-relevant techniques of analysis, the response possibility is tested for correctness or appropriateness against the knowledge and the relevant criteria included within domain-relevant skills. Thus, it is this stage that determines whether the product or response will be appropriate, useful, correct, or valuable—the second response characteristic that, together with novelty, is essential for the product to be considered creative according to the conceptual definition proposed earlier.

The fifth stage represents the decision making that must be carried out on the basis of the test performed in Stage 4. If the test has been passed perfectly—if there is complete attainment of the original goal—the process terminates. If there is complete failure—if no reasonable response possibility has been generated—the process will also terminate. If there is some progress toward the goal—if at least a reasonable response possibility has been generated or if, in Simon's (1978) terms, there is some evidence of "getting warmer"—the process returns to the first stage, where the problem is once again posed.



In this case, as in any case, information gained from the trial is added to the existing repertoire of domain-relevant skills. If task motivation remains sufficiently high, another trial will be attempted, perhaps with information gained from the previous trial being used to pose the problem in a somewhat different form. If, however, task motivation drops below some critical minimum, the process will terminate.

As tasks become more complex, the application of this outline to the production of creative responses to those tasks also becomes increasingly more complex. Work on any given task or problem may involve a long series of loops through the process, until success in a final product is achieved. Indeed, work on what seems to be a task may actually involve a series of rather different subtasks, each with its own separate solution. These subtasks may be hierarchically arranged, and the completion of any single subtask may in itself involve several runs through the process until success is finally achieved. For example, the superordinate goal of writing a poem involves several subtasks, including finding a theme, deciding on a meter to use, choosing major and minor guiding images, inventing metaphors and similes, and writing particular words, phrases, and lines. Each of these can be seen as a task or a subtask whose achievement is necessary for successful completion of the poem-writing task. Thus, success on a task depends in part on the outcomes of subtasks and the number of runs necessary to achieve success on those subtasks.

### *Feedback and Interaction Among the Components*

The outcome of a given run through the process (success or failure or partial success) can directly influence task motivation, thereby setting up a feedback cycle through which future engagement in the same or similar tasks can be affected. If complete success has been achieved, there will be no motivation to undertake exactly the same task again, because in a real sense the task has been completed. However, with success intrinsic motivation for similar tasks within the domain should increase. If complete failure has been encountered—if no reasonable responses were

generated—intrinsic motivation for the task should decrease. If partial success has been met, intrinsic motivation will increase when the problem solver has the sense of getting warmer in approaching the goal; however, it will decrease when the outcome of the test reveals that the problem solver is essentially no closer to the goal than when he or she began.

This proposition that process outcome can influence task motivation is compatible with Harter's (1978) theory of "effectance" motivation. Harter built on White's (1959) definition of the "urge toward competence," a definition proposing a new motivational construct "which impels the organism toward competence and is satisfied by a feeling of efficacy" (Harter, 1978, p. 34). According to Harter's theory, failure at mastery attempts leads eventually to decreases in intrinsic motivation and striving for competence. However, success (which will be more probable the higher the level of skills) leads to intrinsic gratification, feelings of efficacy, and increases in intrinsic motivation, which, in turn, lead to more mastery attempts. In essential agreement with Harter, a number of social-psychological theorists (e.g., deCharms, 1968; Deci, 1975; Lepper & Greene, 1978b) have proposed that success (confirmation of competence) leads to increased intrinsic motivation.

Through this influence on task motivation, outcomes can also indirectly affect domain-relevant and creativity-relevant skills. A higher level of intrinsic task motivation may make set breaking and cognitive risk taking more probable and more habitual, thereby increasing the permanent repertoire of creativity skills. Also, a higher level of motivation may motivate learning about the task and related subjects, thereby increasing domain-relevant skills.

### *Potential Contributions of a Social Psychology of Creativity*

The componential framework is a general outline of the creative process and a description of the factors proposed to influence it. Perhaps the most important feature of this framework is its inclusion of social-environmental variables and their interaction with

personality characteristics and cognitive skills in producing creative responses. Such variables have been largely ignored in previous formulations, even though a consideration of them can lead to important advances in understanding many creativity phenomena. As an example, one problem for which a social-psychological approach to creativity can be particularly useful when combined with cognitive psychology and the traditional individual-difference approach is the undermining of creativity by socially imposed constraints.

### *Detrimental Effects of Extrinsic Motivation*

A major difference between the componential framework of creativity and previous formulations is the prominence given to task motivation and the presentation of specific propositions concerning the detrimental effects of extrinsic motivation on creativity. These propositions derive from the social-psychological theories of motivation discussed earlier. Although those theories have primarily been concerned with the way in which the imposition of salient extrinsic constraints can undermine subsequent intrinsic interest to perform an activity, some theorists have recently begun to speculate about the effects of extrinsic constraint on immediate performance. The conceptualization that most directly deals with creative performance is that of McGraw (1978), who suggests that performance on algorithmic tasks should be enhanced by increases in extrinsic motivation but that performance on heuristic tasks (creativity tasks) should be adversely affected. Lepper and Greene (1978b) proposed a "means-end" analysis of task motivation, predicting that a person will pay attention to those aspects of the task that are necessary to attain the goal (such as simply finishing) but may neglect other aspects (such as novelty of response).

Few studies have set out to determine directly whether extrinsic constraints can adversely affect creative performance. However, there is some empirical evidence that supports this hypothesis. In a study of the effects of reward on "insight" in solving Duncker's (1945) functional-fixedness problem, Glucksberg (1964) found that subjects who were offered monetary rewards for solv-

ing the problem displayed significantly greater functional fixedness—inability to see that a box could be used as a platform—than did nonreward subjects. Similarly, McGraw and McCullers (1979) found that rewarded subjects took significantly longer to break set in solving Luchins's (1942) water jar problems than did nonreward subjects. Also, in a procedure in which subjects were asked to write stories and story titles, subjects promised a reward produced responses that were judged less creative than those of subjects who had simply volunteered (Kruglanski, Friedman, & Zeevi, 1971). There is, then, some convergent evidence from studies on set breaking and overjustification suggesting an inverse relation between extrinsic constraint (in the form of rewards) and creativity.

One recent study was explicitly designed to test the effects of extrinsic constraint on creativity (Amabile, 1979). The constraint employed in this study was the expectation of external evaluation, an extrinsic constraint that is widely used in educational settings. Subjects made paper collages under one of six basic conditions. Experimental-group subjects were told beforehand that their collages would be evaluated by experts; control-group subjects were told nothing about evaluation and were led to believe that the collage was not the experimenter's main focus of interest. In addition, subjects were asked to concentrate on either the creativity of their collages or the technical goodness of their collages or they were given no particular focus in their instructions. The results clearly supported the hypothesis that salient extrinsic constraint is detrimental to creativity. No matter what focus they were given, experimental-group subjects produced collages that were judged significantly lower on creativity than those produced by control-group subjects.

Thus, there is support for the proposition that extrinsic constraints, by decreasing intrinsic task motivation, undermine creativity. In attempting to understand the mechanism by which this social-psychological phenomenon occurs, however, it is necessary to rely on conceptualizations of algorithms, heuristics, and attention from cognitive psychology and on conceptualizations of individual differences from personality psychology.

*Algorithms, heuristics, and attention.* Despite results supporting the intrinsic-motivation hypothesis of creativity, there is evidence from a small body of studies within the behavior-modification and token-economy traditions suggesting a positive effect of constraint on creativity tasks. In one such study (Glover & Gary, 1976), children worked on a standard verbal creativity task in which points were awarded for fluency (number of different responses), flexibility (number of verb forms), elaboration (number of words per response), or originality (statistical infrequency of responses). Consistent with the experimental hypotheses, all four aspects of creativity were "demonstrated to be under experimental control" (p. 79); when fluency was rewarded, the children were fluent; when originality was rewarded, they were original; and so on. Under extinction, each aspect fell to baseline levels or below. Other studies have demonstrated similar functional control over creative performance (Halpin & Halpin, 1973; Johnson, 1974; Raina, 1968; Ward, Kogan, & Pankove, 1972).

Although these results seem inconsistent with those of studies showing detrimental effects of extrinsic constraints on creativity (e.g., Amabile, 1979; Kruglanski et al., 1971; McGraw & McCullers, 1979), they become consistent when considered within the context of the algorithmic-heuristic distinction. In each of the studies showing positive effects of reward, subjects were told rather explicitly what it was they were to do to produce a creative response; in essence, the tasks were rendered algorithmic. By contrast, those studies showing detrimental effects left the task heuristic by failing to specify exactly what should be done. To test this explanation of the divergent results obtained, an additional condition was included in the study reported earlier on the effects of evaluation on creativity (Amabile, 1979). In this condition, the making of a paper collage, which is normally heuristic, was transformed into an algorithmic task by the instructions given. In pretesting, artist judges rated a set of collages on a large number of artistic dimensions in addition to creativity. Those that correlated well with creativity (novelty of idea, novelty of materials use, evident effort, variation in shapes used, detail, and complexity)

were used in the instructions given to subjects in this "algorithmic" condition. Subjects in this condition were told that their collage would be evaluated on creativity and that creativity would be judged on the basis of novelty of idea, novelty of materials use, and so on.

In accord with the present theoretical formulation proposing that intrinsic constraint would undermine creative performance but enhance performance on algorithmic tasks, subjects given this algorithm for making a creative collage showed increments in creativity relative to nonevaluation controls; as described earlier, evaluation-group subjects not given this algorithm showed significant decrements. Of course, by the conceptual definition of creativity, the behavior of subjects in the algorithmic-instructions condition would not be considered creative at all, because the task was not a heuristic one for them.

Conceptualizations from cognitive psychology can be useful in understanding the mechanism by which task motivation influences the response-generation stage of the creative process. Simon (1967) postulated that the most important function of motivation is the control of attention. He proposes that motivation determines which goal hierarchy will be activated at any given time and suggests that the more intense the motivation to achieve an original goal, the less attention will be paid to aspects of the environment that are irrelevant (or seemingly irrelevant) to achieving that goal. This proposition can explain the consistent finding that incidental or latent learning is impaired by the offer of reward for task performance (e.g., Kimble, 1961; Spence, 1956). It can also explain the detrimental effects of extrinsic constraint on creativity.

Extrinsically motivated behavior can be seen as behavior that is narrowly directed toward achieving the extrinsic goal that has been imposed, whether that goal be attaining a reward or meeting a deadline or achieving the approval of an observer or obtaining a positive evaluation from an expert. For a creative response to be produced, however, it is often necessary to "step away" temporarily from the perceived goal (Newell et al., 1962), to direct attention toward seemingly "inci-

dental" aspects of the task and the environment. The more single-mindedly a goal is pursued, the less likely it may be that alternative solution paths will be explored. In a sense, then, the difference between extrinsic and intrinsic motivation—for the purposes of a conceptualization of creativity—can be seen as the difference between divided and undivided attention to the task itself and task-relevant information. An extrinsic motivation will decrease the probability that the creativity heuristics of exploration, set breaking, and risk taking will be applied. There will be a heavy reliance on response algorithms that already exist within the store of domain-relevant skills.

*Individual differences in responses to constraints.* Certainly, there are nontrivial differences between individuals in the extent to which the imposition of extrinsic constraints will undermine creativity. Particular individuals might be more or less "immune" to such constraints in a wide range of activities or in certain narrowly specified activities; indeed, their observable creativity might actually seem to be enhanced by extrinsic constraints. For example, Watson and Crick (see Watson, 1968) were certainly cognizant of the tangible and social rewards that would accrue to anyone describing the structure of the DNA molecule.

There are three conditions under which this seemingly paradoxical phenomenon might be observed. First, it could occur if the extrinsic goal involves finding a creative solution or response *and* the individual is so experienced in the domain that she or he already has algorithms for achieving a solution that will be so judged. In this case, the divided attention produced by the external contingency will not be detrimental, because the individual does not need to apply the creativity heuristics. Second, the individual may be able to reduce psychologically the salience of the extrinsic goal while engaged in the task. She or he might, for example, be less dependent than most people on social approval and tangible rewards. Third, the individual's intrinsic motivation may be so high that the extrinsic motivation is not primary. Such passionate interest in an activity

is rather common in first-person accounts of the experience of creativity (see Ghiselin, 1952).

### Personality, Cognition, and Social Environment: Toward a Comprehensive Psychology of Creativity

The basic question in understanding creativity is this: How is creative performance different from ordinary performance? The conceptualization presented here proposes that the distinction between the two types of performance is not a sharp one. Instead of a dichotomy, there is a continuum ranging from performances marked by reliance on entirely familiar algorithms applied by rote, at the one end, to performances marked by the application of set-breaking heuristics and the exploration of completely new cognitive pathways, at the other end. The factors contributing to the final level of creativity, according to this view, include individual-difference variables, such as general cognitive skills, special talents, and personality dispositions related to independence and risk-taking; cognitive variables, such as the application of set-breaking heuristics and the retention of large stores of domain-relevant information; and social-psychological variables, such as the presence or absence of extrinsic constraint in the social environment.

Clearly, the componential framework is not a fully articulated theory; instead, it should be considered as a general working model of the dispositional, cognitive, and social factors that determine creativity. Although it is articulated at a less detailed level than are most information-processing theories of problem solving, this framework may be considered more complete than many of these cognitive theories in its inclusion of noncognitive variables and its proposition of a specific set of factors that can differentiate creative problem solving from ordinary problem solving. Moreover, in its proposition that the creativity components combine in a multiplicative fashion, this framework can account for "garden variety" levels of creativity as well as the more outstanding cases of creative production. Finally, problem solving, as understood in the present context, can



refer to virtually any sort of task in any domain, including the arts. For these reasons, the componential framework can be seen as offering a new and potentially fruitful approach to the study of the creative process.

The componential framework suggests an answer for the intelligence-creativity controversy that has, in the past, occupied a great deal of the creativity literature. A number of studies have shown a nonhomoscedasticity of variance in the bivariate distribution of IQ and creativity scores (Barron, 1961; Getzels & Jackson, 1962; Wallach, 1971). At low levels of intelligence, there appears to be an almost uniformly low level of creativity. However, at high levels of intelligence, all levels of creativity are found; here, the IQ-creativity correlation is quite low. The perennial question has been, Are creativity and intelligence basically the same thing or are they not? The present conceptualization suggests, simply, that intelligence (as typically conceived) is a component of creativity; it is a necessary, but not a sufficient, contributing factor. Some minimum level of intelligence is required for creative performance because intelligence is, presumably, directly related to the acquisition of domain-relevant skills and the application of creativity heuristics. However, there are other components and elements of components that are necessary for creativity but would not be assessed by traditional intelligence tests: intrinsic motivation toward the task, for example, and personality dispositions conducive to deep levels of concentration or unrestrained intellectual risk taking.

A second major focus of creativity research over the past two decades has been the stimulation of creativity by various training programs. With the wide variety of variables it includes, the componential framework of creativity suggests that creativity can indeed be altered (as many previous theorists have proposed) and that it can perhaps be altered by factors not previously considered. Most creativity-improvement programs in the past have concentrated solely on creativity heuristics—"tricks" that individuals can use in approaching problems. The componential framework, however, delineates a number of

different avenues that may be explored: the improvement of domain-relevant skills, including both factual knowledge and technical skills; training in productive work styles; the removal or diminution of salient extrinsic constraints in the social environment.

Although it is important to identify any enduring personality dispositions that appear consistently in persons who produce creative work, it can be argued that the strong emphasis on personality in creativity research has fostered a set of restrictive conceptions about creativity and a neglect of some important variables. An exclusively trait-oriented approach to creativity carries with it the implicit assumption that creativity cannot be altered and, moreover, that creative persons can produce creative work in virtually any domain (cf. Feldman, 1980). If creative behavior depends only on a general central core of personality dispositions, it should be as difficult to modify as any other personality-dependent behavior, and it should be expressed quite broadly. Moreover, we would not expect much variability in the creative production of people identified as creative; they should consistently produce creative work in a wide variety of domains.

Certainly, this narrow view is more extreme than that expressed by many personality theorists, but elements of this perspective have long been implicitly or explicitly present in much of the creativity literature. An application of the componential framework to creativity research can serve to broaden current conceptions of creativity. It suggests that, rather than focusing solely on the characteristic personality traits of outstandingly creative individuals, researchers might more profitably view creativity as a process (evidenced by products) that can be influenced by both internal and external factors—by cognitive skills, work habits, and social-environmental variables—as well as by personality dispositions. In so doing, this framework can facilitate both the development of an empirical social psychology of creativity and the integration of social-psychological conceptualizations with the insights of cognitive and personality psychology.

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### Manuscripts Accepted for Publication in the Section Personality Processes and Individual Differences

- Transitional Object Attachments in Early Childhood and Personality Characteristics in Later Life. Keith N. Cohen (Cognitive Therapy and Diagnostic Service, 169 Grove Street, Wellesley, Massachusetts 02181) and James A. Clark.
- The Illusion of Control for Self and Others in Depressed and Nondepressed College Students. David J. Martin, Lyn Y. Abramson (Department of Psychology, University of Wisconsin, 1202 West Johnson Street, Madison, Wisconsin 53706), and Lauren B. Alloy.
- The Dimensionality of Self-Esteem: II. Hierarchical Facet Model for Revised Measurement Scales. James S. Fleming (Department of Psychology, California State University, Northridge, California 91330) and Barbara E. Courtney.
- Personality Dimensions Through Trait Inferences. Dean Peabody (Department of Psychology, Swarthmore College, Swarthmore, Pennsylvania 19081).
- Ego-Identity Status, Personality, and Social Influence Style. Doris Read, Gerald R. Adams (Department of Family and Human Development, Utah State University, Logan, Utah 84322), and William R. Dobson.
- On Penetrating the "Mask": The Role of Sagacity and Acumen in a Word-Association-Clinical-Judgment Task. Stephen J. Dollinger (Department of Psychology, Southern Illinois University, Carbondale, Illinois 62901) and Alice L. Riger.
- The Contagion of Self-Focus Within a Dyad. Blair Stephenson and Robert A. Wicklund (Department of Psychology, University of Texas, Austin, Texas 78712).
- Muscular Strength and Mental Health. Larry A. Tucker (Department of Health Science, New Mexico State University, Box 3HLS, Las Cruces, New Mexico 88003).
- Motivation, Model Attributes, and Prosocial Behavior. John P. Wilson (Department of Psychology, Cleveland State University, Cleveland, Ohio 44115) and Richard Petruska.
- Sex Role Identity and Gender-Stereotyped Tasks in the Development of Learned Helplessness in Women. Donald H. Baucom (Department of Psychology, University of North Carolina, Chapel Hill, North Carolina 27514) and Pamela Danker-Brown.
- Conceptual Systems and Holland's Theory of Vocational Choice. Anne E. Winchell (Student Services, Kingsborough Community College, Oriental Boulevard, Manhattan Beach, Brooklyn, New York 11235).
- The Effects of "Severe" Daily Events on Moods. Arthur A. Stone (Long Island Research Institute, State University of New York, Stony Brook, New York 11794) and John M. Neale.