

## Primary Process Thinking and Creativity

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Psychoanalytic theory as a cognitive psychology is a flexible and powerful tool in understanding such a complex phenomenon as creativity. The creative act can be conceptualized as a special form of interaction between primary and secondary process thinking in which a novel idea or insight is generated by the loose, illogical, and highly subjective ideation of primary process and is then molded by secondary process into a context that is socially appropriate and meaningful to others. Although research evidence demonstrating that creativity is determined by the amount of primary process participation is weak, the evidence does reveal how creative ability is related to the extent to which secondary process initiates an integrative control over primary process manifestations. The distinction between scientific and artistic creativity is discussed. Also discussed is how some creative styles may rely on the direct access of secondary process to primary process thinking, whereas other styles may involve the use of special secondary process functions that are derived from primary process in the course of development.

Although its impact in the field of psychopathology is unquestionable, psychoanalytic theory is also a psychology of cognition, with the concepts of primary and secondary process as its two most basic principles. The distinction between these two mental functions originated with Freud (1900/1933, 1895/1958, 1911/1958) but was later clarified and expanded by Rapaport (1950, 1951, 1957, 1959, 1960). Primary process thinking, which is generally unconscious and traditionally considered to be more primitive than secondary process thinking, operates in accordance with the pleasure principle. Its aim is therefore the immediate discharge of drive tension through the manipulation of large quantities of psychic energy. For this reason, it serves an important role in the regulation of drive and affect. Rapaport (1950) in fact described primary process as a drive organization of memory,

since all objects, images, and experiences are organized according to their relationship to some instinctual tension. Besides these drive-related components, which traditionally have been called *content* primary process, there are also those operations designated as *formal* primary process. In the organization of memory, all cathexes are freely displaced, or "mobile," in that an idea and its cathexes are easily parted. Memories and experience are relatively equivalent to each other and easily interchanged. The manipulation of these mobile cathexes accounts for the various cognitive operations subsumed under the formal primary process category, including (a) the symbolization of one object by another, the whole by the part or the part by the whole; (b) the displacement of affect associated with one object to another; (c) the condensation of affects or meanings into one symbol; and (d) loose associations and deviant forms of reasoning typical of autistic logic. Therefore, primary process thinking is essentially metaphoric, since it ignores distinctions and equates anything with anything else, even when only a rudimentary similarity exists; the associative process emphasizes the rule that "a

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this is a that" rather than the more realistic "a this is *like* a that" (Rogers, 1978).

Secondary process thinking, rather than being oriented around drives and affects, is a conceptual organization of memory (Rapaport, 1950). Ideas and concepts are interrelated independently of their relationship to instinctual tensions. This alternate structure of memory has its origin in early development, when the reality principle supplants the pleasure principle in guiding behavior and thinking becomes logical, practical, and realistic rather than impulsive, as in primary process (Hilgard, 1962). The quantity of psychic energy manipulated by secondary process is also relatively small, as compared with that in primary process thinking, so that affect is restricted and controlled. Cathexes are also bound rather than mobile, so that representations achieve permanence and differentiated value. An object stands for itself and is not easily represented by another.

More recent reformulations of the concepts of primary and secondary process have challenged some of these traditional ideas. Primary process may not be a primitive or infantile mode of thought that is gradually replaced by secondary process but may, like secondary process, develop over time out of infants' need to organize their perceptual world and to integrate their needs with the environment (Holt, 1966a). All perceptual input and memories are organized around subjective criteria in that they have meaning only in regard to their relation to the subjective states of drive, need, and affect that constitute the individual's sense of self. Therefore, as Noy (1969) stated, all memories and experiences are assimilated into "self-nuclei" organizational units. Primary process is therefore an egocentric or narcissistic organizational mode—one that often stands in contradiction to reality—but at the same time it maintains the sense of self-identity and self-continuity in the face of an ever changing external environment. In its attempt to bring experience into a syntonic relationship with the self, primary process serves a primarily synthetic function that is necessary in the development of the individual.

Secondary process, rather than being self-oriented, is directed more toward the en-

counter and mastery of the external world. Memories are organized according to perceived relationship of objects to one another rather than to the self. For this reason, Noy (1969) stated, secondary process relies on continuous feedback from the environment in guiding and correcting its operations—a feedback system that is not necessary for primary process. During sensory deprivation, secondary process thinking does in fact decrease in efficiency, whereas primary process then intrudes into consciousness (Goldberger & Holt, 1958; Goldfried, 1960; Kubie, 1961). However, under normal conditions, primary and secondary processes do coordinate their efforts in maintaining self-identity and in adapting to the environment.

Since they are important components of the psychoanalytic theory of cognition,<sup>1</sup> the concepts of primary and secondary process have been applied in many areas of research, including studies of mental health and psychopathology, dreams, sensory deprivation, and religious and drug-induced experiences. This article examines these concepts as they have been applied in studies of creativity. Any such study, psychoanalytic or otherwise, is fraught with difficulties due to the complexity and ambiguity of the concept of *creativity*. The range of behaviors that can be described as creative is vast, including innovative thinking in various fields of art and science and creative problem solving in general. In defining the creative act, one must also consider the psychological, social, and historical contexts in which it occurs.

Despite these complexities, the concepts of primary and secondary process have been useful conceptual tools in both theory and em-

<sup>1</sup> Other theorists have also discussed differences in cognitive styles analogous to the primary/secondary process distinction. Piaget (1955) and Werner (1957) both distinguished between "primitive" and "mature" levels of cognition. Earlier, Bleuler (1912/1951) had coined the term *autism* to describe the highly illogical modes of thought that deviate from the typical realistic thinking of everyday life—a distinction described by McKellar (1972) as the A-thinking/R-thinking dichotomy. In his work on daydreaming, Singer (1966) similarly contrasted fantasy and reality-oriented thought in terms of the concepts of primary and secondary process.

pirical research. The secondary process ability to access and control the loose associations intrinsic to formal primary process can account for the shifting between diffuse and integrative cognitive styles and for the synthesis of remote or apparently inconsistent ideas that have been attributed to many forms of creativity (Barron, 1964; Mednick, 1962). Secondary process access to and control over content primary process can in addition account for how drive-related affect is incorporated into a creative work, as in art and literature.

However, a qualification is in order. Although primary process is used in creativity, this does not mean that it appears only during creative thinking. All cognitions, including dreams, fantasies, and everyday thought, involve varying degrees of interaction of primary and secondary process. As Holt (1966b) suggested, primary process and secondary process are themselves ideal types that never exist in a pure form. When considered from a dimensional framework (Hilgard, 1962), they may be placed at opposite ends of a continuum in which various cognitive processes, including dreaming and waking thought, fall at different points between the two poles and represent varying fusions of primary and secondary process characteristics.

The specific purpose of this article is to evaluate the efficacy of the primary/secondary process distinction as a conceptual tool in understanding the various forms of innovative thinking that can be described as creative. This evaluation includes a historical review of the theoretical speculations about creativity and an examination of the empirical research that has attempted to confirm these theoretical notions.

### Theory

#### *Freud and the Problem of the Special Talent*

Although Freud devoted several of his works to an analysis of various artists and writers, his ideas concerning creativity were never integrated into any systematic theory. He admired artists' special insight and attributed it to a heightened sensitivity that enabled them to apprehend their own intrapsychic processes more readily than the ordinary indi-

vidual. The artist, like anyone else, has unconscious conflicts rooted in early psychosexual development but differs in his or her unusual ability to access these unconscious tensions and to achieve gratification through the imaginative mixture of fantasy and reality. The creative process is therefore analogous to the daydream that also expresses unfulfilled wishes originating in early childhood experiences. However, Freud (1920/1953) noted an important difference between the ordinary daydream and the artist's creative act:

To those who are not artists the gratification that can be drawn from the springs of phantasy is very limited; their inexorable repressions prevent the enjoyment of all but the meagre day-dreams which can become conscious. A true artist has more at his disposal. First of all he understands how to elaborate his daydreams, so that they lose that personal note which grates upon strange ears and become enjoyable to others; he knows too how to modify them sufficiently so that their origin in prohibited sources is not easily detected. Further, he possesses the mysterious ability to mould his material until it expresses the ideas of his particular phantasy faithfully; and then he knows how to attach to this reflection of his phantasy so strong a stream of pleasure that, for a time at least, the repressions are outbalanced and dispelled by it (pp. 384-385)

Here Freud conceptualized creativity as a sublimatory process in which repressed affect associated with intrapsychic conflict could be discharged. This suggests that unconscious conflict is itself a prerequisite for creativity—an idea often exaggerated into the popular notion that misery is a necessary adjunct of artistic talent. But in the previous quotation and in his comments concerning wit (1905/1958) and poetry (1908/1958), Freud also proposed ideas about the nature of the creative process itself—ideas later extended by Kris (1952) in his theory of regression in service of the ego. Freud suggested that artists are able to elaborate their private unconscious thoughts into a form that is communicable and meaningful to others. This is an ego-syntonic cooperation between unconscious and preconscious processes in which once repressed impulses operate in harmony with the controlling tendencies of the ego (Freud, 1915/1958). In his analysis of da Vinci, Freud (1910/1958) attributed this special talent of the artist to exceptional control of the re-

gressive and sublimatory processes but at the same time placed the study of creativity beyond the scope of psychoanalytic inquiry by describing this talent as constitutionally derived:

Instincts and their transformations are at least the limit of what is discernible by psycho-analysis. We are obliged to look for the source of this tendency toward repression and the capacity for sublimation in the organic foundations of character on which the mental structure is only afterward erected. Since artistic talent and capacity are intimately connected with sublimation, we must admit that the nature of the artistic function is also inaccessible to us along psychoanalytic lines. (p. 136)

Although Freud often restated this opinion concerning the unanalyzable nature of artistic talent (Freud, 1928/1958, 1930/1958, 1933/1958), his position should not be interpreted as a rejection of any psychoanalytic investigation of creativity. He often emphasized the need for exploring the motives and circumstances underlying the creative act. Nevertheless, he did indeed place limits on the efficacy of the psychological study of the creative process.

*Regression in Service of the Ego: A Theory of the Creative Process*

Freud's reservations concerning the artist's special talent undoubtedly instilled in researchers some reluctance to study the creative process. However, with the rise of the neoanalytic revisions of psychoanalytic theory, interest in investigating the creative process was revitalized. Hartmann's (1956) description of the nonconflictual sphere of the ego and Kris's (1952) application of similar concepts to the study of creativity were particularly important contributions to this movement. Unlike Freud, these researchers underplayed the role of intrapsychic conflict and sublimation of instinctual impulses in creativity and instead shifted emphasis to the concept of autonomous and conflict-free ego functions. In his theory of regression in service of the ego, Kris described this autonomous function as the ego's ability to regress to unconscious thought processes specifically for the purpose of using unconscious affects and fantasies in producing a creative work. This is a

partial, temporary, and controlled lowering of the ego's function that promotes adaptation, hence the equivalent term *adaptive regression*.

According to Kris (1952), regression in service of the ego involves two phases. In the *inspirational* phase, the countercathetic energies that restrain unconscious ideations are removed, resulting in a regression to primary process thinking. This breakdown of the barrier against the unconscious, resulting in the emergence of primary process into consciousness, is sometimes experienced as an intrusion from the outside, hence the term *inspiration*, suggesting the influence of forces external to the self. Through this regression, the person gains access to the illogical and unmodulated affects, ideas, and images of the unconscious. Also at an individual's disposal for the purpose of artistic creation are the formal components of primary process, including condensation, displacement, and symbolization.

During the *elaborational* phase, the countercathetic barrier is reinforced and the ego restored to its former position of strength. The reality principle is reinstated to subject the private, perhaps unintelligible, primary process content to critical scrutiny, selection, and synthesis. Only through this careful reworking by secondary process can the insights generated through primary process be meaningfully incorporated into the creative work and communicated to others.

The movement between these two phases may be rapid, oscillating, or distributed over long periods of time. Creativity therefore lies along a continuum measured in the degree of intensity of primary process manifestation and in the amount of secondary process control required to integrate those manifestations into the final product. A distinction can be made between the acute creative experience, in which the creative idea suddenly leaps into mind in a nearly complete, fully integrated form, and the more common sustained creative effort, in which the final product arises from enduring conscious work with only small and infrequent regressions to primary process insights (Bellak, 1967). However, in all cases, the artistic work produced acquires its creative value because it is overdetermined. Since the creative work is rooted in primary process thinking, it is, like the



dream, an emotionally charged symbol in which a multiplicity of ideas, affects, and meanings have been focused.

In accounting for how an insight may suddenly leap into consciousness in either a partially or fully synthesized form, several theorists have hypothesized the existence of various preconscious thought processes (Fischer, 1954; Kris, 1952; Kubie, 1958). These preconscious functions are responsible for the reworking of primary process content outside of the boundaries of awareness. Passing beneath the counterathetic barriers of consciousness may in fact be essential in subjecting a problem to primary process thinking (Bush, 1969). The preconscious is perhaps the arena in which primary and secondary process converge and in which creativity is maximized, as unconscious illogic and fantasy are counterbalanced by the demands of the reality principle.

#### *Criticisms and Revisions of the Adaptive Regression Concept*

Although acknowledging the role of primary process in creativity, several theorists have placed greater emphasis on the reality-oriented functions of the ego (Bush, 1969; Corbin, 1974; Giovacchini, 1960, 1971). In both art and science, specific rules and standards dictating what a meaningful achievement is must be fulfilled. Applying these technical requirements during the creative act necessitates the optimal energizing of the reality-testing processes. There is therefore an expansion of the ego's capabilities, including the enhancement of its synthetic functions, as well as the widening of the span and depth of sensory sensitivity (Greenacre, 1971; Rosen, 1960).

This greater emphasis on ego functions has led to the question of whether *regression* is an appropriate term in describing the creative process. In his analysis of research scientists, Giovacchini (1960) did not find it possible to distinguish between an inspirational phase, in which the ego regresses, and an elaborational phase, in which it is again reinforced. The higher order secondary processes instead seemed to function simultaneously with primary process. Similarly, Bush

(1969) stated that there is no detour through regression toward adaptation that involves a suspension of advanced reality-oriented functions but there is rather a direct reinforcement of the ego that advances the level of psychic functioning to a new peak. This indicates not a regression in the ego's functions but rather a progression (Ehrenzweig, 1962; Schachtel, 1959). According to Bellak (1958, 1967), if regression occurs at all, it involves only portions of the ego but not the ego as a whole. The synthetic ego functions responsible for the assimilation of primary process must remain fully effective or perhaps even rise to optimal levels. The ego functions that do momentarily regress are those responsible for the selective and convergent thought processes that narrow the range of cognition and perception. Rather than viewing the ego as an entity that regresses, Bellak suggested, we should explore how different ego functions interact at different levels of efficiency.

Many of the issues raised by these criticisms of the adaptive regression concept are useful, but an extended discussion of them could lead to the fruitless splitting of metapsychological hairs. Basic to all of these arguments is one essential idea. Certain forms of creativity involve the *access* of secondary process to primary process thinking. By describing this as a regression in service of the ego, we are conceptualizing the event based on a structural model and on the traditional assumption that a shift to primary process is a regression to a more primitive cognitive style.

But there are alternatives to this conceptualization. If emphasis is shifted from a structural model to one that stresses psychoanalytic theory as a cognitive psychology, then primary and secondary process can be studied independently of their hypothesized relationship to id, ego, and superego structures. We also do not have to assume that primary process is necessarily more primitive than secondary process but rather, in accordance with more recent reformulations of psychoanalytic theory (Holt, 1966a; Noy, 1969), that primary process develops and changes over time as does secondary process. The concept of a regression to the developmentally more infantile primary process could therefore

be discarded.<sup>2</sup> In its place, primary and secondary process can be studied as relatively independent cognitive functions that interact in various ways. Rather than viewing a secondary process regression to primary process as a component of some creative acts, we may instead describe the interaction of these cognitive functions as an access of secondary process to primary process. It is this concept of an access, rather than a regression, that is emphasized in this article. However, the term *regression* is used often, since most of the research on creativity has been based on the traditional concept of a regression in service of the ego.

Another important theoretical question is whether all forms of creative thinking necessarily involve a direct access or regression to primary process. In his discussion of scientific creativity, Bush (1969) criticized the historical tendency to make this assumption. He noted how secondary process thinking is usually identified with verbal, logical, reality-oriented thought, whereas primary process is equated with perceptual, symbolic, illogical fantasy. Based on this assumption, many researchers believe that thinking that involves symbols or perceptual elements is to be taken as *prima facie* evidence for regression from a more advanced level of psychic functioning to a more primitive one. According to Bush, this is an invalid conclusion, since symbolism and imagery can become special secondary process faculties:

While perceptual and symbolic thought developmentally precede verbal thought (and hence constitute evidence of a temporally regressive mode of thinking), they may nevertheless be coordinated with highly advanced conceptual structures in a stabilized cognitive faculty so that they become the most progressive and adaptive form of reality thinking. . . . A developmentally primitive aspect of thinking which becomes elaborated into a highly adaptive and stable feature of reality testing and reality thinking enters into the creative act not as a regression in service of the ego, but as a special secondary process faculty. (pp. 181-182)

Here Bush suggests that a distinction be made between creativity involving a direct access to primary process and creativity involving those cognitive processes constructed through the permanent integration of primary process styles into stable secondary process

functions. This is the same distinction discussed by Noy (1969, 1972) in his revision of the psychoanalytic theory of primary and secondary process. Secondary process, which is concerned with the encounter and mastery of reality, is a logic-determined system that requires conscious monitoring through feedback from the environment. Primary process, on the other hand, does not require external feedback in guiding its operations but rather organizes all perceptual input and memories around subjective criteria of drive, need, and affect. It is a self-centered organizational mode that shuns reality-oriented adjustment, but it also helps to maintain the sense of self-identity and self-continuity. Noy distinguished this highly subjective, unconscious primary process from those aspects of primary process thinking that in the course of childhood development are integrated into the logical, feedback-monitored system of secondary process. Some of this integrated primary process retains its illogical quality, as in fantasy and daydreams. External feedback then serves mainly to keep it dissociated from other reality-oriented processes so that it does not interfere with their activity. Other aspects of primary process are thoroughly integrated into the secondary process system and are remolded in terms of reality and logic in a manner similar to that described by Bush (1969). Noy suggested that this integrated primary process serves as the basis for many forms of creative talent but also noted how the "old programs" that resist the developmental incorporation into the secondary process system may similarly reveal themselves indirectly in jokes and art, as well as in dreams and various forms of psychopathology.

Psychoanalytic theory therefore provides two general explanations of the creative pro-

<sup>2</sup> It may be wise to compromise on this point in the light of Noy's (1969) distinction between unconscious content, which refers to repressed affects and ideas locked into an infantile pattern of organization, and unconscious functions (such as condensation and displacement), which are not primitive, frozen, and unchanging but develop over time. The term *regression* may be applicable in describing the access to these content components but may be inappropriate concerning the use of unconscious functions.

cess. Traditionally interpreted, the creative process involves a temporary but direct access or regression to primary process thinking for the purpose of using that ideation in generating creative insights. The control and synthesis of primary process by the reality-oriented secondary process is essential in this creative act. However, revisions of this traditional interpretation indicate that creativity may also be mediated by those cognitive activities that are derived from the permanent incorporation of primary process styles into stable secondary process operations—an incorporation that probably occurs during early development.

The question then is which types of creativity rely on these two different cognitive functions. One temptation is to use them to distinguish artistic and scientific creativity. Creativity in art and literature often requires the expression of affect through the exploration of the self and the forces that move it. In producing a truly artistic work, one must therefore gain access to primary process thinking in which ideas are exclusively organized according to subjective states of drive and affect. On the other hand, science is usually more concerned with complex, affectively neutral problems that pertain more to objective conditions than to subjective states of drive and emotion. For this reason, the direct access to primary process should not be essential in innovative scientific thinking. Although unconscious factors may underlie a scientist's motivations or predispositions in choosing a certain field of work, the direct participation of primary process in the creative process is likely to lead to invalid and distorted scientific ideas (Bush, 1969). Scientific creativity may therefore depend more on those cognitive structures derived through the permanent integration of primary process into stable secondary process functions. These cognitive structures permit the flexibility and versatility of thought that are necessary for transcending traditional concepts in search of new models.

Although conceptually useful, this separation of artistic and scientific creativity is also artificial and misleading. Art and science both contain many different fields of study, and there is no reason to believe that all of the

talents classified as artistic are qualitatively equivalent to each other and qualitatively distinct from all types of scientific talent. In addition, within all types of artistic and scientific work, there are numerous gradations of creative ability, ranging from the clever novice to the iconoclastic genius. One must therefore hesitate in associating all artistic creativity with the direct access to primary process and all scientific creativity with those special secondary process functions derived from primary process.

### Empirical Research

Research on creativity based on psychoanalytic concepts has not been extensive. Most of the empirical studies that have been conducted are scattered over the past 20 years. This lack of systematic, focused research is in part due to the many difficulties encountered in studying creativity. Defining and identifying the creative individual is mandatory, and many tests of creativity have been developed; but there is still no general consensus regarding what measure is most useful or valid. This problem is a result of the difficulty in establishing criteria for validating such tests and in distinguishing proposed creativity measures from other measures of various cognitive processes, such as intelligence. As Bellak (1958, 1967) stated, there are also those issues concerning the validity of the experimental method in general. For instance, the creative person is usually inspired or "moved" to create; but in the experimental setting he or she is "required" to do so. Creativity may also be a stable variable in some people at all times and in relation to all stimuli, but for others it may be sporadic and situation specific. Assessing it in some people at certain times or with certain tests may therefore be problematic.

Despite these difficulties, the empirical study of creativity has had a long history. Projective tests in particular have been praised for their usefulness in such research, since the ambiguous test stimuli facilitate the expression of primary process material but at the same time require a rational, synthetic reworking of that material in accordance with reality demands (Bellak, 1958; Schafer, 1958).

The earliest investigations that used projective tests were Rorschach case studies concerned with the types of responses most frequently given by creative people (see Burckhard, 1952). However, the greatest impact on research was the Rorschach scoring system, developed through Holt's (Holt, 1956, 1960, 1966b, 1970; Holt & Havel, 1960) ambitious efforts. This system assesses the extent and type of primary process thinking within the protocols as well as the extent to which these primary process manifestations are integrated into an adaptive and stable context. A response is coded as a content primary process manifestation if it contains libidinal or aggressive elements of a blatant (Level 1) or symbolic (Level 2) nature. A response is coded as a formal primary process manifestation if it involves deviations from logical or linguistic norms.

Three general scores are used in Holt's system. Defense demand (DD), a summary score of both the formal and content manifestations, reflects the extent to which responses incorporate primitive drive content and/or deviate from logical, realistic thinking. Defense effectiveness (DE) assesses the degree to which drive-laden, illogical thinking is integrated into a realistic and appropriate framework. The adequacy of the integration is expressed in the degree to which responses match the property of the card, in the extent to which they are placed in a culturally or socially acceptable context, and by whether the person experiences pleasure or anxiety in giving the responses. Finally, the adaptive regression (AR) score is derived from the mathematical synthesis of DD and DE and reflects the overall degree to which drive content and illogical thinking are expressed in an adaptive form.

Because Holt's system assesses both the extent to which primary process is manifested and the degree to which those manifestations are controlled by secondary process, it has been particularly useful in testing the various theoretical notions about creativity. In the sections that follow, I review those studies that have used various primary process assessment techniques derived from or analogous to Holt's system.

### *Projective Test Studies of Artistic Creativity*

The research techniques used in exploring the role of primary process in artistic creativity can be divided into two general categories. In one, subjects were chosen on the basis of their artistic reputation and were compared, in terms of primary process manifestations on a projective test, with people who were considered relatively unartistic. In the second category, similar projective test comparisons between artistic and unartistic groups were made, but creativity was instead defined by ratings of works that required artistic talent.

In one of the earliest studies that used the first method, Cohen (1961) found a greater total amount of primary process expressed in the Rorschach protocols of art students chosen by their professors as being highly creative than in a control group of students randomly selected from the remainder of the art school population. Although this difference was reduced to nonsignificance when response productivity was controlled, an analysis of the protocols using a measure analogous to Holt's AR dimension did reveal a greater reality-oriented control of drive-related content among the more creative group. Dudek (1968) similarly found more primary process expressed in the protocols of successful sculptors, painters, and writers than in those of unsuccessful artists engaged in commercial ventures and of a noncreative control group—results she considered analogous to those of Myden (1957). However, unlike Cohen, Dudek did not control for response productivity. Also, there was no measure of the extent to which primary process was controlled, although there was anecdotal reference to how the unartistic subjects experienced anxiety and a disintegration of defenses while expressing drive content, whereas the artists did not.

In a study in which response productivity and the control of primary process were considered, Pine (1962) found that a group of unemployed actors produced more primary process on the Rorschach, with significantly less variance, than did a group of male and female undergraduates. Contrary to expectations, however, the actors gave a significantly smaller percentage of well-controlled responses.



This result was explained in terms of the actors' specific talents, which involve fitting their own expressiveness into a structure that is partially constructed by others, such as a writer or director. This formal structure therefore supports their weak control over their easily expressed primary process.

Hersch (1962) studied schizophrenics, eminent artists, and noncreative normals in the context of Werner's (1957) developmental theory. Similar to the psychoanalytic concept of creativity, this theory states that a creative person is able to use cognitive processes at different developmental levels, as evident in his or her ability to shift between primitive cognitive styles that are characterized by diffuse, unmodulated thinking and more mature cognitive styles in which integrative processes predominate. Rorschach protocols of the three groups were scored using a system based on Werner's theory (Phillips, Kaden, & Waldman, 1959), with the results revealing the artists' greater availability of both mature and primitive cognitive processes as compared with the normals. The schizophrenics, however, were limited to primitive thought processes with little use of the more mature integrative functions. In psychoanalytic terms, the artists were apparently more able to use primary process by subjecting it to the integrative control of secondary process. Noncreative normals lacked this special access to primary process, whereas the schizophrenics, lacking in the appropriate secondary process control, were overwhelmed by their primary process ideation.

In other studies, creativity was operationally defined by one's talent in constructing narratives. Pine (1959) rated the Thematic Apperception Test (TAT) protocols of undergraduate students for literary quality, based on variety in sentence structure, time perspective, vocabulary, characterization, unity, and originality. Correlations of the literary quality scores with measures of drive expression and control revealed similar results for males and females. Subjects who produced stories of high literary quality expressed more drive content in total and a higher proportion of drive content that was well integrated into the major context of the story. Subjects who produced low-quality

stories used less drive content in total and/or a relatively greater proportion of drive content that was extraneous to the narrative. Pine and Holt (1960) later found that for males TAT literary quality was again positively correlated with the control of primary process, as reflected in Rorschach DE and AR scores, but was not related to the amount of primary process manifested (DD). For females, literary quality was correlated with DD but not with DE or AR. In Pine's (1962) study, the actors' creativity scores on the TAT were unrelated to all Rorschach scores, although, as previously mentioned, they produced more primary process content on the Rorschach than did the undergraduate students and also fewer well-controlled responses. Since the actors could so readily express primary process, minor variations in this expression were not significant predictors of variations in the quality of their TAT stories. By contrast, in the well-controlled student group, the differential capacity to open up expressively but with control was a significant predictor of TAT story quality.

Creativity has also been operationally defined by one's ability to draw or paint. For example, Silverman (1965) analyzed the verbalizations of children in the process of painting four pictures. Creativity scores, based on artists' ratings of the pictures, were positively correlated within subjects with the amount of controlled primary process manifested in these verbalizations. Other studies have shown that for males the control of primary process on the Rorschach is also more highly correlated with drawing ability than the amount of primary process expressed, whereas for females there are no significant correlations at all (Pine & Holt, 1960; Rogolsky, 1968). However, females chosen by their reputation for artistic creativity have manifested in their drawings more strange and unrealistic elements typical of formal primary process than a comparable control group, although there were no differences in terms of drive-related primary process (Schaefer, 1972).

In summary, some of these projective test studies have confirmed the theoretical notion that artistic people have a greater access to and expression of primary process, whereas others have not. The research defining creativ-



ity by task performance has been particularly contradictory in this respect, perhaps because the range of creative talent assessed was limited. Those studies that defined creativity according to reputation have been more successful, particularly those of Pine (1962) and Hersch (1962). The other studies in this category would have confirmed this relationship between primary process expression and creativity, if not for the confounding due to response productivity. Nevertheless, it is possible that controlling for productivity may actually result in the elimination of a potentially significant indicator of creative thinking. Wallach and Kogan (1965) have shown that both content uniqueness and productivity in responding are important characteristics of creativity. Productivity also significantly accounts for correlations between measures of creativity and primary process expression, as well as for the variance of scores on these measures (Gray, 1969). Response productivity may not be an artifact to be totally eliminated but may instead reflect flexible thinking—perhaps due to primary process influence—that should be assessed in some way.

The problem in confirming the greater expression of primary process among creative individuals has several origins. Not all forms or degrees of artistic creativity necessarily involve an equivalent access to primary process. Sex may also be an important moderator variable, as several of these studies have indicated. Finally, measures of primary and secondary process may still be unrefined. For example, nonsignificant differences in primary process expression between creative and uncreative groups may be due to the composite scores that combine both formal and content aspects of primary process. When assessed independently, formal and content manifestations may yield different correlations with creativity in general and with specific types of creativity. In fact, Holt (1966b) found significant differences between creative and uncreative subjects based on content primary process alone, when previous analyses combining content and formal aspects into summary scores were nonsignificant. Correlations between drive expression and literary quality of stories on the TAT (Pine, 1959) similarly

confirm the theoretical notion that some forms of artistic talent specifically require an access to the affective and drive-related components of primary process.

Regardless of these problems concerning the amount of primary process expressed, most of these projective test studies provide evidence that the *integrative control* of primary process is an important aspect of creative thinking. Being artistically creative therefore requires the use of secondary process in shaping primary process material into an appropriate and meaningful context.

#### *Projective Test Studies of Problem-Solving Ability*

Although problem solving differs from creative thinking, since it is a convergent cognitive process in which a specific solution to a specific problem is sought, there are similarities between the two. Problem solving requires the cognitive generation of alternatives in search of an appropriate solution. As in creative thinking, familiar patterns and relationships must be transcended so that elements can be rearranged into new patterns that satisfy the requirements of the problem. In studying problem-solving ability, researchers have often selected tasks of considerable organizational complexity in which the capacity to work with large masses of data is essential. To successfully complete the task, one must be able to distinguish the relevant from the irrelevant and to create and test models until a solution is discovered.

Blatt, Allison, and Feirstein (1969) administered to a group of male graduate students a series of complex, logical tasks known as the John-Rimoldi Problem Solving and Information Apparatus (PSI). Correlations of Rorschach DD scores with problem-solving efficiency scores on the PSI approached zero. The results were also nonsignificant when the amount of content and formal primary process expressed were separately correlated with the PSI scores. However, DE did correlate highly with the PSI scores, especially when based on total content primary process.

These results must be compared with those derived from the studies of artistic creativity. Although the expression of primary process

may be important to some artistic talents, it is apparently not related to complex problem solving. The authors noted this discrepancy and suggested that perhaps problem solving on the PSI is not entirely comparable with what is usually considered creative thinking. Although the task required the ability to integrate complex elements, it did not necessitate the use of highly imaginative ideation. Creative functioning, however, frequently requires both the ability to generate ideas that are truly novel and often unconventional and illogical and the ability to synthesize these ideational complexities into a meaningful context.

If the amount of primary process expressed is truly unrelated to problem solving, why then was there a high correlation between PSI efficiency and the control of content primary process? The authors answer this question in terms of cognitive development. One task faced by the child is to learn to deal with cognitive complexity. This is accomplished through the mastery of complex experiences, as imposed by the environment, and by one's own affects, drives, and fantasies. The capacity to deal with drive derivatives and illogical thoughts is therefore an expression of a more general capacity to tolerate and master ambiguity of any kind. For this reason, subjects in the experiment who were able to impose integrative control over their drive-determined primary process, as indicated by their high DE, were also able to master the non-drive-related complexity inherent in the problem-solving task. On the other hand, the subjects who had difficulty in organizing and modulating their impulses were also likely to have difficulty when confronted with cognitive complexity even in a logical and impersonal task. This conclusion is supported by the research that demonstrates how efficient problem solvers score high on measures of orality—scores that reflect a receptiveness to experience, enabling them to encounter complex stimuli without a disruption of cognitive processing (Holt, 1966b; Von Holt, Sengstake, Sonoda, & Draper, 1960).

The ability to master ambiguity and complexity is, of course, not unique to problem solving but is also essential to all forms of creative thinking. Although the efficient prob-

lem solver must be able to cope with the complexities of some situation in the objective world, the artist must often be able to master the cognitive ambiguities imposed by the subjective drives and affects of primary process. Although efficient problem solvers may also demonstrate some control of such drives and affects, they do not necessarily have any special access to them; nor does their work require it. But as the trends in research evidence suggest, this special access to primary process may be crucial to artistic creativity.

Complex problem solving is also fundamental to scientific creativity and thus to the scientific process.<sup>3</sup> Creative scientific thinking requires the ability to tolerate cognitive complexity and therefore, like problem solving, may be associated with the capacity to control primary process manifestations. Unlike the artist, however, the scientist deals primarily with objective problems and therefore requires no exceptional access to the drives and affects inherent in primary process. Evidence suggests that scientists are often autonomous, wary of close interpersonal contacts and complex emotional involvements, and more concerned and involved in the world of ideas and things than in people (see Bush, 1969).

Although this conclusion may be valid for some forms of scientific creativity, it is by no means universal. In transcending traditional concepts that often obstruct insights into new ideas, creative scientists have often experienced imagery of an illogical and almost hallucinatory quality, bordering on primary process thinking (see Shepard, 1978). Scientists who have scored high on a creativity battery have as well demonstrated a greater integration of nonconscious concepts into consciousness, as compared with low-scoring scientists (Garwood, 1964). Pine (1959) also found that the ability to express as well as control drive content was significantly correlated with the quality of a scientific theory created to explain a problem related to sex; but when the problem was of neutral content, the correlation was nonsignificant. Pine concluded that scientific work pertaining to

<sup>3</sup> Problem-solving abilities assessed by such tests as the PSI can in fact predict success and productivity in scientific professions (see Blatt & Stein, 1959).

human drives—as in biology or psychology—would be disrupted by anxiety unless the scientist had access to and control over his or her own primary process impulses. When drives are not specifically implicated in the problem, the access to primary process is not necessary.

Although these results were not replicated in a later study (Pine & Holt, 1960), the overall conclusion is still an important one. Complex problem solving probably does not require a special access to primary process, but this access may be crucial to creative work in certain fields of science, as well as in many artistic endeavors.

#### *Primary Process and Objective Tests of Creativity*

Creativity can be operationalized in research by selection of individuals known for their talent or by ratings of performance on tasks that require creative abilities. However, operational definitions have also been based on scores on traditional objective tests of creativity. If such definitions are to be used in psychoanalytic research, the relationship of performance on these objective tests to the expression and control of primary process should be determined.

Guilford's (Guilford, Wilson, & Christensen, 1952; Guilford, Wilson, Christensen, & Lewis, 1951) assessment battery is probably the most popular of the traditional objective tests. The underlying assumption of these scales is that divergent thinking is a necessary component of creative thought. Although Pine and Holt (1960) found that for males DE and AR did correlate with two of these tests, there were no significant correlations for females. Other studies have also failed to reveal any significant relationship of various Guilford scales with the manifestation of primary process (Gray, 1968, 1969; Pine, 1962). In their discussion of such standard tests of creativity, Pine and Holt concluded:

We would argue . . . that primary process is not directly implicated in the production of responses to these tests, but rather that modes of expression and control of primary process (perhaps beginning in early childhood) become generalized as broad cognitive styles . . . which are reflected in all areas of

thinking. Thus, where tests require flexible and original thinking, and where the control style permits this, thinking can be flexible even apart from the (hypothesized) original relation of control directly to primary process thinking. (p. 377)

This conclusion is reminiscent of those theoretical ideas of Bush (1969) and Noy (1969) discussed earlier. Some forms of creative thinking may not require a direct access to primary process but may rely on cognitive processes created through the permanent integration of primary process styles into stable secondary process functions. The ability to think loosely, as required by tests of divergent thinking, is not necessarily a manifestation of primary process but may perhaps reflect cognitive faculties derived from primary process in the course of development.

Although performance on divergent thinking tests is probably unrelated to the expression of primary process, significant correlations with the control of primary process may be expected and may also make theoretical sense. As discussed earlier, the capacity to control primary process may reflect the more general ability to deal with cognitive complexity of any kind. This ability may be essential in dealing with cognitive ambiguities inherent in tests that demand loose or divergent thinking. For example, the Remote Associates Test (RAT), another popular creativity measure, requires one to think loosely to discover remotely associated ideas that together satisfy a specific requirement (Mednick, 1962). The upper range of scores on this scale have correlated significantly with restraint of drive content on the TAT (Martindale, 1972a). Therefore, the ability to cope with drive complexity on the TAT may have been the counterpart of the capacity to deal with the cognitive, drive-neutral complexity inherent in the loose thinking required by the RAT.

Other objective tests not typically associated with creativity have nevertheless been used in creativity research based on psychoanalytic principles. Gamble and Kellner (1968) assumed that a perceptual process, such as subordinating word reading to color naming on Card C of the Stroop Color-Word Interference Test, calls for a developmentally "primitive" cognitive function that is analo-

gous to primary process thinking, whereas symbolic cognitive activity, such as reading the names of colors on Cards A and B regardless of the background color, demands developmentally advanced functions that are typical of secondary process thinking. This assumption was supported by a previous finding that high-scoring subjects on Card C gave more primary process responses on the Rorschach than low-scoring subjects (Holt, 1960). The creative subjects in the Gamble and Kellner study proved to be superior in their performance on Card C but were equivalent to a control group of relatively uncreative subjects on Cards A and B. The authors concluded that the creative subjects had a greater access to primary process thinking but were still comparable with the uncreative subjects in their use of secondary process.

Wild (1965) similarly adapted the Object Sorting test for the assessment of primary process by developing a system for scoring the presence and control of unusual and drive-related responses on the test. In an unregulated condition, in which one was encouraged to think loosely and imaginatively, art students produced significantly more adaptive drive content and more drive content in total, as compared with teachers and schizophrenics, whereas the teachers and schizophrenics did not differ from each other (a result that was attributed to sampling bias). The art students therefore demonstrated a greater availability and control of primary process, as compared with the other groups. They were also more able to shift among the "unregulated" style, their natural or "spontaneous" way of thinking, and a cautious and conventional "regulated" style. These results similarly suggest an enhanced ability among creative people to cognitively shift between loose primary process and reality-oriented secondary process thinking.

Additional research that explores the influence of primary process on such objective tests is needed to expand the psychoanalytic model of creativity. Projective tests are at present the most popular and perhaps the most powerful means of assessing primary process manifestations; but our ignorance of how primary process influences performance on traditional creativity tests and other ex-

perimental cognitive tasks only hinders the growth of psychoanalytic theory as a cognitive psychology.

### *Hypnosis Studies*

Since hypnosis hypothetically involves a regression to unconscious processes (Gill & Brenman, 1959), one might expect that it could facilitate creative thinking. However, research findings have not generally supported this conclusion. Although there may be more primary process ideation for hypnotically susceptible subjects during hypnosis than in the waking state, there are apparently no significant differences in the integrative control of primary process as reflected in DE and AR scores (Fromm, Oberlander, & Gruenwald, 1970). On tests of divergent thinking, hypnotized susceptible subjects scored higher than un hypnotized subjects on only one of six measures in a test battery (P. Bowers, 1967) and also did not score any higher than hypnotized susceptible subjects simulating hypnotic trance (K. Bowers, 1968).

In one study that did demonstrate the enhancement of creativity during hypnosis, Gur and Reyher (1976) asked subjects to rely more on visual images than on verbal processes in responding to the Torrance Test of creativity, since earlier findings indicated that imagery is easily influenced by primary process (Reyher & Smeltzer, 1968). As compared with subjects who simulated hypnosis and with a waking-control group, the hypnotized subjects scored significantly higher on overall creativity and on the Figural subtest of the Torrance Test. The protocols of the hypnotized subjects also contained more drive content typical of primary process thinking. The authors concluded that there is an adaptive regression during both creative thinking and hypnosis and that hypnotic induction can enhance the creative process.

Although this point is still debatable, evidence does seem to suggest a significant relationship between hypnotic susceptibility and creativity. It is known that some people can more easily shift their thinking from reality-oriented styles to others that are more unregulated and imaginative (Fitzgerald, 1966; Wild, 1965). K. Bowers (1968) added that it is the



hypnotically susceptible person, as opposed to the unsusceptible one, who is more able to shift to unregulated, loose thinking and who is therefore more potentially creative. Hypnotically susceptible people do tend to report more unusual or regressive life experiences than do unsusceptible people (As, 1963; Shor, Orne, & O'Connell, 1962), and measures of hypnotic susceptibility do correlate with the so-called experience inventories that assess the frequency and intensity of the unrealistic, regressive experiences in one's daily life (see Hilgard, 1965).

To test this hypothesized relationship between creativity and hypnotic susceptibility, K. Bowers and van der Meulen (1970) administered a variety of creativity measures to both high- and low-susceptible subjects in hypnosis, simulation, and waking-motivated conditions. Within both the high and low susceptible levels, there were no significant treatment or interaction effects, since the hypnotized, simulating, and waking-motivated subjects performed equally well on the tests. However, the susceptible subjects as a whole scored significantly higher on the creativity measures than did the unsusceptible subjects.<sup>4</sup> More recent evidence (P. Bowers, 1979) further supports this hypothesized relationship between hypnotizability and creativity.

An enhanced sensitivity to hypnotic induction may therefore reflect a propensity for tapping the primary process thinking that can enhance creativity. Whether this susceptibility includes or is independent of the capacity to impose integrative control over primary process—which is also necessary for creative thinking—is still an unresolved issue.

#### *Physiological Correlates of Creativity*

Studies of the physiological correlates of creativity have often been based on the more general research concerned with the physiological components of attention and cognition. K. Bowers and Keeling (1971), for example, found that subjects who scored high on a variety of creativity measures manifested a greater heart rate variability than did uncreative subjects. Since attention to the environment is usually accompanied by heart rate deceleration and a concern for internal cogni-

tions by heart rate acceleration (Lacey, 1967), the authors concluded that the greater heart rate variability for the creative subjects indicated their rapid cognitive shifts between reality-oriented cognition and more imaginal, inner-directed ideation. The authors found support for this conclusion in Blatt's (1961) finding that efficient problem solvers on the PSI showed a greater increase in cardiac rate variability during the test than did inefficient problem solvers. However, it should be noted that Blatt was concerned more with complex problem solving than with creative thinking. Despite the similarities in physiological responsiveness revealed in these two studies, different cognitive processes were probably being evaluated.

Martindale (1971, 1972b) in particular has devoted much of his work to an analysis of the physiological components of creativity. He too cited previous research indicating the relationship between levels of arousal and various attentional states. For example, Osgood (1960) applied Hullian theory to the study of creativity and concluded that since high drive levels make dominant responses in a hierarchy more probable—thereby making response patterns more rigid—the flat associative gradients and tendencies to produce remote associates typical of creative thinking imply that it is mediated by states of low drive. High arousal would therefore heighten concentration, attention, and convergent styles of thinking, whereas low arousal would enhance diffuse, unfocused, and divergent cognitions. In terms of psychoanalytic theory, these ideas suggest that different levels of arousal may be associated with primary and secondary process thinking. Rapaport (1957) in fact considered the continuum from alert concentration to fantasy and dreaming as paralleling the secondary-primary process continuum. Lindsley (1960) similarly related levels of arousal to the continuum from selective attention through free associate states to sleeping and dreaming.

With these ideas in mind, Martindale

<sup>4</sup> There may be sex differences in this respect, since significant correlations between creativity and susceptibility hold for women but not always for men (K. Bowers, 1971).



(1971, 1972b) concluded that Kris's (1952) concept of regression in service of the ego can be reformulated in physiological terms. Creative people should possess an above average ability for shifting between states of low arousal associated with primary process and higher states of arousal characterized by secondary process. In addition, the creative person should normally show a lower basal level of arousal, since this would account for the broadening of attention, and higher sensitivity for incidental stimuli that underlie his or her creative ability.

These ideas received marginal support from Martindale's work with electroencephalograms. Although creative subjects, as defined by the RAT, were better able to suppress alpha states through feedback procedures, they were less successful in maintaining alpha over extended trials (Martindale & Armstrong, 1974). The creative subjects could therefore easily block the low-arousal states associated with primary process and thereby shift to secondary process but were less effective in maintaining and controlling those low-arousal states. Contrary to expectations, the creative subjects also exhibited a significantly lower mean alpha index during basal recordings. The authors suggested that perhaps low-arousal levels would appear only when primary process was actually being used during a creative task. In a follow-up study (Martindale & Hines, 1975), there were no significant differences in basal alpha levels between the creative and uncreative groups, but creative subjects, as defined by scores on the Alternate Uses Test, did exhibit higher percentages of alpha across a variety of creativity tasks.

More research is needed to clarify the physiological correlates underlying the creative process. It is possible that different creative processes are associated with different physiological correlates. For example, creative thinking that involves a direct access to primary process may differ physiologically from innovative thinking that involves those operations developed through the permanent integration of primary process styles into secondary process functions. Future research should also consider differences in hemispheric brain function as a basis of primary and secondary process thought, since evidence indicates that

the right hemisphere engages in a verbal, imaginative, and intuitive cognitions, whereas the left hemisphere is more verbal, analytic, and rational (Gazzaniga, 1967; Ornstein, 1972). Covello (Note 1) in fact found a significant correlation between right hemispheric activity and increased use of primary process content in narratives.

If there are real physiological differences between creative and uncreative people, then perhaps creativity is to some extent constitutionally derived. The ability to shift between different states of physiological arousal or to use hemispheric asymmetry in brain activity may be the special, perhaps psychoanalytically unanalyzable talent to which Freud referred.

### *Personality Variables Related to Creativity*

It is often useful to draw a distinction between the creative *process* and the creative *personality*. The interactions of primary and secondary process during the creative act can be distinguished from the motivational structures that underlie an individual's creative aspirations and his or her choice of a particular creative modality (Bush, 1969). Although this article emphasizes the creative process, there have been numerous studies of the personality factors associated with creative talent, as in Roe's (1952, 1963) extensive analysis of scientific creativity.

As Schafer (1958) noted, such personality factors can modify the creative process by facilitating or hindering adaptive regression. Interfering factors are usually those associated with the connotative significance of the creative act. For instance, the transcendence of traditional concepts in search of new ideas may imply a defiance of authority. Inspiration itself may also be experienced as passive, feminine receptiveness. Any personal conflict concerning these issues may therefore precipitate a sense of guilt or anxiety that obstructs creative thinking. On the other hand, those factors facilitating the creative process are those enabling the person to successfully access primary process thinking. These factors include flexible rather than rigid defenses, a sense of interpersonal trust that supports the feeling that the creative work produced will be acknowledged rather than rejected, and a

secure sense of identity that enables the person to cope with the illogical and highly affect-charged aspects of primary process thinking.

There is also the related issue concerning psychopathology and creativity. Traditional psychoanalytic principles maintain that creativity is rooted in intrapsychic conflict. Rank (1932, 1958) stated that neurosis itself is a creative process that may lead to artistic productivity. Neoanalytic theory, on the other hand, has maintained that creative talent can be mediated within the conflict-free sphere of ego functions. The debate between these two camps is too complex to review here, but a general point of agreement is that both the psychopathological defense against primary process thinking and the psychopathological surrender to it are detrimental to the creative process. Excessive defenses result in a rigid and conventional reality orientation that lacks creative freedom and spontaneity. However, the surrender to primary process, as in psychosis, results in a highly subjective world ruled by fantasies and impulses that are meaningless to others.

It is possible that psychopathology plays a different role in different types of creativity. If artists do indeed require a direct access to primary process, then their work may make them susceptible to psychopathological experiences. Historical anecdotes supporting this idea are numerous. Artists may in fact derive their creative power from the ability to gain access to unconscious conflicts that they then incorporate into the themes of their work. From his analysis of several artist-patients, Niederland (1973, 1976) concluded that traumatization during early development provided much of the content later integrated into their artistic productions. These traumas were also the origin of their heightened emotional reactivity and increased sensitivity to external and internal stimuli. On the other hand, the scientist, who is typically more concerned with objective problems, need not risk the direct confrontation with the irrational and highly affect-charged primary process. He or she also does not have to rely on unconscious conflicts as a source for creative ideas.

These ideas concerning artistic and scien-

tific creativity are still speculative, but there is a substantial body of empirical research revealing personality characteristics associated with creativity in general. Subjects scoring high on a battery of creativity tests prefer complexity and imbalance, are more impulsive, and are less likely to use suppression as a mechanism for the control of unusual and impulsive thoughts (Barron, 1955). Fitzgerald's (1966) factor analysis of his Experience Inquiry scale also demonstrated that creativity was related to a tolerance for altered states of consciousness and for unusual personal and interpersonal experiences. High-scoring subjects on this scale—those who were therefore more "open to experience"—also exhibited a looseness of repression, as indicated by their scores on the Repression scale of the Minnesota Multiphasic Personality Inventory. They also were more able to shift from more to less regulated cognitive styles on the Word Association and Object Sorting tests.

These findings are analogous to those discussed earlier concerning the higher orality, enhanced hypnotic susceptibility, and greater capacity to cope with cognitive complexity that are evident among creative thinkers. Being openly receptive to unusual ideas and experiences and being able to control the cognitive complexities they impose are the cornerstones of creativity.<sup>5</sup>

#### Summary and Conclusions

Despite the complexities in defining and studying creativity, empirical research has revealed consistent trends that confirm the long-standing theoretical notion that creative thinking is associated with the special use of primary process. The loose and at times illogical and fantastical ideation characteristic of formal primary process undoubtedly contributes to innovative thinking; but research findings have in particular pointed to content

<sup>5</sup> Research pertaining to the repression-sensitization continuum is particularly relevant to these individual differences in cognitive avoidance and openness to experience. From a topographical point of view, this research can also help to clarify the meaning of an "access" to "unconscious" primary process thinking and the anxiety-arousing stimuli that are associated with it.

primary process or, more specifically, to the integrative control of content primary process as a significant indicator of creative talent. This capacity to master the cognitive complexity imposed by subjective states of drive and affect reflects the more general ability to cope with the complexities in thought inherent in any scientific or artistic creative process. This general ability is also associated with the receptive openness to experience—as assessed by measures of orality and hypnotic susceptibility—that enables one to encounter unusual, abstruse stimuli without being shocked or disturbed by them. It is this receptive openness that is apparently crucial to most creative styles.

Despite these commonalities, the role played by primary process may vary from one type of creativity to another. When the development of highly imaginative or unusual ideas is required or when subjective states of drive and affect are to be integrated into a work, as in many forms of artistic and literary creativity, then a direct access to primary process may be necessary. Creative thinking of this type may be described as *regressive* in the same sense as Kris's regression in service of the ego, although there are theoretical problems associated with the use of this term. Other types of creativity may necessitate flexible or loose thinking in solving a complex, objective problem but may not benefit from fantastical or drive-related ideation. These creative styles, as evident in problem solving and perhaps in certain fields of science, may not demand a direct access to primary process but may instead involve the use of cognitive operations derived from the developmental integration of primary process styles into stable secondary process functions. Creative thinking of this type may be described as *nonregressive*.

Recent revisions in the psychoanalytic theory of primary process have expressed the need for distinguishing between these types of creativity, and research findings have occasionally led to similar conclusions. However, empirical research, although at points confirming these ideas, has not generally been relevant to the hypothesis, since little attention has been paid to the type of creativity being studied or how it is operationally de-

fined. For example, creativity, as defined by performance on tests of divergent thinking, is by no means equivalent to the creative talent among a group of artists. Divergent thinking alone may not require any special access to primary process but may instead rely on those cognitive functions developed through the permanent integration of primary process styles into secondary process. This would explain why the amount of primary process expressed on the Rorschach has typically been unrelated to performance on such divergent thinking tests. However, the comparison of a sample of reputable artists with a control group will more likely reveal that the direct access to primary process is a significant correlate of their talent. Trends in research using such sampling procedures have confirmed this relationship. Although sacrifices to other experimental confounds are made using such procedures, the advantage is that a specific form of creative talent is being evaluated. This is to be contrasted with those studies in which creativity is defined by a composite score based on performance on a variety of unrelated creativity tasks. The operational definition is comprehensive, but there is some confusion as to what it actually represents. Future research should first acknowledge the multiplicity of creative processes that exist and focus its attention on the role of primary process in these various types of innovative thinking. This includes an analysis of the influence of primary process in various fields of art and science, on complex problem solving, and on performance on the various objective tests of creativity. The interrelations among these different types of creativity will then be better understood.

Holt's system for scoring primary process manifestations on the Rorschach will probably be the most powerful research tool in such studies. However, additional research concerning this scoring system could enhance its effectiveness in the assessment of creativity. The debate over whether response productivity is an experimental confound to be eliminated or a potentially significant indicator of primary process influence and of creative thinking as well is still unresolved. There is also the often neglected distinction between content and formal primary process manifesta-

tions. Little is really known about how illogical, unrealistic thinking and drive-related ideation are differentially implicated in various forms of creative thinking. The control of content primary process has more consistently correlated with creativity, as defined in various ways, which may be due to the fact that it is a less heterogeneous category than is formal primary process. But from a theoretical standpoint, the reality-oriented control of the loose, illogical thinking of formal primary process should be just as significant a correlate of the creative process.

It is possible that these two subcomponents may be useful in clarifying the proposed distinction between creativity that involves a direct access to primary process and creativity that does not. As evidence suggests, those artistic talents that require the expression of drive and affect may in particular necessitate the tapping of content primary process. The developmental integration of formal primary process styles into the secondary process system may in turn account for the loose thinking required in various scientific fields and in creative problem solving.

Research should not, however, be limited to correlations between creative abilities and primary process manifestations on the Rorschach. Creativity in constructing narratives can be related to the expression and control of primary process within the narratives themselves, as in Pine's (1959) study of responses to the TAT. The analysis of musical compositions may be particularly useful in evaluating the creative influence of formal primary process (Friedman, 1960; Noy, 1966). Using a rating system developed by Auld, Goldenberg, and Weis (1968), Domino (1976) also found that primary process manifestations in dreams could significantly differentiate creative and uncreative individuals. Similar procedures could be applied to daydreams, using the various experimental techniques recently developed in this field of research (see Singer & Antrobus, 1972). Most important, research suggests that primary process may be implicated in various cognitive-perceptual tasks that are less oriented toward the use of language than other more traditional tasks that are used in assessing primary process. Performance on these cogni-

tive-perceptual tasks—including the Object Sorting test (Wild, 1965), the Stroop Color-Word Interference Test (Gamble & Kellner, 1968), and autokinetic perception (Ewing, Gillis, Ebert, & Mathews, 1975)—are also correlated with scores on various measures of creativity.

Finally, there is the issue of whether creativity should be conceptualized in terms of a trait model of personality. Most research, including many psychoanalytically oriented studies, has implicitly assumed the existence of a stable personality characteristic known as "creativity." A more accurate assumption is that creative thinking is, for some people, a stable characteristic across situations but that for others creativity is a sporadic or situation-specific phenomenon. The varying and often low correlations among various measures of creativity (Barron, 1955; Pine, 1959, 1962; Pine & Holt, 1960) also suggest the existence of various types of innovative thinking rather than a single, all-encompassing trait for being creative. Although there are those geniuses who excel in many endeavors, creativity for most people is expressed in a specific talent.

Trait orientations in general tend to neglect the influence of situational factors (Endler & Magnusson, 1976). In creativity research, this often leads to an underestimation of how the specific mental set for being creative may be stimulus bound to a specific situation (Bellak, 1958, 1967). However, the psychoanalytic theory of cognition itself implies the influence of environmental factors in defining creativity. The integrative control of primary process is assessed by the degree to which aggressive, libidinal, and highly illogical ideations are shaped into a form that is communicable and acceptable to others. Creative talent therefore requires the ability to recognize what can be creative, given a particular technical, social, or cultural context; one must be able to work innovatively with the necessary restraints imposed by external rules and standards. Creativity is not some mysterious, invariable trait but a cognitive function shaped both by the immediate environment and by the larger cultural and historical context in which the individual lives.



## Reference Note

1. Covello, E. Creativity, hemispheric asymmetry and primary process content in narratives. Paper presented at the meeting of the American Psychological Association, Toronto, Ontario, Canada, August 1978.

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